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# SME FP6 Project Catalogue

A Collection of Co-operative and Collective Research Projects

PROJECT SYNOPSES

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EUROPEAN COMMISSION

# **SME FP6 Project Catalogue**

**A Collection of Co-operative and Collective Research Projects**



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# Horizontal research activities

## Specific measures for SMEs

6

The Sixth Framework Programme (FP6) which ran from 2002 to 2006, offered innovative small to medium-sized enterprises (SMEs) with good research ideas but no research facilities the possibility to outsource their research to research performers via two specific schemes devoted exclusively to the needs of SMEs: Co-operative Research and Collective Research. This catalogue contains all 473 projects funded under both schemes.

### What is a Co-operative Research project?

A Co-operative Research project supports SMEs that can innovate but which have no research facilities of their own. It brings together these smaller players from different countries with a specific research objective or need and then assigns a large part of the work required to research and development (R&D) performers. R&D performers could be universities, research centres or technological institutes. They do not control the results they produce; the ownership and intellectual property rights of the research remains exclusively with the SMEs which contract out the work. FP6 placed a strong emphasis on this kind of SME support and set aside about EUR 320 million to finance Co-operative Research activities. Typical Co-operative projects last from 1 to 2 years and cost between EUR 0.5 and EUR 2 million each.

Two kinds of activities are eligible for FP6 funding. One involves research and innovation-related work on any science and technology topic intended to improve or develop new products, processes and services. The range of research topics is needs driven. The other activities that are supported concern consortium management. This covers all the coordination costs related to a project: managerial, contractual, legal, financial and administrative.

Consortia of SMEs in a Co-operative Research project must meet certain conditions. Their consortium must include at least two research performers and at least three independent SMEs established in two EU Member States (or countries associated with FP6).

### What is a Collective Research project?

FP6's second SME-specific scheme was Collective Research with an FP6 budget of about EUR 150 million. This also involved assigning research to R&D performers. However, in this case, the benefits to SMEs are more indirect and the participants involved in a Collective Research project are different. The R&D performers carry out work for industrial associations and groupings in order to improve the overall competitiveness of large communities of SMEs and SME-intensive sectors.

These projects are larger and run for longer periods than Co-operative Research projects. Collective Research projects run from 2 to 3 years and cost between EUR 2 million and EUR 5 million each.

As Europe-wide initiatives, these projects aim to:

- reinforce the technological basis of sectors;
- develop technological tools such as diagnostic methods and safety equipment;
- find solutions to common challenges, such as fulfilling environmental performance criteria, meeting regulatory requirements, and achieving workplace safety standards;
- carry out pre-normative research to help set European norms and standards.

Collective Research activities cover research and innovation-related work, consortium-management tasks and training activities — particularly the training of SME managers and technical staff regarding the new knowledge generated by the project.

Do SMEs influence the kind of research conducted by the R&D performers? Yes. Each Collective Research project includes a 'core group' of SMEs which participate in all aspects of the project, from its definition of the research programme to the



dissemination of final results. While the project's intellectual property rights belong exclusively to the 'contracting' industrial association or grouping (IAG), the core SMEs and the R&D performers are able to exploit the results.

### **SME Definition**

In order for an SME to participate in the Co-operative and Collective Research schemes, it must conform to the SME definition found at [http://ec.europa.eu/research/sme-techweb/pdf/sme-definition\\_en.pdf](http://ec.europa.eu/research/sme-techweb/pdf/sme-definition_en.pdf). However, research centres, research institutes, contract research organisations or consultancy firms are not considered eligible SMEs for the purpose of these schemes. Other enterprises and end-users may participate in the project but must contribute their own costs and must not play a dominant role in the project. They must also be independent from any of the other participants.







# FP6 Project Catalogue

Agri-Food & Aquaculture

# ALFA

## Development of an Automated Innovative System for the Continuous Live Feed Production in Aquaculture Hatchery Units

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Co-operative research

Live food production in intensive marine fish hatcheries comprises repetitive manual tasks that could be performed by specialised automated equipment. Intensive use of manpower for repetitive work may result in frequent human errors, delays in specific production phases, and poor efficiency of the unit. Such problems may affect the productivity of the hatchery with respect to both the quantity and quality of live feed and fry.

The proposed project aims at developing an innovative fully automated system for the continuous production of phytoplankton (algae) as live feed in aquaculture hatcheries. This system will guarantee optimal microclimatic and nutritional conditions for the stable growth of algae by using both natural and artificial illumination and controlling the temperature, the nutrient content, the pH and the CO<sub>2</sub> concentration of the water. Locally adapted cultures of live feed and local climatic conditions will be taken into account for designing such a system. For this reason, three different designs will be developed, for cold, temperate and tropic waters respectively.

A novel optical test based on colour-image analysis techniques will be used online for continuously assessing the growth rate and the quality of the culture. Since the algae production is partially used for feeding rotifers, a secondary objective of the proposed project is to link the new continuous algae production system to the existing rotifer production systems. Another main objective of the proposed project is to develop an automatic harvesting, transferring and packaging system for efficiently managing the continuous algae production. In this way, the production will be automatically harvested and transferred to other components of the hatchery according to demand, while surpluses will be stored. A concentration and storage unit will be developed for short- to medium-term storage of the live algae. This will allow excess production to be temporarily stored at the hatchery.

- 1 AKVAPLAN-NIVA AS (NO)
- 2 ARGOSARONIKOS FISH FARMS S.A. (GR)
- 3 VIVEIRO VILA NOVA S.A. (PT)
- 4 SAGRO AQUACULTURE LTD (CY)
- 5 HESY (NL)
- 6 SAGAFJORD AS (NO)
- 7 AGRICULTURAL UNIVERSITY OF ATHENS (GR)
- 8 RESEARCH ACADEMIC COMPUTER TECHNOLOGY INSTITUTE (GR)
- 9 UNIVERSITETET I BERGEN (NO)

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# ALGADEC

## Development of an rRNA-Biosensor for the Detection of Toxic Algae

Toxin-producing microalgae have been responsible for great environmental, economic and public health catastrophes throughout history. These harmful algal blooms (HABS) are known to cause a wide range of detrimental effects, such as cutaneous damage in swimmers, nervous and digestive disturbances through contaminated seafood — which can even lead to death, physical impairment of fish and shellfish, and degradation of habitats. Moreover, these direct effects of toxic algae have important economic impacts in tourism, fishing and fish farming, for instance. In the last decades the problem has become more and more critical, because alteration of ecological systems as a consequence of human activity seems to enhance proliferation of toxin-producing algae. A concentration of only a few cells per litre of some microalgae may produce harmful toxic effects.

Therefore, developing and commercialising an adequate device to spot such organisms would be of great use in order to avoid, for instance, their appearance in fish farms. The specific recognition of a poisonous strain, however, is complicated. A distinction at molecular level is necessary in order to discriminate between harmful and inoffensive strains, which in some cases are morphologically identical.

ALGADEC aims at developing a biological sensor capable of rapidly and specifically detecting the presence of harmful algal blooms. The *in situ* specific recognition of algae's ribosomal RNA will be possible by means of a Sandwich Hybridisation on an electrochemical sensor. A multi-probe chip will be designed to obtain tailor-made sensors containing the most relevant species for a determined area. In order to achieve an adequate device for field applications, a fluidic cell and a warming chamber, as well as the corresponding control software will be developed to automate and optimise the hybridisation process.

Thanks to the characteristics described above, the device will constitute an adequate device for HABS monitoring. In addition, all developments will be performed aiming at the achievement of a cost-

effective device in order to enable fish- and shellfish-farmers to check the toxic algal levels of their waters and thus take the corresponding measures to prevent economic losses and to ensure product safety.

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Co-operative research

- 1 ISITEC GMBH (DE)
- 2 NORTH BAY SHELLFISH LTD (UK)
- 3 SKAGERRAK SKJELL AS (NO)
- 4 JUAN JOSE MARTIN RODRIGUEZ (ES)
- 5 EXIQON A/S (DK)
- 6 CYTOBUOY BV (NL)
- 7 PALM INSTRUMENTS BV (NL)
- 8 BCS BIO- UND CHEMOSENSOREN GMBH (DE)
- 9 HAVFORSKNINGSINSTITUTTET (NO)
- 10 UNIVERSITY OF WESTMINSTER (UK)
- 11 INSTITUTO ESPANOL DE OCEANOGRAFIA (ES)
- 12 STIFTUNG ALFRED-WEGENER-INSTITUT FUER POLAR- UND MEERESFORSCHUNG (DE)

**Contract:** 508435  
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**Duration (months):** 29  
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# AquaDeGas

Development of a Cost-Effective, Reliable, Robust, Flexible and Efficient Degassing and Aeration Method for Intensive Aquaculture

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Co-operative research

Land-based fish farming is the critical success factor in intensive aquaculture since land-based fish farms are the start of a very complicated value chain, representing a prerequisite to having competitive sea farms, as well as being an important “tool” needed in order to develop and commercialise fish farming of new species.

The aquaculture tank represents a production unit with the primary objective of creating a managed volume where the fish in the spawn and growth phase can be fed in optimal water-quality for cost-efficient production of fish. Water quality is one of the most critical factors in aquaculture. Optimum water-quality is essential for survival rate, as well as for the growth rate of fish in the different phases of the lifecycle, and hence for the productivity per cubic metre of effective tank-volume. The fish in the production units consume oxygen from the water. In addition there is a considerable discharge of food spill, faeces and gases in water, all of which represent harmful effects on the biomass. With increasing reuse and recirculation of water, degassing of water becomes a prerequisite.

The project idea is to develop a cost-effective, reliable, robust, flexible, compact and efficient degassing method, which meets the needs of the aquaculture sector for removing oversaturated harmful gases, i.e. carbon dioxide, nitrogen and argon, through development and application of ejector and nozzle techniques for formation of micro-bubbles for effective gas exchange in water integrated with sensor-and-control technology.

The European aquaculture sector has increased substantially over the past decades. However, overall production growth in Europe over the period spanning 1994 to 2003 was 5.5 % less than the global trend over the same period. The overall price trend was negative (-0.5 % APR) vs. positive global development and this sector has experienced increasing competition from non-EU countries, making it imperative to increase research and development in the sector.

www.aquadegas.com

- 1 ARTEC AQUA AS (NO)
- 2 OXYMAT A/S (DK)
- 3 POLLUTION CONTROL SYSTEMS LTD (IE)
- 4 TRANSVAC LTD (UK)
- 5 ASWEGA LTD (EE)
- 6 BLUEWATER FLATFISH FARMS LTD (UK)
- 7 SELONDA AQUACULTURE S.A. (GR)
- 8 MAINSTREAM AS (NO)
- 9 TEKNOLOGISK INSTITUTT AS (NO)
- 10 PERA INNOVATION LTD (UK)
- 11 UNIVERSITY OF WALES SWANSEA (UK)



FP6 Project Catalogue

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# BACTOFRUCT

## Development of Biological Pesticide against Fire Blight

Fire blight is a very contagious fruit (apple and pear) cultivation disease causing yearly damage in the European Community of approximately EUR 300 million. The bacterium *Erwinia amylovora* causes fire blight. To date, no effective means to control and fight fire blight has been available. The pesticides currently being used consist of environmentally harmful (bio-) chemicals like Streptomycin. Streptomycin is also used as an antibiotic against lung tuberculosis for humans. The European Community is expected to ban the use of Streptomycin against fire blight because of the risk of the occurrence of immunity.

Small to medium-sized enterprise (SME) companies ECOstyle (the Netherlands), Dr Schaette (Germany) and Newbiotechnic (Spain) have teamed up for a project with the objective of developing a sustainable biological pesticide against fire blight. A pre-screening by the University of Konstanz, one of the research and technological development (RTD) performers, has shown that the bacterium species *Bacillus subtilis* has the antagonistic potential to be used effectively against fire blight. An extensive collection of *Bacillus subtilis* and related non-pathogenic *Bacillus* species is available for the project.

The project consists of nine work packages. Throughout the project, the SMEs will be involved in innovation-related activities making up Work Package 1.

The RTD work packages start with laboratory research to screen and characterise *Bacillus subtilis* strains. Selected strains will be screened on fire blight inoculated blossoms. The growth of the selected strains will be microbiologically analysed and appropriate media recipes for production will be deduced. Selected strains will be fermented, analysed and evaluated. First, *Bacillus subtilis* spores from different isolates will be produced. In a first round of field research and laboratory testing, the selected *Bacillus subtilis* spores will be tested for activity and efficacy against fire blight. Following this, the SMEs will evaluate the progress of the project to date.

After the evaluation, the fermentations will be scaled up. Testing of appropriate upgraded processes for the bacterial cultures to mark out and separate spores and cells will follow. In addition, various testing activities to formulate and define spores to create a "final product" will be carried out. A second round of field testing will take place to gather data on the efficacy and dosage of *Bacillus subtilis*. These activities will result in a *Bacillus subtilis* strain (or strains) proven to be effective against fire blight. Final evaluation and reporting to the European Commission will end the CRAFT project.

The SME companies expect to enter the market with the newly developed product in 2007. Sales revenues for SMEs in the period 2007 to 2010 are estimated at EUR 8 500 000.

- 1 ECOSTYLE B.V. (NL)
- 2 NEWBIOTECHNIC S.A. (ES)
- 3 DR SCHAETTE AG (DE)
- 4 FZB BIOTECHNIK GMBH (DE)
- 5 UNIVERSITÄT KONSTANZ (DE)
- 6 PRAKTIJKONDERZOEK PLANT & OMGEVING B. V. (NL)
- 7 KONINKLIJK OPZOEKINGSSTATION VAN GORSEM (BE)
- 8 UNIVERSITY OF DEBRECEN (HU)

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Agri-Food & Aquaculture

## Ensuring the Quality of Innovative Crop Growth Inputs Derived from Biological Raw Materials (Biological Food for Plants)

The global objective of the project is to increase the quality, reliability, safety, and end-user acceptance of environmentally benign crop-growth inputs (Biological Food for Plants or BFPs) for intensive horticulture, thus contributing to the common agricultural reform policy that promotes quality products and sustainable agriculture. BFPs are innovative soil or plant amendments derived from biological resources that contain one or more biologically active compounds that reinforce crop vigour. BFPs reduce the need to employ mineral fertilisers, and also improve crop health, plant disease resistance, and soil micro-life, thus decreasing the dependency on chemical crop-protection agents.

Among organic and conventional crop producers, an urgent need exists to access environmentally benign, safe, and effective inputs, and consumers also increasingly demand "green" agricultural products with guaranteed quality and safety, and good traceability.

The project initiates integrated actions to meet the needs mentioned above and provide the required guarantees. First, the manufacturing processes of BFPs (such as leather hydrolysis, natural extraction of seaweed and herbs, and chemical extraction of pine needles) are evaluated, and for each process, production methods, procedures and variables are reviewed to establish possible relationships between processing steps and end-product quality characteristics. These activities potentially lead to a systematic reduction of waste, increased processing efficiencies, and safer and more homogenous BFP products of controlled consistency, as such contributing to one of the objectives of the EC, i.e. product transparency and traceability. Second, scientific research is carried out on BFP products for their exact chemical and biological composition (including pathogens and heavy metal content) and their effect on plant growth, plant health, and soil micro-life. Also, a scientific assessment is made of the impact of BFPs on soil and groundwater. Furthermore, scientific research is carried out on the quality of the vegetables and fruits produced with

and without BFPs. Possible pathogen loads and chemical contaminants are measured, as well as positive quality indicators such as storability, vitamin content, firmness, etc.

For the small to medium-sized enterprises (SMEs) in this project, the scientific results thus obtained are essential for obtaining legislative permission to export their BFP products to other European countries.

At present, no proper pan-European regulation (similar to the EC label) exists for BFPs or for comparable products, which seriously hinders international trade. By demonstrating that BFPs are indeed effective, safe, and environmentally benign, regulatory recognition of BFPs and thus their international marketing becomes realisable. For increased end-user acceptance, the practical end-use value of BFPs is tested in the project under contrasting production situations, with important temperate and Mediterranean vegetables and fruits as reference crops.

All information with either practical or scientific value will be transferred to the public during the lifetime of the project through open days, demonstration days, press releases, etc. Research methods will be documented, and if possible, published for future use, e.g. in efforts to obtain consistent regulations on BFPs throughout the EU.

- 1 INSTITUTE OF POMOLOGY AND FLORICULTURE (PL)
- 2 UNIVERSITAT MIGUEL HERNÁNDEZ (ES)
- 3 UNIVERSITÄT KASSEL (DE)
- 4 ISTITUTO SPERIMENTALE PER LA NUTRIZIONE DELLE PIANTE (IT)
- 5 GOSPODARSTWO ROLNO-OGRODNICZE SĄPOL (PL)
- 6 INDUSTRIA LAVORAZIONE SOTTOPRODOTTI ANIMALI (IT)
- 7 CERESCO SOCIEDAD COOPERATIVA LIMIDA (ES)
- 8 SZKÓŁKA MARKIEWICZ AGNIESZKA MARKIEWICZ-JANUSZEWSKA (PL)
- 9 JOINT STOCK COMPANY "BIOLAT" (LV)
- 10 AGROBIO PRODUCTS B.V. (NL)

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# BIOFERM

## Advanced Manufacture of Industrial Bio-Products by Activated Fermentation Process

Specific biochemical reactions and their economical operations are the main advantages of bioreactors. They are widely applied in the industrial sector, in areas such as in the food and pharmaceutical industries, in biotechnology and in municipal wastewater treatment plants. The biotechnological fermentation industry in Europe is faced with enormous legal restrictions, such as the genetic law, the embryonic protection law, and so on. The fermentation industry lacks possibility for expansion due to the fact that new installations require new locations with the associated high investment costs. There is a substantial need for a compact and cost-efficient biological fermentation system.

The intensive scientific efforts of the last 20 years in the genetic optimisation of microorganisms and in classical bio-processes led to a drastic increase in the application of biotechnology in central Europe, and to a substantial need for compact and cost-effective biological fermentation systems.

The existing experience with the direct intake of ultrasound into small-scale bioreactors would be transferred into a bypass ultrasound reactor technology. This new process omits the ultrasound-system installed in the bioreactor. This important step would lead to the possibility to use already existing bioreactors in fermentation companies such as the food processing and biotechnology industries. With this type of reactor, a direct scale-up is quite possible. Otherwise, the integration of the ultrasound in already existing fermentation reactors would lead to high investment and energy costs.

Ultrasound systems will be coupled with the biotechnology fermentation process to prove the already achieved results from ultrasound-activated food processing.

- 1 VEREINS ZUR FOERDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. - UMWELTINSTITUT (DE)
- 2 CLAUSTHALER UMWELTECHNIK-INSTITUT GMBH (DE)
- 3 CESKE VYSOKE UCENI TECHNICKE V PRAZE (CZ)
- 4 MELONI VINI SRL (IT)
- 5 AIR-IX OY (FI)
- 6 POMILTEK INTERNATIONAL LTD OY (FI)
- 7 COMMON-LINK AG (DE)
- 8 BANDELIN ELECTRONIC GMBH & CO.KG (DE)

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# BioProFibre

## Development of Cholesterol-Lowering Foods through Bioactive Proteins and Fibres

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Co-operative research

BioProFibre will develop a range of cholesterol-lowering foods and demonstrate their effect on humans in a clinical study. This will allow small to medium-sized enterprises (SMEs) to participate in the attractive functional food market, giving them improved competitiveness.

The new products have the potential to generate EUR 12 million extra annual turnover and additional employment for the SMEs involved. Society will also benefit because consumers will have access to a wider variety of tasty cholesterol-lowering foods.

SMEs represent more than 99 % of all companies and more than 60 % of total turnover in the food sector. But they are under severe pressure from large companies which have bigger and more efficient plants and superior marketing organisations. Hence, SMEs must move into markets with higher margins and growth rates. The functional food market offers both these benefits. However, the cost necessary to demonstrate the health benefits of such foods is unaffordable for SMEs.

Nine food manufacturing SMEs will develop cholesterol-lowering foods, in conjunction with two food ingredient companies and two research and technological development (RTD) performers. The latter possess the expertise necessary to convert plant-based ingredients into foods and to demonstrate the hypocholesterolemic activity via *in vitro* tests, animal studies and clinical studies on humans. As an innovative approach, BioProFibre will demonstrate the bioactivity of the ingredients and their stability during processing, plus potential synergies from different protein and fibre ingredients. This will significantly reduce the effort required to generate data that demonstrate the health benefits of these foods and will also increase opportunities for making new cholesterol-lowering foods.

In contrast to current cholesterol-lowering foods which contain minute amounts of phytosterols or stanol esters added to regular products, BioProFibre will develop new natural foods using

bioactive ingredients that also texturise and stabilise the foods, and so can partly or completely replace original ingredients.

- 1 FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 2 VITAM HEFE-PRODUKT GMBH (DE)
- 3 SHANNON MINERALS LTD (IE)
- 4 NATURE ET ALIMENTS S.A. (FR)
- 5 JOSEF RECHEIS EIERTEIGWAREN UND WALZMUEHLE GMBH (AT)
- 6 VALFLEURI S.A. (FR)
- 7 LABORATORIOS ALMOND S.L. (ES)
- 8 PATERSON ARRAN LTD (UK)
- 9 CORMA VLEESWAREN N.V. (BE)
- 10 HAMBOERKE N.V. (BE)
- 11 CREANUTRITION AG (CH)
- 12 HERBSTREITH & FOX KG (DE)
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EC Contribution: € 1 240 400



# BLUE SEED

## Technology Development for a Reliable Supply of High-Quality Seed in Blue Mussel

The objectives are to secure a reliable supply of blue-mussel seed and to develop techniques allowing farmers to market blue mussels year-round. A problem blue-mussel producers face is the unpredictability of the seed supply. Seed is mostly harvested from suspended substrates or mussel beds. The amounts of wild seed available are extremely variable from year to year. A reliable supply of seed from hatchery sources will allow mussel farmers to overcome this. A second problem is that recently spawned mussels cannot be sold due to insufficient meat content. Producers will benefit greatly from a hatchery-based technique, such as triploid induction, that produces non-maturing mussels that can be marketed year-round.

Mussel farmers and sellers, a network for training and technology transfer, universities and research institutes will collaborate in five work packages. Internal project management will be taken care of in Work Package 1. Work Package 2 will give attention to broodstock conditioning and larval rearing. Work Package 3 will deal with production of triploid larvae and tetraploid broodstock. Work Package 4 will concentrate on spat settlement and on rearing of diploid and triploid spat to seed size. Work Package 5 will compare the allowed costs of hatchery-produced seed with conventional wild-caught seed. In addition, knowledge transfer between research and technological development (RTD) performers and small to medium-sized enterprises (SMEs), and the dissemination and three-year production cycle for blue mussel in Europe, the focus of the project will be on spat and seed production. The project outcomes will include a exploitation of results outside the consortium will be ensured. Considering the normal two- to reliable method to produce triploid seed, allowing year-round production of high quality mussels, protocols for spat and seed production, and an analysis of the economic feasibility of the new techniques developed. Project results will be communicated within the consortium and to end-users, through workshops, meetings with producer associations and a website.

- 1 WAGENINGEN UR (NL)
- 2 GRAINOCEAN (FR)
- 3 VISKWEKERIJ NEELTJE JANS B.V. (NL)
- 4 DEEPDOCK LTD (UK)
- 5 ORGANIZACIÓN DE PRODUCTORES MEJILLONEROS DE GALICIA OPP N° 18 (ES)
- 6 AQUATT UETP LTD (IE)
- 7 ROEM VAN YERSEKE B.V. (NL)
- 8 INSTITUT FRANÇAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER (FR)
- 9 UNIVERSITY OF WALES, BANGOR (UK)
- 10 CENTRO DE INVESTIGACIONES MARINAS (ES)

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Agri-Food & Aquaculture

# BRETT MONITORING

## Development of Diagnosis Tools for Brettanomyces Monitoring in Wineries

18

Co-operative research

Yeasts belonging to the genus *Brettanomyces* are responsible for some serious spoilage problems in the wine making industry. Because of its high spoilage potential, there is a demand for a simple, fast and reproducible monitoring method. The earlier the detection in the wine, the better the chances for winegrowers to prevent further growth and spread to other wine batches.

The project will increase the knowledge on *Brettanomyces* and on the mechanism for off-flavour production. A set of complete tools for monitoring will be developed. The project has three main research components: (1) development of new selective media; (2) improvement of molecular techniques based on PCR for detection in laboratories; (3) development of a new diagnostic test kit based on immunoassay probes (ELISA) for easy detection in wineries. The objectives of the project will be reached through the implementation of seven logical phases. During the first Work Package (WP1), experimentation will be implemented in order to obtain information about *Brettanomyces* and the off-flavour production.

One major objective of this WP will be to determine if the off-flavour production depends on the species, possibly on the strains of *Brettanomyces*. During the second Work Package (WP2), research on the selective media will be developed. The third work package (WP3) will involve improving measurement using PCR probes. Research on the immunoassay probes will be performed in Work Package four (WP4). Monoclonal antibodies will be produced for species identified in WP1. The detection kit will also be developed during this WP.

The three different detection techniques will be tested in Work Package 5 (WP5). The two other work packages concern the dissemination of the project results, the definition of the marketing strategy (WP6) and the management of the project (WP7).

The project gathers three small to medium-sized enterprises (SMEs), three end-users and four research and technological development (RTD) performers from France, Germany and Spain.

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- 2 DR MOLLER UND SCHMELZ GMBH (DE)
- 3 BIONOSTRA (ES)
- 4 CENTRE TECHNIQUE INTERPROFESSIONNEL DE LA VIGNE ET DU VIN (FR)
- 5 CHAMBRE D'AGRICULTURE DE LA GIRONDE (FR)
- 6 PRODUCTOS AGROVIN SA (ES)
- 7 UNIVERSITE VICTOR SEGALEN - BORDEAUX II (FR)
- 8 UNIVERSITE DE MONTPELLIER I - CENTRE DE RECHERCHE ET DE FORMATION EN OENOLOGIE (FR)
- 9 DSMZ-DEUTSCHE SAMMLUNG VON MIKROORGANISMEN UND ZELLKULTUREN GMBH (DE)
- 10 CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS (ES)



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# BUGCHECK

## A Rapid Hand-Held Analyser for Control of Microorganisms in the Complete Meat Supply Chain

Foodborne pathogens in processed ready-to-eat products pose a serious threat to consumers with compromised immune systems. Sensitive, specific and rapid detection of such pathogens is thus essential at production level, to prevent their entrance into the human food-chain. Conventional microbiological detection methods simply take too long (2-7 days) to detect and identify pathogens in food, and no real-time data is available. Other traditional testing methods, such as ELISA, are also relatively costly and time-consuming. Traditional methods require the taking of a product sample, its posterior culturing until sufficient microorganisms have been generated to enable ready detection on culture plates. While a number of methods such as PCR may provide faster detection (6-12 hours), they involve complex procedures and highly specialised trained personnel.

In today's modern food-supply chain, products enter and leave the market within two to three days. Slow traditional analytical methods are clearly unsatisfactory as they enable contaminated meat products to reach the market, resulting in human disease and even death. Moreover, most analyses need to be carried out in large analytical laboratories as the required instrumentation is expensive and requires highly qualified staff. Only very large farms and slaughterhouses can thus afford to perform regular, on-site, microbiological checks.

There is a clear need for a rapid, handheld, easy-to-use and cost-effective microbiological analyser which is tailored and well suited to the needs of the meat industry to enable its use on the processing floor, thus allowing rapid process-control testing. A biosensor based approach presents a promising and sensitive alternative tool for the detection of low numbers of cells in a question of minutes (with no need for enrichment steps) as opposed to days. Electrochemical methods would also enable the application of more user-friendly and cheaper instrumentation.

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- 2 BIO SENSOR TECHNOLOGIE GMBH (DE)
- 3 BVT TECHNOLOGIES A.S. (CZ)
- 4 APPLIED RESEARCH USING OMIC SCIENCES, S.L (ES)
- 5 INVESTIGACIONES BIOQUÍMICAS S.L (ES)
- 6 ATLANGENE APPLICATIONS S.A.S (FR)
- 7 RICHARD WOODALL LTD (UK)
- 8 JCB ELECTROMECÁNICA S.L (ES)
- 9 SELECCION BATALLE S.A (ES)
- 10 CARTON GROUP LTD (IE)
- 11 CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS - CENTRO NACIONAL DE MICROELECTRÓNICA (ES)
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# BULK SUBSTRATES

## Development of an Energy-Efficient Bulk Sterilisation Technique for the Production of Mycelium

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Co-operative research

Europe is experiencing a rapidly growing demand for food-related mycelium products, such as mushrooms, fermented food products, mycelium for bio-control and inoculum for composting.

Mushrooms have the largest share in this sector, particularly the “specialty” mushrooms rapidly gaining importance. EU production of the latter was 44 million t in 2002, worth EUR 160 million. Due to their novelty, figures are not yet available for other mycelium products. The raw materials used in such solid state fermentations (SSF) are infection-sensitive agricultural wastes. Unsafe hygienisation and inoculation lead to variable yield and quality. The regular supply of a standardised mycelium product will lead to a stable market, and thus to a stable income for the producers.

This proposal is directed by 10 small to medium-sized enterprises (SMEs) from 6 EU and 2 affiliated countries. They are mycelium producers with restricted research budgets and a clear common need: the development of a bulk production system for the safe, cost-effective and energy-friendly production of axenic mycelium. It will include sterilisation of raw materials, followed by aseptic cooling and inoculation, and portioning under strictly hygienic conditions.

The proposal includes coordination and five research WPs. Each WP highlights an aspect that is crucial in the process. Sterile handling has top priority. Furthermore, there will be a focus on energy saving and labour friendliness. In WP 2, all substrate components will be inventoried and checked for relevant properties. WP 3 will deliver an appropriate inoculating system, while in WP 4 we will choose a safe system to fill pre-sterilised bags with the cooled and inoculated substrate. WP 5 will result in a multifunctional prototype, provided with appendages, for example, air removal, steam injection and cleaning in place, and sensors for temperature and pressure control. In WP6, semi-industrial production trials will evaluate the uniformity, production rate and quality of the final product.

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- 2 WAM SPA (IT)
- 3 SACOZ NV (BE)
- 4 AGRIFUTUR SRL (IT)
- 5 DINGEMANS MOUT NV (BE)
- 6 TEKOA MUSHROOM FARM LTD (IL)
- 7 MYO AS (NO)
- 8 FUNGI 2000 THE MUSHROOMMAKERS (NL)
- 9 FOREST MUSHROOMS (IE)
- 10 CARLOS DÍAZ TARRAGO (ES)
- 11 PILZGARTEN GMBH (DE)
- 12 MYCELIA BVBA (BE)

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# CODLIGHT-TECH

## Light Technology for Photoperiod Regulation in Cod Mariculture

Cod held in intensive culture mature within two years from hatching, lose somatic growth rate, their condition worsens, their flesh composition deteriorates and they lose at least 25 % of their wet weight. A delay or cessation of maturation during on-growing is therefore crucial for profitable farming. Seasonally-changing day length (photoperiod) is the natural time-keeping mechanism used by finfish from temperate latitudes to entrain a number of important physiological processes, including sexual maturation and overlaying of artificial illumination on the natural day-night cycle in day length masks this seasonally changing signal.

Such techniques have been shown to successfully regulate maturation in a number of tank-based studies in Atlantic cod, in which a complete cessation of maturation and up to a subsequent 60 % improvement in growth have been observed. When such test photoperiods are applied at a commercial scale in open floating-cage systems, it is believed that ambient light can have a major regulatory influence, and as such, the results reported have not been consistently reproducible.

The research focuses on the development of a new lighting technology based on cold cathode light tubes, and then on the appropriate lighting protocols for the system's application in cod mariculture. This project intends to test and demonstrate the efficacy of this technology with an improved light-intensity output of 240 % compared to the first generation systems, and more importantly a production price estimated to be in the region of only 10 % to 15 % of a Light Emitting Diode (LED) setup (this is the only possible comparable technology).

This new technology will thus be tested in a range of commercial cod-farms, reflecting the diverse nature (latitude and systems) of the EU cod-farming industry. A simple analytical maturation detection kit will be developed, allowing real-time detection of sexual maturation activity on farm. Also, a comparison of standard manual assessment (length-weight) and the use of passive measuring system

for growth assessment and the development of a basic standardised flesh-quality scheme in relation to lighting regimes. As a whole, this proposal represents a number of key fundamental developments.

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- 4 INTRAVISION GROUP AS (NO)
- 5 HRADFRYSTIHUSID-GUNNVOR LTD (IS)
- 6 JOHNSON SEAFARMS LTD (UK)
- 7 VAKI - DNG HF (IS)
- 8 FJORD MARINE COD AS (NO)
- 9 SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES (SE)
- 10 ALFSFELL HF (IS)

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# COMPETUS

## Genetic Improvement of Farmed Sea Bass, *Dicentrarchus Labrax*: Strain Testing and Response to Selection

22

Co-operative research

Over several years, overproduction of sea bass and seabream in Europe has provoked a severe diminution of the retail price of commercial-size fish, and producers have seen their profit margins decreasing dramatically. In such a depressed and saturated market, optimisation of production processes is no longer sufficient to recover the narrow profit-margin of industrialists.

Genetic selection should give us the opportunity to acquire sustainable competitiveness, with the possibility to supply the market with 'seeds' improved using a simple but economically sensitive criterion: growth rate, which remains one of the main breeding goals of fish farmers. Nevertheless, today, the Mediterranean aquaculture industry is not yet deeply involved in such programmes. It seems that not enough critical information regarding the efficiency of breeding programmes or the necessary means to set them up, has reached the sector decision makers.

The aim of COMPETUS is to fill this gap, by providing to the participating small to medium-sized enterprises (SMEs), this lacking information, namely:

- performance comparison (based on measurement of several traits of commercial interest) of the three geographic and genetically differentiated wild sea-bass populations;
- assessment of and comparison to a control line, of the genetic progress of two first-generation selected sea-bass populations, derived from classical individual selection and optimised individual selection (called PROSPER);
- a detailed description of the studied selection approaches and their associated costs.

At the end of the project, participating SMEs will have the basic information necessary to evaluate the opportunity to implement such programmes in their own facilities, and adequate fish to start with. COMPETUS will also test the PROSPER selection strategy developed for small- to medium-scale

breeding programmes, which was exclusively used in French aquaculture up now. It will be described to fish farmers of other EU members or associated states ensuring wide transnational cooperation.

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- 2 VIVEIRO VILANOVA S.A. (PT)
- 3 ECLOSERIE MARINE DE GRAVELINES (FR)
- 4 LES POISSONS DU SOLEIL (FR)
- 5 ARDAG COOPERATIVE AGRICULTURAL ASSOCIATION (IL)
- 6 TINAMENOR S.A. (ES)
- 7 UNIVERSITY OF UDINE (IT)
- 8 INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE (FR)
- 9 SYNDICAT DES SÉLECTIONNEURS AVICOLES ET AQUICOLES FRANÇAIS (FR)
- 10 ISTITUTO SPERIMENTALE ITALIANO "LAZZARO SPALLANZANI" (IT)
- 11 AKDENİZ SU ÜRÜNLERİ ARAŞTIRMA, ÜRETİM VE EĞİTİM ENSTİTÜSÜ MÜDÜRLÜĞÜ (TR)
- 12 ISRAEL OCEANOGRAPHIC AND LIMNOLOGICAL RESEARCH LTD (IL)

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# DRY CONTROL

## Control Strategies in Rotary Dryers Dealing with Vegetal Products

The present project is proposed with the fundamental objective of obtaining desiccated high-quality forage and vegetable products (percentage of humidity content, protein and ash) based on an efficient process system, capable of applying only the specific amount of heat necessary at each moment, to achieve a uniform final product within an established range of quality. The project also intends to achieve the following specific objectives:

- develop an automated industrial process capable of rapidly adapting to the specific characteristics of the forage and vegetable products as they enter the process in a continual chain;
- reduce the energy consumption of the drying process by up to 20 %;
- obtain reliable measurements of the principal variables (humidity and protein) throughout the whole process;
- obtain perfectly controllable quality with reference to percentage protein and humidity content.

Dehydration of vegetable products can be very complex given great variations in humidity content. The resulting excessive desiccation of the product not only means a greater cost from energy used, but also degradation of the products' nutritional content, as well as weight loss, which is seen in the final price of the product, and in a reduction in small to medium-sized enterprise (SME) competitiveness.

As such, this project proposes the following operational objectives to achieve the automatic control in the industrial processes of rotary vegetable product driers:

- develop a prototype reliable measurement-sensor for protein and humidity;
- develop a family of process models and algorithms;

- design a real-time controller system to satisfy the problem specifications.

To achieve the results, the work will be split into seven work packages (WPs): six of technical content, one on diffusion and one on management. The technical section has three development phases: Phase I — project specification (WP1); Phase II — sensor development and controller design (WP2, WP3); and Phase III — control prototype development (WP4), integrating the Phase II developments. Finally, WP5 will validate previous work-package results.

The consortium comprises five SMEs from five countries and two research and technological development (RTD) performers from those countries. OLIVER, end user and project coordinator, is an SME specialist in drying forage and other feedstuff products, while UST are German specialists in sensors and control systems. The remaining SMEs are industrial suppliers: DRTS (UK), a specialist company for sensor and real-time control system design and innovation; MAGUIN (France), a drier manufacturer for the sugar and forage industry; and JAVY (the Czech Republic), a company specializing in drying equipment for the agri-food industry. The RTD performers are CETENA (Spain), an industrial RTD centre with experience in modelling, simulation and automation of agri-food processes, and Glamorgan University (UK), highly skilled in real-time IT control systems and sensor developments.

- 1 PRODUCTOS AGROPECUARIOS HERMANOS OLIVER - GRUPO ENHOL AGRO (ES)
- 2 MAGUIN PROMILL SAS (FR)
- 3 DEPENDABLE REAL TIME SYSTEMS LTD (UK)
- 4 UMWELT-SYSTEMTECHNIK GMBH (DE)
- 5 FUNDACION CETENA (ES)
- 6 UNIVERSITY OF GLAMORGAN (UK)

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# E-BREADMAKING

## E-Commerce of Bread-Making Equipment Based on an Expert System, Distributed Agents and Virtual Reality

24

Co-operative research

A recent food industry survey indicated a range of problems within food manufacturing plants. The results highlighted the need for better equipment and process information, as well as better communication between equipment manufacturers and bakery processors. Small to medium-sized enterprise (SME) partners have identified the difficulties inherent in selling equipment when they can only supply a part of the complete solution or when the alternative configurations are enormous.

The industrial objective of this project is the creation of an e-commerce infrastructure that will assist final clients and sales personnel in the configuration of customised bread-making installations. The economic objective of the project will be to provide a tool that will assist in the uptake of the modern bakery industry. Other related objectives will be to enhance the selling capabilities of equipment producers, reducing the need to have a large number of personnel specialised in the design of installations, to facilitate the supply of specialised equipment to produce regional products throughout the EU and to propose an e-commerce industry standard for bread-making equipment manufacturers, which can be easily transferred to other related sectors.

The project will focus on the development of an e-commerce website that will sell customised products configured by artificial intelligence, providing users with a sufficient knowledge base to resolve problems and assist decision-making in baking equipment configurations. Initial market research will be required in order to identify the needs, technological level, foreseen benefits, etc. of potential users of the proposed technology, as well as specifications of existing bread-making equipment.

The knowledge base will span the production tasks of raw material, equipment, process selection, and process design and will encompass the experience of seasoned food technologists as well as equipment manufacturers. Bread-making processes and equipment knowledge will be gathered mainly from the SME partners and research and technological

development (RTD) performers. This research seeks to capture the human solving knowledge used in equipment configuration, to organise this knowledge together with other e-commerce activities required for control and administrative activities, and to provide the computer software frameworks to strategically exercise this knowledge. The global architecture of the application will be defined and the multi-agent system developed. Such distributed agent architecture allows the construction of systems that are more flexible and adaptable than distributed object frameworks. A flexible user interface will be developed to overcome the lack of IT expertise of the average potential user. The proposed system will be validated among the partners and other applications will be analysed.

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- 3 KAELTE - KLIMA JACOBSEN GMBH (DE)
- 4 GOLDEN HARVEST MANUFACTURING CO.LTD (MT)
- 5 BAECKEREI BRUESER GMBH (DE)
- 6 CREEDS (SOUTHERN) LTD (UK)
- 7 IZR SOLUTIONS LTD (UK)
- 8 SPIROMATIC NV (BE)
- 9 ISMAR MASCHINEN GMBH (DE)
- 10 PERA INNOVATION LTD (UK)
- 11 CENTRE DE RECERCA I INVESTIGACIO DE CATALUNYA, S.A (ES)

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# ECOWETSOW

## Increasing Productivity and Cost-Efficiency for SMEs in the Ecological Agricultural Community, by an Innovative Wet-Sowing Technology Involving Sub-Surface Injection at a Preset Depth with a Precisely Controlled Novel Mixture of Seeds and Manure

Ecological agriculture, targeted by major agricultural countries to reach a 10 % crop land coverage during the next 10 years, has today only reached 2,0 % level on average and faces great challenges in order to increase competitiveness and meet customer demand. Large amounts of manure from farm animals contribute to air emissions and smelling problems when used for fertilising. An innovative wet-sowing technology, enabling accurate injection of manure and seed simultaneously in the ground will increase yield, and reduce cost at the same time as reducing air and water emissions, and will also utilise the excess manure. This will have great impact, enabling the larger general community of farmers (6.7 million) as well as the ecological farmers (135 000) to be more cost effective.

A growing trend adopted by agricultural and farming machinery manufacturers and farming customers is the injection of manure in the ground to meet the emission problems, still using separate sowing equipment. Equipment combining manuring and sowing, counting the seeds before sowing and evenly mixing seed and manure to a slurry that is injected in the ground, has long been demanded by the farming community. However, this approach has significant limitations:

1. there is no equipment that combines sowing and manuring at the pre-injecting stage;
2. methods for counting seeds by numbers are designed for counting numbers lower than relevant for this project (up to 24 000 per second), and utilise technology that is not scaleable to that level;
3. mixing units that accurately mix seeds and diluted manure before distributing this to several outlet hoses and nozzles are not found commercially or in the literature;
4. methods for measuring liquid flow through non-contact methods are not found to have been used on diluted manure slurries.

This project proposes to develop innovative wet-sowing equipment with a capacity of 70 000 m<sup>2</sup> per hour with the following novel features:

1. achieving an high evenness of wet-sowing the field, with a variance between the number of seeds sown from the 40 outlet openings, of less than 5 %;
2. being able to inject seeds to a preset depth, with a maximum variance of 1,5 cm in an area of 3 cm to 10 cm.
3. creating a seed measurement system able to measure the number of seeds flowing through the dosage system with an accuracy better than 2 % at a speed of 24 000 seeds per second
4. having a maximum cost of operation of EUR 112 per hectare, being 40 % cheaper than the traditional methods currently used in ecological farming.

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- 3 CAPFLOW SA (BE)
- 4 AGROFINAL S.R.O. (SK)
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- 7 TEKNOLOGISK INSTITUTT AS (NO)
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- 9 DODA COSTRUZIONE MACCHINE AGRICOLE DI DODA ALDO & C. SNC (IT)

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Agri-Food & Aquaculture

# EFROST

## Efficient Refrigerated Food Storage

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Co-operative research

[www.cttc.upc.edu/english/projects/efrost](http://www.cttc.upc.edu/english/projects/efrost)

The aim of this project is to improve the energy efficiency of food cold stores, while considering environmental protection and food safety and quality issues. The project approach is based on the systematic application of advanced numerical and experimental techniques, also taking into consideration economic criteria.

The first project period (16 months) focuses attention on the main elements of the unit:

1. chamber ventilation control and management (air throw, frosting and fan, chamber layout);
2. minimisation of heat and humidity gains (insulation panels, infiltration through openings, frosting-defrosting cycle);
3. ammonia refrigeration systems (refrigeration cycle, in-tube ammonia evaporation data, innovative low-charge concepts);
4. indirect ammonia refrigeration systems with more efficient secondary coolant loops (ice-slurries, single-phase coolants).

All these tasks are performed in parallel but conveniently coupled through the common element: the air-cooler.

Based on the developed infrastructures and the know-how acquired during the first period, an advanced rating and design software tool for the analysis of the whole cold-storage unit (chamber, air-cooler, refrigeration system) will be created. The code will be accessible via the Web. It will take advantage of parallelisation techniques on Beowulf PC clusters.

A set of test cases representative of the lay-outs usually found in real-life installations will be performed using this code and the guidelines developed. During this second period (the last 8 months), special attention is paid to providing adequate up-to-date dissemination procedures to get the best profit from project simulation and experimentation results,

software and guidelines. Management tasks will be mainly focused on the coordination of the tasks interdependence, very relevant in this project because of the multidisciplinary nature of cold stores.

The generation of internal reports and guidelines will include the main conclusions and technical recommendations achieved during the project research activities.

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# ENVIROPHYTE

## Improvement of the Cost-Effectiveness of Marine Land-Based Aquaculture Facilities through Use of Constructed Wetlands with *Salicornia* as an Environmentally Friendly Biofilter and a Valuable By-Product

One of the main economic problems for small to medium-sized enterprises (SMEs) operating land-based facilities is the cost of water treatment. The cost of this single item, approximately EUR 0.5 per kilogram of feed consumed by the fish, can mean the difference between a profit-making enterprise and failure. Developing a cost-effective biofilter which will remove the nutrients from the water and convert these nutrients into valuable products, can potentially resolve both economic and environmental constraints.

Protein is the most expensive component of fishmeal and the main source of nitrogenous pollution in aquaculture. In conventional mariculture, fish or shrimps assimilate only part of their diets; the rest is excreted into the water, mainly as dissolved inorganic or solid organic compounds. These effluents may damage coastal ecosystems. According to international (EU) and national regulations, fish effluents must be treated before being discharged back into the sea.

We propose the use of constructed wetlands (CW) planted with halophytes, which would take in the nutrient-rich wastewater and convert it into valuable plant biomass.

The CW will be evaluated in three prototypes, in cold, temperate and warm water conditions, representative of systems that may be applied in the prevailing climates of most European countries.

CW is efficient in clearing water of nutrients and suspended solids, some materials being purified through incorporation into the plants and others attaching to the substrate or being broken down by bacteria living therein. CW has the benefit of being low cost, simple to operate, and can be given an aesthetically pleasing appearance to attract tourism.

*Salicornia* is a succulent halophyte, which flourishes best in intertidal areas flooded by brackish and seawater and collects nutrients and salts. These plants have commercial value as a health food and are potential candidates for the health, beauty and

nutraceutical industries. The *Salicornia* market is presently based mostly on amateur gathering of branches from wild plants, which limits the market supply because most natural wetlands are protected areas, where harvesting is limited or forbidden.

Quality and quantity of the halophytes are inconstant and change throughout the year and the product is not clean or uniform, which is a disadvantage for commercial processing. Conversion of 'expensive' nitrogen from fishpond effluents into a valuable commodity as a raw product or source of extract for the beauty and nutraceutical industries will diversify the fish-farm products and will increase the profitability of land-based facilities.

- 1 ISRAEL OCEANOGRAPHIC & LIMNOLOGICAL RESEARCH NATIONAL CENTER FOR MARICULTURE (IS)
- 2 ARDAG (IS)
- 3 AQUAMARIM (PT)
- 4 LYNN AQUACULTURE (UK)
- 5 ICHTYO DEVELOPPMENT EAU ENVIRONMENT (FR)
- 6 BRETAGNE COSMÉTIQUES MARINS (FR)
- 7 AGRIMER (FR)
- 8 MARINE PLANT ECOLOGY RESEARCH GROUP, UNIVERSITY OF ALGARVE (PT)
- 9 SCHOOL OF OCEAN SCIENCES, UNIVERSITY OF WALES, BANGOR (UK)
- 10 CENTRE D'ETUDE ET DE VALORISATION DES ALGUES (FR)
- 11 BEN GURION UNIVERSITY OF THE NEGEV (IS)

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Agri-Food & Aquaculture

# EscapeProofNet

Development of an Escape-Proof Net Especially for Cod, Bass and Bream Fish Farming

28

Co-operative research

Intensive farming of species like sea bass, sea bream and cod, uses — to a large extent — technology that traditionally was developed and specialised for salmon farming purposes. This has been shown not to be optimal, with respect to net design, materials used, and resistance against gnaws and chip-ups, among other things. The reason for these problems is differences in species behaviour. Sea bass, sea bream and cod are aggressive towards the net itself, more than other species, and biting, sucking and snatching on loose rope ends, knots etc. is often seen.

As a result, holes in the net may occur, leading to escapees and loss of fish stock. Due to this, there is considerable concern with respect to aquaculture representing a threat to ecology and biodiversity representing risk of disease transfer from aquaculture to wild fish populations and potential “genetic” pollution of wild fish. In addition, escapees represent a considerable decrease in competitiveness for the large community of European aquaculture small to medium-sized enterprises (SMEs).

Thus, our idea is to develop a sea-cage net system especially suitable for farming of typical net-aggressive fish species like European sea bass, Gilthead sea bream and Atlantic cod, currently important in the European fish farming industry and in the near future.

To achieve this, we must develop a cost-effective net filament with exact physical characteristics and incorporated impregnation and repulsive agents for the prevention of fouling, biting and snatching behaviour.

An adaptation of the existing net-manufacturing technique for optimal exploitation of material characteristics will be developed and used to produce a net with improved design regarding configuration, strength and durability that will also fulfil the requirements to embrace low operational costs.

- 1 REFA FROYSTAD GROUP AS (NO)
- 2 BSM TRADING S.R.L. (IT)
- 3 STEEN-HANSEN MALING AS (NO)
- 4 ALCOLOR, S.A. (ES)
- 5 OCEAN NETS LTD (UK)
- 6 HELGELANDSTORSK AS (NO)
- 7 MARINA 2000 S.N.C. (IT)
- 8 TEKNOLOGISK INSTITUTT AS (NO)
- 9 PERA INNOVATION LTD (UK)
- 10 ASOCIACIÓN DE INVESTIGACIÓN DE MATERIALES PLÁSTICOS Y CONEXAS (ES)



FP6 Project Catalogue

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# EUROMITE

## Development of an Economical Rearing and Transport System for an Arid Adapted Strain of the Predatory Mite, *Neoseiulus Californicus*, for Spider Mite Control

Spider mites of the genus *Tetranychus* are important pests for many food and ornamental crops. Although biological control could improve food quality while reducing health hazards and pesticide resistance, it has not been fully implemented because the efficacy of existing natural enemies is often insufficient in arid climates. *Neoseiulus californicus* (*N.c.*), native to the Mediterranean basin, is a natural enemy and is relatively efficient against spider mites at lower humidity levels but is currently produced only in California.

This study is a collaborative effort to identify and mass rear a strain of *N.c.* that will be more efficacious under arid conditions than the standard commercial strain from California.

To achieve this goal, *N.c.* strains will be collected in a number of arid areas worldwide and morphometric and genetic methods will be developed to distinguish between them. The performance of these strains under various climatic regimes and on selected host plants will be evaluated in laboratory and field trials. To provide this product at an affordable cost for European growers, we will develop an economical rearing and delivery system for *N.c.* in Europe.

An innovative aspect of this project is the challenge of discriminating between genetic and cytoplasmic factors, by identifying bacteria associated with *N.c.* strains and evaluating their potential influence on the host. This proposal is the first integrated attempt to select and define a natural enemy strain that is both suited to arid conditions and economical. The proposed study will help produce safer and healthier fruit and vegetable crops not only in southern Europe, where most of Europe's fruits and vegetables are grown, but also in dry environments and greenhouses in central, eastern and northern Europe.

- 1 KOPPERT BEHEER BV (NL)
- 2 KOPPERT BIOLOGICAL SYSTEMS S.L. (ES)
- 3 BIO-BEE SDE ELIYAHU (IL)
- 4 ARAVA DEVELOPMENT COMPANY LTD (IL)
- 5 CHARANTONIS BIOLOGICAL CROP PROTECTION (GR)
- 6 OY SCHETELIG AB (FI)
- 7 BIOHELP - BIOLOGISCHER PFLANZENSCHUTZ - NÜTZLINGSPRODUKTIONS, - HANDELS-, - UND BERATUNGS- GMBH (AT)
- 8 ASOCIACIÓN DE COSECHEROS EXPORTADORES DE PRODUCTOS HORTOFRUTÍCOLAS DE ALMERÍA (ES)
- 9 KIVUN STRATEGY AND BUSINESS DEVELOPMENT LTD (IL)
- 10 AGRICULTURAL RESEARCH ORGANIZATION, THE VOLCANIC CENTER (IL)
- 11 ISRAEL COHEN INSTITUTE FOR BIOLOGICAL CONTROL, PLANT PRODUCTION AND MARKETING BOARD, CITRUS DIVISION (IL)
- 12 ISTITUTO SPERIMENTALE PER LA ZOOLOGIA AGRARIA (IT)
- 13 BOKU - UNIVERSITÄT FÜR BODENKULTUR WIEN - UNIVERSITY OF NATURAL RESOURCES AND APPLIED LIFE SCIENCES (AT)
- 14 ECOLE NATIONALE SUPÉRIEURE AGRONOMIQUE DE MONTPELLIER (FR)

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# EXTRANAT

Highly Selective and Environmentally Friendly Fruit Extraction Using Supercritical Fluids Technology

30

Co-operative research

The last century has witnessed major advances in food science and technology and in nutrition. Indeed, innovations have dramatically improved the quality, safety, and availability of food products, resulting in a better quality of life for consumers. On the other hand, over the last years the protection of the environment has become a major concern for mankind, and thus important progress has been made in producing foods with higher respect for nature. Nevertheless, much remains to be done.

At present, one of the main problems for small to medium-sized enterprises (SMEs) processing vegetables for food, is waste management. However, waste produced by these companies can be recycled into added value products, since it contains a significant percentage of functional compounds.

These compounds — flavonoids, phenolic acids and anthocyanidins among others — show antioxidant properties and can be used as natural colour and flavour additives. The main objective of this proposal is to develop and implement a highly selective and environmentally friendly method to extract these compounds from fruit waste, based upon the Supercritical Fluid Extraction (SFE) technique.

The potential advantages of this objective are:

- reduction of the costs for waste management;

and

- a considerable valorisation of fruit waste.

Due to the reduction of costs related to management of waste and to the opening of new markets, the SMEs of the EXTRANAT consortium will actively help protect the environment and will notably increase their competitiveness. These partner SMEs will therefore pioneer this innovative approach, which is expected to be rapidly adopted by many others in their industrial sector, thus spreading the environmental, technical and socioeconomic benefits of EXTRANAT throughout Europe.

- 1 BODEGA MATARROMERA S.L. (ES)
- 2 COOPERATIVA AGRÍCOLA INDUSTRIAL DE COSECHEROS EXPORTADORES DE SAN NICOLÁS DE TOLENTINO (ES)
- 3 ENVIPLAN INGENIEURGESELLSCHAFT MBH (DE)
- 4 GRADIENS TERMÉKFEJLESZTŐ KFT (HU)
- 5 ALDIVIA S.A. (FR)
- 6 EXXENTIA, GRUPO FITOTERAPÉUTICO, S.A. (IT)
- 7 DULCES Y CONSERVAS HELIOS S.A. (ES)
- 8 CENTRO DE AUTOMATIZACIÓN, ROBÓTICA Y TECHNOLOGÍAS DE LA INFORMACIÓN Y DE LA FABRICACIÓN (ES)
- 9 UNIVERSITA' DEGLI STUDI DI PAVIA (IT)

www.idetra.com/extranat



FP6 Project Catalogue

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The project aims to improve three traditional fermented beverages as well as implement the production of an innovative soy-based fermented beverage.

These products are as follows: Boza, a Turkish cereal-based beverage; Ayran, a Turkish mildly-fermented milk-based, slightly diluted yoghurt beverage, drunk after water and salt addition; and Matsony, a Georgian milk-based beverage. These beverages usually contain a high number of viable microorganisms when drunk. Additionally, a fermented soy beverage developed in Poland will be the object of analyses, standardisation and implementation into production in a Polish small to medium-sized enterprise (SME).

The project involves SMEs (beverage manufacturers, technologies and plant suppliers) and research and technological development (RTD) public bodies and institutes, who will study and characterise fermented beverages, and from their natural microflora will select strains which play a role in the fermentation process and in the production of both acids and flavours.

The ability of strains to prevent the growth of undesired foreign microorganisms will be tested, to see if they can play a role of natural protection on behalf of these beverages. These strains will be used as starters that will contribute to safeguarding the tastes of traditional products, the biodiversity of the microorganisms of this ecosystem, as well as ensuring the sensory and nutritional benefits in the case of the innovative product (fermented soy beverage).

The projects tasks will be carried out through transnational cooperation actions between participants and using a multi-stage research approach comprising analyses of the drinks' chemical, nutritional, microbiological, and sensory characteristics and, where applicable, their functional properties.

In this way, the quality of fermented beverages will be improved in accordance with EU food hygiene standards and in order to impact on human health positively, stimulating the growth of the fermented beverages market and the competitiveness of SMEs.

- 1 CONSIGLIO NAZIONALE DELLE RICERCHE-ISTITUTO DI SCIENZE DELLE PRODUZIONI ALIMENTARI (IT)
- 2 TÜBİTAK, MARMARA RESEARCH CENTER, INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY (TR)
- 3 EAST WEST ECONOMIC NETWORK-GEORGIA (GE)
- 4 INSTITUTE OF AGRICULTURAL AND FOOD BIOTECHNOLOGY / DEPARTMENT OF FRUIT AND VEGETABLE PRODUCT TECHNOLOGY (PL)
- 5 UNIVERSITÀ CATTOLICA DEL SACRO CUORE (IT)
- 6 THE UNIVERSITY OF LIVERPOOL (UK)
- 7 DENİZ TIC. A.S. (TR)
- 8 AYGIN SÜT VE GIDA MAMÜLLERİ SAN VE TIC A.S. (TR)
- 9 İNTERMAK MAK. İML. İTH. SAN. VE TIC. A.S. (TR)
- 10 AMALTEA DIDUBE MILK (GE)
- 11 PLASTCOM A.S. (CZ)
- 12 SACCO S.R.L. (IT)
- 13 MILK PROJECT FOOD ENGINEERING S.R.L. (IT)
- 14 GEORGIAN PRODUCTS LTD (GE)

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# FISHTANKRECIRC

## Development of Electro-Coagulation Technique for Optimal Cleaning Efficiency and Maximum Reuse of Water in Land-Based Fish Farming

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Co-operative research

European aquaculture production has increased substantially over the last decades. However, overall production growth in Europe over the period 1994-2001 was 6,3 % APR, 5,5 % less than the global trend over the same period. The overall price trend was negative (- 0,5 % APR) vs. positive global development. This sector has experienced increasing competition from non-EU countries, especially Asia and South America; this has made it imperative to increase research and development in this sector. Land-based fish farming is the critical success factor in intensive aquaculture since land-based fish farmers are at the start of a very complicated value chain representing a prerequisite in order to have competitive sea farms. Furthermore, land-based fish farms are the most important "tool" in order to develop and commercialise fish farming of new species, since control with water quality is essential. Further development of land based fish farms is therefore crucial for the aquacultural sector and its service and technology providers. Water is one of the most critical input factors, and control of water quality is therefore essential for optimal growth.

Our idea is to develop a water treatment system based on electro-coagulation techniques, to fulfil the need of European aquaculture for rearing inland fish through intensive recirculation of water with cost-effective and reliable technology.

The treatment system addresses the challenges of European aquaculture towards increased competition, scarcity of water resources, environmental degradation and customer demand. To achieve these objectives, we will need to develop a novel reactor configuration for an electro-coagulator, able to remove the organic particles, phosphates, nitrates and ammonia as well as soluble organics at the rate necessary to increase the water quality and associated growth rates of the fish.

To create this technological capability, new knowledge will be acquired and applied to specific development routes related to the acquisition of a deeper scientific understanding of the physical, chemical and

biological environment in aquaculture tanks, the electrochemical processes and the performance of electrodes in waste water suspensions. In addition we will need to develop an intelligent filtration and water control technology that includes a filtration unit for optimal collection of coarse particles in a wide range of particle concentrations and water flow, integrated with pump and valve technology controlled by hydrometers for maximum cleaning effects, to maintain optimal water currents in the aquaculture tank for proper self-cleaning effects in tanks. Finally, we will need to create an electro-coagulation reactor that enables the formation of micro-bubbles, ionisation, electrolysis, free radical formations and magnetic effects to clean the water from a wide range of fine concentrations of particles and nitrogen compounds.

- 1 ARTEC AQUA AS (NO)
- 2 K.E.R. SERVICES LTD (IE)
- 3 SALSNES FILTER AS (NO)
- 4 POLLUTION CONTROL SYSTEMS LTD (IE)
- 5 ASWEGA LTD (EE)
- 6 SELONDA AQUACULTURE S.A. (GR)
- 7 STIFTELSEN TEKNOLOGISK INSTITUTT - TEKNOLOGISK INSTITUTT AS (NO)
- 8 PERA INNOVATION LTD (UK)

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# FLOCAP

## Novel Flow-Focusing Technology to Produce Microencapsulated Probiotic Bacteria for the Food Sector

Functional foods are designed to provide a specific and beneficial physiological effect on health and well-being, beyond the provision of simple nutrients. With the current focus on disease prevention, the functional products' market potential is enormous. Probiotic foods, containing health-promoting bacteria, are the most important and well-known group of functional foods.

Commonly used probiotic bacteria belong to species normally living in the intestinal tract. Illness, poor diet, stress, ageing, infections and the use of antibiotics and other medicines can destroy the balance between these beneficial species and other undesirable or pathogenic bacterial strains, which can then occupy the free niche. It has been claimed that to combat this, a regular intake of probiotic bacteria can deliver health benefits such as a strengthened immune system, reduced colon cancer risk, lowered cholesterol levels, prevention of diarrhoea, etc.

However, it has not been proved that the quantity of bacteria in current probiotic food, when it reaches the large intestine of the consumer, is high enough to exert the expected beneficial effects: culture viability decreases drastically not only along the product shelf life, but also during transit through the stomach and the small intestine.

It is, therefore, necessary to protect probiotic bacteria added in food products until they reach the human large intestine. Providing probiotic living cells with a physical barrier against adverse environmental conditions (via microencapsulation, for example) is currently receiving considerable interest, and quite a few research works have been conducted on the topic. However, the results have been unsatisfactory: bacteria are very sensible to stress conditions (mechanical, thermal, chemical, etc.) and the viability levels after the protecting process are very low.

Based on a recently developed technology, FLOCAP aims to develop a novel microencapsulation process to protect bacteria in food systems and at the same time achieve a particle size less than 30  $\mu$  (under the

consumer sensory-perception limit), thus providing the opportunity to develop a new broad range of probiotic food products. This will be a breakthrough for the probiotic food products sector: the characteristics of the FLOCAP-produced microcapsules will make them adequate for a wide range of food products, thus making probiotics available for more consumers and so improving their general health.

- 1 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIE TRANSFERS AN DER HOCHSCHULE BREMERHAVEN E. V. (DE)
- 2 MICAP GMBH & CO. KG (DE)
- 3 PROBI AB (SE)
- 4 MEIEREI GENOSSENSCHAFT E. G. LANGENHORN (DE)
- 5 CONFIPACK S.A. (ES)
- 6 SUNNYLAND BELGIUM S.A. (BE)
- 7 NEWMARKET CO-OPERATIVE CREAMERIES LTD (IR)
- 8 UNIVERSIDAD DE SEVILLA (ES)
- 9 FRAUENHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

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# FOOD PRO

## Ohmic Heating for FOOD PROcessing

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Co-operative research

In most cases, the production of safe food products requires heat treatment. In the usual heating methods, heat is generated outside the food and transmitted to it by conduction and/or convection. For products containing particles, like fruit or vegetable pieces, these methods often cause overheating of the liquid, if sufficient heating of the solids is to be achieved. A loss of nutritional as well as organoleptic characteristics is often the result.

The aim of this project is to develop an alternative heating process through the use of ohmic heating, where the heat is generated by passing an electric current through the food, heating it as a result of electric resistance. Thus overheating can be avoided, and food with improved taste and nutritional content, and with maintained and in some cases improved microbial safety, may be produced.

This project will offer food producers a new technology to provide healthier and safer food in line with consumer demands. This will be achieved not using chemical additives but using an alternative processing technology. The companies can expect to sell products with higher market value and improved consumer acceptability. This will improve their competitiveness both on the European and the global market, with special relevance for markets such as those in Australia, Japan and North America, where consumers have a significant concern for quality and safety aspects.

- 1 C-TECH INNOVATION LTD (UK)
- 2 BLATAND AKTIEBOLAG (SE)
- 3 LIKO BRATISLAVA A.S. (SK)
- 4 QUINTA DOS MOINHOS NOVOS - LACTICINIOS LDA (PT)
- 5 NATUREDIET PET FOODS LTD (UK)
- 6 COMHLACHT ANRAITH BIA MHARA AN DAINGEAN TEORANTA (IE)
- 7 UNIVERSIDADE DO MINHO (PT)
- 8 UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK (IE)
- 9 INSTITUTET FÖR LIVSMEDEL OCH BIOTEKNIK AB (SE)
- 10 CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS (ES)
- 11 SLOVENSKA TECHNIČKA UNIVERZITA V BRATISLAVE (SK)
- 12 NATURE'S BEST LTD (IE)



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**EC Contribution:** € 693 004

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Recirculating Aquaculture Systems (RAS) offer significant advantages over open aquaculture systems. These advantages are heavily underutilised because the application of RAS is limited. Growth retardation is the major restraint and until this is eliminated, economic feasibility of aquaculture in RAS remains marginal, significant aquaculture production in RAS will not be established and the advantages of RAS remain underutilised. Growth retardation has been observed for most species cultured in RAS but the causes remain obscure.

The turbot industry is the first aquaculture industry that applies RAS on a large scale to produce market-size marine fish. Therefore the turbot industry is the first aquaculture industry to be heavily affected by growth retardation. Growth of turbot in RAS is 15 % to 20 % lower, compared to flow through systems. Individual turbot farms have tried but were unable to solve the problem by themselves. Therefore they need to join forces with other turbot farms and research and technical development (RTD) performers in this project. Without the elimination of growth retardation it is either back to flow-through systems, or an insecure and marginally feasible future with RAS.

Growth retardation is due to accumulation of growth inhibiting factors (GIF) in the culture water. Both the fish and bacteria are believed to produce these GIF. The objectives of this project are to:

- exchange, analyse and document the results of individual farm experiments over the years;
- establish the production, presence and effects of GIF by the fish and bacteria on turbot;
- investigate means for GIF removal and prevention of its production in RAS;
- establish the physiological status of fish cultured in RAS.

Overall it is foreseen that this project will result in a large increase of our knowledge and understanding

of growth retardation in RAS. This would be a large step towards elimination of growth retardation in marine RAS, which is of major importance for all future aquacultures in RAS.

- 1 WAGENINGEN IMARES BV (NL)
- 2 SEAFARM BV (NL)
- 3 ECOMARES MARIFARM GMBH
- 4 FRANCE TURBOT SAS (FR)
- 5 BLUEWATER FLATFISH FARMS LTD (UK)
- 6 INSTITUT FRANCAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER (FR)
- 7 WAGENINGEN UNIVERSITY DEPARTMENT OF FISH CULTURE AND FISHERIES (NL)
- 8 UNIVERSITY OF WALES SWANSEA, SCHOOL OF BIOLOGICAL SCIENCES (UK)
- 9 UNIVERSITE DE MONTPELLIER 1 (HYDROSCIENCES-UMR:CNRS, UM1, UM2, IRD (FR)
- 10 GROENTE- EN VISKEKERIJ CORNELISSE BV (NL)

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# HAPLOTECH

Novel Innovative Doubled Haploid Technology for Ornamental and Medicinal Plant Breeding

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Co-operative research

Medicinal and ornamental plants are of great and diverse importance for human health and daily life. They cover a large market both in Europe and worldwide, exceeding billions of euros. Improving the quality of medicinal and ornamental plants is mandated by a need to produce better medicines, particularly better defined herbal medicines, and new ornamentals to please the senses. At the same time, however, the improvement of ornamental and medicinal plants is using old fashioned, traditional methods, because breeding is done mainly in small, family-owned companies and because personal funds and funding from governmental sources is lacking.

The proposed project is the first concerted effort to bring together academic research institutes and several small and medium-sized enterprises (SMEs) from a four EU countries and a new membership country, to develop innovative doubled haploid technologies to obtain homozygous pure lines in a single generation as a core for the breeding of important selected ornamentals and medicinal plants.

These benefits may accrue to immense advantages for these SMEs and ultimately, for the European ornamental and medicinal plant industry. For the first time, a large number of important ornamentals and medicinal plants will be screened for doubled haploid production via gynogenesis (cultured ovaries and ovules) and androgenesis (anther and isolated microspore cultures).

Basic protocols expected to be developed during the course of this project will also have wide applications in other important crop species and cultivars. Thus, the project will arm ornamental and medicinal plant breeding with new, innovative doubled haploid technologies, which might revolutionise breeding.

- 1 FLORA-NOVA PFLANZEN GMBH (DE)
- 2 PHARMAPLANT ARZNEI- UND GEWÜRZPFLANZEN FORSCHUNGS- UND SAATZUCHT GMBH (DE)
- 3 FISCHER FRANCE SARL (FR)
- 4 INSTITUT FÜR MIKROBIOLOGIE UND GENETIK DER UNIVERSITÄT WIEN (AT)
- 5 UNIVERZA V LJUBLJANI, BIOTEHNIŠKA FAKULTETA (SI)
- 6 UNIVERSITÉ DE REIMS CHAMPAGNE-ARDENNE/IFTS (FR)

[www.univie.ac.at/haplotech](http://www.univie.ac.at/haplotech)

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# HELICAS

## Innovative Utilisation Strategies for Sunflower Biomass

Sunflower is a major source of vegetable oil in Europe and worldwide. The production of oil and non-oilseed sunflowers in Europe has increased steadily over the last 30 years.

Especially in central and southern Europe, sunflower crop production plays an important role in terms of employment and economy. More than 450 000 European farmers are cultivating sunflowers on more than 255 000 ha in 21 European countries. Increasing production of non-European oil plants (palm and soybean oil), increasing competition and changes in the Common Agricultural Policy have resulted in enormous pressure being placed on the small to medium-sized enterprises (SMEs) in this sector.

Taking into account that today only the sunflower seeds are used, 95 % of the produced biomass is wasted, even if it shows very interesting functional properties for food and cosmetic applications. Indeed, the demand for substances of interest for the cosmetic and nutraceutical sectors is continuously growing in Europe.

Therefore, practical and economic utilisation methods of sunflower biomass can amplify the proposer farmers' product range, and through this improve their competitiveness.

Thus, the overall objective of the HELICAS project is to raise the sunflower plant's value through the research and development of utilisation methods, processes and technologies for the sunflowers' biomass recycling (stems, leaves of blossoms, solid residues), and through the development of highly innovative products like valuable substances' extraction for wellness (cosmetics, nutraceuticals) applications and the utilisation of the pressed cake after oil extraction for aquaculture.

With the new valorisation methods mentioned above, the overall performance of the involved sunflower farmers will be substantially improved: It will give them more flexibility and will reduce their dependency of partial subsidies. Other partners in

the consortium, such as cosmetics producers and fish farmers will benefit from ingredients or inputs adapted to their respective needs.

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- 2 KAROLINE GEIGER (AT)
- 3 HELMUT LAMP (DE)
- 4 S.C. COMCEREAL S.A. (RO)
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- 6 PHYTOPATENT MEZOGAZDASAGI SZOLGÁLTATÓ KORLATOLT FELELŐSSÉGU TÁRSASÁG (HU)
- 7 PRIMAVERA LIFE GMBH (DE)
- 8 ARBEITSGEMEINSCHAFT BIOFISH (AT)
- 9 ALCHEMIA-NOVA INSTITUT FÜR INNOVATIVE PFLANZENFORSCHUNG (AT)
- 10 UNIVERSITATEA DE ȘTIINȚE AGRICOLE ȘI MEDICINA VETERINARĂ CLUJ NAPOCA (RO)
- 11 SZENT ISTVÁN EGYETEM (HU)
- 12 ROBER FANDLER (AT)

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Agri-Food & Aquaculture

# ICEMAKER

Development of a Low-Cost, Low-Power Consumption System for Manufacturing Ozonised Fluid Ice for Fishing, Via an Absorption System

38

Co-operative research

The research work proposed in the project will aim at developing a low-cost ice-generating system, which will require low energy consumption for its running and which will be more reduced in size, thus making it more suited to the needs of small and medium-sized fishing vessels.

- The energy required for the system will be obtained by taking advantage of the heat from the engine via an absorption process. By using such a system, it is possible to recover and reuse the thermal energy which is emitted into the atmosphere, to produce ice, thus avoiding the consumption of fuel.
- In order to generate ice, seawater which has been previously ozonised will be used, thus favouring the conservation of the fish. The ozone is generated onboard via an electrochemical process.
- The system will generate liquid ice. Compared with other ice production systems, the machinery in this system will be of a reduced size and will have a lower production and installation cost. The ice will have a greater thermal transfer, will not harm or damage the skin of the fish, will be transportable via pipes, can be and stored in tanks. A prototype system will be built and validated in a real environment and tested out at sea in three different countries in order to monitor and improve its performance.

<http://icemaker.cric-projects.com>

- 1 CENTRE DE RECERCA INVESTIGACIO DE CATALUNYA S.A. (ES)
- 2 PIASA ENGINEERING AND TRADING S.A. (ES)
- 3 HRS SPIRATUBE SL (ES)
- 4 INDUSTRIA TECNICA VALENCIANA S.A. (ES)
- 5 BALIKILER DENIZ URUNLERI URETMI TURIZM ITH. IHR. VE TIC.LTD STI (TR)
- 6 AQUABIO TECH LTD (MT)
- 7 DOULOPOULOS SHIPYARDS LTD (GR)
- 8 OREMAR S.A. (ES)
- 9 VORTEX GMBH (DE)
- 10 PERA INNOVATION LTD (UK)
- 11 FELTALALOI ES KUTATO KOZPONT SZOLGALTATO KFT (HU)



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# IntelFishTank

## Development of an 'Intelligent Fish Tank' for Cost-Effective Aquaculture Production through Control of Water Quality in Each Different Fish Tank in an Aquaculture Plant

European aquaculture production has increased substantially over the last decades. However, overall production growth in Europe over the period 1994 to 2003 was 5.5 % less than the global trend over the same period, and the overall price trend was negative (-0.5 % APR) vs. positive global development.

The aquaculture sector has experienced increasing competition from non-EU countries, especially Asia and South America, making it imperative to increase research and development in this sector. Land-based fish farming is the critical success factor in intensive aquaculture, as the start of a very complicated value chain representing a prerequisite in order to have a competitive European aquaculture with regards to "established" species and introduction of new species in aquaculture. Water quality is the most critical factor in aquaculture and is essential for the survival rate as well as the growth rate of fish in the different phases of its lifecycle.

Our project focuses on productivity per cubic metre of effective tank volume, by increasing the density of fish in aquaculture tanks, as well as increasing their growth rate, hence improving productivity, reducing costs and improving cost-efficiency and competitiveness of land-based fish farming in Europe.

Oxygen is the most important water quality parameter. Our idea is to develop a cost-effective, highly efficient system for oxygenation and water distribution in an integrated aquaculture tank system for land-based fish farming, enabling control of water quality in each different tank in an aquaculture plant.

The principle innovation in this project is the development of a sensor and control system for the oxygenation and water flow in the production of different types of freshwater and saltwater fish in the land-based fish farming industry in Europe. Control of oxygenation of water in aquaculture tanks is also essential for recirculation and reuse of water, representing strong environmental advantages compared to "flow-through" systems.

- 1 PLASTSVEIS AS (NO)
- 2 ASWEGA LTD (EE)
- 3 FJORD SEAFOOD SCOTLAND FARMING LTD (UK)
- 4 TEKNOLOGISK INSTITUTT AS (NO)
- 5 PERA INNOVATION LTD (UK)
- 6 POLITECHNIKA GDAŃSKA - WYDZIAŁ OCEANOTECHNIKI I OKRĘTOWNICTWA, GDANSK UNIVERSITY OF TECHNOLOGY (PL)
- 7 TSURUMI-INTEC PUMB AB (SE)
- 8 OXYMAT AS (DK)
- 9 PAN FISH NORWAY AS (NO)

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# KEYZONES(R)

## To Investigate Sustainable Biological Carrying Capacities of Key European Coastal Zones

40

Co-operative research

This project deals with the characterisation of the carrying capacity of key European coastal zones for commercial production of bivalve shellfish. The research is designed to produce powerful tools which would enable shellfish producers in the targeted areas to optimise production capacity, recruitment of young stock and quality, whilst reducing waste.

The work will also increase the scope and credibility of generic, ecosystem models — with a consequent application to the wider industry and other stakeholders in coastal zones. The outcomes are designed to fit in with integrated coastal zone management schemes throughout Europe.

The research consists of five interdependent TECHNICAL work packages, plus review and assessment, and project management, set out below.

1. Historical Data Collection. Objectives are the collection and storage of historical data that describe environmental parameters and processes at each culture environment (Loch Creran — UK, Eastern Scheldt — the Netherlands, SE Waterford — Ireland), including the physiology and culture practice for each main shellfish species cultured in those environments.
2. Field Work. Objectives are to measure:
  - (a) temporal and spatial variations in the environmental parameters that act as forcing functions driving our simulations of shellfish growth and ecosystem processes (e.g. food availability, light, temperature),
  - (b) physiological responses required to parameterise the generic physiological model for each shellfish species, and
  - (c) natural shellfish growth and ecosystem variables (e.g. chlorophyll) that will be used to calibrate and validate the models.
3. Modelling the physiology of cultured species. Objectives are to:
  - (a) develop a dynamic model structure that may be parameterised to simulate feeding, excretion, growth and reproduction in different shellfish species cultivated throughout Europe,
  - (b) parameterise that generic model structure for separate species to include the mussels *Mytilus edulis*, and oyster *Crassostrea gigas*,
  - (c) validate simulations.
4. Ecosystem scale modelling. Objectives are to describe and predict carrying capacity, using ecological modelling.

Ecosystem models with variable spatial resolution will be used, in order to combine hydrodynamics, biogeochemistry and shellfish population dynamics for multi-year simulations. The specific objectives, for each culture environment (Loch Creran — UK, Waterford estuary — Ireland, Eastern Scheldt — Netherlands), are:

  - (a) to integrate external forcing from water shed and coast in ecosystem scale models,
  - (b) to simulate the major internal processes responsible for energy flow,
  - (c) to describe and predict growth for relevant cultivated species, at resolutions that are adequate for fisheries and resource management.





The general modelling approach will be to develop a multi-year ecosystem model of the culture environment, to which individual shellfish growth (WP3) and population dynamics (WP4) will be coupled. Integration will reflect the time and space scale requirements for the different systems and objectives.

The models produced will be input to WP5 (mapping) where map-based prototypes will be produced.

5. Mapping for Exploitation: Prototype models will be produced, which will allow the user to investigate various management strategies, for example farm expansion, and will provide an indication of the likely environmental and economic impacts of these strategies. This management tool will be developed as a commercial deliverable to other small to medium-sized enterprises (SMEs) (and interested parties) through a consortium partner which specialises in such tools (La Tene Maps (6)).

Critical points are the achievement of the following tasks:

1. to develop tools to meet specific local needs to assess carrying capacity, recruitment, growth potential, stocking densities and yields – within the SME participant group;
2. to provide a commercial and marketable tool for a wider group of industry and regulators;
3. to assist SMEs to reduce waste in both effort and financial terms; and
4. development of a dynamic dataset.

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- 2 STICHTING WATERLOOPKUNDIG LABORATORIUM (NL)
- 3 SCOTTISH ASSOCIATION FOR MARINE SCIENCE (UK)
- 4 INSTITUTE DO MAR (PT)
- 5 NETHERLANDS INSTITUTE VOOR VISSERIJONDERZOEK (RIVO) BV (NL)
- 6 ASSOCIATION OF SCOTTISH SHELLFISH GROWERS (UK)
- 7 THE CALEDONIAN OYSTER COMPANY LTD (UK)
- 8 COOPERATIEVE PRODUCTENTEN ORGANISATIE NEDERLANDSE OESTERCULTUUR (NL)
- 9 COOPERATIEVE PRODUCTENTEN ORGANISATIE VOOR DE NEDERLANDSE MOSSELCULTUUR (NL)
- 10 JOHN COLEMAN T/A LA TENE MAPS (IE)
- 11 CLEW BAY MARINE FORUM LTD (IE)
- 12 SOUTH EAST SHELLFISH CO-OPERATIVE LTD (IE)
- 13 AART CORNELISSE (NL)
- 14 PLYMOUTH MARINE LABORATORY. (UK)

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# Luciopercimprove

Improving Pikeperch Larval Quality and Production by Broodstock Management and Nutrition, Husbandry and Sex Control

42

Co-operative research

Diversification has been suggested as a potential tool to reinvigorate freshwater aquaculture production in Europe. Recent research has demonstrated the feasibility of cultivating intensively pikeperch *Stizostedion lucioperca*, a valuable fish in increasing demand for both the consumption (large size fish, 2 kg to 4 kg each) and the restocking (0+ and one-year-old fish) markets in Europe.

However, the supply of eggs and larvae is still largely dependent on the spawning of wild breeders or captive fish held in ponds during the maturation process. Production of pikeperch eggs and larvae is thus seasonally restricted and extremely variable in quality and quantity.

In order to support the development and sustainability of pikeperch farms recently established in several European countries, the project will develop reliable methods of securing the supply of high-quality eggs and larvae of pikeperch. To reach that goal, the following specific activities will be conducted:

- set-up of technologies securing the continuous supply of eggs and larvae by inducing out-season spawnings through temperature and photoperiod control of broodstock maturation;
- investigations on the effects of different husbandry and dietary variables on the reproductive physiology and nutritional status of breeders, and the related effects on gamete and larval quality;
- comparison of the egg and larval quality from breeders stocked in various environments (tanks vs. cages vs. ponds);
- set-up of an efficient procedure for broodstock and larval rearing, in order to produce pikeperch sex-reversed males, and in a second step, all-female populations of juveniles.

In order to efficiently compare the effects of the different variables on gamete and larval quality, standardised larval rearing conditions will be precisely defined at the onset of the project and applied to all experiments.

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- 2 EXCELLENCE FISH BV (NL)
- 3 SARL PISCIVAL LES SOURCES (FR)
- 4 FISH FARM PASLEK (OŚRODEK ZARYBIENIOWY W PASŁĘKU) (PL)
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- 6 VISKWEKCENTRUM VALKENSWAARD (NL)
- 7 ESOX (FR)
- 8 UNIVERSITÉ DE LIÈGE (BE)
- 9 NETHERLANDS INSTITUTE FOR FISHERIES RESEARCH (NL)
- 10 UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN (PL)
- 11 UNIVERSITÉ HENRI POINCARÉ NANCY 1 (FR)



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# MEATGRADING

Automatic Non-Invasive System for EUROP Carcass Grading of Swine, Beef and Lamb Using Cross-Sectional Electrical Conductivity

In recent years, the meat industry has suffered a significant decline due to the continued pressures of low prices, higher costs and the consequences of livestock diseases. Classification is an important tool for ensuring fair payment to the producer, as well as serving as a tool for contributing to the transparency of the market. Enabling efficient and effective classification will ensure small to medium-sized enterprise (SME) livestock breeders and dealers achieve optimal prices for their meat carcass.

The European classification scheme is the S/EUROP system. Yet even today, current methods of classification are very much based on human visual evaluation, which by its nature represents a subjective, labour-intensive, relatively slow process which depends on the expertise of the classifying expert. A need also exists to enable the classification of individual cuts of meat in a much more efficient manner, information which is of utmost importance in the prime-cuts segment of the higher end of the market. Enabling meat processors to classify products for different markets and packers to provide the consumer with better product information will ensure that meat is correctly classified according to its quality.

Magnetic Induction Tomography (MIT) is a contactless method for mapping the electrical conductivity of tissue. The technique is particularly attractive for the detection of pathological processes such as the identification of tumours. This project will look into developing this technology and adapting it to a very specific application, that of the determination of the conductivity of meat in multiple sectors. The project will also use low-cost vision cameras to provide carcass geometric data (lengths, widths, volumes, etc.).

The overall technical objectives will aim at the development of a non-contact prototype system, which will be capable of measuring the lean proportion of transversal sections of pig, beef and sheep carcass, and will be approved for the SEUROP classification.

- 1 JMP INGENIEROS S.L. (ES)
- 2 JCB ELECTROMECÁNICA S.L. (ES)
- 3 E+V TECHNOLOGY GMBH (DE)
- 4 ROVI-TECH S.A. (BE)
- 5 G & M STEEL FABRICATORS LTD (IE)
- 6 GLENDALE FROZEN FOOD LTD (UK)
- 7 MATADERO COMARCAL VARDERROBLES S.L. (ES)
- 8 W. NIXON & SONS LTD (UK)
- 9 DAWN MEATS (MIDDLETON) LTD (IE)
- 10 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)
- 11 UNIVERSITAT POLITÈCNICA DE CATALUNYA (ES)
- 12 FELTÁLLALÓI ES KUTATÓ KÖZPONT SZOLGÁLTATÓ KFT (HU)
- 13 TEAGASC - AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY (IE)

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# MILQ-QC-TOOL

## The Development of Predictive Models on the Internet for Optimisation of Heat Treatment of Raw Milk in Small and Medium-Sized Dairy Companies

44

Co-operative research

Heat treatment of raw milk (e.g. pasteurisation, sterilisation) is an essential step before the milk is processed into consumer products such as milk, yoghurt or cheese. The purpose of heat treatment is the inactivation of microorganisms that cause spoilage of milk products (e.g. *lactobacilli*) and the inactivation of microorganisms that may seriously affect human health (e.g. *salmonellae*).

However, heat treatments have negative effects on product quality aspects such as taste, texture and nutrition. Heat treatments also account for a large part of the production costs, mainly due to fouling of the equipment with proteins. Fouling results in extra energy consumption, consumption of cleaning agents and waste production. Predictive models designed to optimise heat treatment processes in dairy companies are available on the market. Non-SME companies in particular, use these predictive models successfully in practice, for three different purposes:

- to improve product safety and quality;
- to reduce energy consumption and thus decrease processing costs;
- to enhance new product development.

However, the available predictive models are not suitable for SMEs because these models are designed for use by experts in large companies. The costs of the models are high for individual SMEs, too complicated for use in production facilities, designed as an R&D tool, and not user friendly.

Therefore, SMEs are not able to use predictive models. Hence, their processing conditions are based on experience and empirical data (trial and error).

The conditions applied are usually sub-optimal, resulting in sub-optimal quality of the end product, more product losses and more fouling.

The aim of this project is to develop predictive models as Web applications on the Internet, specifically

designed for the needs of SMEs. By using these models, SMEs will be able to improve product quality and safety and reduce energy consumption.

- 1 VAN DIJK KAASMAKERIJ B.V. (NL)
- 2 NIZO FOOD RESEARCH B.V. (NL)
- 3 WIRELESSINFO (CZ)
- 4 ODI DE DAGERAAD B.V. (NL)
- 5 BETTINHOEVE B.V. (NL)
- 6 DEW LAY PRODUCTS LTD (UK)
- 7 HEKING KAAS VOF (NL)
- 8 KAASMAKERIJ DE JONG B.V. (NL)
- 9 ZUIVELFABRIEK ST JOZEF CVBA (BE)
- 10 KATSHAAR ZUIVEL (NL)
- 11 LAKSYMA A.S. (CZ)
- 12 ZUIVELFABRIEK STE MARIE CVBA (BE)
- 13 COOPERATIEVE ZUIVELFABRIEK "ROUVEEN" UA (NL)
- 14 NV D. VERMEERSCH (BE)
- 15 NV VITALAC (BE)
- 16 ROUSSAS DAIRY S.A. (GR)
- 17 LATTERIE TREVIGIANE S.C.P.A. (IT)
- 18 KLAVER KAAS BV (NL)

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# MusselHarvest

## Development of a Cost-Effective Technique for Mussel Harvesting Combined with Product Control and Retubing

The European aquaculture industry can be considered to be at a crossroads in its development. Overall it has experienced a steady growth, and for some Species, even an impressive growth in production over the last years and decades. If we try to assess the general prospects for its future development, we can identify, on the one hand a promising potential for further growth, and on the other hand significant market changes and increasing pressures on the industry in relation to competition from non-EU countries, food safety, the protection of the environment and the management of coastal zones and aquatic resources.

Our idea is to develop a cost-effective mussel-harvesting machine for offshore harvesting of quality blue mussels from longline systems, and automatic retubing of undersized examples for grow-out. This includes development of a device for the release of droppers, a device that fastens the retubed socks to the longline, and development of a harvesting technique with focus on product quality.

The development of a harvesting technique that focuses on mussel quality will involve mussel stripping in water, use of unconventional materials, and hi-tech systems for grading. A high level of automation connected to the conjunction of each activity to merge into a complete, adjusted and efficient mussel harvester for longline systems, also intended for husbandry practices, will be given preference.

Our innovations and development routes include the following.

1. A submerged mussel stripper with hollow brushes making defined water beams. An innovation consists of a mussel stripper that strips off mussels from the substrate rope in water, by generating defined water beams that hit precisely at the contact spot between the mussel and the rope in order to contain byssus and improve survival of mussels.

2. The development of a grading system that gently and accurately sorts the mussels according to market preference. The innovation includes a mussel grader which combines conventional mussel grading techniques and ultrasonic techniques for measurement of mussel size, weight and content.
3. An automated retubing technology with integrated systems for attachment and release of mussel droppers. The innovation will be the automated clipping of mussels in a socked mesh tube to the longline backbone, and the mechanised release of the dropper from the longline backbone.

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- 2 CLITRAVI - LIAISON CENTRE FOR THE MEAT PROCESSING INDUSTRIES IN THE EU (BE)
- 3 SNIV - SYNDICAT NATIONAL DE L INDUSTRIE DES VIANDES (FR)
- 4 NORWEGIAN SEAFOOD ASSOCIATION / NSL - NORSK SJOMATBEDRIFTERS LANDSFORENING (NO)
- 5 ANFACO – ASOCIACIÓN NACIONAL DE FABRICANTES DE CONSERVAS DE PESCADOS Y MARISCOS (ES)
- 6 PROKALA – PRO FISH ASSOCIATION (FI)
- 7 BVFISCH – BUNDESVERBAND DER DEUTSCHEN FISHINDUSTRIE UND DES FISCHGROSSHANDELS E.V. (DE)
- 8 FECIC – FEDERACION CATALANA DE INDUSTRIAS DE LA CARNE (ES)
- 9 FRESHPOINT QUALITY ASSURANCE LTD (IL)
- 10 HEINRICH ABELMANN GMBH FISCHWEINKOST (DE)

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Agri-Food & Aquaculture

# Netwash

## In Situ Net-Cleaning System in Aquaculture

46

Co-operative research

Fouling in aquaculture is the growth of marine flora and fauna on submerged installations, including the netting. Comprehensive fouling results in clogging of the net, which impedes the passage of water through the fish cage. The reduction in the exchange of water can result in depleted oxygen levels and elevated ammonia levels, affecting growth and animal health negatively. In severe cases, increased levels of fish mortality can be prominent, and are certainly unwanted features for the fish farmer. Also, fouling affects current-induced drag forces on submerged equipment, representing a potential hazard to the fish-cage installation overall. Currently, dealing with fouling problems includes expensive operations, as state-of-art technology is neither sufficiently developed nor cost effective. Hence, there is an urgent need for cost-effective net-cleaning equipment suitable for the various cage systems in commercial use in the fish farming sector.

Our idea then, is to develop a cost-effective net cleaning device, which can be remotely operated from above the sea surface. We seek to develop and use technology that will have improving effects on the environment, in terms of reduction of anti-fouling paints and discharge of toxic chemicals from the fish farming sector.

To successfully achieve our goal we need to develop a system that includes:

- a net-cleaning technology based on suction and brushes;
- a vehicle for integration and movement of the net-cleaning technology;
- integration of equipment for monitoring, inspection and movement control.

- 1 SELØY UNDERVANNSSERVICE AS (NO)
- 2 NIEBLING TECHNISCHE BÜRSTEN GMBH (DE)
- 3 BIT AUTOMATYKA SP.Z.O.O. (PL)
- 4 TSURUMI-INTEC PUMP AB (SE)
- 5 IMENCO ENGINEERING AS (NO)
- 6 PRODUCTOS Y MANGUERAS ESPECIALES S.A. (ES)
- 7 REFA MED S.R.L. (IT)
- 8 MARINA 2000 S.N.C. (IT)
- 9 HRADFYSTIHUSID-GUNNVOR HF (IS)
- 10 TEKNOLOGISK INSTITUTT AS (NO)
- 11 PERA INNOVATION LTD (UK)
- 12 GDANSK UNIVERSITY OF TECHNOLOGY (PL)

www.netwash-project.com



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**EC Contribution: € 644 623**

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# NUTRAMEAT

## Development of New Nutraceutical Meat Products

“Nutraceuticals” or “pharma foods” comprise ingredients, formulae and supplements based on bioregulating principles such as vitamins, mineral salts, antioxidants, microbic flora, amino acids and vegetable extracts.

The big companies of the food sector are the ones that are progressing more in this line, with new products that are launched very quickly into the market with strong promotions. As opposed to this, the small to medium-sized enterprises (SMEs) are not as advanced, as a result of their reduced technological and marketing capacity. In this context, the present project is promoted by a group of European SMEs specialising in transformed meat products, who want to develop new lines of products in this field.

The general objective of the project is to develop new nutraceutical meat products with low fat content, olive oil, oat bran and CLA (Conjugated linoleic acid), and adding TG (transglutaminase enzyme) to optimise their process. Additionally, the project includes a work package dedicated to the research into healthy marinades to apply to meat products.

The formulation of emulsified meat products will be varied to decrease total fat content, and will replace saturated fat with lipid components with a demonstrated positive health impact. The stabilisation of the meat emulsion of lower fat content will be promoted by the incorporation of vegetable fibre, as well as the use of the transglutaminase enzyme, capable of cross-linking the protein matrix of the emulsion. This general strategy will be applied to various emulsified meat products, such as meat paste sausages and reconstituted meats. Prototype formulations with the best technological and sensory evaluation scores will be further developed at the meat industry level. Nutritional assessments will be conducted by nutrition specialists, on the effect of these products in the serum lipid profile of the consumers. Consumer acceptance studies will be carried out to determine the potential of these products in the market.

- 1 EMBUTIDOS GOIKOA SA (ES)
- 2 GRANBY LTD (IE)
- 3 ETABLISSEMENT PASCAL MASSONDE (FR)
- 4 HUNNIA MEAT PROCESSING AND SERVICE LTD (HU)
- 5 VIVARTIA (GR)
- 6 UNIVERSIDAD PUBLICA DE NAVARRA (ES)
- 7 HUNGARIAN MEAT RESEARCH INSTITUTE (HU)
- 8 TEAGASC - AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY (IE)
- 9 ASSOCIATION POUR LE DÉVELOPPEMENT DE L'INSTITUT DE LA VIANDE (FR)

**Contract:** 17554  
**Call:** FP6-2003-SME-1  
**Starting Date:** 01/09/2005  
**Duration (months):** 24  
**Total cost:** € 1 173 702  
**EC Contribution:** € 699 141

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# PARADOX

## French Paradox — Red Wine Extract Food Additives

48

Co-operative research

Europeans dream of dying at over the age of 90 in perfect health. Food and nutritional habits play a key role in public health and quality of life.

Functional foods may contribute to healthier nutrition and may prevent diet-mediated disease. The use of plant extracts containing a mixture of secondary plant metabolites offers an effective tool to enrich food, although the knowledge on identity stability and efficacy of such extracts is incomplete. The BBC News Show broadcast its 'French Paradox' story in 1991. The authors had travelled to Lyon, France to interview doctors and hear their explanations of why the French affinity for fatty cheeses, *foie gras* and indulgently heavy sauces still results in one of the lowest rates of heart disease, much lower than that of Americans or Europeans of regions outside typical wine-growing areas.

Based on these findings, we selected the acronym PARADOX for our proposal. PARADOX is based on results of large epidemiological studies (known to a wider public as the French PARADOX) and recent *in vitro* tests, which have proved the efficacy of the complex mixture of compounds in red wine to prevent cardiovascular disease, Alzheimer's disease and dementia, and have shown potent inhibitory action on prostate and breast-cancer cell lines. Extraction, standardisation and formulation of protection agents from red wine are the development targets of the PARADOX project.

Commercial application of the product in basic foods is the economic goal. Dissemination to the European food industry will be performed.

The task of PARADOX is to obtain a stable extract from red-wine skins and seeds, to identify and quantify the leading compounds analytically, to formulate the extract in stable, palatable preparations and to add it to basic food preparations like bread and milk.

Furthermore, PARADOX will also test the efficacy of such formulated extracts *in vitro* on cell lines and *in vivo* with consumers. 'The influence Europe's

onto the world is limited to the knowledge at which temperature red wine may be best enjoyed...'. (Luigi Parzini, interview, 2003) The project will try to extend that influence to preserving health by utilising Europe's ancient natural resources in today's world.

- 1 GAT MICROENCAPSULATION AG (AT)
- 2 BODGAS RODA S.A. (ES)
- 3 M. CHAPOUTIER (FR)
- 4 HEINRICH JOHANN U MITGES (AT)
- 5 MATJAZ LEMUT (SI)
- 6 VINCELLER MNPS KKT (HU)
- 7 CINS CENTER ZA IZOLACIJO NARAVNIH SUBSTANC D.O.O. (SI)
- 8 NATEX PROZESSTECHNOLOGIE GMBH (AT)
- 9 CHIROBLOCK (DE)
- 10 BARENTZ CAMPY Y JOVÉ S.L. (ES)
- 11 VALMAR SA (FR)
- 12 KUK-HANDELSGESELLSCHAFT M.B.H. (AT)
- 13 ATYS-AUSTRIA GMBH (AT)
- 14 QUEEN MARY AND WESTFIELD COLLEGE - UNIVERSITY OF LONDON (UK)
- 15 DIPARTIMENTO DI PATOLOGIA E MEDICINA SPERIMENTALE E CLINICA, UNIVERSITY OF UDINE (IT)
- 16 UNIVERSITY OF CRETE, SCHOOL OF MEDICINE (GR)



**Contract:** 508649  
**Call:** FP6-2002-SME-1  
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**Duration (months):** 24  
**Total cost:** € 1 373 038  
**EC Contribution:** € 200 911

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# PERCATECH

## Securing Juvenile Production of Eurasian Perch by Improving Reproduction and Larval Rearing

The main objective of this project is to secure the production of Eurasian perch (*Perca fluviatilis*) juveniles (3-5 g) in order to sustain the development of 6 European small to medium-sized enterprises (SMEs) which have funded this new method of diversification (the production of 10-15 g fillets for consumption markets corresponding to 100-150 g fish). Presently, the juveniles' availability is very low and limited to the annual cycle of the reproductive period which occurs in early spring. Moreover, the quality of supplied juveniles is very variable. Thus, to support the sustainable development of Eurasian perch production, a R&D project is proposed to help the setting of a hatchery-nursery activity that other SMEs wish to develop.

In order to respond to the demand, a first objective of this R&D project will focus on the optimisation of the broodstock management considering environmental, nutritional and population variables:

1. to obtain delayed (extension of the natural reproductive period) and out-of-season spawning;
2. to reduce breeders' mortality during the spawning period; and
3. to improve the control of gametes and larval quality. At this level, a specific action will be conducted on the cryopreservation of Eurasian perch semen for artificial reproduction.

This objective will require multifactorial and multidisciplinary studies. A second objective will involve developing protocols for the production of juveniles' populations with improved potentialities (females' monosex, *Perca fluviatilis* x *Perca flavescens* hybrids, triploids). Finally, an economic study will be realised to define the cost of production of juveniles, using different rearing systems (semi-intensive in ponds and intensive in tanks), considering different socio-economic contexts.

- 1 UNIVERSITÉ HENRI POINCARÉ (FR)
- 2 FONDEN BORNHOLMS LAKSEKLÆKKERI (DK)
- 3 EARL ESOX (FR)
- 4 GEBR. DIL IMPORT-EXPORT B.V. (NL)
- 5 RYBÁŘSTVÍ NOVÉ HRADY S.R.O. (CZ)
- 6 PDS IRISH WATERS PERCH LTD (IE)
- 7 LUCAS PERCHES (FR)
- 8 FACULTÉS UNIVERSITAIRES N.D. DE LA PAIX (BE)
- 9 UNIVERSITY OF LIÈGE (BE)
- 10 WAGENINGEN IMARES BV (NL)
- 11 UNIVERSITY OF SOUTH BOHEMIA IN ČESKÉ BUDĚJOVICE (CZ)

**Contract: 512629**  
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Agri-Food & Aquaculture

# PICUS

## Development of a 100 % Biodegradable Plastic Fibre to Manufacture Twines to Stake-Creeping Plants and Nets for Packaging Agricultural Products

The main technical objective is to develop a 100 % biodegradable plastic fibre to be used in two specific applications:

- twines used for staking and propping crops in greenhouses, that combine the biodegradability and low disposal cost of natural fibre twines with the excellent tensile strength-density ratio, design possibilities, flexible and cheap processing technique of synthetic twines;
- nets for packaging low-weight (up to 5 kg) agricultural, marine and non-food products, with the same mechanical properties as those made of synthetic fibres, but without their disposal problems.

The new biodegradable twine and net will have the required physical and mechanical properties for optimum production and use, but will undergo complete biodegradation in composting and in farm conditions. In the case of packaging nets, food contact materials regulations will be also taken into account, for the material and additives selection.

Furthermore, the biodegradable material used to manufacture the intended products will be adapted to the very special manufacturing process necessary to produce them: Extrusion-Stretch-Fibrillation-Twist-Winder process for twines, and Extrusion Melt Spinning process to produce yard for packaging nets.

Both processes have in common the need of a high-strength plastic material with high modulus and low strain. Nowadays, biodegradable materials have important limitations related to these properties.

As the state of the art shows, no biodegradable material has been developed for fibre manufacture, fulfilling the above mentioned requirements. To face this challenge, PICUS will use the following approach: it will develop a new biodegradable fibre (for twines and nets) as a synergic combination of two market-available biodegradable polymers,

obtained by reactive extrusion (functionalisation). Apart from functionalisation, the R&D work will also be focused on compounding, in order to improve the processability of the developed material and the fibre properties.

- 1 ASOCIACIÓN DE INVESTIGACIÓN DE MATERIALES PLÁSTICOS Y CONEXAS (ES)
- 2 HILATURAS MACÍA S.L (ES)
- 3 ABONOS ORGÁNICOS NACIONALES S.A. (ES)
- 4 AGRICOLA ALICANTINA S.A. (ES)
- 5 TERRLOIRE (FR)
- 6 CANTELO NURSERIES LTD (UK)
- 7 PVAXX RESEARCH & DEVELOPMENT LTD (UK)
- 8 AUERPOLIMERI S.R.L (IT)
- 9 EXTRICOM GMBH BLACH EXTRUDER AND COMPONENTS (DE)
- 10 FOURNÉ POLYMERTECHNIK GMBH (DE)
- 11 PERA INNOVATION LTD (UK)
- 12 UNIVERSITY OF PISA (IT)

**Contract: 17684**  
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# PROTENCH

## Intensive and Sustainable Culture of the Freshwater Species Tench

Many regions of Europe have a continental aquatic medium, highly appropriate for the culture of autochthones cyprinid fish, such as tench. This fish is appreciated in Europe as a refined restaurant dish, an angling piece and also as an ornamental fish. In the food market, it has an important potential as a consumer-friendly product, due to its excellent flavour, good appearance and small fish bones.

Tench has been cultivated extensively (using the natural reproduction system) in the ponds of central and eastern Europe for more than 500 years. The natural production cycle of tench makes this fish unavailable in the market all year round, because of its limited spawning period, which is between May and August. Moreover, its semi-intensive production cannot avoid the following factors:

- a large number of them die in the first year;
- growth is very slow at first;
- they spawn for the first time not before their fourth year.

The development of an intensive tench culture (inducing reproduction throughout the whole year, and optimising both survival and growth of juveniles) is largely dependent on reproduction issues (seasonality of spawning, asynchronous spawning), feeding affairs, and environmental factors (illumination, temperature, welfare).

In order to create an optimum procedure for intensive production of tench, research and technological development (RTD) partners will study:

- the method to assure a good rate of continuous fry production (reproduction and nursery aspects);
- the most adequate food composition according to tench requirements;

- a protocol to guarantee the survival and adequate growth rate of juveniles; and
- the study of better conditions so as to commercialise them.

The culture of tench presents some advantages, due to its low level of requirements: it is a fish able to live with a low level of oxygenation, and to bear high densities. The implantation of an intensive culture of tench responds to the need for promoting and diversifying freshwater aquaculture, increasing the sustainable production of a wide range of species. Moreover, this will contribute to the creation of stable employment in rural depressed regions.

- 1 GESINGIN S.L. (ES)
- 2 PESCADOS Y MARISCOS SETE S.L. (ES)
- 3 TENCAS DE CASA SECA S.L. (ES)
- 4 KLATOVSKÉ RYBARSTVÍ PLC (CZ)
- 5 MG TRADING & CONSULTING (RO)
- 6 TENDESALA S.L. (ES)
- 7 FISHGEN LTD (UK)
- 8 ECO- ABALONE (GR)
- 9 MÛN AQUA TECH LTDA (UK)
- 10 TROUW ESPAÑA S.A (ES)
- 11 AKVAPLAN-NIVA AS (NO)
- 12 UNIVERSITY OF SOUTH BOHEMIA IN ČESKÉ BUDĚJOVICE (CZ)
- 13 ARISTOTLE UNIVERSITY OF THESSALONIKI (GR)
- 14 UNIVERSITY OF PLYMOUTH HIGHER EDUCATION CORPORATION (UK)

**Contract: 512575**  
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**Duration (months): 26**  
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**EC Contribution: € 941 823**

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# RACEWAYS

## A Hyperintensive Fish Farming Concept for Lasting Competitiveness and Superior Production

52

Co-operative research

The project will provide a scientific rationale for the establishment of a cost-effective rearing system known as the Shallow Raceway System (SRS) and effective husbandry strategies for several highly priced cultured fish species. As the rearing system can be combined with recirculation systems, the concept will promote aquaculture in regions otherwise excluded from this industry.

The new farming concept will significantly reduce the overall logistic needs with respect to buildings and water-supply systems, and through its compactness and extended automation, will simplify the operation of the production process. The new concept may, in fundamental ways, open up a new era in fish farming in Europe by substantially reducing start-up costs and operational costs. Due to the compactness, these farms can be building blocks in industry parks for Aquaculture. It will also be able to exploit almost unused resources like effluent heated water from a variety of industries, and ground (well) water with a wide range of salinities. To ensure rapid industrial benefit and exploitation of the achievements, several European industrial farmers, culturing a wide range of species, will participate in the project.

Subsequently the hyper-intensive technology may be implemented on a commercial scale by the small to medium-sized enterprises (SMEs) involved, and other enterprises throughout Europe. The wide scope for further increase in productivity should prevent outsourcing of the aquaculture industry to low-cost countries.

The present approach is in line with the short-term evaluation of the Common Fisheries Policy (CFP), by improving the knowledge on the biology and culture of highly valued species. This project is submitted under the thematic programme 'Food quality and safety', area 5.4.6: Safer and environmentally friendly production methods and technologies and healthier foodstuffs. A priority objective is to develop lower input, resource-saving, farming systems (aquaculture) for delivering safer, healthier and more varied foodstuffs that respond to consumer expectations.

In response to this objective, the proposed project aims at developing a new and sustainable compact hyper-intensive production system for enhanced land-based aquaculture, covering the whole production chain.

The project work will include topics like profitability, sustainability, employment and animal welfare. This project will develop new methods of aquaculture production, taking into account all the aspects mentioned above.

- 1 AKVAPLAN-NIVA AS (NO)
- 2 CULMAREX SA (ES)
- 3 FISKELDI EYJAFJARDAR LTD (IS)
- 4 HLYRI LTD (IS)
- 5 LLYN AQUACULTURE LTD (UK)
- 6 TIMAR CULTURES EM AQUA LDA (PT)
- 7 TUSTNA KVEITEFARM ASA (NO)
- 8 VIKING AQUACULTURE DEVELOPMENT (ES)
- 9 CENTRO INTERDISCIPLINAR DE INVESTIGAÇÃO MARINHA E AMBIENTAL, UNIVERSIDADE DO PORTO (PT)
- 10 UNIVERSITY OF PORTSMOUTH HIGHER EDUCATION CORPORATION (UK)
- 11 UNIVERSITAT POLITÈCNICA DE CATALUNYA (ES)

**Contract: 16869**  
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## Development of a New-Generation Biosensor for the Measurement of Reducing Sugars in Potatoes and Assessment of Acrylamide Formation

In April 2002, Stockholm University and the Swedish National Food Authority (SNFA) published the results of a research survey, which showed that unexpectedly high levels of acrylamide were generated in a wide range of starch-rich foods cooked by frying or baking. This finding was of great importance, because acrylamide is classified as a human neurotoxin, showing genotoxic and carcinogenic properties. The highest acrylamide levels were found in potato chips (French fries), potato crisps and other fried, deep-fried or oven-baked potato products.

Several research groups have proposed that the main pathway to acrylamide formation in foodstuffs is through the reaction between asparagine and a carbonyl source. Reducing sugars are the important reactants identified so far. Both asparagine and reducing sugars can be found in potatoes in higher amounts than in any other starch-rich food products, and when they react at cooking temperatures, acrylamide is formed. The only parameter that can be modified in order to have as lowest a concentration of acrylamide as possible, is the content of reducing sugars. In fact, asparagine content in different potato cultivars, even by changing conditions, is always very similar, while reducing sugar concentration can range widely, from 10 ppm to 3000 ppm.

Reducing sugar levels in potatoes varies considerably owing to a number of factors including crop variety, growing conditions, maturity through harvesting and special storage conditions. Controlling storage conditions of potatoes is a simple method for reducing sugar content and therefore acrylamide levels in cooked potato products. Monitoring sugar levels during harvesting and storage is therefore an essential step towards guaranteeing the suitability of specific lots of potatoes for processing, thus avoiding further acrylamide formation.

The aim of REFLAB is therefore to develop a hand-held NADH-based redox-flexible biosensor that allows continuous supervision of the reducing sugar levels during harvesting and storage. The REFLAB technology will allow for a parallel quantification of

different reducing sugars. Furthermore, the current biosensors available in the market are only able to work in oxidative conditions. REFLAB offers the possibility of being used both under reductive and oxidative conditions, and therefore overcomes the interference caused by substances such as ascorbic acid (Vitamin C), other vitamins and phenolic compounds, and can reach higher sensitivities.

- 1 GWENT ELECTRONIC MATERIALS LTD (UK)
- 2 UNISCAN INSTRUMENTS LTD (UK)
- 3 RIGAS LABS S.A. (GR)
- 4 GTP TECHNOLOGY (FR)
- 5 BIOZON GMBH (DE)
- 6 GOURMET TIEFKUEHLSPEZIALITAETEN GMBH (DE)
- 7 AVIKO BV (NL)
- 8 NANTES UNIVERSITY (FR)
- 9 WAGENINGEN UNIVERSITY (NL)
- 10 UNIVERSITY OF APPLIED SCIENCE WEIHENSTEPHAN (DE)

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# RO-SOLAR-RANKINE

## Development of an Autonomous Low-Temperature Solar Rankine Cycle System for Reverse Osmosis Desalination

54

Co-operative research

The research concerns the development, application testing and performance evaluation of a low-temperature solar organic Rankine cycle system for Reverse Osmosis (RO) desalination.

A technical description of the system to be developed is given below.

Thermal energy produced by the solar array evaporates the working fluid (HFC-134a) in the evaporator surface. The super-heated vapour is driven to the expanders where the generated mechanical work drives the RO unit pumps (high pressure pump, cooling water pump, feed water pump) and circulating pump. The saturated vapour at the expanders' outlet is directed to the condenser and condensates.

On the condenser surface, seawater is preheated and directed to the seawater reservoir. Seawater preheating is applied to increase the fresh water recovery ratio. The seawater tank is insulated. The use of seawater for condensation purposes on the condenser surface decreases the temperature of the "low temperature reservoir" of the Rankine cycle, and thus better cycle efficiency is achieved. The saturated liquid at the condenser outlet is pressurised in a special pressurisation arrangement, which consists of two vessels and three valves, substituting a pump. The sub-cooled liquid at the pressurisation arrangement outlet is driven to the economiser. The economiser acts as working fluid preheater. In the economiser outlet, saturated liquid is formed, which is directed to the evaporator inlet and the cycle is repeated.

For the prototype system, 240 m<sup>2</sup> of vacuum tube solar collectors will be deployed. The evaporator and condenser capacity is estimated at about 100 kW.

For these system characteristics, and considering a water recovery ratio of seawater RO desalination unit of 30 %, the average yearly fresh water production is estimated at 1450 m<sup>3</sup> (or 4 m<sup>3</sup> daily).

Specific innovations of the system are as follows:

1. low-temperature thermal sources can be exploited efficiently for fresh water production;
2. solar energy is used indirectly and does not heat seawater;
3. the RO unit is driven by mechanical work produced from the processing;
4. development of a special control system;
5. the components of the system will be tuned to each other so as to achieve higher efficiency, and consequently fresh water production rates;
6. the system condenser acts as sea water preheater and this serves a double purpose;
7. (a) increase of feed water temperature implies higher fresh water production;  
(b) decrease of temperature of "low temperature reservoir" of Rankine cycle implies higher cycle efficiencies.

www.rosolar.aua.gr

- 1 AGRICULTURAL UNIVERSITY OF ATHENS (GR)
- 2 TECHNISCHE UNIVERSITÄT MÜNCHEN (DE)
- 3 UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA (ES)
- 4 HELLAS ENERGY KOSTAS BOUZIANAS D. MOSCHOVITIS & CO.(GR)
- 5 THERMOMAX LTD (UK)
- 6 WIRTSCHAFT UND INFRASTRUKTUR & CO.PLANUNG KG (DE)
- 7 ELECTRICAS CENTRO S.L. (ES)
- 8 WATER ICE SYSTEMS (ES)

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# SAFEVEND

## New-Generation Automated Fruit Juice Vending Machine to Reduce Food Poisoning of the Children and the Working Population

The number of vending machines in Europe has grown by 20 %, from 9 million in 1997 to an estimated 10 million in 2002. They now constitute an integral feature of most workplaces, with more than 80 % of the workforce drinking from automated vending systems at any one point in the day.

An estimated 120 000 man-days are lost annually to stomach bugs caused by waterborne bacteria growing in the remote parts (i.e. portions not easily cleaned) of the vending machine and dispensed through the drinks, costing businesses an estimated EUR 1.2 billion each year. Similarly, the quality of the drink is not assured because the mixing is subject to operator errors in settings, or malicious attempts to maximise profit by over-diluting the drinks. This leads to lack of protection for the drink brand, leading to loss of business.

Furthermore, the estimated 10 million machines consume a staggering 4 800 TW of energy each year at the cost of EUR 432 billion, because they operate on a thermostat-controlled compressor-driven refrigeration cycle. Therefore there is a need for a new enabling technology that will allow vending-machine builders to provide a new generation of vending and dispensing machines able to:

- ensure that multiplication of pathogens does not occur within the machine and in particular on the nozzle and other key components;
- ensure product quality in terms of an online, real-time verified quality measurement and control;
- enable a significant reduction in power consumption.

Therefore our idea is to develop an active controlled vending machine incorporating a novel mixing-chamber that will ensure a consistently accurate quality drink is dispensed, while incorporating a sterilisation unit to prevent microbial growth.

The cooling or heating energy will be supplied by a refrigeration cycle, with energy savings of up to 25 % on the traditional refrigeration cycle.

The proposed technology will generate a market of EUR 976 million while creating 6 500 jobs.

- 1 AUTONUMIS LTD (UK)
- 2 NORPE AS (NO)
- 3 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST-NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 4 DAYLA LIQUID PACKING LTD (UK)
- 5 GLOBAL COOLING BV (NL)
- 6 SDF ELECTRONICS LTD (UK)
- 7 BARCELONA SEMICONDUCTORS SL (ES)
- 8 PERA INNOVATION LTD (UK)

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# SafeBuy

## The Development of a Low-Cost, Easy-to-Use Toolkit Providing Food-Processing SMEs with the Ability to Both Forward- and Backward-Trace, and to Rectify Process-Centric Applications

56

Co-operative research

The decline in the EU manufacturing base within the small to medium-sized enterprise (SME) food-processing and food-processing equipment-manufacturing sectors, during the period 1996 to 1997, has resulted in over 16 560 persons becoming unemployed. This loss reflects both the 1.5 % decline in employment across the sector as a whole, and a decrease in turnover of 4.5 % for SMEs in the food-processing industry sector during the same period.

This decline was reflected in the food-processing equipment-manufacturing sector that underwent a 3.7 % decrease in the number of companies. This decline is attributed to 'increased price-based competition' from non-EU regions such as Latin America and South East Asia. This competitive disadvantage within European supply chains has risen as a result of increased global sourcing within both the food-retail industry and the food-processing industry over the past decade.

Within the food supply chain, both legislation and customer quality perception are continually driving for improvements in the level of assurance and verification of the origin of end-products. To date, whilst some technology exists, the process of establishing the exact date, time, processing conditions, etc. is still largely a paper chase. From 2006, EU legislation will change, fundamentally, the degree to which food processors have to go to assure traceability.

It has been estimated that this will increase the overhead burden of the current paper-based systems by between 140 % and 170 %. Hence, for EU food processors and equipment manufacturers, it is essential that they are provided with a low-cost, highly effective traceability technology if their position is not to worsen still further.

The production of food and food products is a complex process involving a great number of discrete processing stages and ingredients. For example, there are in the order of 1 400 discrete stages and raw ingredients involved in the production of ready-prepared Chicken Kiev, ranging from the meat

through to the sauce, coating, packaging, etc. In supporting our long-term vision of generic traceability within the food-processing sector, we would need to perform four key activities:

- provide a mechanism by which a food processing company could model the processes that takes place within the processing plant, defining those ingredient and process characteristics that would be required to support traceability;
- provide a unified storage architecture within which process and ingredient characteristics and identifiers could be stored in real time and subsequently rapidly retrieved and correlated together;
- provide a mechanism to support both forward tracing (from raw ingredient to end product) and backward tracing (from end product to raw ingredient);
- provide a mechanism through which service users could probabilistically assess the point of failure within the process, on determination of the presence of a process failure.

Our proposed development will deliver a toolkit that can be used by SME food-processors to model their process at an appropriate level of abstraction (using our proposed tool ProcMod), capture process and ingredient characteristics in real time (within our proposed unified storage architecture UniArc), forward- and backward-trace to determine either the resultant end-product from ingredients or process settings, or ingredients and process settings implicated in end-product production (using our proposed multi-platform tool Tracer) and to probabilistically determine the point of failure (using our proposed decision support network Solver). The results of our development will be used by food-processing companies, in order for them to begin the process of supporting rapid and cost-effective product traceability.





The main benefit to those organisations adopting our technology will be a significant reduction in the time taken, and a significant increase in the accuracy, for tracing products across their company, resulting in:

- compliance with current and pending legislation;
- being able to take prompt action to remove products from sale and protect brand reputation;
- minimisation of the size of any withdrawal and hence the costs incurred in recovering, disposing or reconditioning products already placed in the market;
- diagnosing problems in production and pass on liability where relevant;
- creating identity-preserved non-GM sources of soya and other ingredients;
- protection of the food chain against the effects of animal disease;
- assurance of end-product place of origin and quality;
- more rapid identification of likely failure points within the production environment;
- increased visibility of the production process and stock control, resulting in increased production and stock-handling efficiency.

- 1 AGRITRACE LTD (UK)
- 2 JMP INGENIEROS SL (ES)
- 3 O&S COMPUTER-SOFT ORLOWSKI SPOLKA KOMANDYTOWA (PL)
- 4 VALMIERAS PIENS (LV)
- 5 MATBORSEN A/S (NO)
- 6 ASSOCIATION OF MEAT PROCESSORS IN BULGARIA AMB (BG)
- 7 SAMWORTH BROTHERS LTD (UK)
- 8 PERA INNOVATION LTD (UK)
- 9 MATFORSK A/S - NORWEGIAN FOOD RESEARCH INSTITUTE (NO)

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# SAMANTHA

Safe and Intelligent Fishing Products' Traceability Management throughout the Supply Chain

58

Co-operative research

SAMANTHA aims at providing a system which will enable the traceability of fishing products, based on the ability to identify them uniquely at any point within the supply chain. The small and medium sized fisheries determine the size of a batch, which is identified uniquely thanks to a RFID tag containing the required information.

For many European SMEs, and even more those included in coastal regions in some specific sectors like the fishing industry, represented in this consortium, it is of utmost importance to be able to control and manage effectively products and goods traceability throughout the supply chain, not only because they have to observe EC directives regarding certification of goods and consumers health, but also because those halfway points are the object of many black market activities which are definitely harmful for both the industry and consumers.

As a result, SAMANTHA will address the deserved resources management and control, accounting for an intelligent streamline of the traceability supply chain processes.

<http://samantha.moviquity.com>

- 1 APIF MOVIVITY S.A. (ES)
- 2 TECNOLOGÍAS Y SERVICIOS AGRARIOS S.A. (ES)
- 3 VTT TECHNICAL RESEARCH CENTRE OF FINLAND (FI)
- 4 ARIADNA SERVICIOS INFORMATICOS S.L. (ES)
- 5 GRUPO CIE S.L (ES)
- 6 C-TRACE LTD (UK)
- 7 OSAÜHING PER SCITUM (EE)
- 8 AQUAPRI DENMARK A/S (DK)



FP6 Project Catalogue

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**EC Contribution: € 843 200**

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# SENBAK

## Development of a Multi-Sensor System for the Supervision of Durable Bakery Products

During the production of durable baked goods (hard biscuits, crackers, crisp breads, rusks, ice-cream waffles, etc.) and after baking, it is necessary to supervise certain product parameters in well-defined periods of time, in order to ensure that the products fulfil the required quality and appearance standards (weight, moisture, physical dimensions, colour, etc.).

Nowadays, in craft bakeries, the product samples are taken manually from the production line by the operators and then inspected. This inspection involves, in most cases, just moisture determination and measurement of the product's physical dimensions. These parameters are then used to determine the conformance of the product. The determination of the colour, a very important attribute for the consumer, if determined, is performed visually.

These methods are therefore subjective and not precise enough. The use of more accurate techniques is usually limited to large companies, due on the one hand to the high costs of more complex and precise devices, and on the other hand to the lack of skilled personnel able to use them.

In the last years, many small to medium-sized enterprise (SME) bakeries have disappeared, due to the difficult task of surviving in a world where the big players (industrial bakeries) have access to the latest innovations, the best resources and to a more specialist and trained workforce. Therefore, there is an evident need for the development of low-cost, user-friendly instruments suitable for at-line use by small and medium-sized bakeries.

The aim of the proposed project is to develop a modular sensor inspection system — SENBAK — for the continuous and automatic supervision of the quality parameters of durable baked goods in production lines. The development of this new multi-inspection system will be oriented for use in small and medium-size enterprises, in order to provide them with an easy-to-use and precise tool for product quality control. The SENBAK system will

contribute by increasing their process effectiveness, and making them more competitive within the market of durable baked goods.

The SENBAK system will be a low-cost system, rugged, simple, able to withstand the harsh condition in bakeries and also to perform an automatic, fast and accurate quality inspection of durable baked goods.

- 1 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 2 BANOS GARRE S.L. (ES)
- 3 IMIX VISION SUPPORT SYSTEMS B.V. (NL)
- 4 EUROCONE WAFFELN GMBH (DE)
- 5 WAFFELFABRIK FINDEISEN GMBH (DE)
- 6 BIOZOOM FOOD INNOVATIONS GMBH (DE)
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# SPIINES 2

## Sea Urchin Production in Integrated Systems, their Nutrition and Roe Enhancement

60

Co-operative research

Sea urchin roe is a luxury food product. However, the wild stocks of edible urchins are now seriously depleted because of overfishing.

Wild harvested sea urchins now typically have a low roe content and are of a very poor or variable roe colour, further devaluing the product. The biological basis for the culture of sea urchins has been established but the developing industry is now meeting particular constraints. These are:

- a) the lack of DIETS which improve roe colour, while maintaining the other quantity and consistency parameters demanded by the market (flavour, texture, quantity);
- b) the lack of GROW-OUT TECHNOLOGY to reduce time to market;
- c) the lack of HARVEST PROTOCOLS positively influencing shelf life and product quality.

This proposal addresses these constraints by performing the following activities.

1. Uniting the leading small to medium-sized enterprises (SMEs) in sea urchin culture in Europe with experienced researchers who are best able to assist them.
2. Focusing on the two most commonly fished, farmed and consumed sea urchin species in Europe.
3. Roe colour is a critical factor in the commercial product; poor or variable gonad colour at point of sale has a detrimental effect on the value in all species. A diet is required that can be used by three separate sectors: to raise sea urchins in monoculture from juveniles to market size; for use as a finishing diet to perfect roe quality in urchins from polyculture systems; and for use in enhancing the roe of fished urchins with unmarketable roe content. The work packages will investigate

the pigment (carotenoid) content of sea urchin roes to facilitate the design of sea urchin diets containing pigments from natural sources (e.g. microalgae). The diets will be species-specific and will improve roe content and colour.

4. To improve economic viability, there is a need to reduce the time it takes for urchins to reach market size. There is a need to develop the grow-out technology; the culture systems proposed in this research are all integrated, linking sea urchin culture to that of other species with environmental and economic advantages.
5. There is no information on spoilage rates or a verified shelf-life for farmed sea urchins which are exported whole and live at point of sale. If the industry in Europe is to expand at all, to market a farmed rather than a fished product, then under predetermined packing conditions it must be possible to guarantee the shelf life of the product, ensuring consumer confidence and demonstrating due diligence on the part of the producer. Developing protocols for microbial food safety will further enhance the competitiveness and market compliance of the product.

While helping fulfil the aims of the 'Strategy for the Sustainable Development of European Aquaculture', this research will also help relieve the pressure on the remaining, vulnerable wild urchin populations.

The research will have a positive impact on other sectors, e.g. seafood retailers, animal-food manufacturers, and the food processing and transport sectors, and it will be of socioeconomic benefit to rural maritime communities dependent on aquaculture.

The latest retail information shows top-quality farmed urchins can fetch up to EUR 31 per kilogram, but even assuming a conservative price of only EUR 20 per kilogram, then the total costs of this project (EUR 970 640) would be offset by the successful production



of only 50 t of sea urchins, by businesses using the technology developed in this project. One hundred of t urchins produced after a five-year expansion period would have a value of EUR 2 million.

- 1 LOCH DUART LTD (UK)
- 2 ISRAEL OCEANOGRAPHIC AND LIMNOLOGICAL RESEARCH (IL)
- 3 HOGSKOLEN I BODO (NO)
- 4 LIVERPOOL JOHN MOORES UNIVERSITY (UK)
- 5 SCOTTISH ASSOCIATION FOR MARINE SCIENCE (UK)
- 6 IAIN MACKINNON (UK)
- 7 DUMANUS SEAFOODS LTD (IE)
- 8 SEAOR MARINE ENTERPRISES LTD (IL)

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**Total cost:** € 970 641  
**EC Contribution:** € 806 314

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# SPONGES

Sustainable Production, Physiology, Oceanography, Natural Products, Genetics and Economics of Sponges

62

Co-operative research

Many marine sponges contain natural compounds that have potential interest for society. Limited possibilities for supply of these compounds from natural resources often delays or even stops further development of a product after its initial discovery. In the proposed project, systems and processes for the cultivation of marine sponges will be developed, in order to create a stable and sustainable supply and reduce pressures on natural resources.

The development of these applications will be supported by studies on the biology of the target organisms, such as ecology, feeding biology (and the role of symbiotic microorganisms therein) and ATP-metabolism. In addition, the genetic background of growth and secondary metabolism of sponges will be studied in order to rationalise strategies to improve culture techniques.

The culture systems to be developed are an integration of innovative technologies of four European small to medium-sized enterprises (SMEs), including novel strategies to feed sponges in closed and half-open systems, a unique technology to control water quality in artificial marine systems, novel spectrometric sensor technology (and corresponding software) to monitor and control the system, an *in vitro* sponge cultivation system (primmorphs) for testing medium design and specific sponge-farming methodologies. A limited number of (commercially interesting) sponge species will be used in the project as model species for technology development.

Product formation in these species will be studied in order to optimise productivity of the culture systems. The objective of the proposed project is to initiate a sustainable sponge industry in Europe by combining the efforts of innovative SMEs and leading scientific institutes. The project will strongly improve the competitive position of Europe in marine biotechnology and is expected to generate new products for the market.

www.sponges.nl

- 1 JOHANNES GUTENBERG UNIVERSITÄT MAINZ (DE)
- 2 MAX PLANCK GESELLSCHAFT ZUR FÖRDERUNG DER WISSENSCHAFTEN E.V. (DE)
- 3 WAGENINGEN UNIVERSITEIT (NL)
- 4 STICHTING KONINKLIJK NEDERLANDS INSTITUUT VOOR ONDERZOEK DER ZEE (NL)
- 5 UNIVERSITETET I BERGEN (NO)
- 6 TALLINN UNIVERSITY OF TECHNOLOGY (EE)
- 7 CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS (ES)
- 8 KLINIPHARM GMBH (DE)
- 9 BIOTECMARIN GMBH (DE)
- 10 PORIFARMA (NL)
- 11 SCAN MESSTECHNIK GMBH (AT)
- 12 PHARMA MAR SA (ES)
- 13 INSTITUTE RUDJER BOSKOVIC (HR)

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# STUNFISHFIRST

## Development of Prototype Equipment for Humane Slaughter of Farmed Fish in Industry

In the European Union, demands for humane methods to convert live-farmed fish into food are increasing.

The overall objective of the project is therefore to develop prototype equipment for humane slaughter of the selected farmed fish species, namely eel (*Anguilla anguilla*), tilapia (*Oreochromis niloticus*), sea bass (*Dicentrarchus labrax*) and turbot (*Psetta maxima*). Humane slaughter involves stunning (rendering unconscious without avoidable stress prior to killing). Feasibility criteria rule out individual handling of the concerned species. The aim is therefore to develop prototype equipment for electrical stunning, as this can be applied to batches of fish in water.

The proposed project will:

- model electrical stunning so that the required parameters for effective stunning with high-quality standards can be predicted for the selected fish species and other species;
- establish requirements for stunning of the species with respect to product quality and welfare;
- design and build three prototypes (one for each species) for electrical stunning;
- study power-saving techniques to facilitate implementation of electrical stunning by small to medium-sized enterprises (SMEs);
- test the prototypes of SMEs with respect to product quality, welfare and operational characteristics.

The project proposal is submitted under the thematic programme 'Food quality and safety' (area 5.4.6, Safer and environmentally friendly production methods and technologies and healthier foodstuffs). A priority in this area is that consumers require healthy, safe and high quality food. With a focus on food production systems that are tending towards those which are more sustainable, more environmentally and welfare

friendly, and which have lower requirements for inputs. Following the fork-to-farm approach, research on production methods should aim to meet these consumer requirements.

The approach in the proposed study follows the fork-to-farm approach, as consumers and food retailers are increasingly demanding humane methods (i.e. welfare-friendly) to convert live farmed fish into food. Various studies have established that the application of humane methods has a positive effect on fish flesh quality, especially freshness, which is regarded as an essential quality attribute by consumers.

- 1 RIJPELAAL BV (NL)
- 2 MAATSCHAP JANSSEN-VAN MARIS (NL)
- 3 SEAFARM BV (NL)
- 4 ZEELAND VIS BV (NL)
- 5 VIVEIRO VILANOVA S.A. (PT)
- 6 NOORDZEE SU URÜNLERI (TR)
- 7 ACE AQUATEC (UK)
- 8 SPECIALIST WELDING SERVICES LTD (UK)
- 9 VISKEWERIJ ROYAAL BV (NL)
- 10 ANOVA FOOD BV (NL)
- 11 WAITROSE LTD (UK)
- 12 ISIDRO DE LA CAL-FRESCO S.L. (ES)
- 13 WAGENINGEN IMARES BV (NL)
- 14 ASG VEEHOUDERIJ BV (NL)
- 15 THE UNIVERSITY OF BRISTOL (UK)
- 16 SILSOE LIVESTOCK SYSTEMS (UK)

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# SUBFISHCAGE

## Development of a Cost-Effective Submersible Fish-Cage System

64

Co-operative research

Aquaculture constitutes 17 % of the volume and 27 % of the value of the total fisheries in the European Union; however, this varies within the different regions in Europe. The value is currently EUR 2 500 million per year. However, in the last decade, the annual growth rate of EU aquaculture of 3,4 % has been slower than the world average of 11 %. The progress in fish farming has been good, but is now tending to slow down.

To continue to be active in the market, as well as increase the annual growth rate of aquaculture, this industry needs to innovate and develop new and cost-effective production methods compared to the current method of production; there is also a need to address the main challenges this aquaculture industry faces, including space, harmful algae blooms, eutrophication, escapees, alien species and GMOs. Our idea is to develop a cost-effective submersible fish-cage suitable for open waters and unsheltered coastal areas. Using submersion technology, our SubFishCage system to be developed over the period will be able to exploit open waters and unsheltered coastal areas, and avoid threats in the surface layer of the water. These include bad weather conditions and high waves, and ice floe (in Northern waters) which can damage the installation, with consequences like escapees and alien species and GMO. In addition, submersion will make it possible to avoid the negative effects of algae and jellyfish invasions, since this does occur in the surface water layer. Moving offshore will also reduce the risk of negative effects of eutrophication.

Our innovations and development routes include the following.

- A patentable deep-sea anchoring system with rotating head. An innovation consists of a deep-sea anchoring system for water depth of up to 1000 metres, with a rotating head for free rotation through 360°, and a crawfool connection between the rotating head of the anchoring system and the fish cage.

- A control system for submersion of the fish cage. An innovation consists of a control system with submersion of the fish-cage system in less than 5 minutes by controlling the water and air integrated in the floatation ring.
- A patentable net design of the fish cage system: a net design that ensures that the net representing the “walls” of the fish cage system maintain their configuration and hence the volume of the fish cage during quick submersion and high-speed water currents. This is ensured by the integration of the net to the floatation ring, representing a major structural component in the fish-cage system and the weight system, representing the other major structural component for maintaining configuration.

www.subfishcage.com

- 1 GIGANTE OFFSHORE AS (NO)
- 2 BITT AUTOMATYKA SP.Z.O.O. (PL)
- 3 STIFTELSEN TEKNOLOGISK INSTITUT (NO)
- 4 IMENCO ENGINEERING AS (NO)
- 5 REFA MED SRL (IT)
- 6 SAEPLAST DALVIK EHF (IS)
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# SULPHREE

## Sulphite-Free Organic Additives to be Used in White Wine-Making Process

For many years, winemakers have been trying to solve the sulphites problem, but at the present time, there is no method or technology that enables us to produce wine with very low added sulphites content.

This proposal addresses the constantly growing requirement for a wine with a very small concentration of volatile sulphites. Such an increasing demand concerns a small part of the population, the sulphite-sensitive group, but it is expected to spread among the entire population in the next two years.

The SULPHREE project proposes to develop a new product for wine processing based on vegetal extracts. This product will be able to mimic the effect of the SO<sub>2</sub> in the white wine-making process, thus guaranteeing the antioxidant and antibacterial action.

The use of such a product will decrease the amount of added sulphites during vinification, and will obtain, as a final result, a concentration of volatile sulphites lower than 10 ppm in white wines.

This proposal wishes to satisfy the requirement for wines with low added sulphites, which nowadays is growing among sulphite-sensitive consumers worldwide, and which, as expected, will increase also among Europeans not sensitive to sulphites, as since 2005, all European wine producers will be obliged to label wines containing more than 10 ppm of volatile added sulphites.

The main innovative element of the project will be:

- the development of a new natural product able to partially substitute SO<sub>2</sub> in the preservation of white wines;
- the setting up of a new procedure to be used at industrial level, for reducing the sulphites concentration in final white wine by at least 75 %;
- the development of a new methodological tool for winemakers, enabling them to obtain safer white wine with a high quality standard.

- 1 LABOR SRL (IT)
- 2 BODEGAS RODA S.A. (ES)
- 3 ARGIOLOS S.P.A. (IT)
- 4 VINNE PIVNICE SVATY JUR S.R.O. (SK)
- 5 A.N.V. 2001 SRL (RO)
- 6 LABORATORIO ENOCHIMICO POLO DI POLO MAURIZIO (IT)
- 7 INTERNATIONAL NUTRITION COMPANY AGENCY BV (NL)
- 8 EVER S.R.L. (IT)
- 9 UNIVERSITY OF NAPLES "FEDERICO II",  
DIPARTIMENTO DI SCIENZA DEGLI ALIMENTI (IT)
- 10 BIOMA AGRO ECOLOGY CO A.G. (CH)

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# SustainCpGV

Sustaining the Long-Term Efficacy of CpGV-Based products against Codling Moth

66

Co-operative research

The efficient and environmentally friendly control of insect pests is a major challenge for modern crop protection. *Cydia pomonella Granulovirus* (CpGV) meets these requirements *par excellence*. CpGV-based products are used to control the codling moth (CM), the most severe pest on apples and pears.

CpGV products play a key role for different producing and distributing European small to medium-sized enterprises (SMEs) and are applied on more than 100 000 ha in Europe. Last year, the first reports became available of CM populations with a dramatically decreased susceptibility to CpGV products. A spread of the observed resistance is a threat to the continued success of CpGV products and to the economic basis of the CpGV-producing and -distributing SMEs. Sustaining the long-term efficacy of CpGV products is of fundamental importance for these SMEs. It is also to the benefit of consumers and meets the strategic targets of the Community Agricultural Policy.

A multinational consortium including all European CpGV producers and research groups that demonstrated excellence in CpGV research was founded to develop scientific solutions for SMEs. This consortium aims to achieve the following research and development (R&D) related objectives: (1) determination of the baseline susceptibilities of different European CM populations as a first step in looking at the possible differences in their response to CpGV; (2) investigations into the mechanisms involved in resistance development of CM against CpGV; (3) identification and characterization of novel, virulent CpGV isolates as an alternative to the presently commercialised CpGV isolate; and (4) production, formulation and field efficacy of novel CpGV products.

By focusing on these research tasks and providing alternatives to the virus isolate presently being used, this project will form a pivotal step towards the preservation of CpGV products and thus the competitiveness of the SMEs producing and selling them.

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- 2 BIOLOGISCHE BUNDESANSTALT FÜR LAND- UND FORSTWIRTSCHAFT (DE)
- 3 UNIVERSITY OF WARWICK (UK)
- 4 ANDERMATT BIOCONTROL AG (CH)
- 5 INTRACHEM BIO ITALIA (IT)
- 6 PROBIS GMBH (DE)
- 7 NATURAL PLANT PROTECTION SAS ARYSTA LIFE SCIENCE (FR)

www.sustaincpgv.eu



FP6 Project Catalogue

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# TENDERCHECK

## Calpastatin Biosensor for Meat-Tenderness Prediction

Palatability is defined as being “pleasant to the taste”. Meat palatability is referred to as the tenderness, juiciness and flavour of a cooked product. These three characteristics are what consumers desire and what the meat industry is trying to supply. Among these, tenderness has been identified as the most important palatability attribute of beef. The current method of assessing tenderness by taste panels is a slow and subjective process. The objective technique using the Warner-Bratzler Shear Force device is a destructive method and does not provide a direct measurement of meat tenderness; rather it evaluates the resistance of the meat during cutting. There is thus a clear need within the meat industry to determine ultimate meat tenderness.

The positive relationship between the price of meat and its relative tenderness confirms the general willingness of consumers to pay a premium for more tender meat. Furthermore, if tenderness can be determined during the conditioning phase, this will enable producers to control and optimise the level of quality they can provide to the marketplace.

This project will explore the exact functioning of the calpain system in the early post-mortem period and its role as a predictor of ultimate beef tenderness. Final tenderness is determined by the rate and extent of post-mortem proteolysis of key myofibrillar proteins. The calpain system is the principle contributor to post-mortem proteolysis and is made up of three main proteins: calpain-I, calpain-II and calpastatin. The main objective of this project is to design and develop an analytical instrument based on a capacitive biosensor, for the rapid detection of the two proteins (calpain-I and calpastatin). The “tendercheck” device will allow a rapid tenderness grading with a correlation of around 80 %.

- 1 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA SA (ES)
- 2 AYANDA BIOSYSTEMS SA (CH)
- 3 EBIOCHIP SYSTEMS GMBH (DE)
- 4 APPLIED RESEARCH USING OMIC SCIENCES, S.L (ES)
- 5 MATADERO FRIGORIFICO DEL NALON S.L. (ES)
- 6 EMBUTIDOS EL HÓRREO S.L (ES)
- 7 BERDASCO E HIJOS S.L. (ES)
- 8 TENDERLEAN MEATS LTD (UK)
- 9 THE UNIVERSITY OF NOTTINGHAM (UK)
- 10 LUNDS UNIVERSITET (SE)
- 11 FELTALÁLÓI ES KUTATÓ KÖZPONT FKT (HU)

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Agri-Food & Aquaculture

Sustainable production of turbot will be dependent on a year-round supply of juveniles reared in intensive land-based systems at high densities. To effectively exploit such systems it is necessary to obtain detailed knowledge on the impact of key rearing factors (temperature, photoperiod and water quality) on growth performance, food conversion efficiency, age at first maturity and fish welfare. The current proposal will, through a series of small- and large-scale experiments, provide the turbot aquaculture industry with a strategy that will significantly improve growth, reduce maturation and elucidate the impact of critical water-quality parameters. It is foreseen that this will reduce production cost per kilogram of market-sized fish. In addition, the current proposal will investigate new processing methods especially designed for turbot, where the aim is to improve fish yield and flesh quality.

The project will investigate and develop:

- optimal temperatures for growth throughout the on-growing phase;
- production advantages of step-wise temperature regulation as compared to a constant temperature regime;
- potential benefits on growth from using extended photoperiods;
- potential effects of environmental manipulations in the early juvenile phase on subsequent growth and maturation in the commercial on-growing phase;
- water quality requirements of juvenile turbot reared at high densities;
- improved processing methods aiming at improved production yield and flesh quality.

This project is submitted under the thematic programme 'Food quality and safety' (area 5.4.6: Safer and environmentally friendly production methods

and technologies and healthier foodstuffs). A priority object is to develop lower input farming systems (aquaculture) for delivering safer, healthier and varied foodstuffs that fulfil consumer expectations. In response to this objective, the following project aims at the development of new and sustainable production systems for enhanced production of turbot, covering the whole production chain including profitability, sustainability, product quality, employment, animal health and welfare. This project will develop new methods of production, taking into account all the aspects mentioned above.

- 1 LLYN AQUACULTURE LTD (UK)
- 2 ZEELAND VIS BV (NL)
- 3 A COELHO E CASTRO LDA (PT)
- 4 ECOMARES GMBH & CO. KG (DE)
- 5 SILFURSTJARNAN HF (IS)
- 6 AKVAPLAN-NIVA AS (NO)
- 7 NETHERLANDS INSTITUTE FOR FISHERIES RESEARCH (NL)
- 8 UNIVERSITY OF BERGEN,  
DEPARTMENT OF FISHERIES AND MARINE BIOLOGY (NO)



#### CONTACT PERSON

# UHPH

## Development and Optimisation of a Continuous Ultra-High-Pressure Homogeniser for Application on Milks and Vegetable Milks

With the purpose of increasing the competitiveness of small to medium-sized enterprises (SMEs) as well as obtaining safe foods without losses of nutritional value, this project aims to develop and optimise a continuous Ultra-High-Pressure Homogeniser (UHPH), for application on milks and vegetable milks. This machine will be capable of applying pressures of up to 400 MPa, using a special homogenising system which allows the elimination of microbes while maintaining nutritional value, and combines this with the development of a system to control the treatment temperature (30-150°C). This system could substitute HTST pasteurisation and UHT sterilisation, with less energy consumption and less contamination.

The work will focus on the development of dairy products (pasteurised milk, sterilised milk, fresh and ripened cheese and yogurt from UHPH-treated milk and whey protein concentrates), and vegetable milks (lupine, soya and almond milks). Research will be carried out to ensure the safety of the process (killing of pathogenic microorganisms, absence of toxic and carcinogenic substances).

Five SMEs, three universities and two research centres will participate in this project, creating a multidisciplinary team.

The first part of the work is the design and development of the machine, and its adaptation to the food industry (connections, cleaning procedures, etc.).

This machine will be connected to an aseptic tank, which is connected to an aseptic packaging machine (Tetra Pak), to fully simulate industrial production.

The second part is the application of UHPH treatment to milks and vegetable milks for drinking (pasteurised and sterilised milks), or for making cheese, yogurt and desserts, and also protein concentrates for additive applications. The effect of UHPH on these foods will be studied: functionality, nutritional characteristics, microbial inactivation and the possibility of the generation of toxic compounds.

Finally, several different studies will be conducted on the acceptability to consumers of the developed processes and the products treated by UHPH. The exploitation of the technology and developed products will be investigated.

- 1 UNIVERSITAT AUTONOMA DE BARCELONA (UAB) (ES)
- 2 STANSTED FLUID POWER LTD (UK)
- 3 NECTINA S.A. (ES)
- 4 MEIEREI-GENOSSENSCHAFT E.G. LANGENHORN (DE)
- 5 HAUKE KOLL (DE)
- 6 FORMATGERIA GRANJA RINYA S.L. (ES)
- 7 VEREINS ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 8 BUNDESFORSCHUNGSANSTALT FUER ERNAERUNG UND LEBENSMITTEL (BFEL) (DE)
- 9 UNIVERSITÉ MONTPELLIER II (FR)
- 10 UNIVERSITY COLLEGE CORK (IE)

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**EC Contribution:** € 1 231 358

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Agri-Food & Aquaculture

# VINISERV

## Web Service for Wine Growers: Development of an Open Platform

The project gathers four small to medium-sized enterprises (SMEs), five end-users and five research and technological development (RTD) performers from France, Germany, Italy and Spain. The objective of VINISERV is to develop Web services for European winegrowers. The portal to be developed in the frame of the project will include: applications in the area of quality (tools for the implementation and management of quality standards); HACCP (tools for implementation and management of HACCP system); vineyard management (disease prediction, decision support application for fertilisation and irrigation); and cellar management (prediction of the stopping of alcoholic fermentation, decision support application for blends, equipment and service management). Automatic connections between the user database and the applications will be created. Automatic data acquisition from vineyard and winery equipment will also be developed.

The methodology of the development is based on the completion of seven logical phases.

During the first phase (WP1), information about user requirements will be collected in each participating country. It will be used to write the specifications of the portal and of its components. During the second phase (WP2), the architecture of the system will be designed. A generic model of data and application integration will be determined.

The hardware and software configuration will be identified. The third phase (WP3) will involve developing the system components. The development of each module will be realised at the same time by the responsible partners: the quality and traceability module will be developed by VIF and LGI; the HACCP module will be developed by Casals, ITV and AINIA; the vineyard management module will be developed by DCA and ADM; and the cellar management module will be developed by ITV, LVWO and Liquosystems. The modules will be then integrated and will be tested with a restricted number of users (WP4). The complete system will be made accessible to users from France, Germany, Italy and

Spain in order to validate it (WP5). The two other work packages concern the dissemination of the project results and the definition of the marketing strategy (WP6), and the coordination of the management of the project (WP7).

- 1 LA GRAINE INFORMATIQUE (FR)
- 2 A.D.M. - AGRICULTURAL DATA MANAGEMENT SRL (IT)
- 3 LIQUOSYSTEMS GMBH (DE)
- 4 CASALS MAQUINARIA VINIVOLA SL (ES)
- 5 SOCIÉTÉ CIVILE AGRICOLE D'EXPLOITATION DU DOMAINE DE BELLE COSTE (FR)
- 6 AZIENDA VITIVINICOLA GIACOMO VACCARO (IT)
- 7 FELSENGARTENKELLEREI BESIGHEIM EG (DE)
- 8 FINCA LUZON S.L (ES)
- 9 VIGNERONS INDÉPENDANTS DE FRANCE (FR)
- 10 ILLICO TELEMATIQUE (FR)
- 11 DIPARTIMENTO DI COLTORE ARBOREE - UNIVERSITY OF PALERMO (IT)
- 12 STAATLICHE LEHR UND VERSUCHSANSTALT FÜR WEIN UND OSTBAU WEISENBERG (DE)
- 13 ASOCIACIÓN DE INVESTIGACIÓN DE LA INDUSTRIA AGROALIMENTARIA (ES)
- 14 ITV FRANCE (FR)



# VOLT-AIR

## A Novel Hybrid Regenerating Filter for Improving Air Quality by Safely Destroying Biologically Active Airborne Particulates in Agri-Food Production Operations

This proposal is targeted to help a very large group of European small to medium-sized enterprises (SMEs) right across the agri-food production and other manufacturing sectors. These types of companies produce and also suffer from airborne organic particulates, in the form of ultra-fine dust or smoke, which have adverse biological effects when inhaled.

These organic and inorganic emissions, which are generated at all stages — the production of livestock, the manufacture and drying of food, and the preparation of food in restaurants, food service institutions, heavy manufacturing processes, foundries and steel mills — pose a common health threat for a number of reasons:

- allergenic effects of organic materials ingested;
- nutrient effects of the materials for bacterial growth;
- live bacterial content of some materials such as animal dusts;
- adsorbed irritants such as ammonia or volatile organic compounds.

The hidden cost to European business is immense: EUR 2 billion each year is lost by pig farmers due to lack of live weight-gain due to respiratory syndromes; EUR 1 billion each year lost by poultry farmers to *Campylobacter* and similar ailments; EUR 240 million per year in treating human respiratory problems due to air quality alone — and this on top of the disposal of up to EUR 1.25 billion of contaminated filters every year.

Our idea is to develop a novel high-efficiency, high-capacity filter that will both capture and destroy any type of active organic particulate or noxious gas.

It will remove the material from the airstream, including the ultra-fine particles that are increasingly regarded as the most harmful, and render it harmless through an automatic heating and plasma-generating step,

leaving it inert and ready for disposal, or even ready for automatic *in situ* destruction.

The technologies used are a novel multi-electrode precipitator design, and a unique multi-functional medium that adsorbs gases and traps large particles, and can be activated by an electric field to produce plasma.

- 1 PERA INNOVATION LTD (UK)
- 2 FILTER ONE LTD (UK)
- 3 ALUHIGHTECH AS (DK)
- 4 DESOTEC (BE)
- 5 POINT BULGARIA LTD (BG)
- 6 SWISSTULLE UK PLC (UK)
- 7 ASHLEIGH FARMS LTD (UK)
- 8 UGINE & ALZ FRANCE (FR)
- 9 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)

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# WHEATPROTECT

Structural and Functional Analysis of Virus Resistance in Wheat (*Triticum aestivum* L.)

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Co-operative research

Wheat Spindle Streak Mosaic Bymovirus (WSSMV) and Soil-borne Cereal Mosaic Furovirus (SBCMV), which have been detected in the USA and Japan for the first time, are today already widely spread in the EC (France, Italy, UK, Germany, Denmark, Poland) and it is presumed that these viruses will be detected in other EC countries in the near future. In some countries (Italy, France, Germany) both viruses have already gained economic importance due to high yield losses of up to 50% to 70 %, frequently observed in susceptible wheat varieties. Similar to soil-borne barley infecting viruses (Barley Yellow Mosaic Virus and Barley Mild Mosaic Virus) which were detected in Europe in 1978 for the first time and are a serious threat to winter barley cultivation in parts of the EC today, the above mentioned viruses may become a serious constraint for wheat cultivation in the near future. Because of transmission by the soil-borne fungus *Polymyxa graminis*, chemical measures against this disease are neither efficient nor acceptable for economical and especially for ecological reasons. Therefore, wheat cultivation on infested fields relies entirely on resistant or tolerant cultivars, respectively.

Consequently, on the one hand, this project aims at getting information on the properties of soil-borne wheat-infecting mosaic viruses, and on the other hand, consists of the identification of genes involved in resistance and tolerance and the development of respective molecular markers in order to facilitate efficient marker-based selection procedures.

With this approach, detailed knowledge of the pathogens will be gained, enabling risk assessment concerning their future spread, and resistant/tolerant wheat accessions in conjunction with molecular markers will serve as the base for the efficient breeding of high yielding resistant/tolerant wheat cultivars, ensuring economic wheat production in the growing area of infested fields.

- 1 SAATEN-UNION RESISTENZLABOR GMBH (DE)
- 2 SAS FLORIMOND DESPREZ VEUVE ET FILS (FR)
- 3 ELSOMS SEEDS LTD (UK)
- 4 INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE (FR)
- 5 FEDERAL CENTRE FOR BREEDING RESEARCH ON CULTIVATED PLANTS (DE)

www.saaten-union.com/WHEATPROTECT



FP6 Project Catalogue

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**EC Contribution: € 546 000**

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# WINEGAR

## Wood Solutions to Excessive Acetification Length in Traditional Vinegar Production

Traditional wine vinegar production is a very lengthy process. Such long production times have now become the most serious threat to the survival of this sector. Traditional production is generally carried out by family-run small to medium-sized enterprises (SMEs) who are now at risk of disappearing, due to high production costs, low profit margins and competition from inferior versions of their product produced by various 'quick' industrial production processes.

Although there is strong consumer demand for high quality vinegars, the amount produced annually is low and it remains expensive. Furthermore, the low annual production level is partly a consequence of a lack of knowledge among traditional producers of the basic biotechnological process involved in production.

To minimise the costs resulting from having large amounts of the production capacity and materials tied up for long periods, and also to reduce the risks associated with these lengthy production processes, we propose to shorten production while maintaining the highest quality standards.

The main reason why the production process is so time consuming is that the Acetic acid bacteria are obligate aerobes, and so oxygen must be slowly fed into the process — this is a vital, but complex process. Until now, production times have been reduced by forcing air to disperse through the wine, which converts the superficial transformation (aeration) into a submerged development. However, the quality of the final product is lower than that produced by the slower traditional method, as there is considerable loss of volatile compounds.

The WINEGAR project plans to reduce the time needed for traditional vinegar production through an integrated approach which will include research into the wood used in the barrels and the selection and control of bacteria. Most of the wood used in the production of wine vinegar barrels has been similar to that used in wine production i.e., oak, which allows very limited oxygen transfer. The WINEGAR project will investigate the use of other woods which are more porous.

The project will also research the effects of wood thickness on oxygen diffusion.

Finally, a collection of the different micro-organisms involved in the production will be developed (acetic acid bacteria) during the WINEGAR project, for other follow-on work too.

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Co-operative research

- 1 UNIVERSITAT ROVIRA I VIRGILI (ES)
- 2 BOTERIA TORNER (ES)
- 3 CAVALLI CAV. FERDINANDO SNC (IT)
- 4 UNIVERSITA DEGLI STUDI DI MODENA E REGGIO EMILIA (IT)
- 5 UNIVERSIDAD DE SEVILLA (ES)
- 6 UNIVERSITÉ DE GENEVE (CH)
- 7 VINAIGRERIE LA GUINELLE (FR)
- 8 VITICULTORS MAS D'EN GIL (ES)

[www.sre.urv.es/web/amb/WINEGAR/WINEGAR.htm](http://www.sre.urv.es/web/amb/WINEGAR/WINEGAR.htm)

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Agri-Food & Aquaculture

# WIPS

## Wine Fermentation In-Process Monitoring System

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Co-operative research

This CRAFT project intends to make new developments in sensor technology for the support of the European wine industry and will produce innovative hybrid MSDF system designs. Indeed, the approach adopted is to be extended and advanced. The output information from the candidate MSDF system will be fed to the monitoring and prediction system. In the design of process monitoring systems, due attention must be paid to the possible existence within the plant of time delays, as they can cause instability problems. Generally, when confronted with a system that possesses a time delay, in the past it has been usual to introduce some kind of Smith predictor or one of its variants into the control loop.

Such approaches will be explored and applied in this study. Both the MSDF and control algorithms will be fully integrated into a software package using an appropriate high-level computer language with an intuitive graphical user-friendly interface. Each individual module and the complete package will be tested and validated on the basis of a simulated mathematical model of wine fermentation. Sensor work will focus on the calibration and incorporation of commercially available sensors where possible; these include pH, temperature and sugars (sucrose, glucose, fructose). An ethanol sensor is in the final stages of development, as is a Lactic acid sensor. Innovative work will be required in the development of the Malic acid sensor and an SO<sub>2</sub> sensor.

- 1 POLMASSICK VINEYARD (UK)
- 2 VENDANGEOIRS DU VAL DE LOIRE (FR)
- 3 GWENT ELECTRONIC MATERIALS LTD (UK)
- 4 UNIVERSITY OF PLYMOUTH (UK)
- 5 UNIVERSITA DEGLI STUDI DI PAVIA (IT)
- 7 ISTITUTO AGRARIO DI SAN MICHELE ALL'ADIGE (IT)
- 8 INSTITUTUL DE CERCETARE DEZVOLTARE PENTRU VITICULTURA SI VINIFICATIE (RO)
- 9 VIGO LTD (UK)
- 10 OLIVEDA SA (ES)
- 11 LABO SRL (IT)
- 12 MOSSI AZIENDE AGRICOLE VITIVINICOLE S.A. (IT)
- 13 CANTINA VINI ARMANI A.S.R.L. (IT)
- 14 CAVE DU CANAL (FR)
- 15 I. PAPADOPOULOS /I. KALAITZIDIS CO TRADING AS WINE ART ESTATE (GR)
- 16 UNIVERSITE DE NANTES - UN (FR)

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EC Contribution: € 904 412

# YOGHURTAIR

A Novel Environmentally Friendly and Cost-Effective Technology for Thermal and Refrigerated Processing of Yoghurt and Fermented Milks by Air-Cycle-Based Heat Pumps

The prime objective of the proposed YOGHURTAIR project is to generate knowledge and enhance the overall competitiveness of the European dairy industry by developing a novel environmentally benign and cost-effective technology and a versatile pilot system for yoghurt processing. The novelty lies in employing air-cycle-based heat pumps to simultaneously meet the heating and cooling demands of the yoghurt manufacture. This emerging production method will be implemented for the first time in the dairy sector to provide a perfect processing cycle, involving both a healthy product of natural origin and a system operating with the most natural and purest refrigerant available in the environment.

Such an innovative “natural product – natural process” concept affords a unified strategy for integral solving of major environmental, quality and efficiency problems of conventional food processing, by consolidating a critical mass of complementary expertise from small to medium-sized enterprises (SMEs) and academia across the EU, associated states and INCO target countries. A series of workshops will be arranged and held throughout Europe to promote the new technique among milk processors and end-users. Europe-wide dissemination of printed, CD and Internet publications is foreseen, to raise public awareness of the environmental, health and economic benefits offered by the YOGHURTAIR technology. Feasibility studies will also be conducted on possible applications to thermal and refrigerated processing of other highly perishable biotechnological materials.

- 1 NATIONAL UNIVERSITY OF IRELAND, DUBLIN (IE)
- 2 G.R. INSTRUMENTS B.V. (NL)
- 3 LTD LIABILITY COMPANY “MODERN REFRIGERATION TECHNOLOGIES - VELIS REFRIGERATION” (RU)
- 4 BULGARIAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING ENGINEERS (BG)
- 5 ZUIVELBOERDERIJ ARNS (NL)
- 6 UNILEVER NEDERLAND B.V. (NL)
- 7 OFTTECH SA (CH)
- 8 TECHNICAL UNIVERSITY OF SOFIA, DIRECTORATE FOR SCIENTIFIC RESEARCH - NIS (BG)
- 9 THE UNIVERSITY OF BRISTOL (UK)
- 10 CEMAGREF - INSTITUT DE RECHERCHE POUR L'INGNIERIE DE L'AGRICULTURE ET DE L'ENVIRONNEMENT (FR)
- 11 AGROTECHNOLOGY AND FOOD INNOVATIONS B.V. (NL)

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**EC Contribution: € 1 287 520**

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# Barley Bread

## European Guideline for Healthy High-Fibre/Low-Salt Baking Process Based on the Use of European Barley

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Collective research

The increased use of vegetable proteins for animal feed has led to a significant increase in the import of soybeans from South America, the United States and Asia, mainly because vegetable proteins from soybeans are better suited for animal than vegetable proteins from barley, which has been the traditional source in Europe. This rapid decline in demand for barley caused by increasing soybean imports has had a significant impact on the future sustainability of barley farmers in Europe, most of which are small to medium-sized enterprises (SMEs). To survive, barley farmers must seek new applications for their barley in European food products.

Currently there are about 5.4 million farms in the EU with an estimated turnover of EUR 312 billion (1 000 million), employing over 10 million people. Within the farming sector, 22 % of those employed are associated with the production of barely. Barley is a major European cereal product. This collective project aims to create a deeper connection between the barley farmers and the supply chain above them, in order to provide new technology and knowledge to the 11 000 SME millers and 85 000 SME bakeries, to enable them to significantly increase their use of (and thus stimulate consumer demand for) barley, in producing the largest single food product in Europe — bread. We believe that through the transfer of new enabling knowledge and baking know-how, the use of barley as a substitute for wheat can be significantly increased and can lead to the production of a tasty alternative that has the potential to be much lower in salt content — the main factor contributing to cardiovascular disease. Wheat production in Europe is not well differentiated globally and there are high levels of imports at around 27.9 million t per year. Barley production, however, is a major European strength due to the climate and growing conditions, accompanied by long experience in barley growing (8000 to 9000 years), and 90 % of barley consumed in Europe is grown here. Hence, any transition between wheat and barley in relation to bread production is likely to have a net 7.7 % improvement on cereal GDP.

The project will consist of three major development themes.

- The development of a novel process to measure grain size prior to milling in order to obtain at least 75 % of the healthy components ( $\beta$ -glucan, fibre, amylase and antioxidants) in the final flour.
- The adaptation and development of recent scientific and technological improvements in wheat-based ingredient technologies that help reduce salt content in wheat-based products so that they can be used with barley flour to produce a bread that has salt content below 0.4 % in the final product, but is still as tasty as conventionally produced wheat-based bread.
- The development of a novel formulation and baking process adapted for use with specific combinations of barley and wheat flour that is able to reduce the enzymatic degradation of the starch in the barley-based dough, as well as reduce the bitter taste normally associated with barley-based products using antioxidants and tiny amounts of spices, and reducing the salt content in the final product by applying alternative salt types and flavour enhancers. The objective is to reduce the enzymatic degradation of the starch in the barley-based dough through the use of antioxidants and novel technologies, and the removal of “damaged” fibres in order to prevent the hydrolyse of beta glucans and soluble fibre fractions, so that the final barley flour contains at least 4 % (percentage of dry weight) of total beta glucans and at least 30% (percentage of dry weight) of total fibre fractions, for the benefit of the consumer.



The extensive involvement of barley farmers and bakers, in combination with bread- and pastry-product consumer groups within the national industrial association or grouping (IAG) memberships will allow:

- the technical developments to take into consideration the effect of regionality, by mapping the high barley-producing regions in Europe and ensuring that each is represented within the project, and that data related to the genotypes, growing conditions and variants in barley quality and attributes are input to the each of the three major development activities;
- the technical developments, dissemination and training activities to take into consideration the regional variations in consumer demand and tolerance towards barley based products, by mapping the regional demand, preferences and resistance to barley-based products;
- the technical developments and exploitation planning activities to take into consideration the preferences of consumer focus groups in relation to their attraction to barley-based bread and other end products, as concerns their likelihood of switching to or supplementing their consumption of wheat-based products at the target-price level for the barley products, and on the basis of the potential diet and health improvement benefits.

The impact of the project will be to:

- create a higher added value market for barley farmers;
- generate a net increase in the cereal GDP balance of trade;
- increase the aggregate level of technology and knowledge within the milling and baking processes;

- produce an affordable, tasty and healthier alternative to wheat-based bread and similar products;
- reduce salt intake of consumers and improve their health in relation to the risk of cardiovascular disease.

- 1 THE NORWEGIAN FEDERATION OF FOOD AND DRINK INDUSTRIES (NO)
- 2 THE SPANISH FEDERATION FOR THE FOOD AND DRINK INDUSTRY (ES)
- 3 DANISH FRUIT, VEGETABLE AND POTATO BOARD (DK)
- 4 KEVILII PÖLLUMAJANDUSÜHISTU (TRADE ORGANISATION OF GRAIN PRODUCERS) (EE)
- 5 CAN HALEFOGLU (TR)
- 6 TARGI TARIMSAL GIRISIM SANAYII VE TICARET A.S. (TR)
- 7 TROYKA MAKINE GIDA SANAYII DANISMANLIK VE PAZARLAMA LTD Sirketi (TR)
- 8 TWEEDSIDE TRADING ESTATE BERWICK UPON TWEED, NORTHUMBLAND (UK)
- 9 BAKER HANSEN VIKATERASSEN AS (NO)
- 10 AS HALLIK (EE)
- 11 MACPHIE OF GLENBERVIE LTD (UK)
- 12 MATFORSK AS, NORWEGIAN FOOD RESEARCH INSTITUTE (NO)
- 13 PERA INNOVATION LTD (UK)
- 14 SCOTTISH CROP RESEARCH INSTITUTE (UK)

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# BEET-PULP

## Use of Micronised Bleached Beet Pulp as Additive in White Boards and Papers

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Collective research

Beet production in the European Union amounts today to about 116 million t per year and is mostly used for sugar production. The EU beet sector represents 400 000 beet growers, all of them are small to medium-sized enterprises (SMEs) that are independent or gathered within small-sized cooperatives. During the production process of beet sugar, beet pulp is the final residue, representing around 6 million t of dry matter per year. As stipulated in the Common Agricultural Policy, beet producers are the owners of beet pulp and consequently they have the interest and responsibility of valorising it.

Up to now, beet pulp has mainly been used to feed animals but this valorisation way generates very poor income for beet growers (EUR 1 to EUR 2 per tonne of beet) and this is tending to be reduced. There is thus a need for beet growers to find new ways of valorisation that will generate higher incomes and will be make it possible to deal with the large volume of beet pulp produced.

The project proposes a valorisation of beet pulp in a high added-value product: to transform beet pulp into vegetal micro-fillers for paper and board production. Today, mineral additives are incorporated into many paper grades to improve opacity, but the presence of these mineral fillers causes an environmental problem and the mechanical properties of the paper are negatively affected. This project proposes to replace, wholly or partly, these mineral fillers in paper, by bleached vegetal micro-fillers made of beet pulp. In comparison with currently used fillers, these vegetal micro-fillers would bring several advantages in terms of competitiveness and environmental friendliness. Thanks to the project, the beet producers will benefit from an innovative valorisation way, bringing higher value than in cattle breeding and corresponding to a mass market. Due to the imminent sugar reform, this cross-innovative valorisation way will anticipate changes by offering the possibility for beet producers to maintain constant incomes thanks to a better cost-effectiveness of beet by-products.

www.efpg.inpg.fr

- 1 INSTITUT NATIONAL POLYTECHNIQUE DE GRENOBLE / ECOLE FRANÇAISE DE PAPETERIE ET DES INDUSTRIES GRAPHIQUES (FR)
- 2 CONFÉDÉRATION INTERNATIONALE DES BETTERAVIERS EUROPÉENS (FR)
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- 4 ASSOCIATION DE RECHERCHE TECHNIQUE BETTERAVIÈRE (FR)
- 5 UNION DES SICA DE TRANSFORMATION DES PULPES DE BETTERAVES (FR)
- 6 FABRICATION ET ATELIERS L. CHOQUENET (FR)
- 7 W.KUNZ DRYTEC AG (CH)
- 8 SÉCOPULPE DE BOURGOGNE (FR)
- 9 JUAN ROMANI ESTEVE S.A. (ES)
- 10 PAPETERIE DES DEUX GUIERS SA (FR)
- 11 ABO AKADEMIE UNIVERSITY (FI)
- 12 MICRONIS (FR)
- 13 DANIEL GÓMEZ (FR)
- 14 SOCIÉTÉ PARTICIPATION PARISIENNE DES SCIURES (FR)

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# BIOPROS

## Solutions for the Safe Application of Wastewater and Sludge for High Efficient Biomass Production in Short-Rotation Plantations

The economic situation for European farmers deteriorated constantly during the last decade because of increasing cost pressures on agricultural products. Priorities in the EU's Common Agricultural Policy change and are foreseen to strengthen farmers' role in rural development and fulfilment of quality standards for environment, animal protection and food security. To be competitive, farmers are obliged to adapt their business activities in terms of alternative products and quality requirements. Short-Rotation-Plantations (SRP) are a very promising alternative source of income by cultivating fast growing tree-species as a source for bio-energy or other purposes with multifunctional characteristics as the application of wastewater and sewage sludge for irrigation and fertilisation. Due to this procedure, SRPs are high efficient biomass production systems with additional contributions as biological filters to a low-cost and environmentally safe biological wastewater and sludge treatment. Thus SRPs perfectly meet general requirements not only for farmers in the former EU-15 but also in the new Member States and Candidate Countries.

The aim of the proposing industrial associations or groupings (IAGs) in the BIOPROS-project is to gain knowledge about the economic, ecological and technical feasibility of SRPs for different local conditions and market requirements and to transfer it to their small to medium-sized enterprise (SME) members (farmers, biomass processors, engineers, decisions makers). This will contribute to the promotion of SRP biomass production between SMEs throughout Europe and abroad. The main focus will lay on the safe and efficient application of wastewater and sludge to guarantee high yields and sufficient treatment performance without any negative environmental or hygienic impacts.

Lack of knowledge about the high SRP potential and prejudices against the application of human wastes shall be minimised during the project as well as barriers against the application of SRP-biomass. For this reason, a wide range of aspects will be the subject of research including SRPs' best practice and costs as well as related legislation and standards.

- 1 EUROPEAN BIOMASS INDUSTRY ASSOCIATION (BE)
- 2 ASOCIACIÓN AGRARIA JOVENES AGRICULTORES GRANADA (ES)
- 3 BULGARSKA ASOCIACIA NA FERMERITE (BG)
- 4 ULSTER FARMERS' UNION (UK)
- 5 KRAJOWY ZWIĄZEK ROLNIKÓW KOLEJ I ORGANIZACJI ROLNICZYCH (PL)
- 6 EESTIMAA TALUPIDAJATE KESKLIIT (EE)
- 7 ZWIĄZEK ŚLĄSKICH ROLNIKÓW (PL)
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- 11 INTERNATIONAL ECOLOGICAL ENGINEERING SOCIETY (CH)
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- 21 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
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- 23 SVERIGES LANTBRUKSUNIVERSITET (SE)
- 24 CONSIGLIO PER LA RICERCA E SPERIMENTAZIONE IN AGRICOLTURA (IT)
- 25 SZKOŁA GŁÓWNA GOSPODARSTWA WIEJSKIEGO (PL)

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# CORALZOO

## The Development of an SME-Friendly European Breeding Programme for Hard Corals

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Collective research

As a result of an increased public interest in marine life, a growing number of zoos and public aquaria try to display live corals in their marine exhibitions.

In contrast to the commercial sector of marine ornamental trade, which is still largely dependent on collections from the wild, it is the policy of zoos and aquaria to display organisms that originate from sustainable inland breeding facilities. The proposed project aims to improve inland breeding and husbandry methodologies for corals, to be applied by zoos, public aquaria and also by the ornamental trade.

There are three specific goals:

- to acquire the protocols for sexual and asexual coral breeding in captivity, including breeding and feeding techniques and induction of natural coral colony morphogenesis;
- to improve coral husbandry by:
  - developing generic bioassays to evaluate biotic and abiotic husbandry parameters and to monitor coral health,
  - elaborating methods for identification and treatment of coral diseases,
  - optimisation of transport and acclimation practices;
- to train the small to medium-sized enterprises' (SMEs') staff with coral breeding and husbandry protocols and methodologies.

The CORALZOO project is therefore the first comprehensive approach that makes use of molecular biology and mathematical, toxicological and nutritional tools for the development of unique breeding protocol for corals in captivity. This will enable the SMEs to establish large stocks of coral colonies (the asexual approach) that represent a high genetic variability (the sexual approach) and exhibit natural growth forms. The results of the present work

will support the whole industrial sector in Europe, will stimulate European competitiveness, and will facilitate cooperation in research activities between the European SMEs in this sector. Moreover it will strongly contribute to the environmental protection of wild corals: the zoos will become self-supporting and the trade will become sustainable.

www.coralzoo.net

- 1 WAGENINGEN UNIVERSITEIT (NL)
- 2 ISRAEL OCEANOGRAPHIC AND LIMNOLOGICAL RESEARCH LTD (IL)
- 3 TECHNISCHE UNIVERSITAET DRESDEN (DE)
- 4 CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LE SCIENZE DEL MARE (IT)
- 5 EUROPEAN ASSOCIATION OF ZOOS AND AQUARIA (NL)
- 6 BURGERS ZOO (NL)
- 7 EMIH (UK)
- 8 COSTA EDUTAINMENT S.P.A. (IT)
- 9 RED SEA CORALS (IL)

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# CRAB

## Collective Research on Aquaculture Biofouling

The objective is to develop sustainable non-toxic effective antifouling management strategies for the European aquaculture Industry.

Biofouling is a problem in all sectors of the European fish-farming industry. Cost estimates for small shellfish producers indicate that biofouling leads to annual costs of approximately EUR 96 000 per year. Effective control of the problem is expected to reduce annual production costs throughout the industry by 5 % to 10 % and to secure the quality of product.

Keeping environmental impacts low whilst optimising the techniques will be a key driver in the approach. This will ensure sustainable solutions are developed. The project requires collaboration between aquaculture workers and research and technological development (RTD) experts including material scientists, biologists, engineers, managers and trainers. Work packages will include:

1. assessment of requirements and selection of strategies;
2. development and modification of technology;
3. laboratory testing;
4. farm trials programme;
5. risk assessment: environmental and economic;
6. dissemination: fouling control guidelines and recommendations;
7. training events; and
8. project management.

In going beyond the state of the art, the key RTD will initially focus on, but not be restricted to: biological control; new materials; electrical methods generating biocides (CI-) or pH shifts; new shellfish handling and immersion techniques; optimised cleaning

techniques; and developing an improved knowledge base of biofouling that will allow simple avoidance measures to be examined.

Outcomes will include: better technology (biological controls, new materials, cleaning strategies); better management options; training and guidelines to best available techniques.

- 1 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
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- 4 VIVEIROS ANA MANJUA, UNIPESOAL LDA (PT)
- 5 EUROPEAN AQUACULTURE SOCIETY (BE)
- 6 UNIVERSITY COLLEGE CORK, NATIONAL UNIVERSITY OF IRELAND, CORK (IE)
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- 20 BORIS NET COMPANY LTD (UK)
- 21 IRISH SALMON GROWERS ASSOCIATION (IE)
- 22 FISKERI- OG HAVBRUKSNAERINGENS LANDSFORENING (NO)

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# CrustaSea

## Development of Best Practice, Grading and Transportation Technology in the Crustacean Fishery Sector

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Collective research

This Collective Project will focus on improving the infrastructure of our crustacean fishery sector and initiate the process of enhancing the level of innovation and exploitation of technology relative to our global competitors in North America, Canada, as well as a number of Asian countries. As a result, we expect to regain shares of the growing global market by improving our crustacean seafood quality, increase efficiency and reduce costs. To address these main challenges in the industry, our sector needs to innovate and develop improved and cost-effective production methods throughout the product value chain. Our idea is to achieve our main objective through exchange of scientific knowledge and operational experience in order to design improved technical solutions for the grading, holding and transport of live crustaceans, and to facilitate the development of protocols and systems for handling, storage and transportation of live crustaceans through the complete value chain.

In order to achieve this, the following knowledge and technological capabilities will need to be developed.

- a) Enhanced understanding of specific biological requirements of specific crustacean species (edible crab and lobster) and the physical factors (particularly water quality) that impact on their health, growth and survival.
- b) Enhanced understanding related to handling, storage and transportation of live crustaceans, in terms of how to improve survival and quality, and hence add value to the sectors of crustacean fisheries, and in the near future, aquaculture.
- c) Development of a patentable, cost-effective crustacean grading unit for objective grading of such species into different qualities based on meat content.
- d) Development of a patentable transportation technology consisting of "intelligent" transportation boxes comprising a floodable

system for flushing of the live crustacean animals, in order for them to discharge waste components from their metabolism through their gills. This will also consist of an integrated water treatment system to remove ammonia from the water, thereby reducing the amount of water needed per transportation vessel, and increase crustacean survival during transportation.

www.crustasea.com

- 1 NORSKE SJOMATBEDRIFTERS LANDSFORENING (NO)
- 2 SAMTOK FISKVINNSLUSTODVA (IS)
- 3 ASOCIACIÓN DE COMERCIALIZADORES DE PESCADO DE VIGO (ES)
- 4 HITRAMAT AS (NO)
- 5 VINNSLUSTÖDIN HF (IS)
- 6 MC BRIDE FISHING CO. LTD (IE)
- 7 K. E. R. SERVICES LTD (IE)
- 8 TEKNOLOGISK INSTITUTT AS (NO)
- 9 MORE RESEARCH (NO)
- 10 PERA INNOVATION LTD (UK)
- 11 VESTMANNAEYJAR RESEARCH CENTRE (IS)
- 12 CENTRO TECNOLÓGICO DEL MAR - FUNDACIÓN CETMAR (ES)
- 13 WELSH FEDERATION OF FISHERMENS ASSOCIATIONS LTD (UK)
- 14 ASSOCIAÇÃO DOS COMERCIANTES DE PESCADO (PT)
- 15 INSTITUTO PORTUGUÊS DE INVESTIGAÇÃO DAS PESCAS E DO MAR (PT)
- 16 PROMENS DALVIK EHF (IS)
- 17 DATA DESIGN AS (NO)
- 18 MARISCOS BARROSIÑO (PT)

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# FINE FISH

## Improving Sustainability of European Fish Aquaculture by Control of Malformations

Malformed individual fish appear in variable and unpredictable numbers in farmed stocks in both warm and cold waters, and entail severe losses for the production sector. The similarity of malformation symptoms across fish species and culture environments implies that there is a general causal effect within the rearing conditions of farms, and a wide scope research effort is required when seeking to identify the causes.

Available scientific knowledge and practical experience on the causes of malformation problems led to the identification of the following focus areas:

- rearing temperatures, with emphasis on early life stages;
- nutrition, with focus on nutritional quality and impact on bone mineralization of both starter and grower diets;
- tank environment, including gas supplementation and hydrodynamics

The species to be investigated by the project are Atlantic salmon, cod, rainbow trout, sea bass and sea bream, thus covering most of the professional sectors within European fish farming that depend on hatcheries for their livestock.

A series of experimental studies will seek to clarify the impact of the experimental factors, aiming to provide practical guidelines on how to avoid malformations. The experimental fish will be subject to thorough examination, using practical diagnostic procedures and supplementary studies on disease mechanisms, using state-of-the-art methods in morphological as well as molecular sciences.

The project will combine hands-on experience and scientific know-how through interaction between small to medium-sized enterprises (SMEs), the industrial associations or groupings (IAGs) and research scientists, in order to ensure that the project addresses the research and technological development (RTD) requirements of the industry.

Some of the top hatcheries in European fish farming are partners in this project. The establishment of a unique bench-marking effort within collaborative hatcheries will be implemented throughout Europe. As a function of progress, additional SMEs will be invited to participate in this effort.

The results will be the subject of wide dissemination and communication efforts to each element of the European fish-farming sector and the scientific community. The network of the FEAP Associations will disseminate results to their member SMEs while the FEAP Secretariat will develop web-based information Services. Attendance at International Conferences and Association meetings by Consortium partners will also be used for the communication of results to scientists and SMEs. A programme will be made for the collective training in Best Management practice of the personnel of European SMEs and selected IAGs. Hard-copy materials for Best Management Practice and e-learning facilities will be developed.

- 1 FÉDÉRATION EUROPÉENNE DES PRODUCTEURS AQUICOLES (FR)
- 2 HELLENIC CENTRE FOR MARINE RESEARCH (GR)
- 3 CENTRO DE CIÊNCIAS DO MAR DO ALGARVE (PT)
- 4 THE ROYAL VETERINARY COLLEGE (UK)
- 5 PANITICA PUGLIESE SPA (IT)
- 6 BROW WELL FISHERIES LTD (UK)
- 7 VIVIERS DE FRANCE (FR)
- 8 BOLAKS AS (NO)
- 9 TINAMENOR SA (ES)
- 10 VIVEIRO VILA NOVA SA (PT)
- 11 FERME MARINE DE DOUHET (FR)
- 12 PROFUNDA AS (NO)
- 13 INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE (FR)
- 14 UNIVERSITY OF PATRAS (GR)
- 15 ISRAEL OCEANOGRAPHIC AND LIMNOLOGICAL RESEARCH (IL)
- 16 INSTITUT FRANCAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER (FR)
- 17 INSTITUTT FOR AKVAKULTURFORSKNING AS (NO)
- 18 ANDROMEDA SA (GR)
- 19 AQUASEARCH OVA (DK)

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# FRESHLABEL

## Integrated Approach to Enable Traceability of the Cold Chain of Fresh, Chilled Meat and Fish Products by Means of Tailor-Made Time/Temperature Indicators

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Collective research

The consumption of chilled and frozen meat and fish products within the EC is tremendously growing whereas food safety and control are of great concern for the whole consumer's community. Therefore, the reinforcement of confidence in meat and fish products, especially regarding cold-chain aspects, is of high priority for all involved in food manufacturing, trade, logistics and distribution, especially as Regulation 178/2002/EEC on General Food Law will require traceability to be established at all stages of the food chain from 1 January 2005. This Directive will force the introduction of community controls of the treatment of agricultural products and foodstuffs.

The freshness or the spoilage of fresh, chilled meat and fish products is mostly related to temperature conditions during transport and storage. Along the whole lifecycle of the products, it is of utmost importance to be able to monitor the cumulative degree of degradation of the products due to breaks in the cold-chain.

Even if all actors involved in the manufacturing and distribution chain of food products are taking all precautions, the concerned industrial associations or groupings (IAGs) of the food producing industries in Europe are convinced that only the widespread application of reliable, irreversible Time-Temperature Indicators (TTIs) which can record and display the break of the storage conditions, provides the monitoring of the real state of freshness along the product's life. At the same time, the application of TTIs is a comprehensive approach to assure food safety and public confidence, allowing transparency of all actions connected with the logistic chain, maximum information in understandable form, effective traceability of all kinds of foodstuff and will thus be a suitable standardised measure to keep the expected EC regulations of 2005.

Against this situation, the proposing IAGs intend to take an integrated and more proactive approach to the problem: the aim is the introduction of optimised TTIs for specific

products of the European meat and fish industry and to encourage and train their members in the respective application in order to increase the consumer's confidence in food safety. The IAGs are convinced that a Collective Research project is an excellent instrument for this intention.

The outcome of the FRESHLABEL project will be the visualisation of the quality and safety of meat and fish products by means of the generalised application of TTIs and associated training of the small to medium-sized enterprises (SMEs).

The proposing IAGs intend to take an integrated and more proactive approach to overcome the problem of the missing traceability of the cold chain: the aim is the joint introduction of tailor-made TTIs for specific products within the European meat and fish industry and to provide the necessary support to their members by means of training measures in order to fulfil the new obligations according to the EC Regulation 178/2002/EEC in 2005. All partners are convinced that Collective Research is an excellent instrument for this intention as it would be impossible for single SMEs to find a solution for this obligation on their own.

The project will thus have four main impacts:

- it will enable the generalised introduction of TTIs in key sectors of the European meat and fish industry with the support of IAGs — single SMEs would be swamped with this intention;
- it will facilitate the approval of the FRESHLABEL TTIs by the big supermarket chains by IAG driven interrogations regarding the definition of requirements and application tests in the respective work packages;
- it will facilitate the implementation of the new European Directives to be adopted in 2005 dealing with the traceability of the cold chain of food products by means of standardised methods;



- it will increase the commercial image of such indicated products, leading in turn to increased consumer confidence in product quality and safety and thus to an increased market demand for these products.

- 1 TECHNOLOGY TRANSFER CENTRE (TTZ) BREMERHAVEN (DE)
- 2 CLITRAVI – LIAISON CENTRE FOR THE MEAT PROCESSING INDUSTRIES IN THE EU (BE)
- 3 SNIV – SYNDICAT NATIONAL DE L INDUSTRIE DES VIANDES (FR)
- 4 NORWEGIAN SEAFOOD ASSOCIATION / NSL - NORSK SJOMATBEDRIFTERS LANDSFORENING (NO)
- 5 ANFACO – ASOCIACIÓN NACIONAL DE FABRICANTES DE CONSERVAS DE PESCADOS Y MARISCOS (ES)
- 6 PROKALA – PRO FISH ASSOCIATION (FI)
- 7 BVFISCH – BUNDESVERBAND DER DEUTSCHEN FISHINDUSTRIE UND DES FISCHGROSSHANDELS E.V. (DE)
- 8 FECIC – FEDERACION CATALANA DE INDUSTRIAS DE LA CARNE (ES)
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Heat treatment of foods is a key process in the agri-food industry; it mainly results in the development of a large range of flavours and tastes through the Maillard reaction. However, some of these Maillard products called 'neo-formed contaminants' are currently suspected to have deleterious health effects. The recent discovery of neo-formed acrylamide in a variety of fried and baked foods has highlighted the fact that agri-food enterprises and especially small and medium-sized enterprises (SMEs) are poorly prepared to face this emerging issue. Because of a lack of knowledge and inappropriate analytical and technological tools, SMEs are presently not able to control the impact of the different steps of the process on the NFC level.

In this context, the ICARE project is dedicated to the following:

1. reinforce the technological basis of the agri-food sector in order to understand and control NFC formation in industrial foodstuffs;
2. develop a rapid and cost-effective analytical method in order to enable SMEs to monitor the NFC level all along the production line;
3. increase the knowledge base of SMEs by providing them customized training;
4. perform pre-normative research in order to provide EU regulatory authorities with:
  - a) a fast method for NFC quantification,
  - b) a database of NFC levels in food and their impact on health.

ICARE will provide European agri-food SMEs with appropriate means to produce foods with reduced NFC rates and valorise such added value products: guidelines for manufacturers' practices; alternative solutions to heat treatments; analytical methods to control the process and quantify the NFC levels; related training for industrial associations or groupings (IAGs) and SMEs; clinical data and economical studies providing elements to implement a communication strategy geared toward consumers.

The proposed three-year project will bring together 5 European IAGs representing 9200 SMEs, that will be highly responsible for the training and dissemination activities. The SME core group will comprise 14 processed food producers and equipment designers. They will be supported by seven renowned European research centres and universities with complementary expertise in food processing sciences, NFC analysis and clinical studies.

The involvement of eight countries, including new EU members, will ensure efficient dissemination and a significant impact of the proposed pre-normative research.

- 1 D'APPOLONIA SPA (IT)
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- 14 EUROPEAN AND INTERNATIONAL FEDERATION OF NATURAL STONE INDUSTRIES (BE)
- 15 NATIONAL TECHNICAL UNIVERSITY OF ATHENS (GR)
- 16 INSTITUTE OF PHYSICS ACADEMY OF SCIENCES OF THE CZECH REPUBLIC (CZ)
- 17 ISTITUTO SUPERIOR TECNICO (PT)
- 18 TECHMI - PAVEL MILEV (BG)
- 19 MINCON INTERNATIONAL LTD (IE)
- 20 DITTA RIPAMONTI DR GIANNI SAS (IT)
- 21 SODEX OOD (BG)
- 22 BULGARO-ITALIANA TARGOSKA, ZEMEDELSKA E INDUSTRIALNA KAMARA (BG)
- 23 SVILUPPO ITALIA TOSCANA S.C.P.A. (IT)
- 24 LASKARIDIS MARBLE ABEF (GR)
- 25 MASERC - MARMORES SERGIO COELHO LDA (PT)

**Contract: 516415**  
**Call: FP6-2003-SME-2**  
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**Total cost: € 2 981 060**  
**EC Contribution: € 2 014 602**

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As daily consumption products in the Mediterranean area, olive oil and table olives production are important agri-alimentary branches in Europe. About 9.7 million t of olives are grown annually, from which approximately 1.9 million t of olive oil are produced in approximately 12 000 olive mills, most of them small to medium-sized enterprises (SMEs). This means that the EU is the biggest world producer of olive oil in the world (80 % of the total), and employs more than 800 000 people in Europe. In the case of table olives, the European Union is again the main producer (40-45 %), with figures for the last campaigns of between 400 t and 500 t, out of a world total production of 1.0 t to 1.3 million t (IOOC). This sector is integrated into the EU with about 600 companies. Due to their recognised beneficial health properties, olive oil and table olives consumption is expected to grow throughout the world (the growth rate is estimated at 3.5% to 4 % per year for both products — IOOC). From the production point of view, the optimised new plantations and irrigation technologies allow us match the increasing demand.

However, the extremely polluting residues generated by both industries (more than 10 million t from olive oil and about 1 million t from table olives annually in Europe) pose serious problems to the companies involved, especially in the case of SMEs. Indeed, faced with increasingly restrictive environmental legislations and the need to be competitive against other Mediterranean countries and new producers (for instance Australia, the US or South America), many small and medium-sized olive mills and table olives manufacturers could be forced to close in the next years, due to their inability to treat their residues properly. Faced with this situation, the proposing industrial associations or groupings (IAGs) intend to take an integrated and more proactive approach to the problem: the aim is to develop harmonised European environmental quality standards (EQS) for olive oil and table olives production and to provide the necessary support to their members for meeting them.

These EQS will guarantee compliance with European regulation and will be used also as a marketing tool against olive oil and table olives from non-European countries. For this purpose, a label identifying the olive

oil and table olives produced under the EQS will be developed and granted to the olive mills meeting them.

The main impacts of the proposed project are as follows:

- it will improve the environmental performance of olive mills, allowing them to comply with current and future legislation;
- it will improve the commercial image of the olive mills that decide to apply for the EQS, and will provide added value to their products; and
- it will increase their general knowledge base, in turn leading to increased competitiveness.

- 1 UNIONE NAZIONALE TRA LE ASSOCIAZIONI DI PRODUTTORI DI OLIVE (IT)
- 2 CONFEDERACIÓN DE COOPERATIVAS AGRARIAS DE ESPAÑA, U. DE COOP. (ES)
- 3 GREEK ASSOCIATION OF OLIVE MILLS (GR)
- 4 CENTRO DE ESTUDOS E PROMOÇÃO DO AZEITE DO ALENTEJO (PT)
- 5 ASSOCIATION OF OLIVE MILL OWNERS "SYLLOGOS IDIOKTITON ELEOURGION NOMOU CHANION" (GR)
- 6 PANHELLENIC ASSOCIATION OF TABLE OLIVE PROCESSORS, PACKERS AND EXPORTERS (GR)
- 7 UNION OF AGRICULTURAL COOPERATIVES OF PEZA OF IRAKLION PREFECTURE (GR)
- 8 JUAN DEL POZO SANCHEZ S.L. (ES)
- 9 AGRICULTURAL COOPERATIVE OF AGIOI APOSTOLOI LAKONIA (VOION) (GR)
- 10 SABINA AGRICOLA SOC. COOP. ARL (IT)
- 11 FRANTOIO OLEARIO ANTONIO ZAMPORLINI (IT)
- 12 G.E.I. ZA. SL (ES)
- 13 ILIAKO REWMA AGRIOGIANNOS MICHALIS (GR)
- 14 STAB AMBIENTE, CONCEPÇÃO, CONSTRUÇÃO E EXPLORAÇÃO DE SISTEMAS AMBIENTAIS LDA (PT)
- 15 SOCIEDAD COOPERATIVA ANDALUZA VIRGEN DEL CASTILLO (ES)
- 16 AQUATEC 3W GMBH (DE)
- 17 SOCIEDADE DE PRODUÇÃO E COMERCIALIZAÇÃO DE AZEITE FICALHO, LDA. (PT)
- 18 VEREINS ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 19 ISTITUTO SPERIMENTALE PER LA ELAIOTECNICA (IT)
- 20 NATIONAL AGRICULTURAL RESEARCH FOUNDATION (GR)
- 21 UNIVERSIDAD DE CORDOBA (ES)
- 22 CENTRO NAZIONALE DI RICERCA (IT)

**Contract: 500467**  
**Call: FP6-2002-SME-2**  
**Starting Date: 01/02/2004**  
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**Total cost: € 1 584 583**  
**EC Contribution: € 1 070 813**

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# LOWJUICE

## Novel Process for Reducing Sugar and Adding Fibre to Natural Apple Juices for Increased Public Health and Increased Competitiveness of the European Fruit Juice Industry

88

Collective research

<https://projectplace.com/pp/start.cgi?-60&320&512>

### The need

There are some 153 000 apple farmers and approximately 2 361 small to medium-sized enterprise (SME) apple juice processors within the EU. The EU apple juice manufacturers make generic products with limited branding and differentiation. Their competitive position is getting worse, due to increased import of low-cost apple juice from China and non-alcoholic beverages considered to be more healthy than juice. The project will add value and knowledge to the juice products they offer, and increase their competitive position. The novel process to be developed will also open up a totally new market for the 908 EU SME biotechnology companies involved in enzymatic processing and synthesis, and will also have impact on an estimated 1 200 EU SMEs supplying membrane filter equipment and services.

### The idea

Our idea is to develop a novel juice process able to reduce the content of sugars (measured by calories) by at least 50 %, without affecting consumer acceptance and without adding more than 20 % to the overall cost of production. In addition, the juice will have added functionality by increasing fibre content (300 ml of juice is to represent 10 % of RDI).

### The innovation

The technological barriers are limiting the SME-dominated apple supply chain in making these products available today, and the challenges need to be addressed in a pan-European fashion through the supply chain. Through clearly defined and well-focused technological objectives, we will develop a novel juice process based on the combination of:

- the right choice of apple variety and/or blends of varieties initially low in sugars;
- enzymatic conversion of a certain part of the sugars (reducing caloric load and changing overall sweetness);
- enzymatic conversion of a fraction of pectin fibres from the apples in order to make them soluble;

- a novel tangential cross-flow osmotic filtration system (after clarification) to remove compounds in excess and to adjust overall sweetness;
- a modified venturi system will be developed to introduce soluble pectin fibres downstream from the sugar removal system, increasing fibre concentration in the finished product.

We will benefit from scientific and technological progress from ongoing and recent EU-funded projects.

### Making our idea happen

The industrial associations or groupings (IAGs) behind this proposal have a robust plan for dissemination and training activities, and the core group of SMEs are well suited and committed. They provide a pan-European supply of apples, apple juice, enzymes and membrane filter technology, which combined with the expertise of the research and technical development (RTD) performers, will allow optimal European roll-out of the technology.

- 1 FEDERATION OF NORWEGIAN FOOD & DRINK INDUSTRY (NO)
- 2 FEDERACION ESPAÑOLA DE INDUSTRIAS DE ALIMENTACION Y BEBIDAS (ES)
- 3 THE DANISH FRUIT, VEGETABLE AND POTATO BOARD (DK)
- 4 BIOZON GMBH (DE)
- 5 LERUM FABRIKKER AS (NO)
- 6 ALBERTA S.A. (GR)
- 7 TARGI TARMALL GIRISIM SANAYII VE TICZRET AS (TR)
- 8 ERIK LOLLE (DK)
- 9 LENZING TECHNIK GMBH & CO (AT)
- 10 TROYKA MAKINE GIDA SANAYII DANISMANLIK VE PAZARLAMA LTD SIRKETI (TR)
- 11 PERA INNOVATION LTD (UK)
- 12 THE NORWEGIAN FOOD RESEARCH INSTITUTE (MATFORSK AS) (NO)
- 13 NATIONAL AGRICULTURAL RESEARCH FOUNDATION (GR)
- 14 ATHANASAKI BROTHERS (GR)
- 15 COOPERATIVA FRUTOS DEL CAMPO KUMIX (ES)
- 16 ENERGESA S.L. (ES)
- 17 UNIVERSITY OF APPLIED SCIENDE WEIHENSTEPHAN (DE)

Contract: 30379  
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Starting Date: 01/10/2006  
Duration (months): 36  
Total cost: € 2 266 162  
EC Contribution: € 1 297 143

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# MAP-MILLING

## Measure and Control of Mycotoxins, Pesticides and Acrylamide in the Grain Milling Sector

The agri-food sector is of major importance for the European economy as a whole and faces a process of adaptation to new regulations (namely, the White Paper on Food Safety) and new market demands, which call for a guaranteed high-quality product. The grain-milling industry has detected that one of their main problems in the final product's quality assurance, is the control of raw materials and the control of their toxicity: mycotoxins (ochratoxin A, aflatoxins, etc.), pesticides and the formation of acrylamide.

Current analyses in laboratories are long and relatively expensive, and they disturb flour production and increase final process costs. Industrial associations or groupings (IAGs) are very interested in developing and disseminating a new measurement technology at competitive market prices.

The global objective of the project is to increase food safety in the grain processing and milling industry, according to the new regulation and market demands, which require high-quality products and demonstrated reliability.

The operative objectives are:

- to design and develop reliable, fast and economic measurement systems and minimisation strategies focusing on the most common pollutants (mycotoxins, pesticides and acrylamide) in the grain milling and processing industry, both in field and in plant processing;
- to establish a simple guide of best procedures and strategies for decreasing levels of pollutants in food stuffs within the mentioned agri-food sub-sector;
- to develop a risk-management tool that allows, by means of an easy and economic procedure, to ensure final-product (flour) quality and safety, integrating all the results obtained (measurement system results, correlation with official results and best procedures) in a friendly and easy-to-use software tool to be used by milling companies;

- to exploit and disseminate the project results amongst the small to medium-sized enterprises (SMEs) within the sector at different levels to help incorporate these new technologies;
- to analyse other agri-food subsectors for technology transfer and to develop additional market applications of project results.

- 1 CONFEDERACION DE EMPRESARIOS DE ZARAGOZA (ES)
- 2 INTECHNICA GMBH UMWELTGUTACHTERORGANISATION (DE)
- 3 IGV INSTITUT FÜR GETREIDEVERARBEITUNG GMBH (DE)
- 4 MUHLE MUSCHEN (DE)
- 5 ROMANA MACINAZIONE S.R.L. (IT)
- 6 HARINERA DE TARDIENTA S.A. (ES)
- 7 DEMETER BUND E.V. (DE)
- 8 EESTI TOIDUAINETOOSTUSE LIIT (EE)
- 9 PRO AGRO VERBAND ZUR FÖRDERUNG DER AGRAR-UND ERNÄHRUNGSWIRTSCHAFT E.V. (DE)
- 10 UNIONALIMENTARI CONFAPI (IT)
- 11 ASOCIACION DE INDUSTRIAS DE ALIMENTACION DE ARAGON (ES)
- 12 CONSORZIO RICERCA OPERATIVE MARKETING EXPORT (IT)
- 13 INSTITUTO TECNOLOGICO DE ARAGON (ES)
- 14 AZTI FUNDAZIOA (ES)

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**EC Contribution: € 1 012 495**

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# OVULTEST

Improving Profitability of Dairy SMEs through Developing, Validating and Promoting the Use of a Biosensor for Ovulation Detection

90

Collective research

Industrial associations or groupings (IAGs) have manifested a real need to provide the over 600 000 small to medium-sized enterprise (SME) dairy farmers across Europe with a rapid, reliable and affordable means of ovulation detection. Misidentification of oestrus is a big problem in today's herds, leading to poorly timed inseminations and lower conception rates, with the result of farmers presently losing milk production and calves due to long calving intervals. They are also at risk of using less desirable semen on later services and culling good cows from the herd that are not in fact pregnant. Recent studies indicate that 85-90 % of unsuccessful inseminations are caused by failure in heat detection and only 10-15 % are due to the conception rate. On many SME farms, fertility is still monitored by farmers observing changes in a cow's behaviour, combined with laborious regular recording of fertility events, which in general offer poor results. Alternative methods such as pedometers present a large number of false positives and an efficiency of less than 50 %. Available test procedures for monitoring progesterone levels (i.e. ELISA) in milk are not widely used as they are time-consuming, difficult to automate and require skilled technicians.

This project will thus develop a rapid multianalyte analyser for predicting ovulation cycles in the field, using an innovative biosensor for determining levels of progesterone and estradiol hormones in milk. The device will be easy to use and provide rapid, on-site information so that suitable cows can be identified for artificial insemination on a daily basis.

Widespread uptake of this affordable enabling technology will improve the competitiveness of European SME dairy farms, as they will gain in productivity due to optimal output per cow in terms of increased delivery of calves due to short calving intervals, increased milk production due to a reduction in dry periods, and by replacing labour-intensive human observation with innovative technology.

<http://ovultest.cric-projects.com/>

- 1 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)
- 2 IRISH CATTLE BREEDING FEDERATION SOCIETY LTD (IE)
- 3 ANIMAL BREEDERS' ASSOCIATION OF ESTONIA (EE)
- 4 ASSOCIAZIONE ITALIANA ALLEVATORI (IT)
- 5 HOLSTEIN (UK)
- 6 DOVEA GENETICS LTD (IE)
- 7 PIISTAOJA KATSETALU OU (EE)
- 8 POLVA AGRO OU (EE)
- 9 AZIENDA AGRICOLA CARLO E PASQUALE SICILIANI (IT)
- 10 GESUND LANBRUK HB (SE)
- 11 JOAN FURROY BERNATALLADA SL (ES)
- 12 ABEREKIN S.A. (ES)
- 13 APPLIED RESEARCH USING OMIC SCIENCES S.L (ES)
- 14 ELECTRONIC SYSTEM DESIGN LTD (MT)
- 15 L.E.A. BIOTECH SRL (IT)
- 16 INSTITUT DE RECERCA I TECNOLOGIA AGROALIMENTARIES (ES)
- 17 LUND UNIVERSITY, DEPARTMENT OF ANALYTICAL CHEMISTRY (SE)
- 18 MALTA INDUSTRIAL INNOVATION FOR SMEs LTD (MT)

**Contract:** 30377  
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**EC Contribution:** € 1 949 593

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The high costs of European food production may only be faced by either large enterprises and brands able to use highly automatised production processes or by quality products with high added-value, produced by small niche of enterprises. Also, a wide adoption of reliable traceability systems in small companies belonging to the agri-food sector and the improvement of the citizens' trust versus the capability to quickly identify contaminated product batches along the whole value chain contribute to avoid the following risks:

1. a crisis of the whole national and international agri-food value chain due to news about possible contamination of some foods;
2. loss of consumer trust in products coming from small producers' chains, due to the following:
  - (a) lack of capacity of demonstrating the traceability of the products,
  - (b) actions of large competitors interested in increasing their market quote.

The main objective of the P2P project is to develop methodologies and tools supporting the quick collection of information from different traceability systems so that citizens and public officers can easily access such information in a unified approach. Industrial Associations play an important role in setting up service centres, where all the traceability information converges in real time. The main tools of the service centres are as follows: (1) a methodology to assure collection of information from companies; and (2) an Internet-based and an open-source software tool tailored on small to medium-sized enterprises (SMEs), easily supporting collection, archiving and sharing of information and documents, often from the already existing information system of the company.

The P2P project faces the traceability of the swine value-chain. The decision arises from many considerations, including the high number of SMEs

involved, many international relations, the low value of the single animal, and a variety of transformation processes; all ensure that the experience and the results developed will be profitably used also in other agri-food sectors.

- 1 CONFEDERAZIONE NAZIONALE DELL'ARTIGIANATO E DELLA PICCOLA IMPRESA, ASSOCIAZIONE PROVINCIALE DI MODENA (IT)
- 2 LEGA PROVINCIALE DELLE COOPERATIVE E MUTUE (IT)
- 3 CONFCOOPERATIVE UNIONE PROVINCIALE DI MODENA (IT)
- 4 ASOCIACION TXERRIZALEOK (ES)
- 5 FLEISCHERINNUNG DELMENHORST / OLDENBURG-LAND (DE)
- 6 VAGOALLAT -ES HUS TERMEXTANACS (HU)
- 7 L. RICHELDI S.P.A. (IT)
- 8 MOROTTI GIAN LUIGI (IT)
- 9 EUROCENTRO DE CARNES S.A. (ES)
- 10 MIBA S COOP (ES)
- 11 HERMANOS CHICO GALINDO S.A. (ES)
- 12 LUTZ LEHNACKER GMBH (DE)
- 13 MULLER'S WURST DIELE GUT NUTZHORN (DE)
- 14 BIOTECO S.R.L. (IT)
- 15 DEMOCENTER - CENTRO SERVIZI PER L'INNOVAZIONE S.C.A.R.L. (IT)
- 16 CENTRO RICERCHE PRODUZIONI ANIMALI - CRPA S.P.A. (IT)
- 17 AZIENDA UNITA SANITARIA LOCALE DI MODENA (IT)
- 18 INNOPOLE S.L. (ES)
- 19 INKOA SISTEMAS S.L. (ES)
- 20 INSTITUT FÜR ANGEWANDTE SYSTEMTECHNIK BREMEN GMBH (DE)
- 21 SZAMITASTECHNIKAI ES AUTOMATIZÁLÁSI KUTATÓ INTÉZET (HU)
- 22 ORSZÁGOS HÚSIPARI KUTATÓINTÉZET KOZHASZNU TÁRSASÁG (HU)

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**Total cost: € 2 358 199**  
**EC Contribution: € 1 379 183**

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# PATHOMILK

Providing the Milk Supply Chain with a Rapid, Portable and Cost-Effective Biosensor for Multi-Pathogen Detection in Milk

92

Collective research

The European dairy industry represents one of the most important sectors within the European agri-food industry, and comprises over 1.8 million small to medium-sized enterprises (SMEs) in EU-25. Dairy associations are concerned about the presence of diseases which are highly contagious and dangerous to human and animal health, such as brucellosis, Johne's disease and mastitis, in the European herd. The pathogens provoking these diseases are present in raw milk, and some even in pasteurised milk. Nowadays, in most EU countries, official pathogen detection is performed via annual invasive blood analyses. This is clearly insufficient as in the meantime, any infections on farms remain undetected and spread. The latter implies significant losses in production, veterinary treatments, abortions and ill-cow slaughters. Apart from the dramatic impact on farmers' incomes, the absence of detection also poses the risk that contaminated milk is distributed for human consumption until the next official blood sampling. SME farms have neither the resources nor the time to invest in costly surveillance programmes. The competitiveness of SME dairy farms is thus at stake.

The objective of this project is to develop a rapid multipathogen analyser for detecting the most common pathogens in milk, using an innovative biosensor based on a DNA-hybridisation method and using Surface Plasmon Resonance as a detection technique. The system will be designed in an open way to enable easy expansion of the number of detectable pathogens.

Enabling simple, affordable on-farm controls would empower SME farmers to produce safe milk and certify quality, thus improving their competitiveness. The inherent data generated will also reduce economic losses resulting from delayed detection. Moreover, these controls will help to keep disease outbreaks under control by early detection of their origin, thus safeguarding the health and safety of European consumers.

<http://pathomilk.cric-projects.com>

- 1 CENTRE DE RECERCA I INVESTIGACIO DE CATALUNYA S.A. (ES)
- 2 ASSOCIAZIONE ITALIANA COLTIVATORI (IT)
- 3 LEICAR - ASSOCIAÇÃO DOS PRODUTORES DE LEITE E CARNE (PT)
- 4 LLETERS DE CATALUNYA, LLET NOSTRA SCCL (ES)
- 5 ROYAL ASSOCIATION OF BRITISH DAIRY FARMERS (UK)
- 6 BIOSURFIT S.A. (PT)
- 7 EMBIODIAGNOSTICS LTD (CY)
- 8 VITALTECH IBERICA S.L. (ES)
- 9 APPLIED RESEARCH USING OMIC SCIENCES, S.L (ES)
- 10 VYSKUMNY USTAV MLIEKARENSKY (DAIRY RESEARCH INSTITUTE) (SK)
- 11 MILCOM A.S.- DAIRY RESEARCH INSTITUTE (CZ)
- 12 NATIONAL MILK RECORDS PLC (UK)
- 13 SOCIEDADE AGROPECUARIA VILAMORIM LDA (PT)
- 14 TORRE IN PIETRA S.ANGELO DI FILIPPO ALBERTINI (IT)
- 15 AZ AGR. CUGINI BIGARAN SS (IT)
- 16 LEICARCOOP COOPERATIVA DOS PRODUTORES DE LEITE CRL (PT)
- 17 SAT 1342 CAT (ES)
- 18 CADI SOCIETAT COOPERATIVA C. LTDA (ES)
- 19 KE & LRC EDWARDS (UK)
- 20 FELTALALOI ES KUTATO KOZPONT SZOLGALTATO KORLATOLT FELELOSSEGU TARSASAG (HU)
- 21 INSTITUT DE RECERCA I TECNOLOGIA AGROALIMENTA RIES (ES)
- 22 USTAV RADIOTECHNIKY A ELEKTRONIKY AV CR (CZ)

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EC Contribution: € 2 178 710

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# QUALI-JUICE

## Quality Assurance and Development of an Early Warning System for Microbial Spoilage for the European Fruit Juice Industry

European small and medium fruit juice producers face the problem of contamination of their products by lactate fermenting bacteria, provoking undesired fermentation processes and causing enormous financial losses for the afflicted companies. Responsible for these contaminations are an insufficient raw material quality (influenced by storage and climatic conditions), constructional deficits or insufficiently trained technical personnel. Through the proposed collective research project, the necessary tools to overcome these problems will be disposed to the community of European juice producing companies and other food producing companies facing this situation.

The primary objective of QUALI-JUICE is to develop and validate an efficiently sensitive early warning system which indicates a critical undesired bacterial spoilage during fruit juice production. The methodology will be applicable to all European juice producers for detection of microbial contamination with lactate producing bacteria. An early detection of beginning fermentation processes is beneficiary in several ways: Firstly, it helps to identify critical points in fruit processing. Hence, a substantial basis is given for decision-making towards repeated preservation measures (pasteurisation) in order to keep the juice suitable for human consumption. Thus, potential for saving raw material and production costs can be explored, thereby increasing the productivity.

The proposing associations will embed the early warning system technology in an overall training strategy for small to medium-sized enterprise (SME) juice producers in order to provide an integrated approach for this specific industrial branch. The training strategy will therefore include:

- resource management (logistics and raw material management);
- Good Manufacturing Practice;
- tracing sources of microbial contamination throughout the complete production chain;

- quantifying risk factors in juice production.

The envisaged training measure will be carried out according to current standards and regulations on hygiene and food quality and safety.

- 1 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIE TRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. - TTZ BREMERHAVEN (DE)
- 2 ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE ZUMOS (ES)
- 3 POLISH ASSOCIATION OF FRUIT JUICE AND SOFT DRINKS PRODUCERS (PL)
- 4 SOCIETATEA NATIONALA DE HORTICULTURA (RO)
- 5 CHAMBER OF COMMERCE AND INDUSTRY OF SLOVENIA-FOOD INDUSTRIES ASSOCIATION (SI)
- 6 FACHVERBAND DER NAHRUNGS- UND GENUSSMITTELINDUSTRIE (LEBENSMITTELINDUSTRIE) (AT)
- 7 SENSOLYTICS GMBH (DE)
- 8 TECHTRONIK (DE)
- 9 VIN-KON S.A. (PL)
- 10 PEKTIROM S.R.L. (RO)
- 11 HAUS RABENHORST O. LAUFFS GMBH & CO. KG (DE)
- 12 FAHNER FRUCHT HANDELS UND VERARBEITUNGS GMBH (DE)
- 13 INDULLEIDA S.A. (ES)
- 14 TECHNICAL UNIVERSITY OF LODZ (PL)
- 15 CENTRE OF ENVIRONMENTAL RESEARCH LEIPZIG- HALLE GMBH (DE)
- 16 LEBENSMITTELVERSUCHSANSTALT (AT)
- 17 UNIVERSITATEA DE ȘTIINȚE AGRICOLE ȘI MEDICINA VETERINARA (RO)

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# RISKSCRA

## Dairy Products in Mediterranean Sheep Populations: Quantification of Scrapie Risk

94

Collective research

In the Mediterranean area, the dairy sheep industry represents a strategic sector within the agricultural and food economy. In the EU, one of the main problems of alimentary safety is related to transmissible spongiform encephalopathies (TSE). Scrapie is one of the TSEs; it is a fatal brain disease of sheep and goats. Genetics have shown that it is possible to identify sheep resistant or susceptible to TSEs by testing the animal DNA.

An integrated set of research tasks will be carried out to quantify the presence of scrapie-susceptible genotypes in milk, based on the current knowledge of scrapie's genetic background.

The project aims to develop new analytical tools to assess and quantify scrapie risk in sheep dairy products in the Mediterranean area and to implement their application by small to medium-sized enterprises (SMEs) throughout the production chain. The scientific work will be performed by the research and technological development (RTD) performers, who will also prepare suitable analytical protocols for application in the SME production context. Special attention will be placed on adapting the protocols for routine control purposes. The transfer of technology and knowledge will be possible by means of specific training courses organized by the industrial associations or groupings (IAGs), run by the RTDs' researchers and tailored to SMEs' needs and their personnel's competences. The acquisition of analytical control capabilities will provide SMEs with the tools to set up a comprehensive system for scrapie risk evaluation and management from flocks to end products, thus enabling manufacturers to fulfil current consumer needs for food safety. This will endow sheep dairy productions with a quality feature capable of promoting them on a wider market at both national and international levels, providing support to the whole sector.

The ultimate objective is to increase SME competitiveness by developing and applying a safety control, which is in harmony with the advanced European strategies, thus stimulating the manufacturing of scrapie-free dairy products.

<http://www.riskscra.eu>

- 1 ISTITUTO SPERIMENTALE ITALIANO (IT)
- 2 CONSORZIO TUTELA FORMAGGIO PECORINO ROMANO (IT)
- 3 CHIOS SHEEP BREEDERS' COOPERATIVE MACEDONIA (GR)
- 4 CONSEJO REGULADOR DEL QUESO ZAMORANO (ES)
- 5 HIJOS DE SALVADOR RODRIGUEZ S.A. (ES)
- 6 QUESOS CAMPOSTERA S.L. (ES)
- 7 F.LLI PINNA INDUSTRIA CASEARIA SPA (IT)
- 8 AGRIEXPORT SARDEGNA COOP SRL (IT)
- 9 AGRIS SARDEGNA (IT)
- 10 DPTO. PRODUCTION ANIMAL FACULTAD DE VETERINARIA UNIVESIDAD DE LEON (ES)
- 11 ANIMAL SCIENCE DEPARTMENT FACULTY OF AGRICULTURE UNIVERSITY OF ZAGREB (HR)
- 12 ARISTOTELE UNIVERITY OF THESSALONIKI SCHOOL OF VETERINARY MEDICINE (GR)

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**EC Contribution: € 1 460 000**

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# SAFE-CHEESE

## A Barrier for Preventing Pathogenic Bacterial Growth in Cheese from Non-Pasteurised Milk

An estimated 1.2 million man-days are lost annually due to illness caused by the consumption of infected raw-milk cheese. This gives an economic loss of EUR 350 million each year. However there is much under-reporting of foodborne diseases, so the estimated loss could be even higher. The pathogenic bacterium *Listeria monocytogenes* can grow in raw-milk cheeses. *Listeria monocytogenes* is especially dangerous for risk groups such as the elderly, infants and pregnant women. For pregnant women, the *L. monocytogenes* can lead to abortion and disorders for the child. There is a specific need for a technology enabling a cost-effective barrier against pathogenic bacterial growth in raw-milk cheeses, in order to produce safer cheese. When producing cheese from non-pasteurised milk, there is no barrier available for preventing growth of pathogenic bacteria other than Good Manufacturing Practice (GMP). The pasteurisation — an effective barrier to “inactivate” bacteria in the raw milk — destroys the characteristic taste and flavour of the raw milk cheeses, and pasteurisation is not an alternative barrier for the producers. The estimated 110 000 raw-milk cheese small to medium-sized enterprise (SME) producers in Europe therefore need a robust barrier that can prevent pathogenic bacteria from growing in their cheeses without affecting the preferred taste and flavour. The European Alliance for Artisan and Traditional Raw-Milk Cheese Products, EAT, is a group of European SMEs producing raw-milk cheeses. It represents over 50 000 milk producers, 1 500 dairy units (among them 1 000 dairy farm units), spread mainly over France, Italy, Spain, Portugal, the UK and Ireland. The main concern is to provide food diversity through a traditional way of producing cheese and to maintain biodiversity, while at the same time meeting consumers’ high quality and safety standards.

Our idea is to develop a protective culture of lactic acid bacteria that originate from raw-milk cheese. The protective culture will prevent growth of pathogenic bacteria and will result in safer cheese from non-pasteurised milk. The protective culture the project aims to develop, must:

- a. protect against growth of *S. aureus*, *E. coli* and *L. monocytogenes* in the cheese;
- b. be easy to add to the existing process;
- c. not affect the organoleptic features of the cheese;
- d. be suitable to freeze-dry and for production as a commercial culture.

The public health benefits are as follows.

- a. Raw-milk cheese is a product not recommended for pregnant women, elderly or infants because of the risk of getting *Listeria monocytogenes*. By preventing these pathogenic bacteria from growing in the cheese, the risk for these consumer groups will be reduced.
- b. An estimated 1.2 million man-days are lost annually because of foodborne diseases caused by consumption of raw-milk cheeses. This is estimated to be a notional economic loss of EUR 350 million each year. This will be reduced dramatically.
- c. Reduction in hospitalisation and death, caused by consumption of raw-milk cheese.

There are several economic benefits.

- a. Consumers demand safer food, but also more natural food. Raw-milk cheese provides organoleptic experiences that pasteurised food cannot offer. This gives a strong market potential if fears about the safety of raw-milk cheese can be overcome.
- b. Extra exports to be gained, thanks to “healthy” raw-milk cheeses.
- c. Import substitution: European consumers are persuaded of the “healthiness” of new-style

raw-milk products if they are safe, and they will buy more raw milk cheese in preference to imported cheese.

- d. Additional job-saving and job-creation as well as positive income-effects, by encouraging small producers towards higher added-value raw-milk dairy products, due to the availability of the new technology.
- e. Cost-savings by reducing the wastage in current cheese production as a result of bacterial infection.
- f. Secure production is in fragile regions, fragile populations and in production often involving women.

Regarding EU regulations, the project will help implement EU regulation 852/2004 on the hygiene of foodstuffs in such a way as to limit adverse effects on the raw-milk dairy industry.

- 1 MATFORSK AS (NO)
- 2 EUROPEAN ALLIANCE FOR ARTISAN AND TRADITIONAL RAW MILK PRODUCTS EEIG (UK)
- 3 ASOCIACIÓN PROVINCIAL DE EMPRESARIOS FABRICANTES DE QUESOS DE CUENCA (ES)
- 4 KANLAR MILK AND FOOD IND. CORP. LTD (TR)
- 5 MUTO GIULIANA LUGINA (IT)
- 6 MOXLAKIS LTD (GR)
- 7 QUESOS MANCHEGOS MORALES S.A. (ES)
- 8 COPROLAT (IT)
- 9 ESTABLISSEMENTS CONQUARD EXPORT (FR)
- 10 PERA INNOVATION LTD (UK)
- 11 NORSK GARDSOST - NORWEGIAN FEDERATION FOR SME CHEESE PRODUCERS (NO)



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 Duration (months): 36  
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 EC Contribution: € 1 155 577

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Saffron is the most precious and most expensive spice in the world. The greatest saffron producers are Greece, India, Iran, Italy, Morocco and Spain. The largest saffron importers are France, Germany, Sweden, Switzerland, the UK and the US. In the past years, the fraudulent practices have proliferated, in part due to high prices and also to the lack of technological methodologies available to detect them. In fact, the ISO/TS 3632 (2003) norm that regulates the purity and quality of saffron does not take into account any reliable analytical technique to detect basic colorants and natural pigments, to fight against fraud and to establish objective criteria of quality and food safety; neither is there a methodology to assure food safety by determining microbiological contamination. One of the most common fraudulent practices is the use of synthetic colorants and natural pigments. Those products are used in small amounts to dye saffron threads or other plants. Therefore, the scientific and technological problem to overcome is the development of cost-effective, easy-to-use and reliable methodologies for:

- the identification of fraudulent agents in saffron: synthetic colorants and natural pigments;
- the standardisation of the quality and food safety criteria of saffron.

The industrial associations or groupings (IAGs) and small to medium-sized enterprises (SMEs) aim to develop new methodologies to modify the current ISO norm, by introducing standards and reliable procedures to fight against fraud. For this purpose, seven European saffron IAGs and nine SMEs are directly involved in the project. IAGs and SMEs are supported by four research and technological development (RTD) performer experts in saffron and eight independent certified laboratories for the validation of the methodologies. The results will be mainly disseminated and transmitted to the associated and non-associated SMEs by means of a protocol that will be base of the new ISO norm. The introduction of the new standardised methodologies that define the criteria of purity, quality and food safety will be the main tool for the defence of the competitiveness of the European SMEs of the saffron field. Besides SMEs, the new tool will be disseminated in quality control centres

(certified laboratories and customer offices for import and export) to ensure the importation conditions of the saffron into Europe. The implementation of the ISO norm will benefit not only the European sector but the worldwide one. The saffron market aims to gain consumer trust in saffron quality by means of an international norm. The defence of the saffron market will benefit employment in producer countries. Saffron importers will benefit from the absence of synthetic colorants and non-controlled pigments in saffron. The control of the use of synthetic colorants will eliminate its toxic effects when used for the adulteration of saffron. Standardised microbiological control will contribute to consumer safety and will permit rejection of any batch from third countries not fulfilling the food safety requirements in Europe.

- 1 ASOCIACIÓN ESPAÑOLA DE ENVASADORES DE ESPECIAS Y CONDIMENTOS (ES)
- 2 ASOCIACIÓN ESPAÑOLA DE NORMALIZACIÓN Y CERTIFICACIÓN (ES)
- 3 SU ZAFFERANU (IT)
- 4 ASOCIAȚIA PRODUCĂTORILOR, PRELUCRĂTORILOR ȘI UTILIZATORILOR DE PLANTE MEDICINALE (RO)
- 5 KROKOS KOZANI COOPERATIVE OF SAFRAN (GR)
- 6 HELLENIC ORGANIZATION FOR STANDARDIZATION (GR)
- 7 CONSEJO REGULADOR DE LA DENOMINACIÓN DE ORIGEN LA MANCHA (ES)
- 8 VERDÚ-CANTÓ SAFFRON SPAIN S.L. (ES)
- 9 COMPAÑÍA EXPORTADORA DE AZAFRÁN ESPAÑOL (ES)
- 10 PROALIMENT JESUS NAVARRO S.A. (ES)
- 11 AROMATIC (SE)
- 12 FRANCO CURRELLI (IT)
- 13 MARIE CARMINE ENNAS (IT)
- 14 FRANCESCO SANNA (IT)
- 15 BAKATZOUNIS (GR)
- 16 S.C. NUTRACEUTICAL (RO)
- 17 UNIVERSIDAD DE CASTILLA-LA MANCHA (ES)
- 18 AGRICULTURAL UNIVERSITY OF ATHENS – AUA (GR)
- 19 INSTITUTO TECNOLÓGICO AGRONÓMICO PROVINCIAL DE ALBACETE (ES)
- 20 UNIVERSIDAD ALCALA DE HENARES (ES)
- 21 COLEGIO FARMACÉUTICO DE ALICANTE (ES)
- 22 INSTITUTO DE INVESTIGACIONES AGROALIMENTARIAS (ES)
- 23 LABORATORIO QUÍMICO MICROBIOLÓGICO (ES)
- 24 KAISERLAUGHTERN UNIVERSITY (DE)
- 25 INSTITUTO AGRONÓMICO (ES)
- 26 MICROBIOLOGICAL AND CHEMICAL INSTITUTE OF ATHENS (GR)
- 27 LABRAGO (PT)
- 28 INSTITUTE DE LA SANTE ET LA SÉCURITÉ PUBLIQUE (BE)

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**EC Contribution: € 2 314 800**

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# SPIES-DETOX

Active Biological Monitoring and Removal of Toxins in Aquaculture Ecosystems and Shellfish — Including the Development of a Solid-Phase In Situ Ecosystem Sampler(SPIES) and Detoxification of Shellfish (DETOX)

98

Collective research

The project SPIES-DETOX aims to perform the following activities:

1. to investigate new methods, using solid-phase adsorption for detection of algal toxins (amnesic shellfish poisoning (ASP), paralytic shellfish poisoning (PSP), diarrhetic shellfish poisoning (DSP) toxins and other marine lipophilic toxins) in the water column; this may serve as an early shellfish-toxin contamination-warning mechanism for areas important to shellfish harvesting;
2. to develop new techniques to combine solid-phase adsorption toxin-detection methods in remote samplers, and the use of molecular probes for the identification of toxic algal species — leading to rapid methods of detection of specific species of toxic phytoplankton;
3. to develop cost-effective protocols that will combine the solid-phase adsorption and toxin tracking into useable management and quality control tools for the industry;
4. to investigate the use of different protocols to wash ASP (and other algal) toxins from contaminated shellfish during processing; e) to investigate the bacterial degradation of algal toxins, and the use of microencapsulated bacteria to purify these toxins from commercially important shellfish;
5. to set up new industry protocols designed to use latest quality-control technology and set up a training regime that can be used to bring the necessary skills to industrial users and to educate new researchers.

- 1 ORKNEY FISHERIES ASSOCIATION (UK)
- 2 ASSOCIATION OF SCOTTISH SHELLFISH GROWERS (UK)
- 3 BIOMARIN VEKST (NO)
- 4 ASOCIACIÓN NACIONAL DE FABRICANTES DE CONSERVAS DE PESCADOS Y MARISCOS (ES)
- 5 CLEW BAY MARINE FORUM LTD (IE)
- 6 GREEK FEDERATION OF SHELLFISH PRODUCERS (GR)
- 7 HAVBRUKSKOMPANIET AS (NO)
- 8 HVALERSKJELL AS (NO)
- 9 KILLARY FJORD SHELLFISH LTD (IE)
- 10 APPLIED ENZYME TECHNOLOGY LTD (UK)
- 11 KVITSGØY EDELSKJELL AS (NO)
- 12 BIOSENSE LABORATORIES AS (NO)
- 13 THE SCOTTISH MINISTERS ACTING THROUGH FISHERIES RESEARCH SERVICES (UK)
- 14 NATIONAL UNIVERSITY OF IRELAND, GALWAY (IE)
- 15 ARISTOTLE UNIVERSITY OF THESSALONIKI (GR)
- 16 SCOTTISH ASSOCIATION FOR MARINE SCIENCE (UK)
- 17 UNIVERSIDADE DE SANTIAGO DE COMPOSTELS (ES)
- 18 CENTRAL SCIENCE LABORATORY - DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS (UK)

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# SustainAqua

## Integrated Approach for a Sustainable and Healthy Freshwater Aquaculture

About 75 % of the world's most valuable marine fish stocks are either fished to the limits or over-fished. At the same time, world fish-consumption has increased from 45 million t in 1973 to more than 130 million t in 2000, with an estimated rising demand in the future. In order to serve this increasing demand in the long run, sustainable alternatives have to be strengthened.

The most promising one is the aquaculture industry, dominated by small to medium-sized enterprises (SMEs) (90 %), providing more than 60 000 jobs in Europe, including upstream and downstream activities. It has undergone a revolution over the last decades and can now be regarded as a significant segment of the EU economy and global fisheries sector.

However, disorientation regarding best practices and the need to be competitive, especially against low-cost producers from Asia, Latin America and the Caribbean, result in an increasing pressure on the aquaculture farms, especially in the case of SMEs. Moreover, several adverse impacts, resulting for instance from the discharge of effluents, water extraction, chemicals use or genetic releases, are opposed to upcoming restrictive European and national environmental and health legislations and demands. The success of European's aquaculture farmers in the growing global aquaculture market depend, in great measure, on the farmers' ability to fulfil the different requirements: to compete with foreign aquaculture products and to respond to European and national political and consumer quality, environmental and health requirements.

Therefore, the overall objective of the proposed project is to expand the knowledge base of the European freshwater aquaculture farmers by training them mainly in the following three clusters of innovation areas:

1. diversification of economical valuable products,
2. improving product quality, and
3. improving the profitability of production, and with this, improving their overall competitiveness.

- 1 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 2 INTERNATIONAL ORGANISATION FOR THE DEVELOPMENT OF FISHERIES IN EASTERN AND CENTRAL EUROPE (DK)
- 3 AKVAPARK ASSOCIATION (HU)
- 4 VEREIN DER DEUTSCHEN BINNENFISCHEREI E.V. (DE)
- 5 VATTENBRUKARNAS RIKSFÖRBUND (SE)
- 6 POLSKIE TOWARZYSTWO RYBACKIE (PL)
- 7 ORGANIZACION DE PRODUCTORES DE ACUICULTURA CONTINENTAL (ES)
- 8 ÖSTERREICHISCHER FISCHEREIENVERBAND (AT)
- 9 SU ÜRÜNLERİ TANITIM DERNEĞİ (TURKISH FISHERIES AND AQUACULTURE ASSOCIATION) (TR)
- 10 DANSK AKVAKULTUR (DK)
- 11 INTERNATIONAL ECOLOGICAL ENGINEERING SOCIETY (CH)
- 13 AQUABIOTECH INNOVIA LTD (MT)
- 14 ARANYPONTY RT. (HU)
- 15 KAHLE, JENS BERNARD (DE)
- 16 HODOWLA RYB "SALMO" (PL)
- 17 LİMAN ENEGRE BALIKÇILIK SANAYİİ VE TİCARET LTD STİ. (TR)
- 18 VISKWEKERIJ ROYAAL B.V. (NL)
- 19 UNIVERSITY OF SOUTH BOHEMIA IN CESKE BUDEJOVICE (CZ)
- 20 WAGENINGEN UNIVERSITY – AQUACULTURE AND FISHERIES GROUP (NL)
- 21 POLSKA AKADEMIA NAUK, ZAKŁAD ICHTIOTBIOLOGII I GOSPODARKI RYBACKIEJ (PL)
- 22 MARTIN-LUTHER-UNIVERSITÄT HALLE-WITTENBERG (DE)
- 23 HALASZATI ES ÖNTÖZESI KUTATO INTEZET (HU)
- 24 TECHNICAL UNIVERSITY OF DENMARK - DANISH INSTITUTE FOR FISHERIES RESEARCH (DK)

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**EC Contribution: € 2 667 042**

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# TRIGGER

## Development of a Pea Starch Film with Trigger Biodegradation Properties for Agricultural Applications

100

Collective research

The main objective is to develop an agricultural plastic film which will maintain its functional properties during its lifespan, and at the same time be able to break down quickly and effectively after harvest. Our aim is to develop a trigger to start and accelerate the biodegradation process just when the film has completed its work. This trigger must be activated independently of the crop, the type of soil and the climate conditions.

We will investigate two alternative approaches to manufacturing a film with a controlled biodegradation start and rate (trigger system).

- A film based on a biopolymer with a low biodegradation rate, which will incorporate a salt as a filler that will undergo an exothermal reaction on contact with water. During the lifespan of the film, the salt is isolated from water within the film, so rain or irrigation water cannot begin the biodegradation process. After the crop season, the film is ground, and mixed with the soil and water applied by specially adapted agriculture machinery. The filler then comes into contact with water, increasing the temperature and humidity of the film, accelerating its biodegradation process.
- A film based on a biopolymer with high biodegradation rate whose biodegradation activity will be initially inhibited by the addition of an antimicrobial additive and then promoted when required. Inorganic antimicrobials will be considered, keeping in mind that they must not be toxic (for the soil).

Initially, we will work with both alternative approaches. But in Work Package 5, we will select the most technical, economical and environmentally viable solution. The needs of final users will be determined to establish the biodegradable trigger film requirements.

The R&D work will mainly focus on the trigger systems, but also on the biopolymer made of pea

starch, the compounding process, the film extrusion process and the system to obtain plastic bits and mix them with the soil, using specially adapted agricultural machinery.

[www.aimplas.es/proyectos/trigger/](http://www.aimplas.es/proyectos/trigger/)

- 1 ASOCIACION DE INVESTIGACION DE MATERIALES PLASTICOS Y CONEXAS (ES)
- 2 AGRICULTURAL INDUSTRIES CONFEDERATION LTD (UK)
- 3 CHAMBER OF COMMERCE AND INDUSTRY - DOBRICH (BG)
- 4 NATIONAL FARMERS' UNION (UK)
- 5 LA UNIO DE LLAUARDORS I RAMADERS - COAG (ES)
- 6 SCA UNEAL (FR)
- 7 FEDERAZIONE REGIONALE COLDIRETTI FRIULI VENEZIA GIULIA (IT)
- 8 INICIATIVAS PLASTICAS S.L. (ES)
- 9 WELLS PLASTICS LTD (UK)
- 10 MOKSLINIŲ PASLAUGŲ FIRMA GTV (LT)
- 11 PLASTICOS MONTISON S.L. (ES)
- 12 SA ENTREPRISE BOUILLET (FR)
- 13 INSTITUTE OF FOOD RESEARCH (UK)
- 14 SMITHERS RAPRA TECHNOLOGY LTD (UK)
- 15 THOMAS THOMSON (BLAIRGOWRIE) LTD (UK)

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# FP6 Project Catalogue

Biotechnology & Health

## Aloe Vera — Maximising Yield of Effective Compounds and Development of Natural Cosmetic Products with Standardised Content of these Compounds

Natural substances and plant extracts are increasingly important components in the cosmetic and pharmaceutical industry and also in the wellness sector, thanks to their inherent characteristics and their high acceptance among consumers. Therefore, the market share of natural products has been growing very fast, and for instance, plant-based drugs today represent a market share of approximately 30 % of pharmaceuticals.

Aloe Vera is benefiting from this demand for natural ingredients, thanks to its unique healing and nutritional characteristics: The Aloe Vera leaf contains over 75 nutrients and 200 active compounds, including 20 minerals, 18 amino acids, and 12 vitamins, and works effectively against sunburn and UV irradiation. However, up to now, no objective method for quality demonstration and assessment of Aloe Vera has been established, which affects the competitiveness of European producers, since they can only compete against imported raw material by offering a higher quality product.

The companies of the consortium consider that a European project is the best means to perform the necessary study and development to establish the regulations and standards that will guarantee their permanence in the market, while keeping their current product quality.

The AMAY project aims at obtaining:

- exchange of best practices for plantations (maximising yield) regarding soil quality, cultivation methods, plant cultivars;
- isolation and quantification of Aloverose by NMR (irregularly acetylated polymer of Mannose);
- development and testing of new products with standardised content of effective compounds.

- 1 SANTAVERDE GESELLSCHAFT FÜR NATURPRODUKTE MBH (DE)
- 2 PLANT SCIENCE SERVICES GMBH (DE)
- 3 ALFAVERDE PRODUCTOS NATURALES S.L. (ES)
- 4 QUIVERA COSMETICOS S.L. (ES)
- 5 POULIMENOS CACTI (GR)
- 6 PIANTE FARO (IT)
- 7 TELA GMBH (DE)
- 8 GRADIENS TERMÉKFEJLESZTŐ KFT (HU)
- 9 TOPORIINA OY (FI)
- 10 VEREIN ZUR FOERDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 11 SPECTRAL SERVICE GMBH (DE)
- 12 STATNI ZDRAVOTNI USTAV (CZ)





# ArraySBS

## Array-Based Sequencing by Synthesis

Future demands for understanding, diagnosis, treatment and prevention of diseases will create a need for DNA-sequencing platforms that are faster and significantly more cost-effective than the alternatives currently available. It is the aim of this project to develop methods and components for a sequencing-by-synthesis approach with the potential of fulfilling these needs. The core group of three biotech small to medium-sized enterprises (SMEs), located in Sweden, Estonia and Lithuania, have essential and unique competencies for developing these new DNA methods and components, but some key elements are missing and need to be found outside these companies.

The new approach requires the following steps:

- development and synthesising of the four dNTPs (A, C, T, G) with blocked 3'-end and labelled with a fluorescent dye and methods for reverting the 3' modification to a 3'-OH group;
- isolation and selection of a DNA polymerase that accepts these modified nucleotides without removing the 3'-end modification;
- development of a microfluidics device as a reaction chamber and for simultaneous detection of dye-labelled reversible terminators;
- bioinformatics to select the primers and evaluate the data generated;
- verification that these components function together.

The SMEs represent extensive experience in the area of DNA arrays with spotted primers for mutation detection, organic chemistry of modified nucleotides, and isolating and selecting DNA modifying enzymes. The areas where additional expertise is needed are: (1) DNA polymerases interaction with modified dNTPs; (2) microfluidics; and (3) bioinformatics, specifically related to primer selection and handling the DNA sequence information generated. Three research

and technological development (RTD) performers from Germany, Sweden and Estonia with excellent knowledge in the three areas mentioned above will take part in the project. It is expected, that with the support of this CRAFT project, the SME group will succeed in this development of the new approach, based on an array platform with thousands (or more) of oligonucleotide features. The major technical risk concerns the identification of a DNA polymerase that accepts the modified nucleotides and the possibilities for improving its performance. The German RTD performer will provide excellent expertise in this area, and the group will also have additional support from an external scientific advisor with a first-rate track-record in protein engineering, who will be linked to the project.

A positive outcome of the project must be followed by commercialisation that will involve the development of a fully functional and marketable product.

For this phase, the SME group may choose to involve additional partners.

- 1 QUIATECH AB (SE)
- 2 ASPER BIOTECH LTD (EE)
- 3 FERMENTAS (LT)
- 4 JOHANN WOLFGANG GOETHE UNIVERSITÄT FRANKFURT AM MAIN (DE)
- 5 TARTU ÜLKOOL (EE)
- 6 SILEX MICROSYSTEMS AB (SE)

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# AURORA

## Contact-Free Dynamical Volumetric Measurements of Lower Body with Functional Clinical and Diagnostic Capacity

106

Co-operative research

The amount of people suffering from different musculoskeletal complaints of the back and lower body, such as back pain and knee-problems, is huge.

Orthopaedic physicians and physiotherapists are required to analyse a variety of movements to diagnose pathological or abnormal changes. At present, no equipment is available to carry out 4-D surface measurements to analyse clinical functional parameters of the lower body. Therefore, the purpose of the project is to develop and construct a low-cost system able to reconstruct musculoskeletal movements based on scanned volumes of the lower body.

The materials and methods providing innovation in this project will be a full volumetric and musculoskeletal analysis of movements. Raster line triangulation combined with fast laser-based pattern projection will be used as the basic technique to record a part of the lower body in 4-D (3-D+ time). As the equipment only processes (dynamical) surface information, anatomical and physiological models, able to reconstruct the musculoskeletal system of the scanned body parts, have to be developed.

The main advantages of the project output are the equipment's ability to reconstruct kinematics, kinetics and dynamics of the musculoskeletal system of the lower body, without the use of potentially harmful and/or relatively expensive equipment, as well as its ability to indicate and quantify pathological changes or abnormalities, both at an early stage and in connection with diagnosis. Additionally, basic clinical parameters will be covered: volumetric analysis (volume differences, areas, distances, angles, etc.), as well as "standard" kinematical features (axes of the lower extremities, acceleration and velocity parameters, etc.).

- 1 DIERS INTERNATIONAL GMBH (DE)
- 2 RIMKEVICIUS AND GINTAUTAS COMPANY (LT)
- 3 SMARTTECH SP.ZO.O. (PL)
- 4 VELOMAT MESSELEKTRONIK GMBH (DE)
- 5 KATHOLIEKE UNIVERSITEIT LEUVEN (BE)
- 6 POLITECHNIKA WARSZAWSKA (PL)
- 7 EBERHARD-KARLS UNIVERSITÄT TÜBINGEN (DE)

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# BINDING GASTRIN

Therapeutic Synthetic Antibodies — Binding Bodies — against Gastrin to Treat Pancreatic Cancer

Pancreatic cancer is diagnosed 60 000 times in the USA and the EU each year. Almost the same number of people die of this disease each year. This illustrates that all existing therapies have little effect once the disease is diagnosed; survival time after diagnosis is 80 to 160 days. Gastrin drives the tumour growth. Recently, a vaccine against gastrin has been developed, able to double the survival time and to improve the quality of life of pancreatic cancer patients. Unfortunately, only a limited number of individuals respond to the vaccine and produce antibodies, and even then development of antibodies is slow, which is especially problematic for this fast-progressing disease.

We propose to develop an alternative which will take effect immediately in all individuals treated. To this end, we propose to develop high-affinity and low-cost synthetic antibodies — 'binding bodies' — against gastrin. Binding bodies are two or more peptides which represent CDRs (complementary determining regions, which are the hypervariable and antigen-interaction parts of the binding site of an antibody) coupled covalently to a small chemical scaffold. The concept works: ample evidence shows that peptides representing single CDRs can bind antigen. Recent data obtained by Pepscan shows that combining peptides representing at least two different CDRs give much higher binding and much more specificity. We speculate that further optimisation should yield low-cost synthetic antibodies — binding bodies — with activities similar to those of biological antibodies.

To sort this out, a major and concerted effort is required, involving the integration of six different technologies: (1) recombinant antibody libraries, to define initial peptide sequences representing CDRs that bind gastrin (CNIO, Spain); (2) bioinformatics to predict a limited and optimised set of peptides that can be used to synthesise and optimise the binding bodies (Algonomics, Belgium); (3) peptide synthesis, peptide libraries and supramolecular chemistry to construct and optimise the binding bodies (Pepscan, the Netherlands); (4) affinity measurements to validate the various antibodies and binding bodies during

the entire process (ULP, France), (5) the appropriate animal models to validate the therapeutic potential of the optimised products (UMCU, the Netherlands); and (6) array technology to develop binding body arrays for fast selection procedures of promising binding bodies during the project and as such for subsequent clinical applications (Proteomika, Spain).

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Co-operative research

- 1 PEPSCAN THERAPEUTICS B.V. (NL)
- 2 FUNDACION CENTRO NACIONAL DE INVESTIGACIONES ONCOLOGICAS CARLOS III (ES)
- 3 UNIVERSITE LOUIS PASTEUR, STRASBOURG (FR)
- 4 ALGONOMICS NV (BE)
- 5 PROTEOMIKA S.L. (ES)
- 6 UNIVERSITAIR MEDISCH CENTRUM UTRECHT, DEPARTMENT OF METABOLIC AND ENDOCRINE DISEASES (NL)

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# BOVAC

## Development of a Prophylactic Vaccine and Diagnostic Markers to Prevent And Diagnose Lyme Borreliosis Specific to Europe and North America

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Co-operative research

Lyme Borreliosis is the most common tick-borne infection in Eurasia, including Europe, European and Asian Russia, large parts of China, Japan, and North America. The disease manifests itself as a multi-system disorder, which can affect a complex range of tissues including the skin, musculoskeletal system, heart, and nervous system, leading to arthritis, carditis, and neuroborreliosis. The availability of the complete genome sequence from *Borrelia burgdorferi* has enabled the search for antigens and vaccine candidates among the complete proteome of this pathogen. This knowledge, together with the use of human serum antibodies and whole-genome libraries will be applied to identify the most promising vaccine candidates from *Borrelia* in a very short time and without the need to express a large number of recombinant proteins. Applying the powerful combination of state-of-the-art experimental technologies and bioinformatics, we propose to identify common antigens from *Borrelia burgdorferi*, *garrinii* and *afzelii*, which can function as targets for protective immunity, preventing LB and acting as markers for serodiagnosis.

The participating small to medium-sized enterprises (SMEs) and research and technological development (RTD) performers maintain the highest quality of research and technology in their respective fields, among them proven and renowned experts of LB and *Borrelia*. The anticipated results of this project will be of immediate benefit to the involved SMEs. Novel diagnostic markers can be directly exploited as a commercial opportunity leading to a new standard in clinical diagnosis, whereas a prophylactic vaccine can enter clinical testing after completion of this project. Further benefits include the development of marketable research tools (e.g. DNA microarrays), the creation of international networks and the publication of results in high-standard scientific journals. This work will add to the repertoire of intellectual property of the involved SMEs and further broaden the expertise of both, RTD performers and SMEs. Lastly, the project will be of great societal benefit through its contribution to the understanding of the underlying mechanisms of disease caused

by *Borrelia*. The coordinator and most partners have extensive expertise in management of large projects and possess sufficient resources regarding personnel, equipment and finances in order to be able to successfully complete this project.

www.bovac.org

- 1 INTERCELL AG (AT)
- 2 MWG BIOTECH AG (DE)
- 3 BIOTEST S.R.O. (CZ)
- 4 UMEA UNIVERSITET (SE)
- 5 MEDIZINISCHE UNIVERSITÄT WIEN (AT)
- 6 NATIONAL INSTITUTE OF PUBLIC HEALTH (CZ)

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EC Contribution: € 1 260 643

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# CANNABIS

## Standardised Extracts of Cannabis for Use in the Treatment of Migraine and Rheumatoid Arthritis

Preparations derived from *Cannabis sativa* have been used as medicines throughout Europe and Asia, as is seen from the earliest written records, especially in the treatment of pain and inflammation. A number of studies have focused on specific aspects of *Cannabis* and its constituents, but very little commercial development activity has focused on the production of high-quality, high-value, standardised extracts (preferably low in the psychoactive constituent THC) which are orally active and suitable for clinical use. A recent large-scale clinical trial of cannabis in over 600 patients with multiple sclerosis, whilst giving equivocal results on the amelioration of muscle spasm, showed significant effects on relieving the associated pain. It is generally accepted that refined extracts of *Cannabis*, rather than single constituents, are more likely to yield an economically viable product. Commercial ventures have so far focused purely on selecting "appropriate" cultivars to protect individual patents, rather than establishing proper scientific criteria based on chemical and pharmacological requirements for developing therapeutically active preparations. Production methods for establishing suitable standardised extracts, and subsequent pharmaceutical formulations (which would result in valuable IP for any company), have not yet been at the centre of any serious R&D attention.

This consortium of small to medium-sized enterprises (SMEs) and universities intends to develop such extracts using *in vitro* and *in vivo* pharmacological methods, as well as a metabolomics profiling of the final products, focusing particularly on arthritis and migraine. These are two therapeutic areas of pain and inflammation for which both anecdotal and scientific evidence already exists, but which have not yet resulted in appropriate development of a commercial product. The relevance of these conditions is highlighted by the fact that in the EU the standard prevalence of migraine is 19.6 % with a gender incidence of 1:2.4 (men: women), an average age of 46.1 years, and an average onset of 20.64 years. A similar situation exists concerning arthritis, a major health problem of Europe's ageing population, and importantly for both conditions, existing drug

therapy is not completely satisfactory. In fact, recent surveys have shown that patients frequently self-medicate with cannabis, often illicitly, for these types of debilitating pain.

Cannabis already has a high rate of acceptance and interest throughout the general population, making a new medicine based on a high-quality extract a promising commercial opportunity. Therefore a phytopharmaceutical product based on a properly scientifically validated extract would provide a significant business opportunity for a consortium of SMEs with complementary technological expertise in molecular pharmacology, biochemistry and phytopharmaceuticals.

- 1 SCHOOL OF PHARMACY, UNIVERSITY OF LONDON (UK)
- 2 VIVACELL BIOTECHNOLOGY GMBH (DE)
- 3 UNIVERSIDAD DE CORDOBA (ES)
- 4 WILLIAM RANSOM AND SON PLC (UK)
- 5 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH, TNO PHARMA (NL)
- 6 UNIVERSIT DEL PIEMONTE ORIENTALE (IT)
- 7 CEREBRICON LTD (FI)
- 8 UNIVERSITAET BERN (CH)
- 9 UNIVERSITAETSKLINIKUM FREIBURG (DE)

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# CHIMERIC VACCINES

Development of Influenza delNS1 Virus as a Vector for Foreign Antigens

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Co-operative research

[www.greenhillsbiotech.com/eu\\_projects.html](http://www.greenhillsbiotech.com/eu_projects.html)

This project targets the combating of diseases such as human and avian influenza. We propose to develop the influenza delNS1 virus as a vector for antigens of the human- and avian-influenza virus. Candidate vaccines expressing influenza virus antigens will be developed and tested in phase I clinical trials. An important feature of the delNS1 vector is that deleting the pathogenicity factor NS1 not only leads to an attenuated phenotype, but also results in stimulating an efficient immune response in the host. These are highly advantageous properties for a vaccine vector. In the case of the chimeric influenza delNS1 vaccine, expressing antigens from different influenza types by the delNS1 vector would eliminate the current need to combine different influenza virus strains for vaccination. Therefore, production and purification costs will be significantly reduced, resulting in a cheaper vaccine.

The complementary constellation, the quality of the partners, efficient project management and the availability of the combined resources will enable us to successfully achieve the goals of this project. It will allow the small to medium-sized enterprises (SMEs) to significantly reduce the time necessary for the preclinical development phase and will bring the proposed chimeric vaccine viruses a major step closer to a marketable stage. Therefore, the project will contribute to the integration of partners in European research networks, and by its highly innovative features, will strengthen European research. Through the involvement of partners from the Czech Republic and Slovenia, this project contributes to the integration of future EU member countries.

Due to the enormous market potential, significant earnings can be expected. The patents, virus strains and technologies generated through this project will allow the SMEs to negotiate significant upfront, licensing and royalties payments from pharmaceutical companies.

- 1 AVIR GREEN HILLS BIOTECHNOLOGY RESEARCH DEVELOPMENT TRADE GMBH (AT)
- 2 EMERGENTEC BUSINESS ANALYTICS GMBH (AT)
- 3 BIOTEST S.R.O. (CZ)
- 4 BIA SEPARATIONS D.O.O. (SI)
- 5 KLINIKUM DER JOHANN WOLFGANG GOETHE-UNIVERSITÄT FRANKFURT/MAIN (DE)
- 6 MEDICAL UNIVERSITY OF VIENNA (AT)
- 7 STATE INSTITUTION RESEARCH INSTITUTE OF INFLUENZA (RU)



FP6 Project Catalogue

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# CHITOSANPEROS

New Chitosan Formulations for the Prevention and Treatment of Diseases and Dysfunctions of the Digestive Tract (Hypercholesterolemia, Overweight, Ulcerative Colitis and Celiac Disease)

At present, chitosan tablets are commercially available as over-the-counter dietary supplements for hypercholesterolemia and overweight. Nevertheless, their formulation is primitive because the chitosan used is not in the most suitable physical and biochemical form. Thus consumers are forced to take large daily doses, and face exceedingly high costs and poor results. Moreover, for celiac disease, no dietary food incorporating chitosan exists. These kinds of patients have to use expensive gluten-free dietary foods instead of bread and pasta, with economical, nutritional and psychological distress: all these inconveniences could be removed by a proper incorporation of chitosan. Finally it is likely (but not yet investigated) that colitis patients might have benefits from chitosan intake, should chitosan be developed into a carrier for colitis-specific drugs.

This proposal intends to develop new chitosan physical forms and formulations useful for the prevention and treatment of said widely occurring diseases and dysfunctions of the digestive system, that eventually develop into serious chronic diseases (heart diseases, obesity, diabetes, malabsorption, Crohn's disease) that constitute heavy social burdens. The rationale is that chitosan has to be put into amorphous form, increasing its surface area, porosity, solubility and compressibility: in this way tableting becomes feasible without the use of binders and higher efficacy is obtained; moreover, the total weight of a tablet is much lower. This will be achieved by spray-drying, freeze-drying and other techniques available in the food industry, involving the most recent advances in the chemistry of alkaline chitosan solutions. Assessments will include instrumental analytical chemistry, biochemistry, microbiology and organoleptic evaluations. As for celiac disease, the rationale resides in the capacity of chitosan to sequester the toxic gliadin fraction responsible for intolerance. Pasta and bakery products containing minor quantities of chitosan, would expectedly make these common foods accessible to celiac patients. Assessments will include analytical chemistry and organoleptic evaluations.

Among the final deliveries are the following:

1. novel instant soluble, highly effective chitosan formulations;
2. very innovative dietary foods for celiac patients;
3. scientifically based description of the oral delivery of chitosan;
4. quality standards for chitosan to be used as a dietary supplement;
5. drug carriers for aminosalicic acid; (6) scientifically sound informative material for the consumer.

- 1 UNIVERSITA POLITECNICA DELLE MARCHE (INSTITUTE OF BIOCHEMISTRY, FACULTY OF MEDICINE) (IT)
- 2 LATGALES MAIZNICA (LV)
- 3 RIGA TECHNICAL UNIVERSITY (LV)
- 4 FUNDACION LEIA CENTRO DE DESARROLLO TECNOLOGICO (ES)
- 5 OLIGOPHARM CO. LTD (RU)
- 6 ACIDEKA S.A. (ES)
- 7 INSTITUTE OF ANIMAL PHYSIOLOGY AND GENETICS (CZ)
- 8 MEDICOL SCIENCES LTD (CZ)

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**Biotechnology & Health**

# CLEANHAND

## Preventing 10 000 European Hospital Deaths by Securing Efficient Hand Disinfection through an Automatic, Easy-to-Use, Environmentally Friendly and Verifiable Disinfection Process

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Co-operative research

Each year, 2.8 million patients are infected while receiving treatment in European hospitals: these are referred to as nosocomial infections. These nosocomial infections cause patients to incur other illnesses and make treatment more complex. For the patient, hospital infections means a prolonged hospital stay and more suffering at the hospital, and may also lead to permanent health damage or death. While statistics indicate that many major causes of death are now decreasing, hospital infection deaths have doubled in 40 years. It is estimated that at least 10 000 people die from hospital infections in the EU annually. International studies show that high-intensity surveillance and infection control programmes can reduce the prevalence of hospital infections. Hence, high-intensity surveillance and infection control programmes with a high focus on hand sanitation represent a potential for a 30 % reduction in hospital infections.

The Community Network for the epidemiological surveillance and control of communicable diseases, established by the European Parliament and Council Decision 2119/98/EC is an example of the EU focus on hospital infections. Our project also contributes to the basis for EU objectives and actions with respect to combating hospital infections (Article 152, ex Article 129). Despite there being no commercial automatic hand sanitizers, it is estimated that the potential annual global market for sale of apparatus' and sanitising liquids is EUR 1.6 billion, giving an EU market of EUR 783 million a year. Assuming a modest market penetration of 3 % in EU and 2 % globally and also including the healthcare sector outside the hospital market segment, the potential market for the AHS is EUR 310 million a year. The objective of this project is to develop an Automatic Hand Sanitizer (AHS) that disinfects hands of nurses, doctors, staff, patients and visitors in hospitals within 5 seconds, cost efficiently ensuring repeatable, reliable and high-quality hand disinfection, independent of user behaviour, also encouraging frequent use through a user-friendly design and tagging system.

To create the technological capability, the following generation of scientific knowledge and development routes will be undertaken:

1. the acquisition of a deeper scientific understanding, in order to establish the relationships between the applied volume of disinfectant liquid on human hands and disinfection efficiency;
2. the creation of an Innovative Hand-Sensor System, in order to confirm the sufficient spreading of fingers and removal of rings or jewellery to achieve 100 % disinfection of the full hand area;
3. the novel application of RF Tag technology, in order to obtain a tag unit for the user to verify the fulfilled disinfection routine, and identify to the user the need for re-disinfection;
4. the development of an integrated system using low power electronics.

- 1 MAINSANI AS (NO)
- 2 SKIDATA AG (AT)
- 3 SOLEMS S.A. (FR)
- 4 MIKRON TUNSBURG AS (NO)
- 5 ASCOR SPOLKA AKCYJNA (PL)
- 6 CAPFLOW (BE)
- 7 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)
- 8 PERA INNOVATION LTD (UK)



FP6 Project Catalogue

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# ClearBrush

## A Novel Integrated Ultrasonic Brush and Sonically Activated Lotion to Provide a Full System Approach to the Eradication of the European Head-Louse Menace

Except for the common cold, head lice infestation is more common than all the other childhood communicable conditions combined (20 million people in the EU become infested each year, with a treatment cost of approximately EUR 375 million and untold contamination problems). The current treatment — fine-tooth combing, which is unpleasant and difficult to administer, and pesticides, to which resistance is building rapidly — have failed to solve the problem.

Our proposed ClearBrush system is based around a full-system approach to eradication of head lice.

The Active Brush will remove eggs and lice, and aims to develop the following innovative features and benefits.

- The brush will be usable in the same way as an ordinary brush. The ultrasonic bristles will vibrate in a carefully designed lateral mode, so that the bristle spacing can be greater than 0.5mm, allowing all hair to pass through, but exerting a destructive force on the attached eggs.
- The brush will be large enough to capture, kill and remove any lice that can still move.
- A specially designed bristle profile will ensure that the scalp is not hurt.

The Active Lotion will immobilise lice, penetrate and kill eggs, and lubricate their removal, with the following features:

- a novel complex thixotropic lotion, guided to the target area and given highly increased penetration by the ultrasonic brush bristles;
- naturally active Neem compounds, to give a new mode of pediculicidal (louse killing) effect, optimised through a patented high-efficiency extraction process.

The consortium spans a supply chain of healthcare product producers and distributors, brush and ultrasonic hardware manufacturers, and active natural ingredient specialists, complemented by expert RTO Innowacja Polska, to develop the manufacturing technologies, and the UK's Insect Research and Development centre, to carry out the testing. The consortium includes representatives of the user and wholesale chains, so as to accurately target this important solution.

- 1 A NELSON & COMPANY LTD (UK)
- 2 DENMAN INTERNATIONAL LTD (UK)
- 3 KNOXCRIS SERV SRL (RO)
- 4 PRZEDSIĘBIORSTWO BADAWCZO-PRODUKCYJNE OPTEL SP. Z.O.O. (PL)
- 5 LABORATORIOS LAC SOCIEDAD LIMITADA (ES)
- 6 LABORATORIOS DIAFARM S.A. (ES)
- 7 INNOWACJA POLSKA SP. Z.O.O. (PL)
- 8 INSECT RESEARCH & DEVELOPMENT LTD (UK)

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# CORNEA

## Development of an Artificial Cornea for the Human Eye

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Co-operative research

Opacification of the cornea of the human eye results in the loss of vision and finally blindness, unless corrected by a corneal transplant. In developed countries, the standard surgical technology to restore vision is the replacement of the cornea by a human donor cornea in a penetrating keratoplasty. More than 40 000 keratoplasties per year are performed in Europe and the United States each, with a continuous increase in recent years, and with success rates from more than 90 per cent to less than 50 per cent. Low success rates are associated with dry eyes, Herpes keratitis, corneal vascularisation, recurring uveitis, acid burns, and traumatic anatomic structures of the anterior eye. The lack of donor corneas resulted in long waiting lists of patients in developed countries, and their non-availability in developing countries in millions of treatable blind people. There is a long history of attempts to replace the human cornea by alloplastic material with either disappointing results, or complicated multiple surgeries associated with severe drawbacks for the patient.

The CORNEA project will combine the invention of a novel corneal transplant by one small to medium-sized enterprise (SME) partner with novel flexible ophthalmic polymers developed by a second, the manufacturing technology of a third, and the surgical instruments and technology of two more SME partners. This combined SME know-how will be merged with the surface modification technology to be developed by one research and technological development (RTD) partner and the ophthalmic-surgical expertise and preclinical and clinical research capacities of two more RTD partners. Thus the project CORNEA will combine several cutting-edge technologies in order to achieve a implant design that has never been available before, as well as precision of surgery, and open the chance to regain vision for otherwise blind people. It will give a long-term competitive advantage and profit to the members of the consortium, and secure existing and create new job positions.

The CORNEA project aims at:

- creating a competitive advantage for the SMEs in the consortium, by significant product and manufacturing technology innovation, and by providing access to a new, profitable niche market not yet covered by multinational companies;
- making use of technological synergies and combined financial resources through transnational cooperation;
- strengthening the scientific and technological basis by integrating research capacities of RTD performers where the SMEs' own capabilities have shortcomings;
- securing existing and creating new job positions through international competitiveness, ensuring the critical mass in marketing power through transnational cooperation.

www.cornea.coronis.net

- 1 CORONIS GMBH (DE)
- 2 EUROCRYSTAL S.A. (FR)
- 3 I. O. INTERNATIONAL LTD (UK)
- 4 DR SCHMIDT INTRAOCULARLINSEN GMBH (DE)
- 5 ROCKMED B.V. (NL)
- 6 RHINE-TEC GESELLSCHAFT FÜR VIRTUELLE INSTRUMENTIERUNG GMBH (DE)
- 7 PESCHKE MEDIZINTECHNIK GMBH (DE)
- 8 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 9 AKADEMIA MEDYCZNA - IM. KAROLOA MARCINKOWSKIEGO W POZNANIU (PL)
- 10 MEDICAL UNIVERSITY OF SILESIA KATOWICE (PL)

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**EC Contribution:** € 1 178 500

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# Dendrite

## Deposition of Encapsulated Networks of Drugs to Prevent Remedial Implant Treatment Emanating from Deep Bone Infection

Prosthesis implantation of the hip and knee are among the most common operations carried out in the EC and account for over 1.4 million operations annually across Europe per year. However, postoperative infections are also known to occur, resulting in approximately 50 000 cases of deep bone and 193 000 cases of superficial infection, with the effect of having to remove 7 % of all prosthetic implants — and in severe cases, 9 % of these result in limb amputation.

Our project will develop a product that adapts new technologies to meet the marketplace challenges from non-EU competition, through the development of a surface coating designed to deliver antibiotics and drugs aimed to promote bone growth.

This new surface coating will:

- reduce the number of infections within the bone and surrounding soft tissue by 60 % for those fitted with the new coated implants, saving 140 000 patients from the risk of infection;
- increase European implant sales by 10 % and turnover by approximately EUR 45.5 million each year, global implant sales by 2.5 % and turnover by approximately EUR 195 million (within five to ten years of the end of the proposed project);
- reduce overhead costs of health authorities by EUR 116 million each year through the reduction of postoperative infections;
- obtain 10 % of the market share by 2015.

- 1 FINSBURY DEVELOPMENT (UK)
- 2 TEKNIMED S.A. (FR)
- 3 BRACE GMBH (DE)
- 4 HUNT DEVELOPMENTS UK LTD (UK)
- 5 MEDICOAT AG (CH)
- 6 PERA INNOVATION LTD (UK)
- 7 GÖTEBORG UNIVERSITET (SE)
- 8 BIOMATECH S.A. (FR)

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# DIAMOND

## The Development of Innovative, Accurate, Monolithic, CVD Diamond Array-Based Radiation Dosimeter System

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Co-operative research

Nearly one million Europeans die from cancer each year, and one in three can expect to deal with a cancer episode in their lifetime. The cost of treatment in Europe is over EUR 50 billion and fighting the disease is a major EU priority. Radiotherapy is used in 50 % of cases and recent advances in conformal radiotherapy techniques such as IMRT are significantly improving treatment success rates. However, conventional dosimetry techniques (ionisation chambers, silicon diodes, etc.) are not capable of delivering the high-resolution, high-speed measurements required for IMRT calibration. This leads to lengthy set-up times, seriously limiting the number of patients that can be treated.

This proposal will develop an innovative, high-resolution, monolithic CVD diamond array-based dosimeter which will deliver the levels of performance required by IMRT. There is no other commercially available technology that can offer this. The science and technology required to do this will be challenging, yet the partnership comprises some of Europe's leading research and industrial companies. Our innovations in (1) CVD diamond deposition (PIP), (2) overcoming priming effects and sensor fabrication, and (3) ultra-low signal conditioning electronics with a self-evaluation system to monitor degradation will enable us to achieve our goals. The market potential for such a product is EUR 101 million.

Unlike the world radiotherapy market which is dominated by the US (Varian: 56 % share), the dosimetry market is lead by European small to medium-sized enterprises (SMEs). However, this situation is being seriously threatened by large non-EU enterprises such as Varian, who are now targeting dosimetry. As European SMEs, we urgently need to beat our competition to an IMRT dosimetry solution to protect our market and enable us to compete against globalisation. This proposal brings together a transnational partnership of research excellence and SME exploitation capability, and is particularly relevant to the FP6 Cooperative Research programme.

- 1 SEMELAB PLC (UK)
- 2 PTW FREIBURG PHYSIKALISCH TECHNISCHE WERKSTATTEN GMBH (DE)
- 3 SEMICON SP. Z O.O. (PL)
- 4 SPECTRUM TELECOM INSTALLATIONS LTD (IE)
- 5 DIAMOND MATERIALS GMBH (DE)
- 6 MAGYAR TUDOMÁNYOS AKADÉMIA ATOMMAGKUTATÓ INTÉZTE (HU)
- 7 ETUDES ET PRODUCTIONS SCHLUMBERGER - EPS (FR)
- 8 UNIVERSITÀ DEGLI STUDI DI FIRENZE (IT)
- 9 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 10 PERA INNOVATION LTD (UK)
- 11 SHEFFIELD TEACHING HOSPITALS NHS FOUNDATION TRUST (UK)



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**EC Contribution:** € 983 034

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# DUET

## Development of a Disposable Endoscope

Endoscopes are miniature, elongated microscopes that physicians use to perform minimally invasive procedures on patients, in their hollow organs or internal canals. Endoscopes may be rigid or flexible. Both are delicate, precision instruments. Most flexible endoscopes contain systems to deliver light, suction, air and water. Infection in patients can occur due to inadequate cleaning. Endoscopy is centralised in specialising hospitals which can resource the activity with the purchase and maintenance of a sufficient number of endoscopes. This means that patients frequently have to travel long distances to reach these hospitals.

There is an urgent need to change the way in which endoscopy is performed to combat these problems. In this project, a team of small to medium-sized enterprises (SMEs) will develop single-use disposable endoscope equipment (which will eliminate the possibility of infection of the patient from this equipment) and will form a supply chain. The technology developed in this programme will be applicable to other equipment developments by the SMEs. An additional aim is for the disposable endoscope equipment to be constructed from materials which can be recycled after use.

- 1 TWI LTD (UK)
- 2 SINGLE USE SURGERY LTD (UK)
- 3 ENDOMED ENDOSKOPIE UND VIDEO GMBH (DE)
- 4 ELDOS SP.Z.O.O. (PL)
- 5 VISTAMED LTD (IE)
- 6 FORGE EUROPA LTD (UK)
- 7 S.C. OPTOELECTRONICA-2001 SA (RO)
- 8 INSTITUTO DE SOLDADURA E QUALIDADE (PT)
- 9 NOTTINGHAM CITY HOSPITAL NHS TRUST (UK)

**Contract:** 18294  
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**EC Contribution:** € 815 741

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## Ergonomic Instruments Development for Hip Surgery: an Innovative Approach on Orthopaedic Implants Design

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Co-operative research

Nowadays, the hip prosthesis market is going from traditional procedures where instrumentation and product design have important time and effort requirements in the operating theatre, to a new scenario where minimally invasive surgery will progressively substitute old techniques. In both cases, the role of instruments design is very important, but even more important, relatively, in minimally invasive techniques, because it will be impossible to fit the prosthesis without an appropriate instruments design.

Although prosthesis and instrumentation are part of the final system and instruments have a high influence in the implant selected, not much effort has been dedicated in the past to the design of the instruments. This makes the development of innovative ergonomic instruments for hip surgery an extremely innovative approach to the problem.

The aim of the project is the development of instrumentation to use in both open orthopaedic hip surgery and minimally invasive surgery under ergonomic design criteria to improve the working conditions of the surgeons during the operation, keeping the same clinical and mechanical functionality of the instrumentation, according to the current standards requirements.

The main objectives of the project are as follows:

1. develop a new instrumentation — designed for the surgeon — that will provide implant manufacturers involved in the project with an important advantage in selling their products in the market;
2. improve surgeon's working conditions by developing a new generation of instruments to use in hip surgery through ergonomic design criteria to improve the current designs, which are based only on functionality and durability;
3. reduce operation length, thanks to an easier use of the instrumentation due to its ergonomic design;

4. development of instruments for minimally invasive surgery, which will improve patients' quality of life, since surgeons will need to do less and shorter incisions, and patient recovery will be faster.

- 1 INSTITUTO DE BIOMECÁNICA DE VALENCIA (ES)
- 2 CENTRUM MECHANIZACJI GORNICTWA KOMAG W GLIWICACH (PL)
- 3 HOSPITAL DE SAGUNTO Y CENTRO DE ESPECIALIDADES (ES)
- 4 SILESIAN MEDICAL UNIVERSITY (PL)
- 5 LAFITT S.A. (ES)
- 6 ARTUR SALGADO LDA (PT)
- 7 VÍCHI BIO MATERIALS SARL (FR)
- 8 EVOLUTIS (FR)
- 9 EROTHITAN TITANIIMPLANTATE AG (DE)
- 10 LANDMARK SURGICAL LTD (UK)



# ERGOSYSTEM

## ERGOnomically Designed Patient-Management SYSTEM Incorporating a Novel Actuator

The objective of the ERGOSYSTEM project is to reduce the amount of back injuries and pressure ulcers that occur in the caring industries. This will impact on the EUR 26 billion annual combined cost of these two conditions, by reducing the physiological stress experienced by caring professionals in bed-to-wheelchair transfers of incapacitated persons, and varying the points of direct pressure bedridden persons are exposed to.

### Relevance to Cooperative Research Projects:

- Pan-European consortium with small to medium-sized enterprise (SME) proposers and end users capable of manufacturing and distributing the device, and research and technological development (RTD) performers able to deliver the technology the SMEs cannot produce alone. SMEs will own all intellectual property generated in the project, allowing them to move up the supply chain and increase their competitiveness.
- Implementation of EC initiatives regarding ageing populations.

### Scientific and Technological Objectives:

- innovative patient management system, which will greatly reduce the risk of back injury in care-workers and nurses when moving incapacitated persons from bed to wheelchair and vice versa;
- novel actuator, which will have many applications outside the project.

### Potential impact five years after market entry:

- delivered 200 000 ERGOSYSTEM units into the market;
- allowed European health services to redirect EUR 600 million;

- created EUR 100 million in economic value added for consortium SMEs.  
A 'dissemination of use' plan will ensure all new knowledge is protected, disseminated and commercialised.

### Quality of the Consortium – Management and Resources:

- SME proposers with high quality assets;
- the most suitable RTD performers in Europe;
- well connected, large enterprise and sponsor groups;
- equitable, democratic management structure with a detailed communication strategy;
- sufficient resources and in-depth, expert financial planning.

- 1 CRANFIELD SOLUTIONS LTD (UK)
- 2 ALU REHAB AS (NO)
- 3 W&P WOLF & PARTNER GMBH (DE)
- 4 PROMETAL KRZYSZTOF KUCZYŃSKI (PL)
- 5 DIROY SARL (FR)
- 6 BETSON MEDICAL TECHNOLOGIES LTD (IE)
- 7 DAYS HEALTHCARE UK LTD (UK)
- 8 PERA INNOVATION LTD (UK)
- 9 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

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# ET-PA

## Enabling Techniques for the Development of a Novel Class of Protein Antibiotics

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Co-operative research

Antibiotics resistance to pathogens is a major threat to public health and safety. The rapid spread of resistant strains increases the risk of epidemics. This issue also includes preparedness to deal with bio-terrorism.

The objectives of the ET-PA project are to develop an open, generic platform to enable the development of new classes of protein-antibiotics. The key technology (REPPs) is based on a principle that is proprietary to one of the participating small to medium-sized enterprises (SMEs), consisting of rationally modified class II restriction enzymes (RE) fused to cell-penetration peptide sequences (PP) that selectively allow microbial cell penetration. Introduction of a REPP system into pathogens would lead to effective cell killing. The REPP will be designed to inactivate major microbial pathogens, i.e. *S. aureus*, *P. aeruginosa* and *C. albicans*. Addressing these ambitious objectives will require a Cooperative Research setup with complementing expertise and resources, coming both from high-tech SMEs and expert academic research and technological development (RTD) partners.

The ET-PA project will be divided into four work packages.

1. Discovery: the design of a technology platform for the discovery of PP sequences for proper function in antibiotic REPP constructs.
2. Characterisation: extensive characterization of the biological activity of antibiotic REPPs.
3. Technological platform: configuration of a semi-automatic and embedding technology platform that enables a coherent and unified approach for a rapid translation of REPP components into protein antibiotics.
4. Management: to assure consolidation and coordination of the ET-PA project, support and protection of Intellectual Property, and contacts to subsequently license the outcomes to

third-party end-users. The commitment and collective efforts of all participants is the best warranty for success of the ET-PA project, that will provide a technology platform to translate the most effective horizontal bacterial defence system into innovative medicine.

www.et-pa.org

- 1 ADRIACELL S.R.L. (IT)
- 2 BIA SEPARATIONS D.O.O. (SI)
- 3 HECUS X-RAY SYSTEMS GMBH (AT)
- 4 UNIVERSITÀ DEGLI STUDI DI TRIESTE (IT)
- 5 RHEINISCHE FRIEDRICH-WILHELMS UNIVERSITÄT BONN (DE)





# EUROSAGE

## A Reliable and Cheap Drug-Delivery System for the Elderly

In clinical studies of prototype drugs, including treatment of diseases typical of the elderly, performed over samples of a few hundred people, it is of paramount importance to ensure that people are strictly observing their medication-taking. There is, therefore, a need to develop a cheap, reliable system which delivers medication to people correctly.

This niche application opens the path to three main markets: clinical trials (a few tens of thousands of units in Europe); hospitals and healthcare units (hundreds of thousands of units); the care-homes for the elderly (millions of units in Europe). For elderly people undergoing medical care, one of the key issues is indeed observance, i.e. taking the right medication, at the right time, in the right quantity. This is why a consortium of three small to medium-sized enterprises (SMEs), ADDS, RAL and COFOB, active in drug distribution, laboratory and hospital equipment and elderly care, together with a French hospital as an end-user (CHU, Toulouse) have asked two SMEs acting as research and technological development (RTD) performers (TAM TELESANTE and ERGON) and one university (IOANNINA) to validate the concept of a cheap, reliable medication-distribution system able to handle any blistered medication (so that full preservation of the medication features is ensured before the drug is delivered to the patient) and to control each drug absorption (time, quantity and nature). This system, which will automate medication taking, has the potential to be implemented during clinical trials, within medical care houses or hospitals, and in the long term, at care-homes for the elderly.

In Europe today, there are 3.5 million people who need to have medication prepared three times a day. They can use, on average, three different blistered products, whereas 80 % of medical prescriptions deal with blistered products only. By addressing all the issues at once, including ethical problems related to robots in hospitals, the project outputs will generate both safer and more reliable drug-taking at affordable costs.

- 1 ADVANCED DRUG DEVELOPMENT SERVICES (FR)
- 2 RAL, TÉCNICA PARA EL LABORATORIO S.A. (ES)
- 3 COFOB (FR)
- 4 CENTRE HOSPITALIER UNIVERSITAIRE DE TOULOUSE (FR)
- 5 TAM TELESANTE (FR)
- 6 ERGON LTD (GR)
- 7 HEMATOLOGY DEPARTMENT,  
MEDICAL SCHOOL - UNIVERSITY OF IOANNINA (GR)

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**EC Contribution: € 630 100**

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# Fistula Catheter

## New Technology for Haemodialysis

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Co-operative research

The number of European citizens with the need for haemodialysis will increase extensively in the coming 20 years. This will lead to growing costs for society. Dialysis as a treatment is absolutely critical in supporting the patient's life. The reason for this is a malfunctioning kidney. The number of patients with chronic kidney failure reached 1.7 million in 2003 (worldwide). Research is showing that in Europe alone, more than 250 000 patients are regularly haemodialysed. One of the major groups needing haemodialysis are diabetes patients. The objective of this project is to develop a new highly flexible catheter that will have the ability to function as a cannula (not destroying the blood vessels) when introduced, and that will have increased flow rate when functioning. This new technique will reduce vascular damage problems and complications, reduce costs and the total time of dialysis and thereby improve quality of life for a number of people. For the small to medium-sized enterprise (SME) proposers the objective is to develop a low-cost, highly flexible catheter with increased flow rate, with a new technique and material combinations. This new AV (arteriovenous) access device will give the SME proposers considerably improved competitiveness, and also open up possibilities for other SMEs where there are needs for the following:

1. a flexible cannula, to avoid damage to veins and fistulas;
2. improved flow performance, reducing treatment time for patients.

The ageing population is a growing problem and the issue is discussed frequently at UN conferences. The life quality for European citizens, such as people in need of regular haemodialysis, is an important issue with high priorities for the EC. A large increase is expected regarding the number of chronic kidney failures in the coming decades. The average cost for a haemodialysis patient is about EUR 60 000 each year. A major problem is the arteriovenous access to the patient's blood vessels. In 70 % of the cases a fistula is used, made by a surgical connection of two blood vessels. The major problem is the cost for multiple operations due to a short fistula life length — the dialysis needle damages the fistula.

Creation of a new fistula takes about 8 weeks of maturing, which results in unnecessary pain for the patient and high cost for society (fistulas cost EUR 16 000 per patient per year). Therefore our project has the highest priority for all partners in the project. The overall objective is to develop a new, flexible, low-cost fistula catheter based on novel technology such as memory materials, in order to improve the dialysis treatment for patients and reduce the risks connected with dialysis.

The research and technological development (RTD) project will concentrate on how to solve the technical problems with the following:

1. flexible cannula: no sharp edges damaging the fistula;
2. flow optimisation: this decreases dialyse time.

The result will be a new low-cost, highly flexible catheter with increased flow rates for hospitals and dialysis clinics. The SME proposers will exploit the results by selling the systems in Europe and the USA. SME partners in other countries will be able to buy production and sales licences. Exploitation and dissemination of results will start in Medica in Düsseldorf, in 2007 and 2008. The market for haemodialysis is already large and is increasing with the ageing population. Through this RTD project, the competitiveness of the SME proposers will be much improved.

- 1 NORDIC MEDCOM AB (SE)
- 2 BERCO SPA (IT)
- 3 DIRINCO B.V. (NL)
- 4 OY CARBONEX AB (FI)
- 5 VÄSTRA GÖTALANDS LÄNS LANDSTING SAHLGRENSKA UNIVERSITETSSJUKHUSET (SE)
- 6 IFP RESEARCH AB (SE)
- 7 INNOVATION TEAM SWEDEN AB (SE)
- 8 INSTITUTTET FOR PRODUKTUDVIKLING (DK)
- 9 STIFTELSEN CHALMERS INDUSTRITEKNIK (SE)

**Contract: 16909**  
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# FOOT WOUND HEALING

New Healing Footwear, Reducing Problems with Foot Wounds among Diabetic Patients

Many European citizens suffer from diabetes. In many cases, diabetes results in foot wounds (ulcers and ulcerations) on the patients' feet. If not adequately treated, the consequences of these wounds are quite often amputation, which of course is a personal catastrophe for the patient, as well as very costly for society when it comes to surgery, aftercare, rehabilitation and need for prosthesis. The objective of this project is to develop a new healing footwear for use in the prevention and treatment of ulcers among diabetic patients. This will reduce the amount of severe ulcer cases, leading to less patient suffering and reduced treatment costs for society.

150 million people worldwide suffer from diabetes. The number is expected to double by the year 2025. One of the most problematic effects of diabetes is foot problems due to neuropathy, poor circulation and decreased resistance to infection. According to studies, 15 % of all people with diabetes will develop open wounds on their feet. The key to successful therapy is to offload the ulcer (wounds) while still keeping the patient ambulatory. The wish from authorities in the EU and other parts of the world is to reduce the ulceration problems for diabetic patients. The St Vincent Declaration, for example, is an internationally accepted initiative from WHO (the World Health Organization) and IDF (the International Diabetic Federation), stating goals for improved diabetic care. One objective, among others in this declaration, is to reduce the numbers of diabetic patients that need an amputation by 50 %.

The overall objective of this project is to develop new healing footwear for diabetics, optimising the possibilities for efficient pressure relief of ulceration while still making it possible for the patient to maintain a normal mobile life. The objectives are to have pressure control, to avoid bacterial growth and to make the unit user friendly.

- 1 CAMP SCANDINAVIA AB (SE)
- 2 BANDAGE-EN CORSETINDUSTRIE BASKO B.V. (NL)
- 3 GILBERT & MELLISH LTD (UK)
- 4 SAHVA A/S (DK)
- 5 IFP RESEARCH AB (SE)
- 6 INSTITUTTET FOR PRODUKTUDVIKLING (DK)
- 7 INNOVATION TEAM SWEDEN AB (SE)
- 8 UNIVERSITY OF WALES INSTITUTE CARDIFF (UK)

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**EC Contribution: € 689 700**

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# GRANT

## Getting Right Anaesthetic Needle Technology through Novel Forming and Coating Processes

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Co-operative research

This strategic development, dissemination and training programme, executed right across the European medical-devices sector will enable a team of small to medium-sized enterprises (SMEs) from the fields of medical coating and needle forming, the chemical industry, medical plastics, sterile packaging, electronics and medical devices distribution to enable an upsurge in the development of novel, high-added-value anaesthetic needles that will contribute to displacing imports from the USA and the Far East. As the consortium's production facilities will not suffice to produce the amounts of needle systems the market will demand, the technology will be licensed to more SMEs in the sectors mentioned above. This will provide the potential for hundreds of jobs and will improve the quality of treatment for thousands of people undergoing operations, especially the rising number of elderly people to be operated on, as many general anaesthesia procedures can be replaced or supported by regional anaesthesia procedures.

Beside the impact on large groups of medical-devices SMEs, GRANT technology will have direct impact on the European micro system technology and biotechnology sector, affecting more than 240 SMEs. This will be achieved through the realisation of the technological objectives that will result in new anaesthetic needles that can achieve these operational targets:

1. low-energy supply of neuro-stimulation needles (below 10 % of current systems);
2. first closed-circuit bipolar needle system;
3. exactly focused needle-tip electric field;
4. increased haptic navigation safety of needles;
5. higher needle stability for reduced risk of needle breaks.

For second and third markets:

1. novel electric coating will be directly applicable in the micro system industry, enabling direct circuit printing on metal surfaces in MID technology;
2. novel needle forming will be directly applicable to pipetting robots, enabling higher flow rates in diagnostic and pharmaceutical procedures, which will in turn lead to the generation of new protectable IPR.

In addition, once the challenging hurdles of GRANT technology are overcome, SMEs will be responsible for an integrated dissemination programme.

- 1 TECNICAS MEDICAS DE NAVARRA S.A. (ES)
- 2 EUROECONOMY B.V. BERATUNGSGESELLSCHAFT (NL)
- 3 PRODUCTOS QUIMICOS LABORATORIO S.A. (ES)
- 4 VON VELTHEIM EDELSTAHL (DE)
- 5 PARA TECH COATING SCANDINAVIA AB (SE)
- 6 DKI GMBH ELEKTRONISCHER GERAETEBAU UND PRODUKTINNOVATION (DE)
- 7 MEDELEC MINIMECA S.A. (CH)
- 8 KENDAN A/S (DK)
- 9 DISPOMED S.A. (PL)
- 10 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 11 PERA INNOVATION LTD (UK)
- 12 UNIVERSIDAD POLITECNICA DE CARTAGENA (ES)
- 13 MELAB MEDIZINTECHNIK UND LABOR GMBH (DE)
- 14 MD PH.D. JOSEP RODIERA (ES)
- 15 STEFAN JANTSCHULEV, DR MED. (DE)



# HAEMOSCAN

## Development of a Technology to Measure Body-Fluid Distribution In Patients to Improve Dialysis-Treatment Efficiency and Patient Comfort

The project aims at the solution of a clinically relevant problem. Today, about 25 % of all dialysis patients suffer from acute complications (hemodynamic instability) during treatment. Those instabilities are at least partly due to inadequate fluid balance, as has been shown in several publications during the past 10 years. These instabilities provoke tremendous discomfort to the patients, who suffer fainting and vomiting, and require relatively long recovery periods. Apart from this discomfort, physiological problems affecting patient health are huge. It is necessary to accurately estimate fluid distribution in the patient during the dialysis treatment in order to take adequate countermeasures to avoid these instabilities.

To date, there are no suitable methods to measure this distribution with enough accuracy, on line. This project proposes to use a non-invasive method that would allow us to measure this fluid distribution on line. The research and technological development (RTD) performers (NTE and UPC, both based in Spain, and TUG, based in Austria) have been working on this method for 10 years and consider that this technology is ready to enter the applied research phase. The partners of the project propose to develop a system based on this technology, and through a clinical essay to elaborate specific estimators for dialysis patients during treatment.

The sector of instrumentation companies for dialysis is highly biased: it is mainly big multinationals largely based in the United States and small enterprises.

Some of the most active small enterprises are based in Europe with important sales in the United States. The big companies are mainly focused on treatment-based instrumentation (filtration systems with control strategies) with no available systems to estimate body fluid distribution. The effort that the small to medium-sized enterprises (SMEs) in Europe can make to overcome the dominant position of the big multinationals is limited, and thus programmes like CRAFT have become a necessary tool for them to compete in this multinational-dominated market.

The SMEs participating in the project (IBP and MSV, based in Germany, and Akern, based in Italy) are highly interested in evaluating the uncertainties of the technology proposed in order to start product development activities after the finalisation of the project. These companies are already working partly (Akern) or exclusively in the dialysis market (IBP and MSV) and are very active in sales throughout Europe and in the United States. If the validation of the technology proves to be successful, the SMEs would highly reinforce their position in the dialysis instrumentation market.

The use of such a technology would contribute towards improving the quality of life of the dialysis patients in Europe. Improvement of quality of life of persons that have to go through long weekly treatment periods and reduction of risk in this treatment is a very important result towards which this project is aiming.

- 1 NTE MED. ELECTRONICS (ES)
- 2 UNIVERSITAT POLITÈCNICA DE CATALUNYA (ES)
- 3 TECHNISCHE UNIVERSITÄT GRAZ (AT)
- 4 AKERN SRL (IT)
- 5 MSV MEDIZINISCHE SYSTEME GMBH (DE)
- 6 IBP INSTRUMENTS GMBH (DE)

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# HEARTRONIC

## HEART Rating for Objective Neural Intelligent Communication

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Co-operative research

Cardiovascular diseases (CVD) cause the death of around 4 500 000 people per year in Europe, being the first cause of deaths in Europe. The challenge of the HEARTRONIC project is to provide a real solution for continuous monitoring and real-time prevention, by means of early warning, to people already diagnosed as subjects at high risk. This is a solution to allow patients to go on with a normal life, increasing, in the meantime, their expectation of life and improving quality.

The intention of the HEARTRONIC project is not to re-design the cardiology science, but rather to analyse all medical and patient requirements, to exploit the various existing and promising technologies relevant to this area, and integrate them with innovative and non-invasive technologies, for a reliable and safe tool that really responds to the demand of doctors and patients. This will increase life expectation and significantly improve quality of life, especially for the weakest categories of the population, like children, patients waiting for heart transplants, infarctuated patients suffering from chronic depression, the elderly and those with disabilities. Furthermore, the HEARTRONIC system will be able to record any hearth anomaly in real time, providing an early warning to the doctor in charge, and allowing the patient's localisation by the GSM system. The doctor concerned will receive all data either on his PC or mobile phone and will be able to carry out a timely diagnosis, also determining the most appropriate intervention for the patient, without being unaware of conditions. If the doctor is not reachable, all data will be sent to a host server that will manage the emergency in the way explained above.

From a technical point of view, the relevance of transnational cooperation is found in the high multidisciplinary character of the intended project, that aims to integrate biomedical knowledge, research on new materials, TLC and electronics. The intended HEARTRONIC project aims to develop an innovative system, well beyond the state of the art, for prevention and early warning. This will be achieved through a system that provides continuous monitoring of heart conditions, is integrated in a wearable and light support like a shirt or an elastic bandage, is

capable of recognising cardiovascular anomalies and of alerting doctors and hospitals in real time. The project concept is extremely innovative, based on the integration between a system onboard and the patient's mobile phone, that allows automatic Data TX and communication without any physical, distance limitation. The HEARTRONIC System will be mainly based on the following components, with high and innovative technological content:

1. a microchip for data elaboration, integrated in the HEARTRONIC system, capable of providing a guarantee;
2. accuracy and reliability in measurement and identification of cardiovascular anomalies;
3. a reliable filtering system, by means of Neural Network or other similar methodologies, if necessary, to select for the following ECG pattern recognition clean signals only, not influenced by electromagnetic fields like those produced by mobile phone;
4. indication of the patient's state of motion, by means of a miniaturised piezoelectric accelerometer, selected on the basis of minimum clearance and high precision, to give just a qualitative indication of the patient's state of motion and not a precise measure.

- 1 LABOR SRL (IT)
- 2 INDUSTRIAL INNOVATION MICROELECTRONICS DESIGN S.A. (ES)
- 3 ACTA SERVICE SRL (IT)
- 4 MEDICAL UNIVERSITY OF GDANSK (PL)
- 5 UNIVERSITY OF OULU (FI)
- 6 AZIENDA OSPEDALIERIA SAN CAMILLO - FORLANINI (IT)
- 7 DUNVEGAN NETWORKS LTD (UK)
- 8 T-CONNECT (IT)
- 9 ESA S.C. KATARZYNA GRZYWAK-PTASZNIK, ZOFIA GRZYWAK (PL)
- 10 AGT SRL (IT)
- 11 INSTITUTO AGILUS DE INOVACAO EM TECNOLOGIA DE INFORMACAO LDA (PT)

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# HOTSOLUTIONS

## New Applications for Compatible Solutes from Extremophiles

As life sciences and bio-industry enter a new era where biopreservation and manipulation are everyday concerns, it has become imperative to look for new and safer solutions to efficiently stabilise biomaterials. Compatible solutes from hyperthermophilic bacteria, called hypersolutes, are superior to their mesophilic counterparts in the preservation of the performance of a wide variety of biomaterials, ranging from proteins to whole cells, skin, and artificial tissues. From both an economical and scientific points of view, the rapid development and discovery of new such compounds makes it urgent to unravel their potentialities.

The goal of the HOTSOLUTIONS project is to find hypersolute applications in old and emerging areas of research, ranging from classical molecular genetics to emerging approaches such as genomics and proteomics. Within HOTSOLUTIONS, a group of experienced research and technological development (RTD) research groups will concertedly work with small to medium-sized enterprises (SMEs), with the aim of finding applications within the areas of protein stabilisation and aggregation, DNA and protein microarrays, molecular biology enzyme performance, biosensor technology, heterologous protein-production systems, and animal cell line stabilisation. The project will ultimately have a positive impact on diverse areas, from basic sciences to health. HOTSOLUTIONS will hopefully contribute towards the development of science best practice and European SME welfare.

- 1 STAB VIDA, INVESTIGACAO E SERVICOS EM CIENCIAS BIOLOGICAS LDA (PT)
- 2 BIOANALYTICAL TECHNOLOGIES (RU)
- 3 CENTRO DE NEUROSCIENCIAS DE COIMBRA (PT)
- 4 INSTITUTO DE TECNOLOGIA QUIMICA E BIOLOGICA - UNIVERSIDADE NOVA DE LISBOA (PT)
- 5 EMPRESA DE CONSULTORIA EM BIOTECNOLOGIA LDA (PT)
- 6 UNIVERSITA DEGLI STUDI DI FERRARA (IT)
- 7 CRANFIELD UNIVERSITY (UK)
- 8 ASPER BIOTECH LTD (EE)
- 9 BITOP - AKTIENGESELLSCHAFT FUER BIOTECHNISCHE OPTIMIERUNG (DE)
- 10 TRENZYME GMBH (DE)

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# IMEDGEN

## Intracellular Methyltransferase Delivery as Therapeutic Tool for Carcinoma-Specific Regulation of Gene Expression

128

Co-operative research

The goal of this CRAFT consortium is the generation of a prototype of a new generation of drugs, which are based on the combination of established technologies in the field of protein engineering, DNA-targeting and drug delivery. The combination of the diverse fields of technology is very innovative and an achievable task.

The prototype we aim for is a double-targeted therapeutic compound which is a carcinoma cell-specific-delivered and carcinoma gene specific in its DNA-methyltransferase activity; it can switch the expression of a tumour-associated gene involved in carcinogenesis expressed in 40 % of all human tumours from on to off. Cancer is the second cause of death in the Western world and continues to emerge at an accelerated rate in the developing countries as well. Although progress has been made in the therapy of some types of cancer, the overall survival prognosis with current standard therapy is poor. Therefore, new treatment strategies are needed.

The approach we propose here is based on the selective silencing of the epithelial glycoprotein-2 (EGP-2) gene, which is abundantly expressed in a variety of carcinomas, accounting for 40 % of all cancers. The goal of the proposed method is to selectively silence the EGP-2 gene by targeted methylation of the EGP-2 promoter. The therapeutic compounds we wish to develop consist of a targeted DNA methyltransferase and a targeted delivery system, based on synthetic amphiphiles, specific for EGP-2 positive cells. The targeted DNA-methyltransferase is a covalent complex of a triplex-forming oligonucleotide (TFO) and the CpG-specific DNA methyltransferase M.Sss1. This TFO-M.Sss1 conjugate has the potential to methylate a unique CpG site in a genome. Because of the high targeting specificity of the envisaged product, the proposed approach is expected to be free of many negative side effects, and thus can lead to more effective treatment of a broad range of cancers.

- 1 SYNVOLUX THERAPEUTICS B.V. (NL)
- 2 MAGYAR TUDOMÁNYOS AKADÉMIA SZEGEDI BIOLÓGIAI KÖZPONTJA (HU)
- 3 RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN (DE)
- 4 RIJKSUNIVERSITEIT GRONINGEN (NL)
- 5 PRIMA S.R.L (IT)
- 6 EPIGENOMICS AG (DE)



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# IMMUNOLEGIO

## Rapid Biotechniques Based on Immunosensors for In Situ Detection of Legionella in Industrial and Environmental Water Samples

*Legionella pneumophila* is found in aquatic habitats, especially in potable water systems, cooling tower systems and heat exchanger systems. Human infection occurs through the inhalation of aerosols contaminated by *Legionella* spp.

An estimated 8 000 to 18 000 people are stricken with *Legionnaires'* disease in EU-15 alone each year. Up to 30 % of people who have *Legionnaires'* disease die.

The conventional method for detection of *Legionella* is a complicated procedure involving isolation in a selective medium. However, this method presents several problems, including the presence of viable but non-culturable pathogens, loss of viability after collection and the long time required for culture and confirmation, which takes several days. In addition, detection is more difficult, since *Legionella* can be inhibited and masked by the rapid or abundant growth of other microorganisms. In order to avoid the problems encountered with the conventional analysis method, an alternative method for rapidly detecting *Legionella* with high sensitivity is needed. The aim of the proposed project is to develop new bio-analytical instruments in order to arrive at an analytical tool for the *in situ* detection of *Legionella* by a rapid and low-cost assay.

The main objective is to develop a magnetoresistive biosensor device employing magnetic particles as biological markers, which allow for real-time measurements, in order to achieve a detection limit of 50 CFU L<sup>-1</sup>. It will ensure that the Immunolegio device passes the strict threshold level regulation fixed at 100 CFU L<sup>-1</sup>, enabling a complete analysis in a total test time of 30 min, with a minimal enrichment stage.

- 1 FELTALÁLOI ÉS KUTATÓ KÖZPONT SZOLGÁLTATÓ KFT (HU)
- 2 ADEMTECH S.A (FR)
- 3 APPLIED RESEARCH USING OMIC SCIENCES S.L. (ES)
- 4 BVT TECHNOLOGIES, A.S. (CZ)
- 5 JCB ELECTROMACANICA SL (ES)
- 6 AQUA TREATMENT (IE)
- 7 AQUALAB, S.L ASSESORIA I ANALISIS D' AIGÜES (ES)
- 8 DECSA SRL (IT)
- 9 MICRONISER S.A (BE)
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- 11 CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS, CENTRO NACIONAL DE MICROELECTRÓNICA (ES)
- 12 DEPARTMENT OF BIOLOGICAL EN ENVIRONMENTAL SCIENCE, UNIVERSITY OF JYVÄSKYLÄ (FI)
- 13 SEVERN TRENT LABORATORIES LTD (UK)

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# ION

## A Sequential High Throughput Ion Channel Screening System for Drug Discovery in Neurological and Psychiatric Disorders

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Co-operative research

ION is a cooperative research proposal for the development of an innovative system capable of efficient screening of candidate drugs on a wide set of targets (ion channels) involved in important neurological and psychiatric disorders, e.g. depression, Parkinson's disease, epilepsy, migraine and pain.

The proposers are a group of small to medium-sized enterprises (SMEs), including technological companies and end-users in the pharmaceutical sector. The research and technological development (RTD) partners are required to provide the knowledge and the research capabilities, to address the selection and optimisation of the cellular targets and to validate the outcomes of the system in relation to the results of *in vivo* models of the pathologies of interest. However, an important contribution of the RTD partners will be to design a suite of innovative software agents for data analysis and experimental planning. The role of these agents is essential to achieve real high-screening throughputs. The ION project will optimise the performance of a sequence of screening experiments instead of focusing on the execution of a single experiment. With respect to the current state of the art, the proposed development will introduce two important innovations. First, easy access to a large set of targets and to an efficient drug discovery process, exploiting a well designed and implemented library of starting molecular structures. Second, it will innovatively develop the analysis of the output and enable future experiments to be planned more effectively by introducing intelligent software agents, interpreting the outcome of an experiment and planning the next experiment of a drug discovery screening sequence.

The proposers estimate a large market in the EU, USA and Japan for their future products, due to the expanding pharmaceutical research in the considered disorders which are still an unmet medical need. The developed pilot (libraries and software agents) will be tested and validated using an adapted version of an electrophysiology platform for the study of ion channels to be provided by one of the SME partners (Multi Channel Systems). However the ION system

will be able to use other well established experimental equipment already on the market, presently dominated by USA products. The project will have an impact on several EU policies. Most importantly, the envisaged development will address a number of priorities such as health policy (major diseases), industrial policy (innovative drugs) and economic policy (new technological products). The proposing SMEs intend to present a common business plan in order to exploit the expected results worldwide.

www.ion-project.net

- 1 NEWRON PHARMACEUTICALS SPA (IT)
- 2 MULTI CHANNEL SYSTEMS MCS GMBH (DE)
- 3 SC IT ROMANIA ITR SRL (RO)
- 4 NIKEM RESEARCH SRL (IT)
- 5 UNIVERSITY OF DEBRECEN (HU)
- 6 UNIVERSITA DEGLI STUDI DI FIRENZE (IT)
- 7 INSTITUTE OF PHARMACOLOGY, POLISH ACADEMY OF SCIENCES (PL)
- 8 ISTITUTO DI RICERCA FARMACOLOGICHE "MARIO NEGRI" (IT)
- 9 POLITECNICO DI MILANO (IT)

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# LasInject

## Enhancing Efficiency of Therapeutic Treatment by Increasing the Accuracy of Drug Delivery to Dendritic Cells in Skin

Our idea is to develop an efficient and cost-effective needle-less injection device for accurate and safe delivery of drugs into the lower epidermal layer of the skin (*stratum germinativum*) that will enable us to impact the dendritic cells in the epidermal layer, significantly enhancing the efficiency of immunotherapeutic treatment of HIV-1, hepatitis and several types of cancer.

Immunotherapeutic drugs need to reach the Langerhans cells in the lower part of the 80  $\mu\text{m}$  to 110  $\mu\text{m}$  thick epidermis layer to be effective, and current syringe injection does not fulfil this requirement. To achieve this, an ultra-low-cost and disposable system needs to be developed that targets the most effective depth for injection at the epidermis/dermis barrier of human skin. An accurate delivery of immunotherapeutic drugs at such a specific depth cannot be accomplished by use of a syringe, since the tip of a syringe itself is 500  $\mu\text{m}$  long and sloped. For this reason, a similarly low-cost needleless injector should be developed to accurately drill holes in human skin to enable the drug to be delivered at accurate depth.

To achieve this, we need to develop:

1. an ultrasonic depth-measurement sensor that can detect the barrier between the epidermic and dermal layer of the skin with an accuracy of  $\pm 15\%$  and a polymeric optical micro-lens array that splits the incoming LASER beam into multiple beams of known diameter and distributed evenly over a patch of skin no more than 25 mm diameter to create an array of holes into which to inject;
2. a feedback system between depth detector and laser drilling system to drill multiple (49) holes in human skin accurately, with a diameter of  $\sim 25\ \mu\text{m}$  and depth of  $\sim 80\ \mu\text{m}$ , with a repeatability of 99 %;
3. an automatic injection system of liquid drug into the holes drilled.

- 1 BINOR IMMUNO AS (NO)
- 2 EPIGEM LTD (UK)
- 3 A K INDUSTRIES LTD (UK)
- 4 LASER OPTICAL ENGINEERING LTD (UK)
- 5 CONVEX ELECTRICAL LTD (IE)
- 6 TEAMPAC OY AB (FI)
- 7 DISPOMED S.A. (PL)
- 8 BESPAC EUROPE LTD (UK)
- 9 TEKNOLOGISK INSTITUTT AS (NO)
- 10 PERA INNOVATION LTD (UK)
- 11 GOTEBORGS UNIVERSITET (SE)

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The aim of this project is to develop new vaccination approaches for the highly needed treatment of lung cancer. To reach this goal, new targets will be studied, new animal models will be developed and new adjuvant formulations will be tested. Lung carcinoma is the number one killer amongst cancer patients, for which no adequate treatment exists, corresponding to about one fifth of all cancer deaths in Europe (IARC1). The growing burden on the population is probably best illustrated by recent studies in the US, showing that between 1960 and 1990, deaths from lung cancer among woman increased by over 400 % in the period, to exceed breast cancer deaths. Currently no adequate treatment protocols for the different types of lung cancer exist. With conventional therapy, median survival for the sub-type of small cell lung cancer (SCLC) is 15 months for limited-stage disease and 9 months for extensive-stage disease, whereas long-term survival is very low.

Major obstacles to the successful treatment and eradication of lung cancer are late diagnosis, highly metastatic behaviour, resistance to chemotherapy and the failure in surgically removing all cancer cells during surgical intervention. In principle, vaccines are a promising approach for the treatment of cancer in general and lung cancer in particular. Major obstacles in the development of a successful vaccine are the lack of cancer-specific antigens to be targeted, and the lack of tools to evaluate immunotherapy based on such targets. An additional problem is the heterogeneity of lung cancer, often consisting of both non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC) lineages.

This project combines two academic partners that will share state-of-the-art proteomics, molecular and cell biological know-how and technologies with three small to medium-sized enterprises (SMEs) that have a non-overlapping but highly synergistic know-how, IPR and R&D infrastructure relating to lung cancer vaccines and novel adjuvants. In our approach, both lung cancer antigens and allogeneic lung-cancer cell combinations will be used as antigen sources in cancer vaccines. The response to vaccination

strongly depends on the immune-stimulating power of the adjuvant applied in the vaccines. Therefore, novel adjuvants, containing mixtures of cytokines in depot form will be applied ("Multi-Cytokine-Depot-Adjuvant" approach). The vaccines and adjuvants will be tested in murine models with human lung-cancer antigen-expressing tumour cells. The approaches having the best effects for vaccination therapy of SCLC and NSCLC will be defined and patented. In particular, the combination of antigen cells from both the CLC and NSCLC lineage may prove to be an important additional step forward in the eradication of these heterogeneous cancer types. It is hoped that these deliverables will lead to a breakthrough in cancer immunotherapy worldwide, and will provide a strong competitive edge to the partners in this project, helping them to grow from R&D-based companies to companies that develop tumour vaccines for the treatment of lung cancer patients.

- 1 MUBIO PRODUCTS BV (NL)
- 2 CIREG GMBH (DE)
- 3 ONYVAX LTD (UK)
- 4 RUHR-UNIVERSITY BOCHUM, MEDICAL PROTEOM CENTER (DE)
- 5 UNIVERSITEIT MAASTRICHT / RESEARCH INSTITUTE GROWTH & DEVELOPMENT (NL)

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# LEVMAC

## Macromolecule Levitation Test Method

Precise knowledge of the three dimensional (3-D) structure of a given protein forms the basis for understanding its mechanism of action. Such knowledge is particularly important for designing and developing new drugs, but is also essential in understanding the biology of humans and of other organisms. The HUGO project has determined the complete human genome, where the focus has now shifted from the DNA level to the structure and function of gene products at the protein level. An important method for protein structure determination is X-ray crystallography. The method requires access to single protein crystals, which has been the primary limiting step.

This project aims to complete development of LEVMAC, a piece of equipment used in the field of proteomics to assist the crystallisation of macromolecular structures, especially to resolve difficult cases where crystals of protein-ligand complexes are sought by the pharmaceutical industry. We will refine the prototype LEVMAC into an affordable and user-friendly instrument with good accuracy and validity, and with adequate software support. The LEVMAC device will be implemented in the frontline structural studies of naked and enveloped viruses, membrane receptor proteins, and protein-ligand complexes — areas under focus for advanced proteomics and drug discovery.

The equipment will allow structure determination of macromolecules to be reached faster and with higher accuracy than earlier, and at the same time waste less of the precious macromolecular materials. To support these goals, the underlying algorithms for defining crystallisation conditions will be further explored to provide nucleation phase diagrams. There is no competing equipment. Thus, the interest in the LEVMAC is expected to be very high among the pharmaceutical industries and within the scientific community. The proposed project will put CRAB at the forefront of the international proteomics race and substantially benefit the other participants as well.

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- 3 OÜ LEAB EESTI (EE)
- 4 KAROLINSKA INSTITUTET (SE)
- 5 UNIVERSITÄT BASEL (CH)

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# LVRT

## Leakless Vertebra Reposition Therapy

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Co-operative research

Osteoporosis is a skeletal disorder characterised by low bone mass and deterioration of bone tissue, currently affecting nearly 200 million individuals worldwide. The disease leads to increased bone fragility and fracture risk of the hip, spine, forearm and shoulder.

In Europe alone, at least 1 in 3 women and 1 in 8 men over the age of 50 will sustain an osteoporotic fracture in their lifetime.

Our aim is to improve treatment of the most common of all osteoporotic fractures: the Vertebral Compression Fracture (VCF). Vertebrae (spinal bones) are the building blocks of the spinal column. Loss of body height and a bent posture are visible signs of the condition. People suffering from vertebral compression fractures tend to become less mobile, and regularly suffer from associated problems like decreased appetite, sleep disorders, low self-esteem, diminished social interaction and loss of independence.

High doses of pain medication, especially narcotic drugs, further limit functional ability in daily life. There appears to be a link between reduced mobility and increased mortality levels: Patients who are bedridden for longer periods of time run increasing risks of bedsores, wound infections and embolism. Current state-of-the-art techniques require a hydraulic balloon for restoration of the collapsed vertebrae to original height. Our aim is develop a completely different approach, on the basis of stents, a concept that originally developed and tested in other fields of surgery. Current state-of-the-art techniques also require the injection of bone cement, a process currently prone to leakages. Complications associated with these leakages include neurological deficits and cement embolisation, resulting in pulmonary embolism or stroke.

Our project aims to develop a bone-cement application procedure that is leakage-proof: we intend to design a stent delivery system that incorporates a surface-treated polymer film that can act as a cement barrier.

<https://webdav.teg.fraunhofer.de/NetStorage>

- 1 SOMATEX MEDICAL TECHNOLOGIES GMBH (DE)
- 2 SCANTUBE AS (SE)
- 3 VUSAPL AS (SK)
- 4 ATTICA COMPONENTS LTD (UK)
- 5 A&G LTD (EE)
- 6 BLOODLINE SPA (IT)
- 7 FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 8 PERA INNOVATION LTD (UK)
- 9 CHARITE UNIVERSITÄTSMEDIZIN BERLIN (DE)
- 10 MEDIGLOBE GMBH (DE)



# M3C

## Multi-Monitoring Medical Chip for Homecare Applications

M3-C is a CRAFT project which aims to provide a group of small to medium-sized enterprises (SMEs) from Germany, Sweden, Spain and Poland, whose business interests include medical equipment development and distribution, systems integration and healthcare information management systems, with access to advanced system-on-a-chip (SoC) technology, to enable them to expand from their existing business positions into the emerging homecare and ambulant medical devices markets. The project will enable these SMEs to contribute effectively to the goals of e-health.

Three research and technological development (RTD) performers will apply state-of-the-art techniques, such as the application of multiplexed analogue components within sigma-delta modulators to the SoC design. Higher performance small-area digital cells and multi-channel digital filters will help reduce the chip area and power dissipation. Auto-calibration concepts will overcome the effects of non-ideal behaviour of analogue parts. Built-in self-test (BIST) schemes will be implemented in order to increase the reliability of medical devices. A digital signal processor (DSP) core will be integrated, making on-chip data compression and signal feature extraction possible. Compression algorithms will be defined to run on the DSP-based platform, which minimise the requirements for data storage and transmission. The proposed developments include implementation of BlueTooth™ Wireless Technology and investigation of the "Zigbee" technology for wireless communication.

It is envisaged that the results will permit multi-functional bio-signal processing devices (e.g. for EEG, ECG) to be developed, which are 50 % smaller and can be operated at approximately half of today's power consumption, providing the SMEs with opportunities for developing new-generation wearable and possibly even implantable biosensors.

The next two decades will see dramatic changes in the health needs of the world's populations. Rising healthcare use and spiralling costs everywhere have led to a trend and the necessity to treat patients in

the home. If this is not to become an unsustainable burden (for women especially), new devices to enable effective homecare must be seen as a priority. Currently, this market is served by SMEs and not the major multinational medical equipment suppliers. M3-C will enable leading SME suppliers to support this strategic aim.

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Co-operative research

- 1 SCHWARZER GMBH (DE)
- 2 MAELARDALEN UNIVERSITY (SE)
- 3 KATHOLIEKE UNIVERSITEIT LEUVEN (BE)
- 4 TECHNISCHE UNIVERSITAT HAMBURG-HARBURG (DE)
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- 6 ABMEDICA S.A. MATERIAL Y EQUIPOS MEDICOS (ES)
- 7 ORTIVUS AB (SE)

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# MACROCEPT

## Targeted Therapies For Inflammatory Bowel Disease

136

Co-operative research

Inflammatory bowel diseases such as Crohn's disease still lack efficient, cost-effective treatments. Using recent advances in drug design, the partners have identified a new therapeutic approach that has the potential to cut annual treatment costs six-fold, reduce side effects and offer a better efficacy than is currently available. The approach combines a novel class of antagonists of macrophage TNF-coupled production with a novel macrophage targeting technology that can increase drug concentration in the macrophage by 200-fold or more. The result is an effective "double whammy", by concentrating potent inhibitors in these cells that are intimately associated with the lesions.

The goals of this proposal are therefore to:

1. select and improve the new anti-inflammatory compounds using partner technologies;
2. formulate them for use in the context of bowel disease;
3. test them in advanced disease models;
4. select clinical candidates and demonstrate their safety in standard toxicological models.

The technical insight driving the project is the potential role that tumour necrosis factor (TNF) plays in the pathology associated with inflammatory bowel diseases. It is possible that reductions in the production of this cytokine could result in disease remission. TNF is produced in response to stimulation amplified via key signalling proteins like p38 kinase — inhibiting these enzymes prevents TNF production. Macrophage, a type of immune cell accumulated in IBD, is a source of TNF, and a drug must reach these cells in order to reverse progress of disease. Optimal drug safety and efficacy will depend on maximising the amount of drug available to the macrophage while limiting the overall dose and exposure to the rest of the body. The project, therefore, sets out to use a combination of computer-aided drug design and a novel technology for assisting drug partition into the macrophage, to create potent new inhibitors of macrophage TNF production.

These will be validated in models of inflammatory bowel disease and progressed into preclinical development for eventual patient trials.

www.macrocept.com

- 1 SYNOVO GMBH (DE)
- 2 EBERHARD-KARLS UNIVERSITÄT TÜBINGEN (DE)
- 3 UNIVERSITÀ DEGLI STUDI DI PERUGIA (IT)
- 4 CRESSET BIOMOLECULAR DISCOVERY LTD (UK)
- 5 QUEEN MARY AND WESTFIELD COLLEGE - UNIVERSITY OF LONDON (UK)
- 6 INSTITUTE OF MOLECULAR GENETICS - ACADEMY OF SCIENCES OF THE CZECH REPUBLIC (CZ)
- 7 EPISTEM LTD (UK)

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# Med-ePHV

## Learning and Practicing Pharmacovigilance in the Mediterranean Countries of the EU

Pharmacovigilance involves collecting and analysing the adverse reactions to medicines following their market authorisation; it is an essential practice to ensure public health. The recognition and notification of Adverse Drug Reactions is a complex task, requiring knowledge and expertise from both health practitioners and patients.

The Med-ePHV project intends to study and develop a new approach to pharmacovigilance practice in order to improve ADRs' recognition and notification. The project does not interfere with the pharmacovigilance activity of the European Agency and the national authorities, as the issue addressed by Med-ePHV takes place in the periphery of the health systems, at the interface between health practitioners and patients.

The research is proposed by a group of small to medium-sized enterprises (SMEs) from France, Italy and Spain that have noticed significant market opportunities in the development of online products and services in support of pharmacovigilance. The new pharmaceutical legislation approved by the European Commission in 2003 aims to an improved pharmacovigilance within the EU and recommends a more efficient ADRs recognition and notification.

The Med-ePHV project will focus on the medical culture and practice of three Mediterranean countries: France, Italy and Spain. During the last phase of the project, the consortium will search the most suitable network-based application grid models to define the most cost-effective platform useful in supporting a heavy multi-user e-learning programme. As the main project goal is allowing end-users to learn and train on pharmacovigilance (innovative e-learning) and to practice in a user-friendly knowledge-based environment ADRs recognition and notification, a key task of the project will be the testing and validation of the online modules by target end-users. The target market for the SMEs is represented by local health authorities, market authorisation holders, hospitals, and public and private health organisations.

- 1 GRUPPO S LAB S.R.L. (IT)
- 2 JUNGLE BOX S.L. (ES)
- 3 PASTEUR MEDIAVITA (FR)
- 4 UNIVERSITÀ DI PAVIA - DIPARTIMENTO DI MEDICINA INTERNA (IT)
- 5 TECNOFARMACI - SOCIETÀ CONSORTILE PER AZIONI - PER LO SVILUPPO DELLA RICERCA FARMACEUTICA S.C.P.A. (IT)
- 6 INSTITUT NATIONAL DE LA SANTÉ ET DE LA RECHERCHE MÉDICALE (FR)
- 7 INSTITUTO DE FARMACOEPIDEMIOLOGÍA DE LA UNIVERSIDAD DE VALLADOLID (ES)
- 8 EUROPEAN FORUM FOR GOOD CLINICAL PRACTICE (BE)

**Contract: 33016**  
**Call: FP6-2004-SME-COOP**  
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**EC Contribution: € 804 420**

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# MERMOTH

## MEdical Remote MONitoring of cloTHes

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Co-operative research

The continuous remote monitoring of some vital signals from patients is a new healthcare concept: it is technology-driven, since the advances in sensor technology, communication technology and data processing allow thinking about suits that would seamlessly imbed such technologies to make the remote-sensing systems wearable. It is socially driven because of the rising costs of medical assistance, the need to improve early illness detection and medical interventions, and the human lifetime average value, which is steadily increasing.

A consortium of European small to medium-sized enterprises (SMEs), involving a company in charge of clinical trials — ADDS, two textile manufacturers — ELASTA and Fernand Dubois, and three hardware and software developers — DTSO, NETSMART and IMS, in the field of bio-clothes, require a textile research institute (CENTEXBEL) to coordinate and manage a development project involving two SME research and technological development (RTD) performers — TAM TELESANTE and NMRC — specialised in telemedicine technologies and bio-cloths.

They aim at providing the clinical study markets and academic laboratories with instrumented clothes that can monitor patient health. In this research project, the design of the fabric is one of the most critical issues, since it could be manufactured as a woven, a crocheted or a knitted product. Since comfort is an important parameter, the design of the fabric needs to be optimised: the use of a full fashion technology on a knitting machine appears key for the positioning of the sensors and the actuators within the final product. The main output of MERMOTH is a comfortable, wearable monitoring prototype unit, based on a “wearable interface”: it is implemented by integrating smart sensors, advanced signal processing techniques and new telecommunication systems on a textile platform. A parallel data management provides the first two markets with a whole prototype unit for extensive testing.

- 1 DELTA TECHNOLOGIES SUD OUEST (FR)
- 2 NETSMART S.A. (GR)
- 3 ADVANCED DRUG DEVELOPMENT SERVICES (FR)
- 4 INFORMATION & IMAGE MANAGEMENT SYSTEMS S.A. (ES)
- 5 ELASTA IND. NV (BE)
- 6 JBM NV (BE)
- 7 CENTRE SCIENTIFIQUE ET TECHNIQUE DE L'INDUSTRIE TEXTILE BELGE (BE)
- 8 TAM TELESANTE (FR)
- 9 UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK (IE)



**Contract:** 508272  
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**Starting Date:** 01/02/2004  
**Duration (months):** 24  
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**EC Contribution:** € 943 000

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# MICROBEARRAY

Genome-Scale Analysis of the Immune Response against Pathogenic Micro-Organisms, Leading to Diagnostic and Vaccine Candidates and Development of an Integrated Micro Array Platform for Clinical Use

The genome sequences of microbial organisms responsible for diseases of worldwide medical importance have been sequenced or will be available in the near future. Technologies for producing large numbers of proteins have been developed and high-throughput assays such as protein micro arrays have been clinically validated for detecting the presence of antibodies, in serum, directed against microbial antigens. These achievements offer the opportunity of investigating the natural immune response against the whole proteome of a variety of micro-organisms. Powerful combinations of genomic information, molecular tools and immunological assays are becoming available to help identify the antigens that function as targets of protective immunity or could be used as markers for serodiagnosis.

We propose here to identify in micro-organisms of great medical relevance (*M. pneumoniae*, *C. pneumoniae*, *L. pneumophila*, *coronavirus spp.* and *P. falciparum*), a large collection of surface and secreted proteins as well as putative endotoxins. This protein repertoire will be produced as recombinant molecules or as sets of overlapping synthetic peptides and printed on array slides. The serum reactivity of groups of individuals with a proven history of exposure to the selected micro-organisms will be analysed against the arrayed proteins to identify diagnostic markers and correlates of protection.

This project will significantly expand the small to medium-sized enterprises' (SMEs') bank of Intellectual Property and contribute to expertise within the research and technological development (RTD) performers. It is anticipated that the proposed work in high-throughput protein expression, software analysis, surface peptides synthesis, protein and peptide surface capture, and array reader instrumentation will create an integrated platform of great commercial and research value. Finally it will contribute to unravelling how the humoral immune response interacts with the microbial proteomes, thus filling the gap between genomic data and development of novel vaccines and diagnostic tools.

- 1 DIAGNOSTIC MATRICES LTD (UK)
- 2 MIKURA LTD (UK)
- 3 CHELSEA INSTRUMENTS LTD (UK)
- 4 PROTEIN EXPERT (FR)
- 5 MICROTEST MATRICES LTD (UK)
- 6 UNIVERSITÀ DEGLI STUDI DI PERUGIA (IT)
- 7 ISTITUTO SUPERIORE DI SANITA (IT)
- 8 BIOINFORMBANK INSTITUTE (PL)
- 9 DEUTSCHES KREBSFORSCHUNGSZENTRUM STIFTUNG DES ÖFFENTLICHEN RECHTS (DE)

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**Call: FP6-2002-SME-1**  
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**EC Contribution: € 1 401 002**

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# MUST

## Multidimensional Ultrasonic Scanning Technology to Reduce Cancer Death Rate through Fast and Accurate Diagnosis — Particularly of Breast Cancer

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Co-operative research

[www.medcom-online.de/projects/must/must.htm](http://www.medcom-online.de/projects/must/must.htm)

35 years to 65 years old. The exact progress of the growth of a tumour is difficult to map; tumours don't really follow growth guidelines. What we do know is that once a tumour in the breast has grown to a 2 cm diameter there is already a 40 % to 50 % chance that secondary cancers exist. Set this in context, breast cancer accounts for 31 deaths in 100 000 women every year. This also equates to 31 deaths out of 75 sufferers, or a little over 40 % of diagnosed breast cancer resulting in mortality.

Dividing those figures into pre-secondary and post-secondary cancer, the figures are stark. Breast cancers that are detected prior to any secondary presence result in 20 % mortality, whereas in cases where secondary cancers are present the result is 65 % mortality.

Of the 100 000 women who will die of breast cancer this year about 70 000 will die from cancer that was not detected until secondary tumours (metastases) were present. Had they been diagnosed earlier, pre-metastases, nearly 50 000 of them would have lived. Diagnosis is key. The purpose of the MUST project is to create a three-dimensional scanning system which:

1. is a patient-friendly scanning system available at the point of care;
2. does not require a significant fixed installation;
3. is fully affordable by the most modest of facilities, with a target price of EUR 10 000;
4. is highly portable;
5. has great ease of use;
6. gives immediate results for further decision-making.

The MUST three-dimensional ultrasound scanning solution will not replace the CAT and MRI scanner, but it will replace certain functions in relation to surface or near-surface tumour recognition, thereby greatly

reducing the diagnosis time and cost and increasing the availability of high-quality scanning. The MUST development has the potential to put future-generation imaging technology into the hands of the people that need it anywhere in Europe, by removing the need for infrastructure reliance, providing ease of operability and doing so at a price level that will be widely accessible and acceptable.

- 1 MEDCOM GMBH (DE)
- 2 SK TRADE GMBH (DE)
- 3 PI MEDICAL LTD (GR)
- 4 S & S PLASTICS (UK)
- 5 TELEMED (LT)
- 6 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 7 PERA INNOVATION LTD (UK)



# MYCOPLEX

## Development of Innovative Immuno-PCR Assay for the Detection and Quantification of Ochratoxin and Aflatoxin in Complex Matrices (Milk, Coffee)

Ochratoxin A (OTA) is a mycotoxin produced by several fungi of the *Penicillium* and *Aspergillus* species. Aflatoxin is produced by at least three species of *Aspergillus*: *A. flavus*, *A. parasiticus*, *A. nominus*. They occur naturally in a variety of plant products such as cereals, coffee, wine, beer and spices. OTA has been proved to have carcinogenic, nephrotoxic, teratogenic, immunotoxic and possibly neurotoxic properties and has been linked to nephropathy in humans. In humans, aflatoxins have sub-acute and chronic effects, like primary liver cancer, chronic hepatitis, jaundice, hepatomegaly and cirrhosis.

Aflatoxin M1 is an hydroxylated metabolite produced when ruminants ingest contaminated feed. It is excreted in milk and may subsequently contaminate other dairy products such as cheese and yoghurt, which represents an important risk factor for frequent consumers, in particular for infants and young children. After cereal products, coffee and beer contribute about 15 % to OTA ingestion. In Europe, OTA and aflatoxin levels are regulated by the Commission Regulations EC 472/2002 and EC 1525/98, which establish maximal concentrations of OTA in some foodstuffs and limit maximal permitted concentration of Aflatoxin M1 in milk to 0.05 µg/kg, respectively. Moreover, the EU Scientific Committee on Food recommends an OTA daily intake lower than 5 ng/kg BW. Regarding their risk potential and stability, the amounts of these mycotoxins in foodstuffs should be reduced to the lowest technically achievable level.

MYCOPLEX aims to develop a simple and sensitive technique for the detection and quantification of OTA in coffee and Afla in milk. This will be reached by combining an ELISA assay with PCR amplification of the signal. PCR amplification provides the method with sensitivities up to 1 000 times higher than those inherent to conventional immunoassays, and allows for the analysis of diluted samples, minimising cross reactivity and interferences. MYCOPLEX will therefore account for a more effective method for the detection of mycotoxins in complex matrixes than the immunoassays currently used, and for a cheaper and easier-to-handle technique than HPLC, the standardised method.

- 1 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E. V. (DE)
- 2 BIOTOOLS B&M LABS S.A. (ES)
- 3 BIO CULT BV (NL)
- 4 MUNGIVET S.L. (ES)
- 5 LÖFBERGS LIA AB (SE)
- 6 UNIVERSITY OF STRATHCLYDE (UK)
- 7 FUNDACIÓN GAIKER (ES)
- 8 ISEAO TECHNOLOGIES LTD (UK)

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**EC Contribution:** € 553 059

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# NanoDARTS

## Nanotechnology Dual Advanced Reliable Topical Mucosal Drug-Delivery System

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Co-operative research

'The majority of infections affecting man and animals take place or start at mucosal membranes.' The ability to retain pharmacologically active agents for extended periods of time on any mucosal epithelia, including those of the nose, mouth, rectum or vagina confers a number of potential therapeutic advantages.

The wider society and policy objectives of our project are set out below. We aim to benefit European society by reducing the length of localized topical treatment for mucosal infections by 50 % and the pain experienced by 40 %. The relatively low cost of the Nano-DARTS technology will enable the increasing use of this local topical application in all European countries including eastern Europe, and this will support the policies of the European Union that aim to bring the health of eastern Europeans up to the same standard as those of the 15 EU Member States.

To achieve this, our technical targets are to discover technological routes to enable the development of an advanced nano-sized polymer-coated liposome system compatible with carrying hydrophilic or hydrophobic drugs of varying sizes (or both simultaneously), that are retained at the mucosal site of application and release the active ingredient in a controlled manner for local and/or systemic absorption.

The economic objectives to improve competitiveness are set out below. This project will strengthen the competitiveness of our group of participant small to medium-sized enterprises (SMEs) and subsequent licensees to gain a 5 % share of the approximately EUR 2 billion annual global market-growth for advanced topical mucosal drug-delivery systems by 2014, and create 1 250 new European jobs. In addition, this project will contribute towards implementing the goals set by the EU in 2005, which include increased innovation and investment in the pharmaceutical and biotechnology industries, to regain European global competitiveness in this sector by offering this sector product differentiation and life-cycle management opportunities.

- 1 PERA INNOVATION LTD (UK)
- 2 LIPOID GMBH (DE)
- 3 BRACE GMBH CHEMISTRY-PLASTICS-DATA SYSTEMS-ESTHETIQUES (DE)
- 4 SOCIEDAD DE TUBOS Y ESTUCHES S.L. (ES)
- 5 AK INDUSTRIES LTD (UK)
- 6 EUROPEAN MEDICAL CONTRACT MANUFACTURING BV (NL)
- 7 SINCLAIR PHARMACEUTICALS LTD (UK)
- 8 BIO-GELS PHARMACEUTICALS LTD (IS)
- 9 YTKEMISKA INSTITUTET AB (SE)
- 10 FUNDACIÓN RIOJA SALUD (ES)



FP6 Project Catalogue

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Duration (months): 24  
Total cost: € 1 578 503  
EC Contribution: € 816 734

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# PIBF

## Towards New Diagnostic Standards — Development of a Protein-Based Diagnostic Assay and of a Novel Anti-Abortion Drug Target

Project 508141\_PIBF is based on a family of international patents and other intellectual property. The patents claim the use of a natural protein with immunomodulatory activity as a diagnostic marker and as a drug candidate. The natural protein has been named Progesterone Induced Blocking Factor or PIBF. It has been shown by one of the consortium partners (Pro-Gestatione) that PIBF blocks the autoimmune response which normally leads to the killing of rapidly growing tissue, such as foetuses.

High levels of PIBF are absolutely essential for the maintenance of normal pregnancy, therefore PIBF resembles a promising drug target. During the characterization of PIBF as an important mediator for the maintenance of pregnancy, it has surprisingly been shown that tumour cells also express PIBF, whereas no or low PIBF reactivity is found in the adjacent normal tissues. This indicates that PIBF constitutes an essential marker for tumour cells.

Project 508141\_PIBF describes the required steps to develop a novel testing assay to diagnose malignant tumours, to monitor tumour therapy and to diagnose premature abortion risk.

The development of this diagnostic method is based on development of a validated Enzyme Linked Immuno Sorbent Assay (ELISA), and research concerning the expression of PIBF in malignant tumours and during normal and risk pregnancy.

The strategic objectives of project 508141\_PIBF are the development of a convenient testing assay to diagnose malignant tumours, to monitor tumour treatment in patients, to diagnose premature abortion risk, to develop and exploit a ready-to-use kit for carrying out testing in patients.

The kit's competitive advantage is its easy, safe and rapid use without the need of high-tech equipment. It is envisioned that this development will lead to a novel diagnostic standard in tumour and pregnancy

medicine. Because of its potential as a novel drug to support *in vitro* fertilisation, PIBF also addresses unmet medical needs. The activities described in project 508141\_PIBF will be necessary for the participating small to medium-sized enterprises (SMEs) to generate a competitive product, that besides its strong potential as a therapeutic medicine, may emerge as a new “golden standard” for tumour markers.

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Co-operative research

- 1 SEMMELWEIS EGYETEM (RACIONÁLIS HATOANYAGTERVEZŐ LABORATORIUM KKK) (HU)
- 2 BIODEVELOPS VERWERTUNG VON LIZENZEN GMBH (AT)
- 3 PEPSCAN SYSTEMS B.V. (NL)
- 4 DR OBRUCA UND DR STROHMER PARTNERSCHAFT (AT)
- 5 DIAGNOSTICUM RT (HU)
- 6 PRO-GESTATIONE LTD (HU)
- 7 INTERCELL AG (AT)
- 8 SOLVO BIOTECHNOLOGY RT (HU)

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**Total cost: € 1 316 100**  
**EC Contribution: € 786 300**

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Biotechnology & Health

# PICO

## Paraendoscopic Intuitive Computer-Assisted Operating system

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Co-operative research

Endoscopic interventions have been performed in growing numbers in neurosurgery for the last years. Compared to microscopic interventions, the use of an endoscope has significant advantages, mainly resulting from an improved view of the object field and a reduced trauma. Yet limitations of the systems available exclude most of the indications in neurosurgery from endoscopic interventions. In addition, endoscopic interventions offer significant benefits to the patients. The reduced trauma leads to reduced stays at hospitals and a faster convalescence. Especially in neurosurgery, a reduced trauma is directly associated with a reduced impact on the brain's functions, and the patient shows immediate improvements.

The availability of an endoscopic system characterised by improvements concerning optical properties and the handling concept would have the power to transform today's microscopic interventions into endoscopic interventions in neurosurgery.

The objective of PICO is the development of an integrated neurosurgical system in a two-year schedule, consisting of:

- a holding device for an endoscope,
- an ergonomic and reliable human interface for remote control,
- a set of specially adapted micro instruments,
- a specially adapted stereo-endoscope,
- a 3-D visualisation system.

The vision of PICO is the combination of the benefits of microscopic systems like 3-D visualisation and well-suited holding concepts with the benefits of endoscopic systems, thus overcoming the drawbacks in neurosurgery today.

A consortium of small to medium-sized enterprises (SMEs) and research and technological development (RTD) performers has been founded, bringing together the know-how and the resources needed. The development of such an integrated neuroendoscopic system will make a significant contribution to the future positioning of SMEs in the field of high-tech medical applications. In addition, a large enterprise will participate in the project by bringing in its facilities for the development of the stereo-endoscope and making its market entry points and sales channels available to the SMEs.

www.pico-endoscopy.org

- 1 KOMPETENZZENTRUM MINIMAL INVASIVE MEDIZIN & TECHNIK TÜBINGEN- TUTTLINGEN E.V. (DE)
- 2 SILICONSFTWARE GMBH (DE)
- 3 ING. WERNER FUCHS GMBH (AT)
- 4 MEDIN A.S. (CZ)
- 5 NOUVAG AG (CH)
- 6 FACULTNI NEMOCNICE, HRADEC KRALOVE (UNIVERSITY HOSPITAL IN HRADEC KRALOVE) (CZ)
- 7 UNIVERSITY MEDICAL CENTER NIJMEGEN (NL)
- 8 KATHARINENHOSPITAL, KLINIKUM STUTTGART (DE)
- 9 UNIVERSITÄTSKLINIKUM GREIFSWALD DER ERNST-MORITZ-ARNDT-UNIVERSITÄT GREIFSWALD (DE)
- 10 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 11 SWISS FEDERAL INSTITUTE FOR TECHNOLOGY LAUSANNE (CH)
- 12 UNIVERSITÄT STUTTGART (DE)
- 13 RICHARD WOLF GMBH (DE)

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EC Contribution: € 1 345 506

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# POSBEADD

The development of POSitively charged BEADs for Drug Delivery in the embolotherapy of uterine fibroids

Uterine fibroids cost European small to medium-sized enterprises (SMEs) 3.45 million working days each year. The wider societal and policy objectives of our project are to benefit European society by improving embolotherapy for fibroids, using drug-eluting beads and reducing the following: the length of fibroid treatment by 90 %; the number of women having hysterectomies by 5 %; the pain experienced by women by 50 %; and the post-operative infection rate by 50 %. In addition, the relatively low cost of the POS-BEADD technology will enable the increasing use of embolisation treatments in all European countries including candidate countries, and this will support the policies of the European Union to bring the health of eastern Europeans up to the same standard as those of the 15 states

To achieve this, our technical targets are to discover technological routes to enable the development of the following: positively charged beads made from PVA that are lyophilised and carrying drugs at concentrations between 20 mg/ml and 100 mg/ml of beads; catheters compatible with all drug-bead combinations; and beads made by a new route coupled to sample drugs — aspirin and nucleic acids.

The economic objectives to improve SME competitiveness are for the participants and subsequent licensees to: gain a 5 % share of the yearly EUR 2 billion global market for UFE products by 2010 and generate 65 new jobs in Europe; gain a 5 % share of the remaining EUR 1 billion global market for bead embolisation products and create a further 25 new jobs in Europe; gain a 5 % share of the EUR 200 million global market for chromatography consumables and create a further 10 new jobs in Europe.

- 1 BIOCOMPATIBLES INTERNATIONAL PLC (UK)
- 2 FRAUNHOFER-GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 3 JOLINE GMBH & CO. KG (DE)
- 4 CELLMED AG (DE)
- 5 S & S PLASTICS LTD (UK)
- 6 DMC MEDICAL (IE)
- 7 PERA INNOVATION LTD (UK)
- 8 BIOMATECH (FR)

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**Duration (months):** 30  
**Total cost:** € 1 410 500  
**EC Contribution:** € 729 390

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# RASPED

A Single-Use Device for the Implantation of Hip Prostheses that Will Reduce the Stress Generated within the Femur During Surgery, Preventing Intra- and Post-Operative Femoral Fractures Consisting of a Reverberating Abrasive Single-Use Piezo-Electric-Driven Device

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Co-operative research

Hip prosthesis implantation is one of the most common operations carried out in the EC today (approximately 700 000 annually across Europe per year). The technique for hip implantation requires the removal of the femoral head followed by the incremental impaction of a smooth tamp or broach to create an opening in the intramedullary canal to form an insertion site for the hip prostheses within the femur. The impaction of either of these devices results in high stress generation within the femur, which can result in intra-operative femoral fractures which occur in approximately 17 % of all cases, resulting in over 119 000 surgical and associated post-operative complications per year.

We propose to develop a bespoke disposable hollow rasp and drive unit that can be incremented into the femur removing the trabecular bone, spongiform and marrow from the centre of the intramedullary canal (femur). The more effective cutting and removal process of our rasp and drive mechanism will negate the requirement for impact-based surgical methods and thus reduce the occurrence of femoral fractures and complications.

Our aim is to develop a product that is an alternative to the impact-based surgical method of hip replacements, and thereby reduce the level of femoral fractures by 60 %. We recognise the importance of economics in our project; we aim to produce a disposable set of surgical tools that will displace 35 % of all US imports of re-usable tooling.

www.finsbury.org

- 1 FINSBURY INSTRUMENTS LTD (UK)
- 2 NISAFORM, S.R.O. (CZ)
- 3 INCERPLAST SA (RO)
- 4 HUNT DEVELOPMENTS LTD (UK)
- 5 CEDRAT TECHNOLOGIES SA (FR)
- 6 BESTER MEDICAL SYSTEM SP. Z O. O. (PL)
- 7 MOLNLYCKE HEALTH CARE AB (SE)
- 8 PERA INNOVATION LTD (UK)
- 9 BIOMATECH (FR)
- 10 UNIVERSITY OF SOUTHAMPTON (UK)



FP6 Project Catalogue

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EC Contribution: € 683 833

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# SafetyWatch

## Development of an Innovative Location and Tracking Device with Autonomous Emergency-Activation Capabilities Usable in GPS-Hostile Environments

This project will be able to deliver the following:

1. provide a highly accurate location service;
2. based on the behaviour of the user, the device can determine if the wearer is wandering off, thus increasing safety and contributing to the goals of the European health project Remind;
3. through the innovative technology, increase the competitiveness of the small to medium-sized enterprise (SME) community through the development of export and licensing opportunities outside of Europe.

Our idea is to develop a highly accurate positioning and location device to be used by elderly who suffer from dementia. Various European organisations and university studies have determined that dementia sufferers should be able to live dignified lives for as long as possible. This includes the ability to leave the confinement of a room and to move freely and in privacy. The wish to grant the elderly freedom often conflicts with the obligation to provide them with safety, because dementia sufferers often wander without the ability to return or alert care-givers.

The device we envisage utilises the user's movement patterns, as recorded by GPS and Dead reckoning (DR) systems, to continuously learn how the user acts and behaves, and combines this information with internal mapping to establish safe zones and pattern recognition, making it possible for the device to recognise if the wearer is wandering or performing usual daily tasks. This is made possible through the device's learning capability that can be enabled when the user is accompanied during walks. The safe zones are further used to determine the energy state of the device, allowing it to be almost completely powered down during stays in completely "safe" areas. If the user is wandering, the device's GPRS communication capability will alert emergency services.

To achieve this we need to develop:

1. internal sensor-based dead reckoning (DR) that can differentiate local and global acceleration effects which will be capable of positioning the user in areas where the GPS signals are unavailable;
2. a device-internal neural network with the capability to observe, learn and discover patterns in the way the user behaves. This information is used in two ways:
  - (a) to predict if the user is engaged in wandering,
  - (b) to control the device's power states, thus reducing power consumption;
3. a GPRS subsystem that can be used to alert emergency services and to remotely request the location of the device.

The use of DR enables the device to detect if the wearer has suffered from a fall, in which case it will also alert emergency services

- 1 SPOT ON SYSTEMS APS (DK)
- 2 SILEX MICROSYSTEMS AB (SE)
- 3 PAJ SYSTEMTEKNIK A/S (DK)
- 4 MPOWER SOLUTIONS LTD (UK)
- 5 TEHNOPLAST AS (EE)
- 6 HEALTH CARE INNOVATION (DK)
- 7 AZIENDA ULSS 20 DI VERONA (IT)
- 8 MANGAR INTERNATIONAL LTD (UK)
- 9 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)
- 10 DANISH INNOVATION INSTITUTE (DK)

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**EC Contribution: € 696 403**

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# Trolair

A New Concept of Patient Handling, Featuring an Innovative, Fully Collapsible, Lightweight, Soft-Walled Pneumatic Device to Operate in Accidents and Emergencies Services for the Reduction of Patient-Handling Injuries among Healthcare Workers

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Co-operative research

More than a third of all severe and major injuries reported each year to EU-health authorities (around 525 000) are caused by manual handling. In particular, healthcare workers are under extreme risk, mainly due to patient handling and the growing obesity problem (400 000 new cases each year in Europe). This represents an approximated cost of EUR 105 million each year to the health services around Europe.

This proposal will develop a new concept of patient handling, featuring a fully-collapsible, lightweight trolley that operates on inflatable structures specially integrated with a plastic frame to provide a pneumatic-suspension system.

The trolley will operate on lifting cushions made of advanced polyurethane-coated nylon fabric, which use air power to lift the patient from the "totally flat" position to the required height. It will be able to adjust ergonomically to the patient, which is particularly important in spine and head injuries. It will be cheaper than current market leaders (mainly Ferno and Stryker, both in the USA) and will be the only one providing a safe working environment for healthcare staff without the risk of back injuries. However, the market leaders and new manufacturers in India and China are coming up with power-assisted trolleys that may become fully collapsible in the near future. As European small to medium-sized enterprises (SMEs), we urgently need to benefit from this opportunity in the patient-handling market, before our competitors do. However, the only way we can overcome the scientific and technological obstacles inherent to our innovation is through a cooperative partnership involving research and development institutions.

Our innovations in advanced lightweight thin textile laminates, rapid inflation and deflation systems, and innovative industrial design will enable us to achieve our goals. Therefore, there is a clear new opportunity to introduce an innovative patient-handling solution that provides a "no lifting" environment, targeting a global market worth EUR 441 million each year.

- 1 MANGAR INTERNATIONAL LTD (UK)
- 2 EREZ THERMOPLASTICS PRODUCTS LTD (IL)
- 3 ATI PROFIL OU (EE)
- 4 FIRE EATER A/S (DK)
- 5 SAS TOLERIE INDUSTRIELLE DE BREZOLLES (FR)
- 6 SURREY AMBULANCE SERVICE NHS TRUST (UK)
- 7 PARAIID LTD (UK)
- 8 PERA INNOVATION LTD (UK)
- 9 D'APPOLONIA SPA (IT)



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**EC Contribution:** € 749 575

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# TROY

## Endoscope Capsule Using Ultrasound Technology

The TROY project represents a significant advance in the investigation of gastrointestinal tract diseases. The project aims to develop an ultrasound capsule to be used as a first-line exam for investigation of diseases in the gastrointestinal tract, such as cancers, Crohn's disease and ulceration. Endoscopy is a field undergoing high evolution and technological investigation. Endoscopy closes the diagnostic gap by enabling physicians to directly view the entire digestive tract. This is a bigger task than most people realise, since the average adult digestive tract is approximately 9 m in length. Gastrointestinal endoscopes are now recognised as the only medical devices that can simultaneously perform observations, diagnoses and treatment. The Ultrasound Endoscope Capsule will support the diagnoses procedures in the early detection of cancers. It helps in the treatment of gastrointestinal diseases and cancer from the early stages, because it not only gives 3-D high definition images, but also can do much faster than X-rays or other radiographic techniques not using radiation. The early diagnoses look forward to the promoting health and disease prevention.

The TROY project idea is to develop an endoscope capsule, using ultrasound technology, to generate high definition 3-D computer-generated images, to contribute to the improvement of early cancer detection. The Ultrasound Endoscope Capsule is swallowed by the patient.

This allows us to capture ultrasound information from the entire digestive tract. The capsule travels smoothly and painlessly throughout the gastrointestinal tract by natural peristalsis movements, transmitting the ultrasound data.

The patient will wear a shoulder-supported belt pack holding a power supply and a small hard drive for storing the data. After the exam, the data are downloaded from the belt-pack recorder to a customised PC workstation. The software will then reconstruct a 3-D image of the digestive tract and the data-mining module will try to recognise problem

patterns. This 3-D interactive image of the digestive tract will provide the physicians with an excellent tool to analyse patients' interior body, closing the diagnostic gap by directly viewing the entire digestive tract, and can assist them in the diagnosis and treatment of gastrointestinal diseases.

The TROY System will be mainly based on the following components with high and innovative technological content:

1. Ultrasound Endoscope Capsule, for data acquisition, with miniaturised units for:
  - (a) data communication,
  - (b) energy supply (batteries),
  - (c) ultrasound;
2. data storage unit, for receiving and recording the data with:
  - (a) sensors to receive the capsule signal,
  - (b) storage hard drive,
  - (c) energy supply (batteries).

- 1 INSTITUTO AGILUS DE INOVAÇÃO EM TECNOLOGIA DE INFORMAÇÃO S.A. (PT)
- 2 SC IPA SA SUCURSALA CIFATT CLUJ (RO)
- 3 DUNVEGAN SYSTEMS LTD (UK)
- 4 AGT SRL (IT)
- 5 ARDORAN OU (EE)
- 6 ARTICA TELEMEDICINA S.L. (ES)
- 7 LABOR S.R.L. (IT)
- 8 ULTRASOUND INSTITUTE, KAUNAS UNIVERSITY OF TECHNOLOGY (LT)
- 9 IULIU HATIEGANU, UNIVERSITY OF MEDICINE AND PHARMACY CLUJ - NAPOCA (RO)

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**Biotechnology & Health**

The successful management of venous leg ulcers represents a significant clinical problem and a major drain on the limited financial resources of the health services. Compression therapy is accepted as the essential part of the venous ulcer treatment.

In the proposed project, an opportunity is offered to develop a pressure dressing system that addresses the shortcomings of current state of the art, whilst making considerable cost savings. The proposed project intends to develop an advanced and more effective two-part neoprene-based pressure dressing integrated with a pressure monitoring system. The pressure monitor system will allow the system to be employed in a primary care environment by community healthcare workers or by the patient self-caring at home. This portable system allows the doctor, nurse, health visitor and patient to take an instant and accurate readout of pressure, through application of the dressing system to the body.

The system, worn continuously and discretely, enables the patient to adjust the compression therapy themselves if the forces applied by the dressing system drift out of tolerance ranges.

A highly professional version of the system is also proposed for clinical usage. Additional improvement of the system is proposed by introduction of the enzyme-based treatment. The system will include a self-fixing, fully adjustable carrier, upon which is attached an optimised membrane impregnated with a composition of enzyme complexes that produce multiple effects in various stages of the treatment. The advanced system for compression therapy of venous leg ulcer will be developed in a few phases, including the development, design and testing of the separate components and integration of the components into an advanced intelligent system. Clinical trials, final evaluation and development of plans for commercialisation of the system will also be performed.

- 1 BLUEPRINT INNOVATION LTD (UK)
- 2 LOKMIS UAB (LT)
- 3 FOCUS' PRODUCT DEVELOPMENT LTD (UK)
- 4 BAKTERINIAI PREPARATAI (LT)
- 5 INFORMA S.R.L. (IT)
- 6 CAMPUS MICRO TECHNOLOGIES GMBH (DE)
- 7 ULSYS LTD (UK)
- 8 AINTREE HOSPITAL NHS TRUST (UK)
- 9 SEMICONDUCTOR PHYSICS INSTITUTE (LT)
- 10 UAB BIOCENTRAS (LT)
- 11 BRADFORD VASCULAR SURGICAL AND WOUND CARE UNIT (UK)
- 12 TECHNOVENT LTD (UK)
- 13 ULSYS LTD (UK)
- 14 VALENTIS UAB (LT)

**Contract: 508739**  
**Call: FP6-2002-SME-1**  
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**EC Contribution: € 1 053 632**

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# Universal Vaccine

## Novel Antigen-Adjuvant Vehicle as an Effective Influenza Vaccine

Influenza is a recurrent global threat and it affects millions of people in Europe and the world every year. The Universal Vaccine project is highly original and brings together European state-of-the-art scientists in order to develop a powerful new mucosal vaccine for humans, providing lifelong protection against influenza. In the longer perspective, the project may contribute to the objective of reducing or even eradicating influenza disease in humans.

The Universal Vaccine project combines European small to medium-sized enterprises (SMEs) and research and technological development (RTD) performers that have pioneered the development of new vaccines and vaccine formulations, and which possess unique IPR related to new components and procedures that can be used for safer and more effective vaccination strategies. Arexis (Sweden) is the IPR holder of CTA1-DD, which is a new, highly potent mucosal adjuvant. Pepscan (Netherlands) has unique knowledge and IPR related to peptides and peptidomimetics, while Proxima Concepts (UK) has the exclusive IPR related to a proprietary delivery technology. The unique collaboration between these SMEs and VIB/University of Ghent (Belgium), the IP holder of M2e-based influenza vaccines, Eurogentec (Belgium) and Göteborg University (Sweden) has the potential of resulting in important breakthroughs in European vaccine development research.

The unique combination of the three SMEs for the rational design of a mucosal influenza vaccine is unprecedented in European vaccine research. A successful novel mucosal vaccine against influenza would have significant impact on the global market and secure the growth and development of the European vaccine industry. If successful, Arexis, Pepscan and Proxima will establish themselves firmly on the market for mucosal vaccines, and their extended and potentially stronger IP would allow for an expansion of their respective business markets.

- 1 AREXIS AB (SE)
- 2 PEPSKAN SYSTEMS B.V. (NL)
- 3 PROXIMA CONCEPTS LTD (UK)
- 4 EUROGENTEC SA (BE)
- 5 VLAAMS INTERUNIVERSITAIR INSTITUUT VOOR BIOTECHNOLOGIE VZW (BE)
- 6 GÖTEBORGS UNIVERSITET (SE)

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# DERMAGENESIS

Bio-Engineering of Leather: Structure Design, Biosynthesis towards Zero-Emission Production

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Collective research

The project addresses the most prominent issues of European tanneries: availability, quality and yield of raw material, as well as pollution prevention and control. The major goal is to develop a new, cost-effective bio-manufacturing process for the production of a smart, innovative product, tailored for the specific needs of footwear manufacturers, to be used as raw material by tanneries, that will guarantee: controlled biochemical composition; standard and consistent quality; process yield increase; substitution of chemical with high-tech biological processes; and 50 % to 60 % reduction in water consumption and in pollution loads.

The complexity and strategic importance of the problem is a challenge that cannot be addressed by single small to medium-sized enterprises (SMEs); therefore the project complies with the objectives and falls within the scope of application of collective research. Expertise from two Universities and three sectorial research institutions, as well as bioreactor and tannery machines developers will be amalgamated with eight SMEs' technical skills, under the leadership of six industrial associations or groupings (IAGs). Starting from the product-specification definition, attained with the participation of all industrial partners, tissue-engineering techniques used for biomedical applications will be transferred, adapted, optimised and validated. The stepwise research approach comprises design, development and testing of cells, materials, protocols and bioreactors.

The project is expected to yield demonstrators tested at lab and pilot scale, including bioreactors, matrices, culturing protocols and a stabilisation system, as well as a waste treatment and recycling system, towards a closed-loop production approach. Moreover, the industrial feasibility of dermagenesis will be assessed in conjunction to fitness for end use of Bio techno leather (model shoes). In parallel, training of skilled personnel and the definition and exploration of exploitation pathways, will directly involve SMEs and IAGs. The project is expected to last 48 months.

- 1 CONCIARICERCA ITALIA S.R.L. (IT)
- 2 BIMEO VIZSGÁLÓ ÉS KUTATÓ-FEJLESZTŐ KFT (HU)
- 3 PÉCSI BŐRGYÁR RÉSZVÉNYTÁRSASÁG (HU)
- 4 BŐR- ÉS CIPŐIPARI EGYESÜLÉS (ASSOCIATION FOR HUNGARIAN LEATHER AND SHOE INDUSTRY) (HU)
- 5 CONFEDERACION ESPAÑOLA DE CURTIDORES (ES)
- 6 UNIONE NAZIONALE INDUSTRIA CONCIARIA (IT)
- 7 UNIVERSITA DEGLI STUDI DI NAPOLI FEDERICO II (IT)
- 8 ASOCIACION DE INVESTIGACION DE LAS INDUSTRIAS DEL CURTIDO Y ANEXAS (ES)
- 9 UNIVERSITY COLLEGE NORTHAMPTON (UK)
- 10 FONTANELLAS Y MARTI SA (ES)
- 11 BLC LEATHER TECHNOLOGY CENTRE LTD (UK)
- 12 VENETA CONCIARIA VALLE AGNO SPA (IT)
- 13 BORGE GARVERI AS (NO)
- 14 CONFÉDÉRATION DES ASSOCIATIONS NATIONALES DE TANNEURS ET MÉGÏSSIERS DE LA COMMUNAUTÉ EUROPÉENNE (FR)
- 15 BIOFIN LABORATORIES SRL (IT)
- 16 OFFICINE DI CARTIGLIANO SPA (IT)
- 17 CALZADOS LIS S.L. (ES)
- 18 VIVAPEL S.A. (ES)
- 19 B.Z. MODA S.R.L. (IT)
- 20 CONCIARIA BONAUDO - SPA (IT)
- 21 ASSOCIAZIONE CALZATURIFICI RIVIERA DEL BRENTA (IT)



FP6 Project Catalogue

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EC Contribution: € 2 088 233

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# Innofoot

## Innovative Treatment of Foot Disorders

Foot disorders are a large social problem in the Europe: 35 % of the population suffers from foot problems, with orthopaedic treatment being the most convenient, although not the only possible treatment. Europe also has to face the challenge of an increase in healthcare costs. This is both an opportunity and a risk for the foot-care sector that urgently needs to increase the effectiveness of treatments and to reduce costs. The Foot-care trade — 98 % small to medium-sized enterprises (SMEs) — is gaining increasing importance throughout Europe, with 24 000 SMEs, and a turnover of EUR 7 525 million. However, it is highly fragmented with huge differences between countries.

INNOFOOT aims to increase competitiveness through the reduction of production costs of orthopaedic footwear and foot orthotics with improved and controllable medical quality, and to preserve the competitiveness of the trade.

This objective will be realised by:

1. improving the innovation level and the know-how base of orthopaedic shoe and insole making companies in the treatment of foot disorders;
2. generating a common space throughout Europe, for the trade in which procedures and methods are shared.

In order to increase the innovation level the project aims to perform the following tasks:

1. develop new design criteria, procedures and techniques for shoe/foot orthotics treatment. Set up customisation criteria based on patient characteristics and foot disorders, to reduce rework and adaptations and thereby reduce production and delivery time by at least 35 %;
2. develop new approaches in product definitions and new materials, and from that to create a new innovative concept: active pressure-responding foot orthoses;

3. generate new functional procedures and criteria concerning the diagnosis of patients. Innovate by using more sophisticated ICT techniques, and thereby improve the quality of the treatment, and reduce medical treatment costs by at least 15 %;
4. develop new cost-effective production techniques customised in shape and material properties, thereby reducing costs for production of insoles and outsoles by at least 30 %.

- 1 TNO SCIENCE AND INDUSTRY (NL)
- 2 NEDERLANDSE VERENIGING VAN ORTHOPEDISCH SCHOENTECHNICI (NL)
- 3 API SERVIZI (IT)
- 4 CZECH FOOTWEAR AND LEATHER ASSOCIATION (CZ)
- 5 GREMI D'ORTESISTES I PROTESISTES DE CATALUNYA (ES)
- 6 ASOCIACIÓN DE EMPRESAS DE ORTOPEDIA TÉCNICA DE ANDALUCÍA (ES)
- 7 FLEXOR S.A. (ES)
- 8 A. MATEAOS E HIJOS PLASTIC (ES)
- 9 WITTEKAMP EN BROOS (NL)
- 10 BUCHRNHORNEN ORTHOPEDISCHE SCHOENTECHNIEK (NL)
- 11 ESPECIALIDADES MEDICO ORTOPEDICAS (ES)
- 12 ORTOPEDIA MOLLA (ES)
- 13 TRIO D.D. (SI)
- 14 KOPITARNA SEVNICA (SI)
- 15 INSTITUTO DE BIOMECÁNICA DE VALENCIA (ES)
- 16 ASOCIACIÓN DE INVESTIGACIÓN DE MATERIALES PLÁSTICOS (ES)
- 17 UNIVERSITY OF PERUGIA (IT)
- 18 TOMAS BATA UNIVERSITY IN ZLÍN (CZ)
- 19 BALTIC ORTHOSERVICE UAB (LT)
- 20 C.F. (IT)
- 21 MATERIAL DESIGN AND PROCESSING (IT)
- 22 METIS SRO (CZ)

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# FP6 Project Catalogue

Construction

# Blastwall

An Integrated Wall and Window Structure that is Bomb Resistant

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Co-operative research

<http://pera.projectcoordinator.net/~blastwall>

It is a fact that terrorist attacks, including bombings, have taken place in Europe and continue to do so at an escalating rate. Apart from the direct impact of the blast, there are the devastating consequences of broken glass and debris and building collapse, which act as lethal missiles and which claim more lives than those caused by the direct effects of the blast.

With this in mind, the consortium behind this proposal have devised an innovative building response system to bomb blasts, which allows for the building fabric to absorb and spread blast forces, thereby minimising the amount and velocity of glass and structural debris, and to manage the blast forces to avoid building collapse. Our proposed innovative concept can be economically retrofitted to existing buildings. The concept is based on the development of a new form of ductile shatterproof glass and a unique method of tying the glass to the structure of the building; it is designed to absorb the blast impact in a ductile manner, thus avoiding building collapse and debris.

The system also checks that the specified alterations do not compromise the integrity of the structural framework, as this could lead to the building's collapse. Furthermore, the low weight of the Blastwall solution does not cause any further structural issues when retrofitted.

- 1 HAMILTON ERSKINE LTD (UK)
- 2 IFS CHEMICALS LTD (UK)
- 3 HANDING EN GROS SRL (RO)
- 4 RIOJALEX SA (ES)
- 5 STAP AS (CZ)
- 6 INDUSTRIAL CONTROL MACHINES SA (BE)
- 7 KOMMERLING CHEMISCHE FABRIK GMBH (DE)
- 8 OVE ARUP & PARTNERS LTD (UK)
- 9 PERA INNOVATION LTD (UK)
- 10 FRAUNHOFER-INSTITUT FÜR KURZZEITDYNAMIK ERNST-MACH-INSTITUT (DE)



FP6 Project Catalogue

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# PRODICON

## Land Protection by Improvement of Dike Construction

Flood disasters account for about a third of all natural catastrophes throughout the world (by number and economic losses) and are responsible for more than half of the fatalities. Trend analyses reveal that major flood disasters and the losses generated by them have increased drastically in recent years. For this reason, it is important to take appropriate steps without delay. On the one hand, the efforts that are being taken to combat climate change must be stepped up, while on the other hand we must pay more attention to flood protection and loss minimisation or prevention.

These disasters could be significantly attenuated by improved technical flood protection. One main part of flood protection is the dike rehabilitation of existing dikes (some of them were built more than 150 years ago) as the majority of existing dikes do not fulfil the existing safety standards. Existing dike rehabilitation techniques are quite often expensive with a limited field of application. The proposed PRODICON system will target this problem, as it intends to develop a universal dike rehabilitation technology applicable to all types and states of dikes. The PRODICON technology is an innovative and economical technology for dike rehabilitation, due to the onsite and *in situ* preparation of the novel dike-sealing material. By applying the PRODICON technology during dike rehabilitation, transport processes can be minimised significantly.

Beside the material development, the PRODICON project aims to develop a novel technique for the application of dike-sealing material. The novel technique can also be applied to wetted and softened dikes where the usual technologies fail due to heavy construction machines — this could be very impressive during and after the recent flood disasters.

- 1 SÄCHSISCHE BAU GMBH (DE)
- 2 HEADS POLSKA SPOLKA Z O.O. (PL)
- 4 HEUVELMAN IBIS B.V. (NL)
- 5 GEPRO INGENIEURGESELLSCHAFT FÜR GEOTECHNIK, VERKEHRS- UND TIEFBAU UND UMWELTSCHUTZ MBH (DE)
- 6 DUFONEV S.R.O. (CZ)
- 7 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 8 VYSOKÉ UČENÍ TECHNICKÉ V BRNE (CZ)
- 9 FORSCHUNGSINSTITUT FÜR TIEF- UND ROHLEITUNGSBAU WEIMAR E.V. (DE)
- 10 POLITECHNIKA KRAKOWSKA (PL)

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# Pro-Pipe

The Development of an Impervious Nano-Composite Barrier System which Can Be Used for Potable Water Pipes in Brownfield Sites and Other Harsh Environments

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Co-operative research

The development of an impervious nano-composite barrier system which can be used for potable water pipes in brownfield sites and other harsh environments.

The main objective of the project is to develop impervious potable water pipes for brownfield sites, to avoid risk of hydrocarbons permeation from contaminated land and potentially problems of chemicals leaching from the pipes. This will enable safe and high quality potable water served to brownfield sites.

The technology objectives to deliver an impervious pipe are:

- to gain increased knowledge regarding the mechanical property and impact behaviour of aligned nanoclays in polymer;
- to develop an efficient method to disperse and exfoliate 99 % of nanoclays;
- to develop an online quality control system to check the performance (dispersion, alignment and barrier property) of nanoclays in polymer;
- to develop a chaotic advection system that could generate at least one thousand unbroken nano-composite thin layer (<200nm).

The economic objectives of the project are:

- to protect domestic sales in Europe of EUR 368 million each year, thereby safeguarding 3 000 jobs;
- to create exports of materials of EUR 78 million each year and creating 620 jobs
- to generate an additional EUR 150 million each year and thereby creating 1200 jobs through growth;

- to create manufacturing systems sales of EUR 25 million each year and thereby creating 200 jobs.

These objectives will be delivered by eight small to medium-sized enterprises (SMEs) from seven Member States, three research centres from two different Member States and two large enterprises providing a route to the market.

The project contributes to the objectives of the Sixth Framework Programme by:

- supporting SMEs to respond to the pressures for continuous innovation and technological adaptations;
- facilitating transnational co-operation in research between SMEs, research institutions and other organisations;
- facilitating co-operative relations in research activities between SMEs, research institutions and other organisations.

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- 1 ROSSI STAMP SRL (IT)
- 2 PIPEREC OU (EE)
- 3 ICELANDIC NANOTECHNOLOGIES LTD (IS)
- 4 SETEC MASCHINENBAU GMBH (DE)
- 5 ARTS (IT)
- 6 CONTRATAS IGLESIAS S.A. (ES)
- 7 UPONOR LTD (UK)
- 8 SEVERN TRENT WATER LTD (UK)
- 9 PERA INNOVATION LTD (UK)
- 10 THE TECHNOLOGICAL INSTITUTE OF ICELAND (IS)
- 11 UNIVERSITY OF NEWCASTLE (UK)
- 12 AUSERPOLIMERI (IT)
- 13 ROLLEPAAL (NL)



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# STREAM

## Novel Drilling System for Cost-Effective Extraction of the 30 Million Tonnes of Ornamental Stone Blocks in Europe with Lower Environmental Impact

To face competition from the Far East and South America, the European stone industry aims at the improvement and optimisation of quarrying technologies in order to satisfy the growing demand of the end-users, which is expected to reach 53 million t by 2010. Currently in Europe, 40 % of quarrying operations are performed with hand-held pneumatic top-hammers. Pneumatic top-hammers have a low energy efficiency, produce high levels of noise and vibrations, generate high hole deviations and dust.

Medical studies performed in the last years and ISO standards have highlighted that the maximum levels of vibration and noise that a worker can safely cope with, over a eight-hour working shift, are 2 m/s<sup>2</sup> and 85 dB respectively, while microscopic particles below 5 microns are responsible for cancer, silicosis and poisoning. The EC has recognized the seriousness of these problems; however, none of the available equipment is able to guarantee vibrations below 4 m/s<sup>2</sup> and noise below 100 dB, as well as full capture of micrometric particles.

The main objective of the project is to develop an innovative water-powered “down-the-hole” (DTH) hand-held hammer for quarrying of dimensional stone. The enabling technology is a novel and cost-effective deposition of a water and wear-resistant “diamond-like” coating on the percussion piston/cylinder sliding surfaces. The principle innovation is the development of a water-powered DTH Hammer, capable of drilling straight holes with increased energy efficiency, reduced levels of noise and vibrations as well as full capture of micro-metric particles through the deposition a novel water- and wear-resistant coating technology. The main innovation of the coating concerns the deposition through remote plasma discharge that allows a low deposition temperature, thus decreasing residual stress and providing unique water resistance properties. Further novelty is provided by the special mixture of gas precursors enabling the formation of friction sites that establish the unique frictional behaviour of the coating.

- 1 DITTA RIPAMONTI DR. GIANNI S.A.S. (IT)
- 2 CROMOSTAMP ITALIA S.R.L. (IT)
- 3 VTT TECHNIKI I TECHNOLOGIE SP. Z O.O. (PL)
- 4 MARMORES DO POÇO BRAVO LDA (PT)
- 5 ABRA TOMASZ CZEKAJ (PL)
- 6 D'APPOLONIA SPA (IT)
- 7 POLITECNICO DI MILANO (IT)
- 8 INSTITUTE FOR TEROTECHNOLOGY - NATIONAL RESEARCH INSTITUTE (PL)

**Contract:** 32133  
**Call:** FP6-2004-SME-COOP  
**Starting Date:** 01/10/2006  
**Duration (months):** 24  
**Total cost:** € 1 189 580  
**EC Contribution:** € 691 978

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Construction

The adopted design method for lateral loading (shear) of masonry structures in Eurocode 61 (EC 6) is greatly simplified and there is no associated test method for the determining of masonry shear strength, which covers the full range of possible failure modes of masonry in shear. On the other hand, static and dynamic horizontal loading of buildings have dramatically increased in European Load Standards, such as Eurocode 82. Hence the design of traditional structures in masonry is difficult and, in many cases, impossible. Due to this, the European Masonry Industry, which is mainly composed of small to medium-sized enterprises (SMEs), is facing a dramatic loss of market share.

To prevent a loss of market share and ensure employment in SMEs within the European Building Industry, the proposed research project aims at a fundamental investigation of the mechanisms of masonry shear bearing capacity and the evaluation and exploitation of load bearing potential of load bearing masonry structures. The intention of the proposed project is an improvement of knowledge in the lateral (shear) design of masonry in order to enhance harmonized European design standards. The aims of the project will be achieved by means of theoretical investigations and carefully monitored tests on specimens, closing with a large-scale test on a selected building. The partners of the consortium were carefully chosen in order to ensure the quality of research, implement the results in product development and European Standardisation, as well as to endorse the general dissemination and exploitation of results.

- 1 DEUTSCHE GESELLSCHAFT FÜR MAUERWERKSBAU E.V. (DE)
- 2 LIAS VINITROV, LEHKY STAVEBNI MATERIAL K.S. (CZ)
- 3 HERBERT PEXIDER GMBH (AT)
- 4 INSTITUT FÜR ZIEGELFORSCHUNG ESSEN E.V. (DE)
- 5 INGENIEURKONSULENT FÜR BAUWESEN - DIPL.-ING. DR ANTON PECH (AT)
- 6 TECHNISCHE UNIVERSITÄT MÜNCHEN - LEHRSTUHL FÜR MASSIVBAU (DE)
- 7 ZÄPFWERKE GMBH & CO. KG (DE)
- 8 VERBAND ÖSTERREICHISCHER ZIEGELWERKE (AT)
- 9 VERBAND ÖSTERREICHISCHER BETON- UND FERTIGTEILWERKE (AT)
- 10 COMMISSION OF THE EUROPEAN COMMUNITIES - DIRECTORATE GENERAL JOINT RESEARCH CENTRE (BE)
- 11 DRESDEN UNIVERSITY OF TECHNOLOGY (DE)
- 12 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 13 ANDIL ASSOLATERIZI (IT)
- 14 RIL RONDI INDUSTRIA LATERIZI SPA. (IT)
- 15 ARBEITSGEMEINSCHAFT MAUERZIEGEL E.V. IM BUNDESVERBAND DER DEUTSCHEN ZIEGELINDUSTRIE E.V. (DE)
- 16 BUNDESVERBAND KALKSANDSTEININDUSTRIE E.V. (DE)
- 17 TECHNISCHE UNIVERSITÄT DARMSTADT (DE)
- 18 NATIONAL TECHNICAL UNIVERSITY OF ATHENS (GR)
- 19 FORSCHUNGSVEREINIGUNG KALK-SAND E.V. (DE)
- 20 SEPA SARL (FR)
- 21 PETER GMBH KALKSANDSTEINWERK KG (DE)
- 22 EUROPEAN AUTOCLAVED AERATED CONCRETE ASSOCIATION (DE)
- 23 ZIEGELWERK BELLENBERG WIEST GMBH & CO. KG (DE)
- 24 CIRKEL GMBH & CO. KG (DE)
- 25 UNIVERSITA DEGLI STUDI DI PAVIA (IT)
- 26 UNIVERSITÄT KASSEL (DE)

**Contract:** 500291  
**Call:** FP6-2002-SME-2  
**Starting Date:** 10/06/2004  
**Duration (months):** 45  
**Total cost :** € 3 011 009  
**EC Contribution:** € 2 174 026

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# EURACTIVE ROOFer

## EUROpean performance requirements and guidance on ACTIVE ROOFs

A wide variety of new products, such as photovoltaic (PV) systems and solar collectors, roof lights, ventilation devices, and insulation and safety devices is being introduced in roofing. The roof changes into an "Active Roof": it supplies electricity and hot water and it provides daylight and ventilation. Active Roofs contribute significantly to the quality of the living space under the roof. The quality of these products as well as the safety equipment for installation and maintenance is, when installed in a roof system, in many cases insufficient, because there are no standards or legislation to assess their performance. At the same time, good products get poorly installed by inexperienced roofers. This leads to significant numbers of (preventable) failures from rain and snow-water ingress, wind damage and condensation. Due to this, failure costs in the EU total approximately EUR 2 billion each year. The secondary damage to the interior of the building is at least of the same order of magnitude. The vast majority of this damage would be preventable if adequate pre-standards and guidance for testing and installation existed.

In order to achieve this, the main deliverables of EUR-ACTIVE ROOFer are as follows.

1. New knowledge on the environmental actions on European roofs, in particular wind and seismic effects, rain, snow and condensation.
2. Performance criteria and assessment methods for wind and seismic loading, driving rain, snow drift and condensation.
3. Prototypes of innovative concepts for Active Roofs.
4. Reduced risks for the European roofing trade and installers of solar-energy systems, enabling them to fully guarantee the quality of their products.
5. Guidelines, best practice catalogues and maintenance and safety devices.
6. Training programmes for the European active roofers. This will help the roofing trade to improve their products and to reduce barriers to trade, restore consumer confidence and improve competitiveness, so they can increase their markets.

- 1 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 2 HUNGARIAN FEDERATION OF ROOFING CONTRACTORS (HU)
- 3 VERENIGING HET HELLENDE DAK (NL)
- 4 ZENTRALVERBAND DES DEUTSCHEN DACHDECKERHANDWERKS (DE)
- 5 NATIONAL FEDERATION OF ROOFING CONTRACTORS (UK)
- 6 THE BRITISH PHOTOVOLTAIC ASSOCIATION (UK)
- 7 CONSTRUCTION INDUSTRY FEDERATION (IE)
- 8 NORWEGIAN BUILDING RESEARCH INSTITUTE (NO)
- 9 SCHWEIZERISCHER VERBAND DACH UND WAND (CH)
- 10 POLSKIE STOWARZYSZENIE DEKARZY (POLISH ROOFING FEDERATION) (PL)
- 11 STROOMWERK ENERGY BV (NL)
- 12 BIOHAUS PV HANDELS GMBH (DE)
- 13 BEDACHUNGSTECHNIK MANFRED SCHRODER GMBH (DE)
- 14 KUIPERS CONSULTING S.L. (ES)
- 15 ECOVENT (DK)
- 16 H & E COSTELLOS ROOFING LTD (IE)
- 17 TECTUM KFT (HU)
- 18 ALLUKOL SZERKEZETEPITO KFT (HU)
- 19 PUSKASMUVEK BADOGOS IPARI KFT (HU)
- 20 SCHNEIDER BALAZS MAGANVALLALKOZO (HU)
- 21 ENERGY EQUIPMENT TESTING SERVICE LTD (UK)
- 22 SOLARWALL ITALIA S.R.L. (IT)
- 23 INTERNATIONAL FEDERATION OF THE ROOFING TRADE (DE)
- 24 BUILDING RESEARCH ESTABLISHMENT LTD (UK)
- 25 NON PROFIT COMPANY FOR QUALITY CONTROL AND INNOVATION IN BUILDING (HU)
- 26 NORWEGIAN BUILDING RESEARCH INSTITUTE (NO)
- 27 CENTRE FOR RENEWABLE ENERGY SOURCES (GR)
- 28 CENERGIA ENERGY CONSULTANTS (DK)
- 29 BAUTECHNISCHES INSTITUT (AT)
- 30 TECHNISCHE UNIVERSITÄT BERLIN (DE)
- 31 POLITECHNIKA WARSZAWSKA (PL)
- 32 TECHNISCHE UNIVERSITEIT EINDHOVEN (NL)

Contract: 12478  
Call: FP6-2003-SME-2  
Starting Date: 21/07/2005  
Duration (months): 36  
Total cost: € 4 081 054  
EC Contribution: € 2 571 081

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# LOW-HEAT

The Development of a New Domestic Heat Recovery Technology for Low-Grade Heat in Waste Water

162

Collective research

"Low-grade" heat (in the range 25-80°C) in the form of a waste-water stream discharged into sewers, is an everyday by-product of European homes. It is generated from a variety of domestic appliances such as washing machines, dishwashers, shower units, baths, sinks etc. In the EU, there are an estimated 58 million dishwashers, 232 million washing machines and 63 million shower units, with at least 90 % of the input energy going into heating the water for these appliances. This equates to approximately 26 500 terra Joules of thermal energy. To date, this source of energy from waste water has been largely ignored and not recovered or recycled.

Our solution is to develop a low grade heat exchanger for use in the domestic sector to recover over 40 % of the heat energy from this waste water to supplement domestic boilers. In so doing, we aim to reduce the overall energy consumption of domestic dwellings by 7 %, saving over 1000 kWh per dwelling per year or expressed as a European total saving of 10 billion kWh of energy at a target market penetration of 6 %.

To achieve this aim the proposed research needs to develop new scientific knowledge and understanding relating to the heat transfer relationship of low grade low flow fluids, particularly on the effect of surface roughness on the heat transfer coefficient (h) and the generation of turbulent flow. This new scientific knowledge will lead to the understanding on how to develop and enhance the efficiency of heat exchanger for low-grade applications. Such a system will represent a massive leap beyond state of the art, represented by existing concentric tube heat exchangers which are mainly targeted at the high-end of heat recovery from industrial processes.

The plumbing sector, (with over 150 000 small to medium-sized enterprises (SMEs)) has been traditionally slow to innovate and needs new added value products with enhanced features to help them combat increased competition. The predicted sales for the technology are approximately EUR 1.67 billion in Europe alone, creating over 10 000 jobs.

- 1 THE INSTITUTE OF PLUMBING & HEATING ENGINEERING (UK)
- 2 POLSKA KORPORACJA TECHNIKI SANITARNEJ GRZEWOCZEJ GAZOWEJ I KLIMATYZACJI (PL)
- 3 HRS SPIRATUBE SL (ES)
- 4 A K INDUSTRIES LTD (UK)
- 5 CONVEX ELECTRICAL LTD (IE)
- 6 METALLISATION LTD (UK)
- 7 K. LUND A/S (NO)
- 8 ANGEWANDTE SYSTEM TECHNIK GMBH (DE)
- 9 ROBERT PRETTIE AND CO. LTD (UK)
- 10 PERA INNOVATION LTD (UK)
- 11 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)
- 12 AIMPLAS - INSTITUTO TECNOLÓGICO DEL PLÁSTICO (ES)
- 13 MAGYAR ÉPÜLETGÉPÉSZÉK SZÖVETSÉGE (HU)

**Contract: 500399**  
**Call: FP6-2002-SME-2**  
**Starting Date: 15/08/2004**  
**Duration (months): 39**  
**Total cost: € 2 141 397**  
**EC Contribution: € 1 255 802**

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# SURFASAM

## Innovative “Green Wood Treatment” to Achieve Risk Class 4 Protection

In western Europe, there is a growing interest and market for wood construction since timber is available and consumers are attracted by the environmentally friendly image and advantages of wood. While traditional construction is mainly led by big companies manufacturing concrete, sawnwood activity is most favourable to the development of small to medium-sized enterprises along the whole “forest wood chain”. Yet, there are many barriers to overcome to make wood competitive and adopted by a larger amount of consumers. One of them is the deterioration of the material when exposed to outdoor conditions, which means it requires protection with special treatments.

These treatments include biocides (formerly known as “non-agricultural pesticides”) used to destroy and exert a controlling effect on any harmful organism by chemical or biological means. They are still widely used in most countries, but the future trend is to control their use. Currently, the highest level of biological protection, Risk Class 4, can be reached only with treatments that inject toxic products such as creosote, pentachlorophenol or hydrosoluble salts in the wood.

The project will provide the wood industry with an innovative, safe and efficient solution for the in-depth protection of wood against biological predators by using a “green chemical process” applicable by the small to medium-sized enterprises without risks. This solution, completed with a surface coating, will satisfy Risk Class 4 protection and provide a new scientific base for the application of the European Directives’ controlling and reducing the use of chemical compounds that are toxic to humans, animals and the environment.

Hence, over a thousand small to medium-sized enterprises from several European countries (Spain, France, Lithuania, Estonia, Sweden and Romania), members of the six international associations and/or groupings of the consortium, will be able to activate their competitiveness, and to improve health and safety at work.

- 1 INSTITUT NATIONAL POLYTECHNIQUE DE TOULOUSE (FR)
- 2 CIDEMCO - CENTRO DE INVESTIGACIÓN TECNOLÓGICA (ES)
- 3 ORGANISATION COMMERCIALE DU BOIS FRANÇAIS (FR)
- 4 EESTI METSATOOSTUSE LIIT (EE)
- 5 LIETUVOS MEDIENOS PRAMONES IMUNIU ASOCIACIJA (LT)
- 6 ARBIO AKTIEBOLAG (SE)
- 7 ASOCIATIEI FORESTIERILOR DIN ROMANIA (RO)
- 8 ASOCIACIÓN PROFESIONAL DE CARPINTERÍAS, EBANISTERÍAS, TAPICERÍAS, FABRICANTES Y COMERCIA DE MUEBLES DE ASTURIAS (ES)
- 9 INDUSTRIAS QUIMICAS IRURENA S.A. (ES)
- 10 FACTORY FURNITURE LTD (UK)
- 11 SARL OLEOBOIS (FR)
- 12 BOIS DU ROUERGUE (FR)
- 13 TRATAMIENTOS MADERA HOL-ATZ SL (ES)
- 14 MANUFACTURE LIMOUSINE DE CLOTURES (FR)
- 15 APROVECHAMIENTOS MADEREROS Y TRATAMIENTOS PARA EXTERIORES S.A. (ES)
- 16 CARPINTERIA DEL BIDASOA LAISTER SLL (ES)
- 17 CONAGUA 2000 SL (ES)

**Contract: 12467**  
**Call: FP6-2003-SME-2**  
**Starting Date: 01/04/2005**  
**Duration (months): 36**  
**Total cost: € 2 094 255**  
**EC Contribution: € 1 366 972**

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# VAR-TRAINER

Versatile Augmented Reality Simulator for Training in the Safe Use of Construction Machinery

164

Collective research

In the EU, construction is the sector with the highest risk of accidents. The main hazards in construction work include working at height (falls from heights are the most common cause of injuries and death), excavation work and moving loads; all of them connected in some way with the use of specific machinery and equipment.

The proposed project deals with the lack of training tools and methodologies for the very wide range of tasks to be performed by construction workers. In particular, it addresses the use of and work with greatly varying specific machinery and equipment, which entails certain risk. In this regard, special attention is paid to lifting equipment (such as cranes, hoists, aerial work platforms, telescopic handlers or scaffolding elevators) and heavy works machinery (such as power shovels or retro-excavators), because any failures on their operation may cause important injuries to people, and damage to works and equipment. These machines are complicated and expensive pieces of equipment, and training is critical to developing skilled operators.

The general objective of the project is to develop a real time simulator with such versatility and user-friendliness that training in the operation (with special attention to safety aspects) of multiple models of lifting equipment, aerial work platforms and heavy works hydraulic machinery from different trademarks will be possible with just one single simulator, thus ensuring its profitability and flexibility. It will be based on the integration of mechanics, electronics, automated technologies, computer science and augmented reality.

[www.ikerlan.es/vartrainer](http://www.ikerlan.es/vartrainer)

- 1 CONFEDERACIÓN NACIONAL DE LA CONSTRUCCIÓN (ES)
- 2 ASOCIACIÓN ESPAÑOLA DE FABRICANTES EXPORTADORES DE MAQUINARIA DE CONSTRUCCIÓN Y OBRAS PÚBLICAS (ES)
- 3 VDMA - VERBAND DEUTSCHER MASCHINEN- UND ANLAGENBAU E.V. (DE)
- 4 ASSOCIAÇÃO DE EMPRESAS DE CONSTRUÇÃO E OBRAS PÚBLICAS (PT)
- 5 ASSOCIAÇÃO EMPRESARIAL DE PORTUGAL (PT)
- 6 ASSOCIAZIONE NAZIONALE COSTRUTTORI EDILI (IT)
- 7 ZVAZ STAVEBNÝCH PODNIKATEL'OV SLOVENSKA (SK)
- 8 CONSTRUCCIONES LEGARRA LAZCOZ SL (ES)
- 9 ENGIARTE - ENGENHARIA E CONSTRUÇÕES LDA (PT)
- 10 ROMANA SCAVI S.R.L. (IT)
- 11 IKERLAN S. COOP (ES)
- 12 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (FHG/IGD) (DE)
- 13 OKTAL S.A. (FR)

**Contract:** 500452  
**Call:** FP6-2002-SME-2  
**Starting Date:** 15/07/2004  
**Duration (months):** 36  
**Total cost:** € 2 446 526  
**EC Contribution:** € 1 299 944

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# FP6 Project Catalogue

Energy

# BIO-HYDROGEN

## Development of a Biogas Reformer for Production of Hydrogen for PEM Fuel Cells

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Co-operative research

[www.mg.uniag.sk/Biohydrogen/Biohydrogen.htm](http://www.mg.uniag.sk/Biohydrogen/Biohydrogen.htm)

BIO-HYDROGEN aims at the development of a cost-effective biogas reforming system (10 kW hydrogen) for decentralised application with biogas from agricultural biogas plants, municipal waste water treatment plants and landfills. The main objectives are the development of reformer system which exhibits a better compatibility with biogas and hence shows an improved efficiency. The improvement of the heat and steam management for CO<sub>2</sub> containing gas will be targeted with the aid of simulation and modelling. A screening of the catalysts currently used for the reforming reaction will be performed in order to evaluate and compare their stability, performance and durability when used for biogas reforming. Biogas upgrading will focus on hydrogen sulphide (H<sub>2</sub>S) and siloxane removal. For desulphurisation, state-of-the art technologies will be adopted. With regard to siloxane removal, a reliable and cost-effective technology has to be developed. Biodegradation of siloxane is currently being investigated by PROFACTOR in the framework of the European project PROBAT. Biofiltration has already been applied successfully for H<sub>2</sub>S treatment (PROFACTOR) and it is believed to give good results for siloxane too. Part of the present project will therefore focus on the development of a bio-trickling filter for siloxane treatment, according to the results obtained from current laboratory experiments. The laboratory system will further be up scaled to a pilot plant having a capacity of 2 m<sup>3</sup>/h biogas which fits to the 10 kW reformer.

These ambitious aims will be achieved by a well balanced international consortium containing the necessary critical mass. Small to medium-sized enterprise (SME) partner BESEL and research and technological development (RTD) partner UNI DUISBURG will be jointly responsible for the development of the biogas reforming unit (including the shift reactor). They build up their work on lasting experience in research and engineering. SME partner SCHMACK and RTD partner PROFACTOR will develop a unit for siloxane removal based on results from European research projects "AMONCO" and "PROBAT" (both coordinated by PROFACTOR within the Fifth Framework Programme (FP5)). BESEL and SCHMACK are the main SME partners highly interested in exploiting the new developed biogas

upgrading and reforming system. UDOMI is an SME partner who offers the link to the fuel cell trading branch in which the hydrogen supply at the specified quality is of great importance. The inclusion of SME end-users (MFN, PROTON MOTOR and BITTER) will guarantee the right orientation of the project. FRONIUS as a non-SME demonstrates without getting funding its interest in the technology to be developed. UNI NITRA will provide their knowledge in biological biogas cleaning and will be mainly responsible for the dissemination of the results towards New Member States in Middle and Eastern Europe.

The proposal addresses the objectives of the work programme concerning Co-operative research in following ways:

- support for the participating SMEs by developing new innovative technologies as well as systems which complement their existing products, increasing therefore their market potential and applications;
- through an international approach within BIO-HYDROGEN the international competitiveness of the SMEs will be improved by providing a partner network in several EU countries;
- RTD partners provide know-how not available to the SMEs.

- 1 PROFACTOR PRODUKTIONSFORSCHUNGS GMBH (AT)
- 2 BESEL S.A. (ES)
- 3 SCHMACK BIOGAS AG (DE)
- 4 UDOMI COMPETENCE IN FUEL CELLS (DE)
- 5 MATADERO FRIGORIFICO DEL NALÓN S.L. (ES)
- 6 PROTON MOTOR FUEL CELL GMBH (DE)
- 7 BITTER GMBH (AT)
- 8 FRONIUS INTERNATIONAL GMBH (AT)
- 9 UNIVERSITÄT DUISBURG-ESSEN (DE)
- 10 SLOVENSKA POLNHOŠPODARSKA UNIVERSITA V NITRE (SLOVAK AGRICULTURAL UNIVERSITY IN NITRA) (SK)

Contract: 17819  
Call: FP6-2003-SME-1  
Starting Date: 01/07/2005  
Duration (months): 24  
Total cost: € 1 370 237  
EC Contribution: € 846 236

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# BIOWELL

## Increased Renewable Energy Recovery from Biomass by Highly Efficient Disruption Process

The fundamental goal of the project is to increase the output of biogas as a renewable energy source through anaerobic digestion of homogenised biomass in an optimised anaerobic digestion system.

This improvement of biological digestion would be achieved by the introduction of a biomass pre-treatment process.

The process is based on the disruption of organic materials and cell structures of the biomass to increase the concentration of solved nutrients as feed for the micro-organisms involved in the anaerobic digestion process. The fundamental aim of BIOWELL is to demonstrate the most efficient pre-treatment process for maximal energy recovery from biomass.

The BIOWELL project consortium consists of five small to medium-sized enterprise (SME) proposers that have defined a common need for external research and development (R&D) support (by the three research and technological development (RTD) providers), in order to develop a new pre-treatment technology system to be utilised at biogas plants.

The results of the project shall help to strengthen the competitiveness of the partners, and will also help them to enter new growing markets with new products and services, e.g. remote condition monitoring and process optimisation services (C-L), manufacturing of BIOWELL system (GHM), adaptation of homogeniser technology to biomass disruption (DMS).

The coordinator of the project is CUTEC from Germany.

Europe should play a key and dominant role in the exploitation of renewable energy sources for the benefit of mankind and nature.

A market survey carried out by CUTEC on energy recovery from biomass and the anaerobic digestion industry has shown that there is a substantial need for a compact and cost-efficient biological digestion system suitable for optimal exploitation of biomass

as a sustainable source of energy. A target of about 12 % of the EU's total energy consumption from renewable sources by 2010 has been set by the Union. This would lead to a minimum of 5 000 additional biogas plants in the next few years.

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Co-operative research

- 1 CUTEC-INSTITUT GMBH (DE)
- 2 BHR GROUP LTD (UK)
- 3 DUBLIN CITY UNIVERSITY (IE)
- 4 CZECH TECHNICAL UNIVERSITY IN PRAGUE (CZ)
- 5 COMMON-LINK AG (DE)
- 6 ING. FRANZ-PETER JEGEL (AT)
- 7 UNITED BIOFUELS HOLDINGS EUROPE AG (CH)
- 8 DAUBORN MEMBRANSYSTEME FÜR WASSERBEHANDLUNG GMBH (DE)

**Contract: 32609**  
**Call: FP6-2004-SME-COOP**  
**Starting Date: 15/11/2006**  
**Duration (months): 24**  
**Total cost: € 1 919 500**  
**EC Contribution: € 1 289 500**

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Energy

# BUILD-DSSC

## Large Area DSSC for Building Integrated PV Tile

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Co-operative research

The main objective of the BUILD-DSSC is to set up a technology for the production of Large-Area Dye-Sensitized Solar Cells, solving the technological problems that presently do not allow us to produce reliable DSSC. This will be made possible by using a new class of electron transfer mediators, which are non-corrosive, with metallic fingers used to realise conductive glass substrates, non-volatile, able to avoid problems of the sealing of the cells and dramatically improve the duration and stability of the cell in operative conditions.

The present project is of primary importance in the field of DSSCs and can successfully finalise industrially, with such a novel solution, the completely new DSSC application onto opaque substrates (ceramic), for the production of BIPV tiles for roofs and facades. The BUILD-DSSC tile will be realised with a transparent conductive glass to produce the photo anode and a ceramic substrate as counter electrode, made conductive through graphite deposition. The technical solutions for the realisation of each process production step will be studied and implemented. The process will be installed in a pre-industrial unit, set up to produce BUILD-DSSC tiles, starting from the pilot plant for the production of high-conductivity transparent glasses already available and realised in a previous EC-funded project.

The production process implemented will allow us to reach the following targets: (1) DSC solar cells with 5 % efficiency; (2) outdoor stability of over 10 years; (3) configurations amenable for mass production; (4) realistic cost target of EUR 2.0 per WP. The BUILD-DSSC tile will have a cost comparable to traditional non-integrated silicon modules, not considering substitution costs and the realisable integration with the solar thermal element, to be realised by applying the results of an ongoing project. The product can then have an impressive impact in building applications, from the economical and architectural point of view.

- 1 LABOR S.R.L. (IT)
- 2 S.G.G. DI RESTAGNO, TRIMBOLI, VEZZOLLA & C S.N.C. (IT)
- 3 GWENT ELECTRONIC MATERIALS LTD (UK)
- 4 MMT S.R.L. (IT)
- 5 LIMETZ D.O.O. (SI)
- 6 IBE INGENIERIA E INDUSTRIAS BIOENERGETICAS S.L. (ES)
- 7 CONSORZIO FERRARA RICERCHE (IT)
- 8 UNIVERSITY OF NANTES (FR)
- 9 CENTRE FOR RENEWABLE ENERGY SOURCES (GR)



**Contract:** 512510  
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**EC Contribution:** € 701 519

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# BURNERCAT

Catalytic, Environmental-Friendly, Fuel-Flexible and Cost-Effective Burner for Domestic Boilers

Due to the growing concern of the European Union regarding NO<sub>x</sub> emissions, greenhouse gas emissions (CO<sub>2</sub>, etc) and energy savings, household appliance manufacturers must develop technologies able to comply with existing and forthcoming regulations that will be more and more stringent. For domestic boilers, the burner is the critical component for such progress. However, optimisation of the design of traditional burners has reached its limits in this field and induces technology suppliers of the sector to embark on the catalytic combustion track.

The BURNERCAT project aims to provide the small to medium-sized enterprise (SME) proposers of the partnership a cost-effective solution to manufacture efficient and reliable catalytic burners. A successful implementation of this innovative technology requires the necessary research and development (R&D) investments. The main deliverable of the BURNERCAT project will be a catalytic burner for a domestic boiler application (average heat input 10 kW) with the following specifications:

- ultra-low NO<sub>x</sub> emissions (< 20 mg/kWh);
- cost-effectiveness through optimised use of noble metals;
- fuel-flexibility (methane, LPG);
- high modulation properties leading to savings in terms of gas consumption and CO emissions through operating abilities in the lowest heating powers (below 3 kW).

The technical objectives of the project will be achieved through innovative development on:

- the combustion support;
- the catalyst;
- the deposition methods.

In 2002, the gas heating market reached a total of 5 million boilers with an annual growth rate of 3-5 %, which gives an encouraging idea of the exploitation potential. The success of the project would enable:

- technology provider SMEs (SUNKISS, NORTA, SCHWANK, TECNES) to emerge as leaders in these high-tech sectors (deposition methods, burner manufacturing) and anticipate stringent forthcoming regulations in the field;
- the end-user (MTS) to benefit from a high-performing and cost-effective innovation.

- 1 GAZ DE FRANCE (FR)
- 2 MERLONI TERMOSANITARI SPA (IT)
- 3 SUNKISS (FR)
- 4 SCHWANK (DE)
- 5 NORTA UAB (LT)
- 6 TECNES S.A.S. DI MAZZACURATI ERNESTO & CO. (IT)
- 7 UNIVERSITÉ CLAUDE BERNARD LYON 1 (FR)
- 8 POLITECNICO DI TORINO (IT)

**Contract: 16937**  
**Call: FP6-2003-SME-1**  
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**EC Contribution: € 644 725**

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# COMPFREEZE

Improving the Competitiveness in the European Frozen Food Industry through the Development of New Freezing Equipment Based on CO<sub>2</sub>

172

Co-operative research

The overall objective of the project is to increase competitiveness among small to medium-sized enterprises (SMEs) in the frozen food industry, by developing low-temperature freezing equipment enabling SMEs to increase productivity. The focus of this proposal will be on the freezing process, using CO<sub>2</sub> as a refrigerant in order to:

- produce knowledge of the connection between the quick-freezing process and quality of the product, using various types of freezers in order to control the process;
- implement the developed knowledge in new freezing equipment that ensures better product quality at less operational cost.

By using CO<sub>2</sub>, a safe and environmentally friendly technique is introduced that protects the ozone layer as well as reduces global warming effects. Recent research programmes focus on the performance of the CO<sub>2</sub> installation itself. However, the benefits and consequences of using this refrigerant are not well known or quantified.

Within the EC, 10 organisations have formed a consortium aimed at carrying out the project. Among those are five SMEs, two research and technological development (RTD) performers and three end-users who are all willing to take part. The participants are registered in Belgium, Denmark and the Netherlands, and the consortium has been established in order to develop and exchange knowledge with the overall objective of increasing SME competitiveness.

- 1 DANISH TECHNOLOGICAL INSTITUTE (DK)
- 2 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH - TNO (NL)
- 3 SCANIMA A/S (DK)
- 4 F&F EUROPE BV (NL)
- 5 VAN DE LEUR (NL)
- 6 MASTERFOOD CHOCOLAD FRANCE (FR)
- 7 YORK DENMARK APS (DK)
- 8 GRAM EQUIPMENT A/S (DK)
- 9 A/S DYBVAD STÅLINDUSTRI A/S (DK)
- 10 COOL CLEAR LOGISTICS B.V. (NL)



# COncEPT

## Development of a Portable, High-Energy, Nanofocus Computer Tomography System for Glass-Reinforced Plastic Wind-Turbine Blades

A novel and Portable Computed Topography (PCT) system will be developed to perform total structural-integrity inspection of present and next generation composite Wind Turbine Blades (WTB), without taking them out of service.

The Computerised Open Environment Portable Topography (COncEPT) system will provide the only means of detecting several significant defects, including disbonds on the nano-scale, in the thickest sections of 100-metre-length blades intended in the future. As a diagnostic tool used to assure the safe operation of present and future wind farms, it will provide a key technology to support the growth of wind power intended under global economic, environmental and societal policy initiatives.

The continued increase in the size of WTBs, necessary to meet power-generation efficiency targets for wind power, may produce enhanced environmental fatigue and impact damage effects of an order as yet unknown. The highest sensitivity of structural health monitoring as provided by the COncEPT system will be required to address these issues. The use of wind turbines has increased approximately 30 % per year from 1993, and this trend is set to continue until 2010 and beyond, consistent with worldwide initiatives for sustainable and renewable energy sources. Composite materials are essential to realise their targets efficiently. However, a small discontinuity in a composite material can seriously impair its in-service function and may lead to a critical fault with little or no visible warning sign. Failure to detect such a fault can, and has, resulted in catastrophic failure, endangering life and reducing public confidence, leading to restricted future wind-turbine developments. The need to detect such small defects in the thickest sections of WTBs is only feasible by means of radiography with a nanofocus tube and CT image reconstruction routines.

The project will increase the competitive advantage of European small to medium-sized enterprises (SMEs), enabling them to increase their share of the EUR 600 million global inspection market.

- 1 TWI LTD (UK)
- 2 X-TEK SYSTEMS LTD (UK)
- 3 DETECTION TECHNOLOGY INC. (FI)
- 4 GENERAL HIGH VOLTAGE INDUSTRIES LTD (UK)
- 5 NAFTOSOL S.A. (GR)
- 6 INNOSPEXION APS (DK)
- 7 E.ON UK PLC (UK)
- 8 RWE NPOWER PLC (UK)
- 9 GERMANISCHER LLOYD WIND ENERGIE (DE)
- 10 KAUNAS UNIVERSITY OF TECHNOLOGY (LT)
- 11 LONDON SOUTH BANK UNIVERSITY (UK)
- 12 I.S.O TEST ENGINEERING SRL (IT)
- 13 PHOTONIC SCIENCE (FR)

**Contract: 32949**  
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**EC Contribution: € 1 200 776**

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# COOLVAN

An Innovative, Environmentally Friendly Adsorption Refrigeration System for Automotive Applications that is Powered by Vehicle Exhaust Waste Thermal Energy to Reduce Transportation Energy and Costs

174

Co-operative research

Twenty seven million t of refrigerated food with an estimated value of more than EUR 100 billion is currently stored within the EU at anytime. Of all refrigerated food, the 45 % transported within the EU is transported by road (with a total annual distance of 1395 billion t/km). This enormous transportation of refrigerated food leads to large environmental and economic costs due to emissions of CO<sub>2</sub>, carbon monoxide (CO), Volatile Organic Compounds (VOCs), nitrogen oxides (NOx) and other particles. In addition, the refrigeration systems use refrigerants that have ozone-depleting properties.

Automotive refrigeration systems are based on traditional vapour-compression technology, driven directly from the vehicles' engines. These units are a source of problems, due to the excessive power draw from the engine, that can affect the vehicle's performance and long-term behaviour. These units are also heavy (more than 100 kg), which affects the vehicle's styling and aerodynamics.

The proposed co-operative project, "Cool-Van", will develop an automotive refrigeration technology that will use water as the working refrigeration fluid and will be driven by the vehicle's waste exhaust heat to power the refrigeration unit — which will not draw any parasitic power from the engine. The refrigeration system will not affect the engine coolant system and will not require any under-bonnet work to be undertaken.

The Cool-Van project aims to develop an adsorption refrigeration system for automotive refrigeration applications weighing less than 80 kg. This will be powered by waste exhaust heat with an average power input of 15 kW. The refrigeration system will have a Coefficient of Performance of more than 0.5 and an average cooling power of 7.5 kW. In addition, available thermodynamic energy will be stored during normal operation, that will be used to rapidly cool the refrigeration compartment when required.

The economic objectives are to provide an affordable automotive refrigeration with a market price of EUR 2 700, and will reduce fuel costs by more than 5 %.

- 1 RBR ASSOCIATES LTD (UK)
- 2 ROTA MADENCILIK HAY. TAR. NAK. DIS. TIC A.S. (TR)
- 3 AS LAPI MT (EE)
- 4 PERPLASTIC S.L. SOCIEDAD UNIPERSONAL (ES)
- 5 PARMA PLAST AS (NO)
- 6 KESTREL TEMPERATURE CONTROLLED SERVICES LTD (UK)
- 7 REMUS INNOVATION FORSCHUNGS-UND ABGASANLAGEN PRODUKTIONS GMBH (AT)
- 8 FORD MOTOR COMPANY LTD (UK)
- 9 PERA INNOVATION LTD (UK)
- 10 IDNTAEKNISTOFNUN ISLANDS (THE TECHNOLOGICAL INSTITUTE OF ICELAND, ICETEC) (IS)



Contract: 32852  
Call: FP6-2004-SME-COOP  
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Duration (months): 24  
Total cost: € 1 188 369  
EC Contribution: € 615 248

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# DEMAG

## Domestic Emergency Multipurpose Advanced Generator

DEMAG intends to investigate the indoor domestic application of advanced hydrogen technologies to life-saving emergency energy generators, and deliver an emergency power supply, rated 10 kWh, based on the integration of a PEM fuel cell with ultra-capacitors and with a metal hydrates container for hydrogen storage: the FC is expected to provide a basic power output, whereas ultra-capacitors can supply temporary peak loads.

The system will be designed to provide the best retrofit potential. An in-depth safety assessment will be performed to support the integration of hydrogen-based devices in domestic environments.

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Co-operative research

- 1 LABOR S.R.L. (IT)
- 2 AGT S.R.L. (IT)
- 3 SEIRA ELETTRONICA INDUSTRIALE S.R.L. (IT)
- 4 SZWED SP. Z O.O (PL)
- 5 PIÙ SRL COSTRUIRE IL FUTURO (IT)
- 6 IDEATEL INGENIERIA (ES)
- 7 UNIVERSITÀ DI ROMA "TOR VERGATA" (IT)
- 8 AGT S.R.L. (IT)
- 9 GRAZ UNIVERSITY OF TECHNOLOGY, INSTITUTE FOR CHEMICAL TECHNOLOGY OF INORGANIC MATERIALS (AT)
- 10 ENERTRONIX DE STROMVERSORGUNGEN (DE)

[www.demag-project.net](http://www.demag-project.net)

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**Total cost:** € 1 222 280  
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Energy

# DESIRE

## Development of Simple and Reliable Online Monitoring Equipment for Thermal Spraying Control

176

Co-operative research

Industrial production of high quality coatings remains a permanent priority for all thermal spray companies. It is known that the spray companies have improved the level of quality and performance of the industrially applied coatings. However, this situation has shifted the practical issue in industrial environments from "how to make" to "how to guarantee", questioning the stability of the actual spray process during the long spray sessions required by industry. Advanced control systems lead to reproducible primary input parameters, but they are not enough to monitor the variation of the coating quality resulting from permanent or sudden modifications in the system hardware, such as nozzle wear, spitting, troubling in feeding lines, gas leaks, tube erosion, etc. Such problems are undetectable by these systems, but extremely important for practical application.

The development of the equipment proposed in this project, offers the possibility to monitor and permanently control the characteristics of the thermal spray flame, as a direct indicator of the stability of the spray process. Thus the promised quality of the sprayed coatings can finally be guaranteed. The main advantages of the equipment are as follows: it is simple, cost effective, reliable in supporting the working environment, small-sized so as to follow the gun movements, and easily implemented in existing spray cells. All these characteristics are met by an equipment based on photodiode array, used to quantify the intensity and spatial distribution of the flame emission; instead the existing devices, intrinsically complex and not adapted to industrial use, focused on the measurement of the velocities and temperatures of the powder particles.

The main industrial objective of the project is to develop a simple cost effective and reliable online monitor and control device, specifically adapted to the flame characteristics of the thermal spray process. The development will be performed by experimentally establishing the required electronic hardware and data processing systems, to obtain a clear sensitivity with regard to the critical modifications in all the process parameters. Experimental maps of monitoring signal will be used for calibration purposes.

The main economic objective of the project is the development of a simple, technically effective, and low-cost online monitoring and control system, easily implemented, even for small spray companies or workshops looking for strategies to improve the quality of their thermally sprayed coatings to increase their competitiveness and work efficiency. The monitoring and control equipment developed will be much more affordable for small to medium-sized enterprises (SMEs) than that available on the market, and will give them important economic benefits.

- 1 FUNDACION INASMET (ES)
- 2 PUTZIER OBERFLÄCHENTECHNIK GMBH (DE)
- 3 TURBOCOATING SPA (IT)
- 4 CONSORZIO INTERUNIVERSITARIO NAZIONALE PER LA SCIENZA E TECNOLOGIA DEI MATERIALI (IT)
- 5 ARTEC SAS DI COPPELLETTI GIROLAMO EC (IT)
- 6 MONITOR COATINGS LTD (UK)





# DeSol

## Low-Cost Low-Energy Technology to Desalinate Water into Potable Water

In the southern states of the EU, tourism is a main business on which in some areas up to 90 % of employment depends on. Tourism today requires up to 300 litres per person per day of clean water. The areas where most of the hotel resorts and secondary facilities like restaurants or laundries are located are scarce on potable water. The available source of water is sea and groundwater which has to be desalinated too. Hotels and restaurants are mainly local small to medium-sized enterprise (SME) businesses which depend on public supply of water and electricity. Due to the high demand of potable water there is a threat to this growing industry.

Today's main technology for desalinating water is Reverse Osmosis, which is expensive in investment and operation, and due to the high consumption of electrical energy, not environmental friendly. The proposing SMEs have to upgrade their products or expand their markets with new applications of their technology and therefore have come together to develop a new innovative technology.

DeSol is an environmentally friendly and efficient process that desalinates water using thermal energy at a low level solely which will be provided by solar collectors in the proposed system. The low temperature level of evaporation could be achieved through processing at vacuum pressure. Vacuum is generated through the water column in the effluent formed by the gravity of the condensed water.

The proposers will develop a highly competitive product with significant technological features.

- Evaporation at temperature of <math>60^{\circ}\text{C}</math> in a vacuum pressure atmosphere generated by the gravity of the effluent water column.
- Raw water charging by a maintenance free pump unit combining a piston pump with a directly coupled Stirling motor.
- Modular design for flexible adaptation to low or high capacities required by customers.

- Control and adjustment by non-electrical but hydro- / thermo-mechanical systems.
- Energy efficiency up to >92 %. The proposed system will be cost-efficient and will save investment and energy. It will be easily operated and designed for low-maintenance efforts at a long lifetime.

Innovation barriers that have to be overcome are:

- a self-adjusting of the water column generating the vacuum in the tank system;
- a pump driven by a direct coupled Stirling engine which is supplied by solar collectors;
- hydro- and thermo-mechanical control and self-adjustment of the sub-processes in the unit.

- 1 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 2 MASCHINENBAU LOHSE GMBH (DE)
- 3 THERMO-GEN AB (SE)
- 4 OPTICAL PRODUCTS LTD (UK)
- 5 WATTPIC ENERGIA INTEL-LIGENT S.L. (ES)
- 6 AQUA TREATMENT (IE)
- 7 CLUB MEDITERRANÉE S.A. (FR)
- 8 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)

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**EC Contribution: € 527 655**

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# DESPROCH

## Design of a Semi-Hot Process Chain

178

Co-operative research

Hot Forging is a manufacturing process by which metal is plastically deformed under great pressure and high work piece temperatures, into high durable parts known as forgings. The forged parts are used in areas where there is a demand for high quality and excellent mechanical properties, combined with large batch sizes. Customer demand is rising with regard to higher accuracy of manufacturing, surface quality and use of material. It is up to the forgers to respond to these pressures. Therefore it is necessary to support the European forging industry — that mainly consists of small to medium-sized enterprises (SMEs) — in the development and optimisation of production technologies. Semi-hot or warm forging is an economical alternative to conventional forging technology. It offers several advantages that contribute to economic, environmental and social issues. These are reduced energy input, no scale, better surface quality and closer tolerances. It has so far been used successfully in the production of rotationally symmetric components. Components in which one axis is several times longer than the others cannot be manufactured with this process now.

The main goal of this project is to establish a basis for the setup of complete, reliable and flexible process chains for the semi-hot forging of long parts. It begins with the feeding of raw material and ends with the output of finished, cooled and measured parts. This is to be realised in the supporting SMEs, in a “one-piece-flow” process with low production costs and high process quality, and will guarantee optimal use of the project results. The result expected from the proposed project is the spreading of the semi-hot forging technology, first within the project participants, but later in the European forging industry as a whole, hence strengthening the competitiveness of European forges. It will also help the SME participants to build up international partnerships and alliances for research and marketing. This will help them to keep up with the globalisation of the market.

www.desproch.de

- 1 IPH - INSTITUT FÜR INTEGRIERTE PRODUKTION HANNOVER GEMEINNÜTZIGE GMBH (DE)
- 2 KOVARNA “VIVA” ZLIN, SPOL. S.R.O (CZ)
- 3 S.C. METAV CERCETARE DEZVOLTARE SA (RO)
- 4 OMTAS OTOMOTIV TRANSMSIYON AKSAM I SAN. VE TIC. A.S (TR)
- 5 HOFMANN WARMETECHNIK GMBH (AT)
- 6 COMTES FHT S.R.O. (CZ)
- 7 BEMERS & CO. GMBH (DE)
- 8 ROBOTERM SPOL. S.R.O. (CZ)



FP6 Project Catalogue

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Duration (months): 26  
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EC Contribution: € 999 000

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# ELATION

An Ultra-Efficient, Low-Cost, Lightweight, Thermal Insulation Material to Improve the Energy Efficiency of Refrigeration Equipment by 30 %

There is a clear need for an ultra-high-performance insulation material that is capable of significantly reducing the energy consumption of refrigeration appliances (including refrigeration vehicles), thereby reducing the ever-increasing European energy demand, and Europe's ever-increasing reliance on imported energy. Conventional insulations materials (foams) are inexpensive and low cost, but they do not provide the ultra-high levels of thermal insulation required to achieve the above energy reductions. Vacuum-insulated panels or VIPs (using metallic barrier layers) are the state of the art with respect to thermal insulation, yet they suffer from significant disadvantages in smaller applications due to edge leakage losses. This is even more pronounced in 3-D systems such as refrigerators.

This proposal aims to develop an innovative ultra-high-performance, low-cost, lightweight insulation material, (with insulation properties of VIPs 10 mW/mK) at a cost comparable to conventional insulation. It will overcome the problems associated with conventional VIPs by utilising an all polymer barrier layers (WP2). Furthermore, the innovation in the manufacturing process will produce VIPs in 3-D form, (WP4) with integrated thermal storage and a predictive time-temperature electronic system (WP3) that will be capable of ensuring that even the lower levels of electrical energy consumed occur at off-peak times, thereby smoothing energy demand.

The proposal is particularly relevant to small to medium-sized enterprises (SMEs) in this sector as it is particularly exposed to globalisation, since most overseas competitors have virtually identical technologies and can compete on quality and delivery. Due to low overseas labour rates, cost is an area where we cannot compete. We need to continually innovate to differentiate and add value to our products, and this proposal is a perfect mechanism for bringing together a transnational partnership with critical mass and the leading research and technology capability to deliver it.

- 1 ICELITE LTD (UK)
- 2 IMT INTERNATIONAL SRL (IT)
- 3 CONVEX ELECTRICAL LTD (IE)
- 4 ENVIRONMENTAL PROCESS SYSTEMS LTD (UK)
- 5 MIELE & CIE GMBH CO. (DE)
- 6 SUEDPACK VERPACKUNGEN GMBH & CO (DE)
- 7 THE VAC COMPANY GMBH (DE)
- 8 FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 9 PERA INNOVATION LTD (UK)

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Energy

# Energy Saving Weld

New Technique for Radiation-Free, Energy-Saving and More Versatile High-Frequency Welding

180

Co-operative research

The objective of this project is to solve the technical problems which currently impede the group of small to medium-sized enterprise (SME) proposers, i.e. to develop a new technique for high frequency welding, with lower electromagnetic radiation, lower energy loss and with more efficient and flexible high-frequency welding machines as a result. The new technology will give the SME proposers improved competitiveness and increased employment possibilities, and will open up transnational cooperation between SMEs, researchers and research and technological development (RTD) organisations in different countries.

Other SMEs will have benefits of the result of the project, wherever there are needs for:

- high-frequency generation without the use of vacuum tubes;
- high-frequency welding of complex products and of materials not weldable today.

High-frequency welding equipment is used all over the world, especially for welding plastic films of polyurethane and PVC. The main products welded using the technique are life jackets, drip and blood bags, rain clothing and lorry covers. The problem with the technique being used is that the very high power (up to 80 kW) in combination with old low-tech equipment (vacuum tubes) gives both a high-energy loss and a high level of electromagnetic radiation. The International Commission on Non-ionizing Radiation Protection has published a standard that lays down the electromagnetic field strengths to which the human body may be exposed. The HF welders are really living on the edge of this standard.

The overall objective is to develop a new technique for HF welding, based on modern technology, giving better energy efficiency and lower levels of electromagnetic radiation. A secondary objective is to automate the frequency adjustment. This will enable tuning for new materials and products, and welding of materials with varying thickness.

The RTD project will concentrate on solving the technical problems regarding:

- the vacuum tube: how to replace it with modern solid-state techniques, to eliminate electromagnetic radiation and reduce energy consumption;
- frequency adjustments: new regulating equipment for optimised weld cycles, easier tuning when new materials or products are to be welded, and enabling more complex products to be welded. This also includes the development of new materials.

The result will be a new HF welding equipment — radiation free, low energy and versatile — which the SME proposers will exploit and/or sell in most countries in Europe, starting in 2008/09.

- 1 FIAB HF AB (SE)
- 2 EBA PLAST AB (SE)
- 3 TTF LTD (UK)
- 4 STRONGHOLD LTD (UK)
- 5 THALES ELECTRON DEVICES SA (FR)
- 6 SIEMENS AG (DE)
- 7 CHALMERS INDUSTRIAL TECHNOLOGY AT CHALMERS UNIVERSITY (SE)
- 8 ITV - INSTITUTE OF TEXTILE TECHNOLOGY AND PROCESS ENGINEERING DENKENDORF (DE)
- 9 INNOVATION TEAM AB (SE)
- 10 INSTITUTE FOR PRODUCT DEVELOPMENT AT TECHNICAL UNIVERSITY OF DENMARK (DK)



FP6 Project Catalogue

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# FEMAG

## Flexible Ecological Multi-Purpose Advanced Generator

FEMAG targets an energy generator BOX, closed, of small power, based on the integration of a fuel cell in the range of 0.125 kW to 1 kW with a battery pack and supercapacitors, for the flexible supply, at variable power, of small portable non-automotive devices, composed of all those companies' manufacturing systems potentially suitable to be supplied by fuel cells, but of size and value lower than those presently requested for an ad hoc development of similar systems. The project is targeted at small to medium-sized enterprises (SMEs), and will produce also an advanced expert system for the design of complex generators based on FCs in the range of 0.125 kW to 1 kW FEMAG proposes to develop a product which is based on fuel cells, but is combined with all the components required to make its application flexible, simple and able to satisfy not only the base power consumption, but also relative peaks of consumption of associated machines, within utilisation profiles prefixed at the design stage.

There exists a clear and remarkable target market for such systems, composed of all those companies with manufacturing systems potentially suitable to be supplied by fuel cells, but of size and value lower than those presently requested for an ad hoc development of similar systems.

The approach proposed by FEMAG is very original and with impressive replication potential, since, further to the development of prototypes optimised by experimental design for the specific target applications of the project, it envisages the application of advanced mathematical methodologies in order to formalise the knowledge generated by the project into an expert system for virtual design of integrated generators based on FCs.

- 1 LABOR SRL (IT)
- 2 ENERTRON - STROMVERSORGUNGSGERÄTE UND ELEKTRONIK GMBH (DE)
- 3 SZWED SP. Z O.O (PL)
- 4 UNIVERSITA DEGLI STUDI DI ROMA TOR VERGATA. (IT)
- 5 INGENIERIA E INDUSTRIAS BIOENERGETICAS S.L. (ES)
- 6 UNIVERSITY OF TECHNOLOGY GRAZ (AT)
- 7 MOLECULAR NETWORKS GMBH (DE)
- 8 AZIENDA SANITARIA LOCALE ROME (IT)
- 9 NUOVAFIMA SPA (IT)
- 10 AGT SRL (IT)

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# FlexiRiserTest

Development of Novel Underwater Digital Radiography Techniques, Sensors and Systems for the Volumetric Examination of Offshore Flexible Risers and Flow Lines

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Co-operative research

The major oil companies are developing an ever-increasing number of offshore oilfields in their quest to maintain stable world oil and gas supplies. With the increasing price of oil, deepwater offshore oil fields are now an economically viable oil supply option. This includes European deepwater fields, to the north-west of Scotland and Norway. Water depth, ocean currents and harsh weather may mean that the deployment of traditional fixed oil production platforms is not technically feasible. However, Floating Production Storage and Offloading (FPSO) vessels are able to work year round, on stations producing from deepwater oil fields. Flexible pipes called flexible risers are used to carry oil and gas from subsea oil wells to the FPSOs. When in service, the flexible risers are expected to operate for the life of the oil field — that may be up to 30 years.

There is no current method of examining, *in situ*, the underwater risers and flowlines to ensure their continued reliable high-integrity operation. The failure of a single riser could lead to the failure of adjacent risers and flexible flow lines, dramatic long-term environmental damage, loss of oil production and huge economic consequences for Europe.

The project will develop the world's first underwater digital radiographic NDT method for the reliable, volumetric inspection of risers to detect defects in the areas of greatest concern. Subsea radiography has been recognised by many of the FPSOs operators as the only inspection method that can provide the type of information required to detect the defects of concern to major oil companies operating FPSOs. Remote Operating Vehicle (ROV) manipulator tooling will be developed to deploy the subsea radiographic inspection system.

www.flexiriserest.com

- 1 TWI LTD (UK)
- 2 EURONDT LTD (FR)
- 3 COMPUTERISED INFORMATION TECHNOLOGY LTD (UK)
- 4 NOE ENTERPRISE SP. Z.O.O. (PL)
- 5 TECHNICAL SOFTWARE CONSULTANTS LTD (UK)
- 6 NAFTOSOL S.A. (GR)
- 7 WELLSTREAM PLC (UK)
- 8 PETROLEO BRASILEIRO SA (BR)
- 9 NORDION S.A. (BE)
- 10 ZENON SA - ROBOTICS & INFORMATICS (GR)
- 11 FORSCHUNGSZENTRUM JUELICH (DE)

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# FLEXRAP

## Development of an Innovative, Modular Rapid Prototyping System for Rigid and Flexible Models

Rapid prototyping techniques are an important tool for fast and efficient development of a product. It allows a short time-to-market and better design and quality of the product. In this way, it enhances competitiveness. Different RP techniques are on the market, but the threshold to use it — especially for small to medium-sized enterprises (SMEs) — is still very high, since there is no high-quality technology available at a reasonable price. Also, the mechanical properties of the RP model are limited to rather hard materials. Moreover, the technique is not widely accepted yet, as it cannot be used in an office environment and special skills are needed for the high end RP techniques.

Availability of a flexible RP technology that is easy to use (in an office environment) and gives high quality models for a low price and with the possibility of having different types of (also soft) materials would mean a breakthrough in the RP market. It would, for example, be a big asset for SMEs in the toy and shoe sector when import limitations for goods from south-east Asia are relieved (from 2005 on).

Although many types of RP machines are available, the Objet technology is best suited as a starting point for the development of such a technology.

The technology demands very specific resins:

- the resin formulations have to comply with the proprietary Ink-jet technology that jets the formulation at high temperature;
- the resin formulations have to show fast cure under UV illumination;
- the final mechanical properties must be good.

In the Objet technology, a model material and a support material is used. First the present model material will be optimised so it gains properties comparable with commodity or engineering polymers.

At the same time, a support material and removal method will be developed by which the support can be removed so easily, that the building of a RP-model can take place in an office environment.

Next, a material will be developed that shows rubber-like properties. This makes it possible to make rubbery RP models in a cost effective way. The Objet Technology, in principle, should be able to allow the use of more than one model material. To explore this possibility, an experimental apparatus will be built with the option of printing two model materials and a support material. This kind of technology is also a first step in the direction of a rapid manufacturing technology.

The potential applications of this technology will be investigated. Case studies will be made regarding applications in the foundry, automotive, toy and shoe industry. Training programmes will be prepared, to allow the easy introduction of the technology into the shoe and toy industry.

- 1 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH – TNO (NL)
- 2 ACTIVA DISEÑO INDUSTRIAL Y GRAFICO SL (ES)
- 3 CREACIONES JOVIAR S.L. (ES)
- 4 LAMBSON FINE CHEMICALS (UK)
- 5 CREATIVIDAD Y DISEÑO, S.A. (ES)
- 6 ASOCIACION DE INVESTIGACION PARA LA INDUSTRIA DEL CALZADO Y CONEXAS - INESCOPE (ES)
- 7 ASOCIACION DE INVESTIGACION DE LA INDUSTRIA DEL JUGUETE, CONEXAS Y AFINES (ES)
- 8 ECOLE NATIONALE SUPERIEURE DE CHIMIE DE MULHOUSE (FR)
- 9 LEON Y MARTINEZ MATRICERIA S.L. (ES)
- 10 AUTOMATICA Y CONTROL NUMERICO, S.L. (ES)
- 11 POPULAR DE JUGUETES S.L. (ES)
- 12 OBJET GEOMETRIES LTD (IL)

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Energy

## Integrated Modular System for Energy Self-Sufficient Buildings Based on Thin Film Photovoltaic and Thermoelectric Devices

The aim of the IMS project is to develop an innovative technology and the industrial production process for a complete building-integrated thermophotovoltaic and thermoelectric climate-conditioning solution. The system, called Integrated Modular System (IMS) is conceived as a completely building-integrated and self-standing energy system: IMS works as bioclimatic regulator, realising a trivalent effect (Thermal-Photovoltaic-HVAC) in the same element, exploiting solar radiation as its primary energy source and making the building completely independent from the energy point of view.

The product is designed to be produced with relatively low cost and on flexible support, in order to be easily mounted with yard techniques and completely integrated into the building during construction and restoration phase. The aim of the project is to apply the most innovative and advanced nano-films production solutions achieved in the thermo-electrical and photovoltaic field to obtain unique performances for the proposed system.

On the external part of the building, the PV effect is realised through deposition of low-cost amorphous silicon to be integrated on the flexible polymeric pipes working as thermal captive elements. The TE subsystem is fed directly through DC current produced by the PV subsystem, and produces heat or cold by acting on the current polarity, thus allowing self-standing and solid-state air conditioning.

The TE effect is realised through a thin semiconductor film deposited over the polymeric support, where the heat removal is realised by exchange with a liquid vector, and then recovered for domestic hot water needs or dissipated.

The element is integrated into the building structure (e.g. ceiling) to act as the climate conditioning of the building, both heat and cold. The expected results are: a) the definition and design of the IMS product ; and b) the definition of the process for production of the IMS.

- 1 IBE INGENIERIA E INDUSTRIAS BIOENERGETICAS, S.L. (ES)
- 2 S.G.G. DI RESTAGNO, TRIMBOLI, VEZZOLA & C.SNC (IT)
- 3 CIDETE INGENIEROS SL (ES)
- 4 MMT S.R.L. (IT)
- 5 ANGARIS GMBH (DE)
- 6 LABOR S.R.L. (IT)
- 7 KUNGLIGA TEKNISKA HÖGSKOLAN (SE)
- 8 GERMAN AEROSPACE CENTER (DLR) (DE)
- 9 CENTRO DE INVESTIGACIONES ENERGÉTICAS, MEDIOAMBIENTALES Y TECNOLÓGICAS (ES)



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# MULTISOLAR

## Development of an Integrated Solar System for Buildings

The objective of the project is the study and development of a new generation of solar panels, capable of replacing the demands for any type of building, be it electric power, hot water or hot air for heating. This will lead to improvements of these facilities regarding the individualised systems in use. The proposal of this type of panel is to serve as a structural element of the building, forming part of the structure that is, i.e., walls and roof, giving it a good aesthetic impression, together with the glass surfaces that form the panels.

The idea arose from the need to palliate the low performance of the photovoltaic generators, that usually don't go beyond 10 % or 15 %.

The reason why is that in this type of facility, the heat is not taken advantage of in an appropriate way, leading to a loss of approximately 34 % of the incident energy, and the performance of the apparatus diminishes quickly as the temperature of the collector increases, causing important losses as soon as the temperature of the cells are between 40 and 45°C, for modern solar panels.

During the project the focus of the work will be placed on:

- review of the concept, energy analysis and architectural analysis,
- design of the system components,
- manufacturing of the components,
- installation and integration of the components in a prototype house,
- development of field tests.

- 1 MILLENIUM ELECTRIC T.O.U. INC. (IL)
- 2 AD FONTES (DE)
- 3 CERÁMICA VEREA SA (ES)
- 4 MANIERO ELETTRONICA S.A.S. (IT)
- 5 APEX MM LTD (BG)
- 6 VEREINS ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 7 UNIVERSIDAD DE SEVILLA (ES)
- 8 DANMARKS TEKNISKE UNIVERSITET (DK)

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# NANOSPARK

## Development of a New Machinery for NANOTubes Mass Production Based on the Channel SPARK Ablation Technique

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Co-operative research

Carbon nanotubes have many unique and extreme physical properties, and for this reason they will play a key role in the next future of society. Many governments all over the world are investing great resources in nanotechnologies research activities. The reason is the great performances of nanostructured materials and the large variety of applications of these technologies. The objective of this proposal is to realise a new machinery based on a cheap technological procedure, the Channel Spark Ablation (CSA), to produce high-quality single-walled carbon nanotubes which should yield the same quality as laser ablation, but at much lower costs. The nanotubes produced by this equipment will be used as passive electronic elements into innovative solar cells and dye-sensitised solar cells. The major innovation of the proposal is the idea to adopt an innovative technology to provide single-walled nanotubes, on the kilogram scale at first and ultimately on the tonne scale.

The CSA is a system based on the pulsed electron-beam generation from the glow-discharge plasma environment. The applicability of the CSA to nanotubes preparation relies on the high effective temperatures that can be reached at the target surface and on its similarities to Pulsed Laser Ablation. It is clear that the development of sophisticated equipment and its further adjustment required for different materials utilisation cannot be tackled by one company exclusively. The contribution of the research and technological development (RTD) performers will be essential to provide the indispensable know-how and resources to overcome the theoretical and technical problems, and so to achieve the final positive result.

The economic reason for transnational cooperation is given by the great industrial interest, all over the Europe, for this new, promising technique for nanotubes mass production. Actually, the most important limitation of the nanostructured materials is the high production cost, mainly due to high energy consumption and low process productivity.

www.nanospark-project.eu

- 1 LABOR S.R.L. (IT)
- 2 TECNA S.R.L. (IT)
- 3 SINEUROP NANOTECH GMBH (DE)
- 4 INGENIERÍA E INDUSTRIAS BIOENERGÉTICAS S.L. (ES)
- 5 KONARKA AUSTRIA FORSCHUNGS- UND ENTWICKLUNG GMBH (AT)
- 6 SHANGHAI YANGTZE NANOMATERIALS CO. LTD (CN)
- 7 CONSIGLIO NAZIONALE DELLE RICERCHE (IT)
- 8 TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY (IL)
- 9 MAX PLANCK INSTITUT FÜR FESTKÖRPERFORSCHUNG (DE)
- 10 ORGANIC SPINTRONICS S.R.L. (IT)



FP6 Project Catalogue

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# OPTISUN

## The Development a New More Efficient and Easy-to-Install Grid-Connected PV Module with Subdivided Solar Cells, Cell-Integrated Micro Inverters and Backlight Module

Current PV module technologies are based on centralised inverters and string inverters. However, these systems are very sensitive to environmental influences such as dirt and temperature differences, which lead to poor performance of the systems.

We propose to overcome these problems by developing a more efficient and easy to install PV module, with subdivided solar cells and a solar cell-integrated micro inverter to increase the efficiency of the inversion process. In addition, the solar cells will be parallel-connected in order to control as few cells as possible, to reduce the negative effects of environmental influences such as dirt and temperature differences. In addition, the PV module will encompass a backlight module that will utilise the empty space between the cells to transfer light to the rear side of the solar cells to generate additional solar power, at a total integrated system cost of EUR 4 000/kW (OPTISUN).

This project will target the fast growing market for grid-connected PV systems. The competitiveness of the EU PV industry is a major issue in this rapidly increasing market. Currently, European industry is lagging behind the US and Japan, which exports PV components to the EU. Also, competition will become increasingly intense, as new players from low labour-cost countries such as China and Taiwan are now entering the market for PV systems.

The proposed project will increase the competitiveness of the 6 000 small to medium-sized enterprises (SMEs) in the European PV sector by providing them with a technology that will significantly improve the efficiency and cost effectiveness of PV modules. This will provide the sector with the necessary momentum to increase their competitiveness against current market leaders in Japan and the United States.

The benefits of increased competitiveness and internationalisation will be enabled through the transnational partnership between the SMEs, research and development (R&D) partners, LE and sponsor groups that will be used to develop

further commercial and technological relationships, which will enable a broader exploitation of the project results and stimulate new joint innovations and facilitate the development of further enabling technologies across the EU.

The results of this research work, including members within the industry and research institutes, are the basis for the development of new technologies and new products and are the first step to open up new markets. Improved cooperation between the research sector and the PV industry will enable the research sector to better understand the needs of the PV industry and its customers. This will lead to the development of technologies and products that will better meet the needs of the markets. The SMEs will use the access to their networks in the future to extend the product applications and to provide full transnational, global and cross-sectoral access into all potential markets for the proposed innovations and enabling technologies, thereby facilitating cooperative relations in research activities between SMEs, research institutions and other organisations to enable European SMEs to benefit from the many advantages of networking for innovation.

We will support EU policy to reduce harmful CO<sub>2</sub> emissions from fossil fuels and help reach the EU target of 3 gigawatt peak of installed PV capacity by 2010. In addition, the proposal will help the European Union meet its commitment to cut greenhouse gas emissions, in accordance with the Kyoto Protocol.

- 1 ALLSUN A/S (DK)
- 2 PLAST A/S APS (DK)
- 3 SOLARTEC S.R.O (CZ)
- 4 IBERSOLAR ENERGIA S.A (ES)
- 5 SEMELAB PLC (UK)
- 6 PERA INNOVATION LTD (UK)
- 7 NETHERLANDS ORGANIZATION FOR APPLIED SCIENTIFIC RESEARCH, TNO SCIENTIFIC AND INDUSTRY (NL)

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# Power-Grade Charcoal

## Large-Scale Production of Charcoal for Use in Coal Fired Power and Co-Generation Plants

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Co-operative research

The overall goal is to develop a new process for large-scale production of charcoal for use as sustainable fuel in coal-fired power plants.

To comply with power sector quality standards and price levels, charcoal production costs will need to be reduced drastically. This will be achieved by developing an innovative process design, with optimised extent of carbonisation, higher conversion yields (30 % increase), and significant economies of scale (scale-up factor 10). The specific aim is to reduce production costs by 30 %, from EUR 200/t to EUR 140/t.

Main project activities include:

1. determining charcoal specifications;
2. lab and pilot scale carbonisation experiments, including process modelling and conceptual design;
3. research on feedstock drying and charcoal densification;
4. full-scale co-firing experiments; and
5. engineering of a large-scale carbonisation retort and plant.

The four small to medium-sized enterprise (SME) project partners jointly represent the complete charcoal production and supply chain, whereas the three research and technological development (RTD) performers are experts in selected bio-energy fields. Power company Electrabel completes the partnership.

If the targeted price level is achieved, a large market emerges for the SME partners. Kyoto targets (minus 6 % greenhouse gas emissions in 2008-2012) and the EU renewable electricity directive (22 % renewable by 2010) force energy companies to look for low-carbon technologies and fuels. Co-firing biomass is an efficient and cost-effective method to

comply with these objectives, but the use of raw biomass is technically complicated and not always viable. Using wood charcoal as co-firing fuel can overcome these hurdles.

Interest of the energy sector in the concept is demonstrated by the participation of end-users Electrabel who will perform a full-scale experiment (500 t of charcoal) in its CG-13 coal plant. Electrabel aims to co-fire 240 000 t of biomass (charcoal) each year by 2008. Other power producers have adopted similar targets.

- 1 BTG BIOMASS TECHNOLOGY GROUP B.V. (NL)
- 2 AS ENER EA (EE)
- 3 GREENCOAL B.V. (NL)
- 4 INSULCON B.V. (NL)
- 5 PRZEDSIĘBIORSTWO PRODUKCYJNO HANDLOWE CENTROPOL JERZY CICHON (PL)
- 6 UNIVERSITÄT KASSEL (DE)
- 7 SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES (SE)
- 8 ELECTRABEL NEDERLAND N.V. (NL)



# PROBIO

## Production of Biogas and Fertilisers Out of Wood and Straw

The proposed project is based on a modular biogas reactor for cellulose-rich materials, which provides energy from the use of biogas and fertilisers from the use of the digestate.

Biomass can be considered as a strategic resource not only because it is renewable, but also because it is available everywhere and can provide products of vital interest to sectors of strong external dependence (i.e. fuel for transportation, electricity, chemicals, etc.), and also because it may benefit the environment and socioeconomic development (particularly in a rural areas). Such benefits are:

- retention of the rural landscape;
- improved operation of biogas plants;
- use of lignin-containing materials (straw, wood, grass) leading to an extension of input materials for anaerobic digestion;
- a closed nutrient cycle, by bringing the produced fertilisers back onto the fields;
- less environmental impact by fertilisers;
- increased use of renewable materials mean no net gain in carbon dioxide emissions and negligible SO<sub>2</sub> and NO<sub>x</sub> emissions, compared to fossil fuels;
- creation of an alternative use for straw, since burning of straw is banned in some European countries;
- reducing reliance upon finite fossil fuels;
- environmental sustainable production of energy;
- reduction of soil erosion, as ploughing in straw is expensive and very energy intensive, and does not always improve soil structure;

- reduced capital and operation costs;
- strengthening of farmers leads to the sale of products (e.g. fertilisers) that can generate an extra income;
- competitiveness of the agricultural sector, especially in the accessing countries;
- creation of employment possibilities, especially in rural areas.

- 1 DJS RECYCLING UND ENTSORGUNGSTECHNIK BGBGES (DE)
- 2 ABM SOLID SA (PL)
- 3 BIO GENEZIS ENVIRONMENMENTAL LTD (HU)
- 4 BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYETEM (HU)
- 5 POLITECHNIKA WARSZAWSKA (PL)
- 6 VEREINS ZUR FOERDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 7 GOSPODARTWO ROLNE STANISLAWA I ANDRZEJ KIJAK. (PL)
- 8 AUS-BIO APOLDA (DE)

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# PROCOMO

## Protective Coatings with Combined Monitoring System to Control Process Conditions in Boilers

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Co-operative research

The incineration of waste and the combustion of biomass is growing rapidly, both due to environmental aspects (minimisation of landfills, utilisation of waste, reduction of greenhouse gases), and the ambition for self-sufficiency of energy sources in European countries (vs. imported oil, coal and gas).

However, co-combustion, i.e. burning different fuels together (including fuels such as waste, biomass, oil, coal), produces a combustion process more complex and hard to control than traditional fuel combustion. The new, harsh condition has a detrimental effect on the boiler construction, i.e. boiler tubing, shortening lifetime by erosion and corrosion. Hence, the control of the burning process, control of emissions, and the safe and long-life use of boilers is becoming more important. To gain efficient control and reliability of boilers, new methods and protections have to be applied. In the proposed work, a novel approach to both monitor the temperature of boiler and protect the susceptible boiler construction is introduced. The main innovation is to combine a protective coating and temperature-monitoring optical fibre by developing a novel temperature-monitoring protective coating. Hence, the result is less pollution, and long-lasting boilers, able to reliably burn fuels like waste and biomass, are achieved.

A novel combination of protective coating and temperature monitoring will be achieved with cooperation of different European small to medium-sized enterprises (SMEs). The project provides an opportunity to combine two different technologies. Both the best know-how concerning novel monitoring technology and the latest knowledge of the protective coatings is in SMEs, located in different countries. The technological and economical chain is formed by the following: coating manufacturer PikoBlade; A.R.T. Photonics, industrial manufacturer of optical fibres; coating manufacturer Flame Spray; Hitele Systems, DTS (distribute temperature sensing) company; coating raw material distributor Durum and also boiler users.

- 1 VTT - TECHNICAL RESEARCH CENTRE OF FINLAND (FI)
- 2 A.R.T. PHOTONICS GMBH (DE)
- 3 FLAME SPRAY SPA (IT)
- 4 HITELE SYSTEMS LTD (UK)
- 5 DURUM VERSCHLEISS-SCHUTZ GMBH (DE)
- 6 PIKOBLADE OY (FI)
- 7 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH - TNO (NL)



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# REFLECTS

## Novel Bifacial Single-Substrate Solar Cell Utilising Reflected Solar Radiation

The use of renewable energies, and in particular photovoltaics (PV), is one of the most attractive solutions used to overcome the problems caused by conventional energy sources. Whilst much progress has been made over the last couple of decades in reducing the costs of PV cells, their costs are presently still the main obstacle for a worldwide increased utilisation of the electric power provided by this clean and renewable technology. Therefore, the need for innovative, competitive manufacturing concepts is compelling.

The project proposed here aims to prepare the back end of an c-Si solar cell by applying a recently established Lithuanian technology for producing single-sided solar cells, based on self-formation. In this technology, the positive and negative conductors are both at the front end, and two-sided processes can simply copy the process to the back end. This process is far simpler than the manufacturing process of the current two-sided solar cells. Despite foreseen losses in the bulk of the wafer, the expected cell efficiency — based on theoretical calculations — is a whopping 26 %, with only a 10 % to 15 % cost increase, so the 'euro to work package' ratio is expected to be effectively reduced by approximately 50 %, compared to commercially available single-sided c-Si solar cells. Furthermore, a competitive specular reflector will be developed which is optimised for c-Si bifacial solar cells.

The project entails the following work.

- c-Si bifacial solar cells will be developed on basis of the ORTO structure that makes use of both horizontal and vertical planes. The leading principle is self-formation which is largely steered by smart software. Simulation runs will be part of the work. The experimental cells will be tested and validated under laboratory conditions.
- A reflector is to be designed to reflect as much sunlight as possible. Experimental modules will be manufactured with number of cells, and,

in combination with the developed reflector, evaluated in real-world conditions to assess the influence of environmental conditions and to verify its user-friendliness. Plans will be drawn up to commercially exploit the bifacial solar system developed identifying possible markets, pricing and distribution.

- 1 PRO SUPPORT B.V. (NL)
- 2 GIRASOL INTERNATIONAL B.V. (NL)
- 3 UAB "TELEBALTIKOS" IMPORTAS IR EKSPORTAS (LT)
- 4 UAB SAULES ENERGIJA (LT)
- 5 OPTICAL PRODUCT LTD (UK)
- 6 WINSUND INTERNATIONAL LTD (UK)
- 7 BADHAM FARMS (UK)
- 8 HEAVENS SOLAR TECHNOLOGY (UK)
- 9 MILLENIUM ELETRIC T.O.U. LTDA (IL)
- 10 INSTITUTE OF LITHUANIAN SCIENTIFIC SOCIETY (LT)
- 11 INSTITUT FUER SOLARENENERGIEFORSCHUNG GMBH HAMELN/EMMERthal (DE)
- 12 CENTRE FOR RENEWABLE ENERGY SOURCES (GR)

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**Call: FP6-2002-SME-1**  
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# SAFELUBE

A Novel Method of Continuous Online Conditioning and Safe Management to Enable the Use of Fire Retardant Lubricants in Gas and Steam Power Generation Turbines

192

Co-operative research

This proposal addresses the cost effective and safe operation of steam and gas turbines. Since 1991 in Europe there have been in excess of 2 500 power generation gas turbine related incidents including some 700 fires and 14 explosions. This equates to a risk of fire of 1 in 32 per gas turbine per year. VGB (the international industrial and technical association for power generating companies) state that 94 % occur in the area of turbine oil supply. Factory Mutual Corporation data indicates that fire protection measures are only 49 % effective.

Clearly there is a need, both economically and socially, for more effective fire prevention measures in the power generation industry to improve the security of energy supply, a key objective of the EC. Currently, fire retardant lubricants which could greatly reduce the fire risks are barely used in Europe. The current liberalisation process of several Network Industries in the majority of European countries is opening up new business opportunities for small to medium-sized enterprises (SMEs), not only as users of these industries, but also as possible suppliers of new or existing services. In this sense, the liberalisation process has opened up whole new markets in the electricity sector, which has resulted in the start-up of many new small enterprises.

As one such consortium of SMEs we propose to address the above issues by developing a remote sensing and conditioning system to make cost-effective use of fire retardant phosphate esters as turbine lubricant. This can be done by extending lubricant life to the life of the turbine and promoting its expanded use therefore creating a new market worth EUR 89 million in new sales to European SMEs.

- 1 KELMAN LTD (UK)
- 2 ALPES LASERS S.A. (CH)
- 3 MACQ ELECTRONIQUE S.A. (BE)
- 4 MINERWA UMWELTECHNIK GMBH (AT)
- 5 SAFIBRA S.R.O (CZ)
- 6 GREAT LAKES PERFORMANCE ADDITIVES AND FLUIDS (UK)
- 7 MAN TURBOMASCHINEN AG (DE)
- 8 PERA INNOVATION LTD (UK)
- 9 FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)



**Contract:** 17970  
**Call:** FP6-2003-SME-1  
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**Duration (months):** 24  
**Total cost:** € 1 709 259  
**EC Contribution:** € 881 389

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# SOCOLD

## Development and Implementation of a Cost-Effective Adsorption Refrigeration System Utilising High Temperature (120°C) Solar Compound Parabolic Collectors (CPC)

SOCOLD aims at the development of a cost-effective small-sized (5 kW) solar cooling system, based on adsorption technology and new high-temperature (120°C) solar Compound Parabolic Collectors (CPC). The new CPC solar collectors were previously developed in a past CRAFT project (JOR3-CT97-7001) by SOLARFOCUS (Austria). Two different cooling levels shall be achieved by low-pressure adsorption, meaning solid-gas sorption technology, most probably using pure water as liquid phase: ~18°C for building air conditioning (AC) and pure methanol for low temperatures below the freezing level (FROST) for food conservation. Consequently it will be a non-polluting process. The consortium will not only target an energetically efficient system but will keep the cost aims in mind, in order to provide a product ready for market penetration after finalisation of the project.

These ambitious aims shall be achieved by a well balanced international consortium containing the necessary critical mass. Whilst CNAM-IFFI (France) will target the FROST area, FRAUNHOFER (Spain) will focus on the AC development. SOLARFOCUS will improve its existing high-temperature CPC solar panel based on the conclusions of the CRAFT project mentioned above. Finally, two 5 kW prototypes will be built by two small to medium-sized enterprises (SMEs): FAVIER (France) and SORTECH (Germany) and tested under real field conditions at one end-user location in Spain.

The energy management will also play a decisive role. PROFACTOR (Austria) will bring in its know-how concerning alternative refrigeration methods gained in former research and technological development (RTD) projects, such as POLAR (CRAFT-1999-71242) or EJECTOR (JOR3-CT98-7007). In order to prepare a fast market penetration, SOLARFOCUS' distributor in Spain, ALTERSUN, is included in the consortium. ALTERSUN will not only involve its (potential) clients in order to build up a reliable database concerning end-user requirements but will be responsible for the long-term solar tests of the collectors and the integrated system field trials. The final product shall

fit the demands and expectations of as many clients as possible. The proposal addresses the objectives of the work programme concerning Co-operative research in following ways:

- supports the participating SMEs by developing new innovative technologies as well as systems which complement their existing products, increasing therefore their market potential and applications;
- the international approach within SOCOLD improves the international competitiveness of the SMEs by providing a partner network in several EU countries;
- RTD partners provide know-how not available from the SMEs.

- 1 PROFACTOR PRODUKTIONSFORSCHUNGS GMBH ENERGY AND ENVIRONMENTAL TECHNOLOGIES (AT)
- 2 INTIAM RUAI S.L. (ES)
- 3 ASOCIACION DE INVESTIGACION DE INDUSTRIAS CARNICAS DEL PRINCIPADO DE ASTURIAS (ES)
- 4 SORTECH AG (DE)
- 5 INDUTHERM S.L. INGENIERIA E INSTALACIONES (ES)
- 7 ALTERSUN GRUP S.L. (ES)
- 8 CONSERVATOIRE NATIONAL DES ARTS ET METIERS (FR)
- 9 SOLARFOCUS KALKGRUBER SOLAR UND UMWELTECHNIK GMBH (AT)
- 10 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

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Energy

# SOFCSPRAY

Development of Low-Temperature Cost-Effective Solid Oxide Fuel Cells

194

Co-operative research

Solid Oxide Fuel Cells (SOFC) enabling the direct conversion of the chemical energy of hydrocarbons into electricity are creating a great deal of escalating interest as a power generation system. They possess high power-generation efficiency (up to 70 %), which is the highest conversion efficiency compared with any of the developed fuel cells (PEMFC, MCFC, etc.).

SOFC could be used today in large, high power applications, including industrial and large-scale central electricity generation stations. Some developers also see SOFC use in motor vehicles and are developing fuel-cell auxiliary power units. The main objectives of the project are to reduce the working temperatures of planar SOFC from 1000-800 °C to 650-700 °C and their manufacturing costs by 50 %, by using new powders and advanced thermal spraying techniques. In order to achieve these objectives, new powders to be used for the development of the materials for the fuel cell elements will be developed.

For the manufacturing of SOFC, high velocity oxy-fuel (HVOF) spraying and a novel technology of the micro-plasma spraying (MPS) will be used. These two spray techniques have not been used so far for design and development of the SOFC elements. They would enable the manufacturing of low-temperature and cost-effective SOFC. Characterisation and optimisation of the developed powders will be provided to meet the requirements and specifications of industrial partners. The structure and properties of the elements of SOFC (anode, cathode and electrolyte) developed by thermal spraying using these powders will be evaluated, in order to establish the optimum structure-properties relationships. The SOFC elements will be assembled in a stack, which will be tested under industrial conditions, taking into account the industrial specifications.

www.sofcspray.com

- 1 NTDA ENERGÍA (ES)
- 2 FUCELLCO AG (CH)
- 3 CÉRAMIQUES TECHNIQUES ET INDUSTRIELLES SA (FR)
- 4 FUELCON AG (DE)
- 5 TELEMAQ (FR)
- 6 FUNDACIÓN INASMET (ES)
- 7 FORSCHUNGSZENTRUM JUELICH GMBH (DE)



FP6 Project Catalogue

**Contract:** 508266  
**Call:** FP6-2002-SME-1  
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**Duration (months):** 25  
**Total cost:** € 1 182 455  
**EC Contribution:** € 612 665

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# TECUS

## Technology for Titanium High-Quality Customised Products

Tecus is a precompetitive research PROJECT scheduled to last two years. The main objective is to develop a new technology to cast titanium (Ti). The project is divided into seven work packages, including the project management and the exploitation and dissemination activities.

There is an increasing demand for titanium implants and external dental fixtures, due to the ageing population. To supply this demand, there are several outdated commercially available technologies, unable to cope with the reliability and reproducibility required for any industrial process. This obliges dental laboratories to handle extremely low yielding and high re-working of the produced fixtures.

The new technology proposed in this project will solve this problem: it will be formed by the most suitable melting and casting technologies for titanium, "skull melting" and "centrifugal casting", and will be fitted with the required measurement systems: electronic controls, automation, and registration of data.

The following technical developments will be involved:

- a MELTING process with a novel induction device to avoid melt contamination from the crucible;
- a CENTRIFUGAL casting unit to ensure porosity-free castings;
- the INTEGRATION of melting and casting units;
- the ELECTRONIC CONTROL, by the temperature of the metal;
- the AUTOMATION of the process to ensure the production of reliable and reproducible components; and
- a CODE OF BEST PRACTICE for the casting of titanium with the new technology will be also developed, to make for a friendly process which will not required highly

skilled personnel to obtain excellent titanium castings. The target price for a subsequent machine working with this technology is in the range of EUR 25 000 to EUR 45 000.

The development of the new technology will drastically reduce the re-working and scrap of the dental laboratories, presently around 50 %, to lower than 15 %. It will ensure excellent metallurgical quality, and will be reproducible and traceable. This new technology is also of great interest to other industrial sectors, such as jewellery, production of small prototype components, medical implants, surgical instruments, etc.

The partners of the consortium are: Valdentia, Aragoneses, and Bescós (dental laboratories, Spain); NRU (customised products and prototypes, Germany); Beznoska s.r.o. (producer of biomedical implants and surgical instruments, the Czech Republic); KRIZEK (jewellery working in Titanium, the Czech Republic); Phoenix Scientific Industries Ltd (PSI) (laboratory equipment, the UK); research and technological development (RTD) performers Inasmet, (materials RTD, Spain); and CNRS (research centre, France).

- 1 FUNDACION INASMET (ES)
- 2 SVATOPLUK KRIZEK ZLATNICVI (CZ)
- 3 BESCOS LABORATORIO DENTAL (ES)
- 4 PHOENIX SCIENTIFIC INDUSTRIES LTD (UK)
- 5 BEZNOSKA S.R.O (CZ)
- 6 VALDENTIA SL (ES)
- 7 NRU PRAEZISIONSTECHNOLOGIE GMBH (DE)
- 8 ARAGONESES S.A. - CENTRO PROTESICO DENTAL (ES)
- 9 CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (FR)

**Contract: 508606**  
**Call: FP6-2002-SME-1**  
**Starting Date: 27/09/2004**  
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**Total cost: € 1 114 820**  
**EC Contribution: € 577 035**

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**Energy**

# VACI

## Vacuum Insulation

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Co-operative research

Insulation methods are among the most important aspects in many applications. Conventionally used materials are often considered suboptimal in terms of environmental issues, space requirements, and performance. Depending on the nature of the application, these drawbacks can become costly and possibly prohibitive. Hence, the development and introduction of new materials is of great importance. An alternative approach to conventionally employed insulation materials is one that considers vacuum insulation. Laboratory experiments concerning the performance have shown good results; however, to refine the method for commercial exploitation requires further research.

The participants of this project have recognised the potential of this new method and believe the availability of such methods would provide access to new horizons. In controlling the intellectual property rights, the participating small to medium-sized enterprises (SMEs) would be able to gain a significant competitive advantage, as the application of this method is relevant to many areas of industrial importance.

The technical objective of the research is hence the refinement and development of methods, processes, and machinery to manufacture and maintain Vacuum Insulation Panels (VIPs) in a way that will facilitate their use in industrial applications, preferably for cold service equipment. This implies the development of methods that will allow tapered and bent segments, and it especially requires research regarding the joining of segments. Additionally, the development of machinery and methods to ensure on-site repair or exchange of damaged segments is a topic.

The project is expected to contribute to European objectives in a distinctive way. While the unique character of the research involved constitutes a new path, and will therefore lead to valuable prerequisites that will set standards accordingly, the combined impact on safety, from both a fire hazard and materials standpoint, as well as multiple environmental issues, is particularly appealing from a European perspective.

<http://www.va-q-tec.com/english/products>

- 1 VA-Q-TEC AG (DE)
- 2 FOILTEC VERARBEITUNG VON FOLIEN UND TEXTILIEN GMBH (DE)
- 3 BC CONTRACT VALLALKOZO KFT (HU)
- 4 PRODAK KOSMETIK SPOLKA Z.O.O (PL)
- 5 KAEFER ISOLIERTECHNIK GMBH & CO. KG (DE)
- 6 TECHNISCHE UNIVERSITEIT DELFT (NL)
- 7 BAYERISCHE JULIUS-MAXIMILIANS UNIVERSITÄT WÜRZBURG (DE)

**Contract:** 508026  
**Call:** FP6-2002-SME-1  
**Starting Date:** 01/02/2004  
**Duration (months):** 24  
**Total cost:** € 1 468 500  
**EC Contribution:** € 1 049 250

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# WACOSYS

## Monitoring and Control System for Wastewater-Irrigated Energy Plantations

A main objective of the European Commission's energy policy is to raise the amount of renewable energies from the current level of about 6 % up to 12 % from total energy generation, by 2010. Therefore, huge potential is seen in the application of biomass, which is competitive, storable, CO<sub>2</sub>-neutral and in connection with wastewater, an extremely low-cost fuel for heat and power generation.

The current main biomass sources like forest wood, recycled wood and biogas cannot meet the future demand for heat and power generation in Europe. Therefore, it is necessary to develop high-efficient and low-cost biomass production systems. Wastewater irrigated Short Rotation Plantations (SRP) can contribute toward meeting these requirements, because they use the advantages of communal wastewater as a source for cheap fertilisation and irrigation for the cultivation of fast-growing combustible energy crops (e.g. willows, poplars). Due to this procedure, these SRPs also can contribute to a low-cost and environmentally safe biological wastewater treatment for about 25 000 small communities in Europe (135 million citizens), who are not yet connected to the central wastewater treatment systems but will soon have to fulfil the requirements of the new EU environmental legislation.

The aim of the WACOSYS-project is to develop, test and optimise a monitoring and control system (WACOSYS system) for wastewater irrigation of SRPs which guarantees SRP operators safe and more efficient production in their plantations. The WACOSYS system consists of a combined sensor-detector-dosage system which includes a monitoring, control and distribution unit which enables the dosing and distribution of the wastewater in accordance with the plantations' demand for optimum plant growth and maximum uptake rates, while observing critical loads in the effluent to avoid environmental pollution. That will strengthen the competitiveness of SRP-produced biomass against other fuels and combustibles and will ensure compliance with European and national environmental legislation.

The WACOSYS project will test the performance efficiency of the WACOSYS system for its practical and commercial application within existing Short Rotation Plantations working with different clones from willows and poplars, under different climatic conditions (namely Estonia and Spain).

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Co-operative research

- 1 HYDRO-AIR GMBH JÜTERBOG (DE)
- 2 BIOAZUL S.L. (ES)
- 3 STAB TRATAMENTO DE ÁGUAS E BIOTECNOLOGIA LDA (PT)
- 4 MUNITSIPAALASUTUS KARJÄÄR (EE)
- 5 ANTONIO RAMOS FERNÁNDEZ (ES)
- 6 PARKANON PELLETT OY (FI)
- 7 ESTONIAN AGRICULTURAL UNIVERSITY (EE)
- 8 WARSAW AGRICULTURAL UNIVERSITY (PL)
- 9 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E. V. (DE)

www.wacosys.com

**Contract: 512877**  
**Call: FP6-2002-SME-1**  
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**Total cost: € 931 031**  
**EC Contribution: € 571 490**

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Energy

# WAVEGEN

## Wave Pump Submersible Power Generator

198

Co-operative research

The search for a cost-effective and reliable product able to open the wave energy market and make it grow into a profitable opportunity, especially for small to medium-sized enterprises (SMEs), has not achieved a satisfying result so far.

The WAVEGEN project proposes to develop a modular, very low impact, offshore wave energy converter created from the integration of the WAVEPUMP technology with a novel sub-sea power generation hydraulic turbine. A system with inherent characteristics of modularity, scalability and substantial absence of visual impact can be produced, achieving a competitive cost per energy unit produced.

- 1 LABOR SRL (IT)
- 2 IDEUTVIKLING - TORGER TVETER (NO)
- 3 NORPUMP A/S (NO)
- 4 EUROTECNICA - METALOMECANICA DA CANCELA, LDA. (PT)
- 5 PREPLAST INDUSTRIER A/S (NO)
- 6 WSP ENVIRONMENTAL OY (FI)
- 7 GEA SRL (IT)
- 8 EMPRESA DE ELECTRICIDADE DA MADEIRA (PT)
- 9 NORGES TEKNISK - NATURVITENSKAPELIGE UNIVERSITET (NO)
- 10 AGENCIA REGIONAL DA ENERGIA E AMBIENTE DA REGIÃO AUTÓNOMA DA MADEIRA (PT)
- 11 ABS PUMPER A/S (NO)



Contract: 17766  
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Duration (months): 28  
Total cost: € 1 300 910  
EC Contribution: € 673 920

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# AGROBIOGAS

## An Integrated Approach for Biogas Production with Agricultural Waste

Annually, around 700 million t of agricultural wastes are produced within the EU, representing a high load for farmers that are obligated to get rid of them. So far, the majority of the time, manure and crop residues have been receiving the cheapest treatments, although these are not the most adequate ones. Upgrading to biogas (AD) by means of anaerobic digestion (AD) represents an alternative treatment with a lot of potential, as it not only prevents pollution, but also allows for energy and nutrient recovery.

There are still many challenges to be solved in order to make this technology effective in treating agricultural waste and also widely accessible to European farmers. Its distribution is still scattered through the EU, and farmers, depending on their location, have differing opportunities to apply this technology. It is necessary to clarify which are the best conditions, adapted to local situations to treat the targeted residues, and make this information accessible to farmers through the industrial associations or groupings (IAGs) which represent them.

The possibility of co-digestion opens a door with plenty of potential to farmers who would be able to treat their own waste together with other organic substrates. By these means, farmers will treat their own residues properly, and at the same time, they could make a profit by treating and managing organic waste from other sources (waste disposal and management fees) and by selling and/or using its outputs: heat and electrical power, together with a stabilised bio-fertiliser.

The aim of the proposing IAGs is to gather and gain knowledge about financial, legal and technical requirements for developing feasible agricultural AD treatments for different local conditions, and to further transfer it to their small to medium-sized enterprise (SME) members. This will strengthen the competitiveness of AD treatment of agriculture waste against other treatments, and will ensure compliance with European and national environmental legislation.

- 1 DANISH AGRICULTURAL ADVISORY SERVICE, NATIONAL CENTRE/ DANSK LANDBRUGSRADGIVNING LANDCENTRET (DK)
- 2 EUROPEAN BIOMASS INDUSTRY ASSOCIATION (BE)
- 3 FACHERBAND BIOGAS- GERMAN BIOGAS ASSOCIATION (DE)
- 4 ASOCIACIÓN AGRARIA JÓVENES AGRICULTORES GRANADA (ES)
- 5 SLOVENSKA ASOCIACIJA PRE BIOMASU (SK)
- 6 DEUTSCHE GESELLSCHAFT FÜR SONNENENERGIE E.V. (DE)
- 7 COORDINADORA DE ORGANIZACIONES DE AGRICULTORES Y GANADEROS INICIATIVA RURAL (ES)
- 8 PANHELENIC CONFEDERATION OF UNIONS OF AGR. CO-OPS (GR)
- 9 ANNEBERGS GÅRD (SE)
- 10 HAGAVIKS GÅRD AB (SE)
- 11 TESTA LARA (IT)
- 12 POLNOHOSPODARSKÉ DRUŽSTVO - AGRICULTURAL COOPERATIVE (SK)
- 13 BIOMASSE ENERGIE GMBH (DE)
- 14 ELBE BIOENERGIE GBR (DE)
- 15 R.E.S. - RELIABLE ENVIRONMENTAL SOLUTIONS - COOPERATIVE SOCIETY (IT)
- 16 SANTIAGO APOSTOL SCA (ES)
- 17 BIOAZUL S.L. (ES)
- 18 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 19 UNIVERSITY OF SOUTHERN DENMARK (DK)
- 20 LUND UNIVERSITY (SE)
- 21 BOKU - UNIVERSITY OF NATURAL RESOURCES AND APPLIED LIFE SCIENCES, VIENNA (AT)
- 22 CENTRE WALLON DE RECHERCHES AGRONOMIQUES (BE)
- 23 UNIVERSITAT DE BARCELONA (ES)
- 24 EXPLOITATION AGRICOLE À RESPONSABILITÉ LIMITÉE DES BRIMBELLES (FR)

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Total cost: € 2 998 518  
EC Contribution: € 2 170 615

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# Flexoline@home

Development of a Cost-Efficient Innovative Reusable Integrated Power-Supply System, Enabling Interference-Free High-Speed Power Line-Based Communication Architecture for the Affordable Smart House

200

Collective research

There is a global significant skilled labour shortage in construction product manufacturing and electrical installation sectors. Thus there is a growing need to provide rapid counter-measures which will increase the perceived value of these sectors through innovation and encourage young people to become specialists in these fields.

A major step forward is required nowadays, across the EU, in order to provide affordable housing for a large proportion of EU citizens without compromising the benefits of home automation, while overcoming the skilled labour shortage (specifically in the European electricity sector), and providing home owners with improved "home networking" capabilities. The idea of using power supply infrastructure as a communication network, although providing a straightforward solution to the problem, has so far failed to demonstrate that the required characteristics can be achieved, primarily due to problems related to electromagnetic (EM) compatibility. The purpose of this project will be to develop a system that will provide three times the throughput and decrease the EM interference by 30 dB to 40 dB, while significantly decreasing the installation time and associated costs.

In order to achieve the proposed project objectives, it will be necessary to develop a better understanding of the factors determining the coexistence of the power supply, using HFAC (High Frequency Alternate Current) and high frequency signals in parallel conductors of planar structure. This will enable the development of a robust and safe integrated power supply and high-speed communication architecture for domestic applications, which will exceed all current and foreseeable state-of-the-art solutions.

The combined power supply and communication system will enable every newly built or renovated house throughout the EU to face the challenge of the information era, thus raising the quality of life. However, the possible applications are wide reaching, and can be found in offices, scientific laboratories and hospitals. In addition, this product will meet the current legislation efforts at the EU level, triggered by the EU

Mandate M313 on Electromagnetic Compatibility, and will also contribute to the ecological welfare of the environment in reducing "electromagnetic smog", and thus the pollution levels associated with the distribution of energy and communication signals.

- 1 CONSTRUCTION PRODUCTS ASSOCIATION (UK)
- 2 EUROPEAN ASSOCIATION OF ELECTRICAL CONTRACTORS - ASSOCIATION EUROPÉENNE DE L'INSTALLATION ÉLECTRIQUE (BE)
- 3 LOW POWER RADIO ASSOCIATION (BE)
- 4 TSE SPOL. S.R.O (CZ)
- 5 EC SYSTEMS SP. Z O.O. (PL)
- 6 SPIDCOM TECHNOLOGIES (FR)
- 7 MOSAIC VENTURES LTD (UK)
- 8 IPA SA (RO)
- 9 NAVTEL SYSTEMS (FR)
- 10 INNOWACJA POLSKA SP. Z O.O. (PL)
- 11 JUICE TECHNOLOGY LTD (UK)
- 12 CENTRA DE RESERCA I INVESTIGACIO DE CATALUNYA S.A. (ES)



Contract: 30313  
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Total cost: € 2 036 545  
EC Contribution: € 1 150 028

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# GREENERGY

## Energy Optimisation in European Greenhouses

Unlike field agriculture, which bases production costs on hectares, greenhouse costs are calculated on a per square metre of growing area or on a per plant basis. The production costs represent around 78 % of the total chain costs in greenhouses, energy consumption being the main factor affecting those expenses.

It is estimated that greenhouses cover an area of about 41 000 ha in the European Union, setting Europe as the biggest supplier of greenhouse products in the world. At the same time, as Eastern European markets open up, the EU is also becoming the biggest consumer of greenhouse products in the world. However good the situation may seem, the competitiveness of European growers is threatened by the increasingly higher costs of fuel and the competition of external growers producing at low costs. A reduction in the production costs of commodities, will help the European greenhouse producers to retain their position in the European market where internal transportation costs are significantly lower than those of external competitors. The most important aspect of the production that can be improved to reduce costs is energy consumption. Therefore, an optimisation of the energy consuming systems and operating procedures in existing greenhouses will reduce production costs, enabling European greenhouse growers to remain competitive in the European market. On the other hand, reducing the energy consumption in their facilities will help farmers face the increasingly restrictive environmental regulations affecting the sector.

This project intends to investigate the greenhouse energy requirements for different areas in Europe. A tool for auditing energy efficiency in greenhouses, a set of technical improvement measures and a guideline for the optimisation of energy consumption in European greenhouses will be developed and tested in several case studies taking into account current and upcoming European environmental legislation.

- 1 PANHELLENIC CONFEDERATION OF UNIONS OF AGRICULTURAL COOPERATIVES – PASEGES (GR)
- 2 DANSK ERHVERVSGARTNERFORENING (DK)
- 3 HORTICULTURAL DEVELOPMENT COUNCIL (UK)
- 4 KAUPPAPUUTARHALITTO RY (FI)
- 5 MAGYAR ZOELDSEG-GYUEMOELCS SZAKMAKOEZI SZERVEZET ES TERMEKTANACS (HU)
- 6 EESTI AIANDUSLIT (EE)
- 7 CONFEDERAZIONE GENERALE DELL'AGRICOLTURA ITALIANA (IT)
- 8 ASOCIACIÓN DE COSECHEROS EXPORTADORES DE FRUTAS Y HORTALIZAS DE ALMEIDA (ES)
- 9 TOMATO GROWERS' ASSOCIATION LTD (UK)
- 10 HONKASEN PUUTARHA OY (FI)
- 11 GAERTNEREI PAETZ (DE)
- 12 AGROCOMPONENTES S.L. (ES)
- 13 FEC SERVICES LTD (UK)
- 14 GAERTNEREI HANS-JUERGEN SADOWSKI (DE)
- 15 MARTENS TRADGARDSSTIFTELSE (FI)
- 16 BIOAZUL S.L. (ES)
- 17 AGRONIN S.R.L. (RO)
- 18 HEVI-KOLMIO OY (FI)
- 19 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 20 UNIVERSITY OF COPENHAGEN (DK)
- 21 VALTION TEKNILLINEN TUTKIMUSKESKUS (VTT) (FI)
- 22 WAGENINGEN UNIVERSITEIT (NL)
- 23 UNIVERSITATEA POLITEHNICA DIN TIMISOARA (RO)
- 24 EESTI POLLUMAJANDUSUELIKOOL (ESTONIAN AGRICULTURAL UNIVERSITY) (EE)
- 25 UNIVERSIDAD DE ALMERIA (ES)
- 26 UNIVERSITY OF HERTFORDSHIRE (UK)

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# PREWIND

## Development of a Methodology for the Preventive Maintenance of Wind Turbines through the Use of Thermography

202

Collective research

Wind-energy plays an important role, not only as an economic factor and for the environment and climate protection, but also as a safe natural energy source. The European Union has the goal of covering 12 % of its' total electricity demand by renewable energy sources by the year 2010. This means that the already significant wind-energy capacity installed will increase in both onshore and (now also) offshore wind parks, creating a market niche for innovative maintenance applications for wind turbines.

The objective of the project is to develop, through the use of thermography, a certified methodology for the early detection of failures in wind turbines (onshore and offshore). The methodology, however, is not limited to maintenance applications only, thus it can also be applied for quality assurance during the manufacturing of the components or after the transport or mounting of the wind turbines during their installation. The methodology will be certified by a certification body (e.g. Lloyds, BVQI, TÜV, DNV or SGS) so that it can be used by insurance companies, wind-turbine operators, maintenance service providers, etc. as a warranty for quality operation, reducing repair times and costs and therefore increasing productivity.

In a general sense, thermography is a non-destructive method that involves measurements and graphing of isothermal contours on the surface of an object, displaying the effects of temperature differences in its material. Some elements of a wind turbine themselves generate temperature differences during their functioning (generator, brake disc, etc.), and can therefore be easily analysed through thermography. For the other parts (GRP rotor blade, tower, etc.), the suitable heat source will be developed to induce energy into them and thereby characterise defects on a more qualitative basis.

www.prewind.net

- 1 FORDERGESELLSCHAFT WINDENERGIE E.V. (DE)
- 2 ASOCIACIÓN DE PEQUEÑOS PRODUCTORES Y AUTOGENERADORES DE ELECTRICIDAD CON FUENTES DE ENERGÍA RENOVABLES- APPA (ES)
- 3 ASSOCIAÇÃO PORTUGUESA DE PRODUTORES INDEPENDENTES DE ENERGIA ELÉCTRICA DE FONTES RENOVÁVEIS APREN (PT)
- 4 ITALIAN SECTION OF INTERNATIONAL SOLAR ENERGY SOCIETY - ISSES ITALIA (IT)
- 5 IRISH WIND ENERGY ASSOCIATION LTD (IE)
- 6 GALWAY ENERGY AGENCY LTD (IE)
- 7 ALPHATHERM GMBH (DE)
- 8 TEGOPI - INDUSTRIA METALOMECANICA, S.A. (PT)
- 9 REETEC GMBH (DE)
- 10 KRYPTON GMBH (DE)
- 11 ESPACE EOLIEN DEVELOPPEMENT SARL (FR)
- 12 JONICA IMPIANTI SOC. COOP. A.R.L. (IT)
- 13 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 14 AUTOMATION TECHNOLOGY GMBH (DE)
- 15 AMBIQUAL LDA CONSULTORIA EM AMBIENTE E QUALIDADE (PT)
- 16 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)



FP6 Project Catalogue

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Call: FP6-2002-SME-2  
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# PYROL X-TYRE

Remove Scrap Tyres from European Waste Streams To Recycle High-Quality Carbon Black and Recover Energy by Fast and Feedback-Controlled Microwave Pyrolysis

Scrap tyres represent not only a waste problem but also a resource opportunity; both for society and for the large recycling trade community. Annually in Europe, 360 million car tyres enter the waste stream, representing an annual waste load of 2.5 million t, and in 1999, 39 % of all scrap tyres ended up on landfills. Living close to stockpiles represents a danger to life and health, especially due to improper stockpiling and fires, with results in air emissions and increased leaching of chemical compounds. 250 cases of cancer per year and 25 cases of birth defects annually in Europe are linked to living close to stockpiles. In addition, many disease-carrying insects prefer stockpiled tyre environments as their breeding ground, and represent a threat to life and health as well as reduced quality of life.

The Council Directive 96/61/EC concerning integrated pollution prevention and control lays down measures concerning waste designed to prevent and reduce emissions to air, water and land. Directive 2000/52/EC on end-of-life vehicle aims at the prevention of waste from vehicles, primarily through reuse and recycling of materials. Our project will contribute directly to these directives. The objective of Council Directive 1999/31/EC on the landfill of waste is to provide measures, procedures and guidance to prevent or reduce as far as possible the negative effects on the environment. According to the Landfill Directive, landfill of scrap tyres are prohibited by 2003, and by 2006 landfills of shredded rubber will also be prohibited. Our project will therefore directly contribute to the Landfill Directive with respect to achieving recycling and recovery of materials and safeguarding natural resources. The global need for recycling of rubber is compelling. Every year more than 600 million scrap tyres are produced in the USA and Europe alone, amounting to more than 4.2 million t of scrapped rubber material containing a weight percent of 1,5 of substances listed as hazardous waste in the Basel Convention.

The objective of this project is, through innovative and novel use of a microwave technology process, to design a continuous scrap and feedback-controlled tyre recycling process based on an innovative

microwave reactor technology to pyrolyse tyres, to obtain carbon black complying with industrial specifications for different types of carbon black qualities.

The innovations necessary to achieve this are:

1. an innovative and patentable microwave reactor chamber including waveguides and continuous flow-through to enable optimisation of process parameters; and
2. a novel feedback control with an innovative development of sensor technology to adjust parameters to feed of varying rubber qualities with different composition, accordingly.

- 1 NORSK DEKKRETUR AS (NO)
- 2 ASSOCIATION EUROPÉENNE POUR LE RECYCLAGE DES PNEUS (FR)
- 3 SVENSK DACKATERVINNING AB (SE)
- 4 STAVANGER INSTALLSJON AUTOMASJON AS (NO)
- 5 MILTON HOUSE SERVICES LTD (UK)
- 6 WOLFTÉCHNIK FILTERSYSTEME GMBH (DE)
- 7 ZAKŁADY PRZEMYSŁU GUMOWEGO "SANTOCHEMIA" SPÓŁDZIELNIA PRACY (PL)
- 8 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)
- 9 PERA INNOVATION LTD (UK)
- 10 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 11 PER HAAGENSEN AS (NO)
- 12 ECLUTEC BARCELONA S.L.A. (ES)

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# SHERHPA

## Sustainable Heat and Energy Research for Heat Pump Applications

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Collective research

Sustainable energy systems, such as heat-pumping technologies, provide an efficient use of renewable energy from the ambient and of waste heat sources. Typical applications are space heating, domestic hot water, and processes with combined heating and cooling. Doubling the number of heat pumps in Europe by 2010 would increase the annual energy and CO<sub>2</sub>-emission savings to 100 TWh and 40 million t respectively. To achieve such an ambitious target at European level and to support the creation of a strong market impact, in addition to the European Heat Pump Association, EHPA (policy, strategy and marketing) and the European Heat Pump Network, EHPN (dissemination of information, website) a dedicated project towards small to medium-sized enterprises (SMEs) is jointly proposed by GRETH (Heat Equipment Association) and EHPA.

This project deals with the development of heat pumps that are cost-energy efficient and that comply with future environmental regulations. The new environmental regulations concerning greenhouse gases and the protection of the ozone layer will lead to the phasing out of conventional refrigerants. For example, in the EC the "Freon" R22 phase out is scheduled in 2010. Therefore "natural fluids" have to be adopted (hydrocarbons, carbon dioxide or ammonia), but this implies a change in the components' technology and control system. Heat pumps are components that allow energy savings for heating and cooling buildings and for many industrial applications, and concern a very large spectrum of applications — much wider than the existing heat pump market. During the first half of the project, components and subsystems (heat exchangers, controllers, ground coupling system, heat recovery, etc.) will be developed, tested and optimised. Afterward, during the second half of the project, prototypes will be developed and tested in laboratories prior to field tests. In parallel with these research activities, a training programme will be set up. This programme will include technical training and e-learning for engineers.

This project is coordinated by two independent associations (Greth and EHPA), that have complementary activities: the core group comprises

19 SMEs from 11 countries, including participants from the newly associated states; and the research and technological development (RTD) work will be performed by 10 centres of excellence, from 9 EC and associated countries, in the area of heat pumps, energy and control.

- 1 ASSOCIATION GRETH (FR)
- 2 ÖSTERREICHISCHES FORSCHUNGS- UND PRUEFZENTRUM ARSENAL GMBH (AT)
- 3 ENERGIES NATURELS (ES)
- 4 GEOTHERMAL-KOLIKOVSKI & CO. (BG)
- 5 GROENHOLLAND BV (NL)
- 6 NATIONAL UNIVERSITY OF IRELAND - DUBLIN (IE)
- 7 CENTRE TECHNIQUE DES INDUSTRIES AERAIQUES ET THERMIQUES (FR)
- 8 UNIVERSITA DEGLI STUDI DI PADOVA (IT)
- 9 UNIVERSITY OF MANCHESTER INSTITUTE OF SCIENCE AND TECHNOLOGY (UK)
- 10 FACHINFORMATIONSZENTRUM KARLSRUHE GESELLSCHAFT FÜR WISSENSCHAFTLICH-TECHNISCHE INFORMATION MBH (DE)
- 11 NATIONAL TECHNICAL UNIVERSITY "KHARKIV POLYTECHNIC INSTITUTE" (UA)
- 12 UNIVERSIDAD POLITÉCNICA DE VALENCIA (ES)
- 13 FIRTH EXECUTIVE LTD (UK)
- 14 COMMISSARIAT A L' ENERGIE ATOMIQUE (FR)
- 15 KUNGLIGA TEKNISKA HOGSKOLAN (ROYAL INSTITUTE OF TECHNOLOGY) (SE)
- 16 WIEDEMANN POLSKA (PL)
- 17 KENSA ENGINEERING LTD (UK)
- 18 HIBERNATUS (PL)
- 19 HELIOTHERM WAERMEPUMPENTECHNIK GMBH (AT)
- 20 M-TEC MITTERMAYR GMBH (AT)
- 21 NEURA ELECTRONICS TECHNISCHE ANLAGEN GMBH (AT)
- 22 ONDA SPA (IT)
- 23 HIREF SPA (IT)
- 24 AKTSIONERNOE OBSHESTVO SODRUGESTVO - T (UA)
- 25 COMPANIA INDUSTRIAL DE APLICACIONES TERMICAS (ES)
- 26 EVECO BRNO LTD (CZ)
- 27 DELTA AIR PLUS (FR)
- 28 GEOSOLAR V-63 (BG)
- 29 SPIREC (FR)
- 30 THERMIA VAERME AB (SE)
- 31 EUROPEAN HEAT PUMP ASSOCIATION (UK)

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**EC Contribution: € 2 102 709**

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# FP6 Project Catalogue

Environment

# ABIOS

An Innovative Technology, Based on UV Radiation, to Strongly Reduce the Microbial Activity of the Air inside the Store Rooms of the Cultural Heritage Conservation Institutes

208

Co-operative research

An innovative technology, based on UV radiation, will be developed to strongly reduce the microbial activity of the air inside the store rooms of public and private museums, archives and libraries where the cultural heritage collections are conserved. The direct irradiation of objects and the formation of ozone by the UV light respectively will be prevented by the development of proper shielding and catalysts of manganese oxides supported by honeycomb graphite structures. The adoption of the proposed equipment will strongly reduce the biologic activity of the particles suspended in the air and minimise the spread of fungal infections that are responsible for irreversible deterioration of priceless objects and are dangerous for the health of people working in the institutes.

The successful completion of the project will put a new kind of equipment at the disposal of thousands of European museums, archives and libraries. It will minimise the need for traditional fumigation with toxic gases, such as ethylene oxide, that are currently carried out to disinfect the store rooms. The proposed research fulfils the CAFE initiative (Clean Air for Europe) of the Commission, a daughter directive of the Air Quality for Europe Directive that explicitly mentions the need of decreasing any activity related to cultural heritage that would lead to air pollution. The project is also in line with the Community interventions through the 'Culture 2000' Framework Programme and Structural Funds.

- 1 UNIVERSITY OF ROME LA SAPIENZA (IT)
- 2 RGI RESOURCE GROUP INTEGRATOR (IT)
- 3 ADVANCED MECHANICAL AND OPTICAL SYSTEMS (BE)
- 4 MYCOTEAM AS (NO)
- 5 ISTITUTO PER LA PROMOZIONE DELL'INNOVAZIONE TECNOLOGICA (IT)
- 6 NORSK INSTITUTT FOR LUFTFORSKNING (NO)
- 7 THE NATIONAL MUSEUM IN CRACOW (PL)



**Contract:** 32192  
**Call:** FP6-2004-SME-COOP  
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**Total cost:** € 679 000  
**EC Contribution:** € 472 250

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# ADOPBIO

## Advanced Oxidation Processes and Biotreatments for Water Recycling in the Textile Industry

The AdOPBio project aims to develop a decolouring and recycling treatment of the wastewaters in the textile finishing industry, based on two alternative methods: Advance Oxidation Processes (UV-activated photolysis of hydrogen peroxide and thermal activated oxidation process) for the decolouration of the spent bath, combined with a bioflotation process for the destruction of the residual organic load. The combination of these wastewater treatments is expected to achieve a complete decolourisation of the process waters for every type of wet process (finishing, bleaching, dyeing, etc.). The project will also develop and implement process-control software based on artificial neural network and systems dynamics.

Research centres in collaboration with textile finishing companies and suppliers of dyeing machines and wastewater treatment equipment will develop a prototype that will be tested and validated by the end-user companies (textile finishing companies), in order to accumulate experiences and improve the capability of the plant to match a wide range of industrial needs. The project includes all the steps involved in developing a wastewater treatment unit, such as:

- modelling and laboratory investigations of AOP and bioflotation processes;
- design and manufacture of AOP and bioflotation reactors;
- design and manufacture of a dyeing machine, interfaced with both AOP reactors;
- implementation of an ANN-based process control software;
- interfacing the dyeing machine with the bioflotation treatment plant;
- tests of the plant in, and industrial validation of, the decolouring and recycling process.

- 1 HELIOS ITALQUARZT SRL (IT)
- 2 ROBERT BLONDEL SA (FR)
- 3 DAMA ENGINEERING D.O.O. (SI)
- 4 OBEM SPA (IT)
- 5 TOVARNA SUKANCEC IN TRAKOV D D (SI)
- 6 STAZIONE SPERIMENTALE PER LA SETA (IT)
- 7 ECOLOGIA APPLICATA SRL (IT)
- 8 UNIVERZA V MARIBORU, FACULTETA ZA STROJNISTVO (SI)

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EC Contribution: € 388 970

# ADOXPOL

## Advanced Industrial Wastewater Treatment with Ozone Oxidation and Flotation Technique for Maximum Water Reuse

210

Co-operative research

In spite of some success in reducing the pollution of bodies of water with domestic and industrial wastewater, EU countries are still far from the goal of reducing hazardous substances polluting European waters to a value close to zero or the natural background values, notwithstanding the fact that this target has already been set in the WFD (Water Framework Directive) and agreed by the countries bordering on these waters, among others in international marine protection agreements. At the beginning of the millennium, more than 20 % of all surface water in the EU was seriously threatened with pollution, primarily from municipal and industrial discharges (Directive 2000/60/EC). Today, the Union's problem in this regard is even greater considering the state of water quality in the new member countries.

In the IPPC Directive, it is requested that technologies have to be developed for the minimisation of pollution and the development of water recycling. Due to the lack of available effective onsite technologies, however, a bulk of the industrial activities included in the IPPC Directive and the UWWT are not treating their wastewater appropriately, thus falling far short of meeting the directive's objectives. In 2001, 38 % of the total pollution management expenditure by environmental media in EU-15 constituted wastewater management. However, available technologies in wastewater treatment have not been able to redress the pressure on European waters to an acceptable level. To address this problem, improve the quality of life of European citizens and stimulate economic growth, the European Parliament and the Commission have now launched the Environmental Technologies Action Plan (ETAP), where water quality is one of the four fundamental issues. It is also stressed in ETAP that given the increased worldwide demand for and pressure on natural resources, existing technologies are not adequate to safeguard sustainable development in the long term (COM (2004)).

Our idea is to develop an advanced oxidation method by innovative development of ozone flotation technology for treatment of industrial wastewater cost effectively, and to fulfil the need of the European

industry to meet emission standards and apply water recycling. The treatment system addresses the challenges related to sustainability of the European manufacturing industry, the competitiveness of European suppliers of water treatment equipment and issues of water resource management.

To achieve these objectives, we need to develop a novel ozone injection unit which maximizes the oxidation process with minimal amounts of ozone, especially for oxidation of recalcitrant substances and development of a flotation chamber that enhances optimal diffusion of micro-bubbles, coalescence of colloidal materials and efficient removal of the agglomeration of coagulating froth and adsorbed pollutants.

To create this technological capability, new knowledge will be acquired and applied to specific development routes related to the acquisition of a deeper scientific understanding of the physical, chemical and biological properties of representative pollutants, the kinetics of ozonation, formation of froth under ozonation which stimulates coagulation and pollutant separation by gas bubbles, as well as the impact of bubble size on the effect of pollutant separation. In addition, we need to develop a real time Process Control Unit (PCU) to monitor and control the flow rate and water quality parameters with the help of waterproof and state-of-the-art sensors

www.adoxpol.com

- 1 NORMEX AS (NO)
- 2 STATIFLO INTERNATIONAL LTD (UK)
- 3 ASIO SPOL. S R.O. (CZ)
- 4 STOGDA SHIP DESIGN & ENGINEERING SP Z.O.O. (PL)
- 5 HYDRO-ECO-INVEST SP. Z.O.O. (PL)
- 6 SALSNES FILTER AS (NO)
- 7 NAPRO PHARMA (NO)
- 8 TEKNOLOGISK INSTITUTT AS (NO)
- 9 PERA INNOVATION LTD (UK)
- 10 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

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**EC Contribution: € 781 371**

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# AEROSOL REDUCTION

## New Hygienic Cleaning Technique for Food Production, Reducing Aerosol Problems and Water Consumption

Worldwide, the food, pharmaceutical, and agricultural industries use high-pressure water cleaning to get rid of contamination, micro-organisms and bacteria. Enormous amounts of water and energy are used every day for different cleaning purposes. Still, many people get seriously ill or poisoned every year, due to hygienic problems and contamination. Investigations show that a huge problem is the contamination of already cleaned equipment. This contamination is a result of aerosols, spread all around the plant.

The major route of food contamination during production is by air. Micro-organisms are normally transmitted through the air incorporated in particles and water droplets (aerosols), which is a result of cleaning actions. Aerosols are fine, moisture droplets. Aerosols can be generated from cleaning operations. This type of contamination may be a potential source of Listeria.

The wish from authorities in the EU and other parts of the world is to guarantee or safeguard the cleaning process — to avoid contamination and to reduce the water consumption.

The overall objective is to develop a vacuum-based cleaning system as a replacement for today's water-wasting system. The objectives are to avoid harmful contamination and to reduce total water consumption by about 40 %.

This research and technological development (RTD) project will concentrate on:

- solving the technical problems in the vacuum-based cleaning system;
- how to measure and collect the aerosols and reduce the spreading.

The result will be a new cleaning system for the food and pharmaceutical industries. The small to medium-sized enterprise (SME) proposers will exploit the results by selling the system in north Europe and the UK. SMEs in other countries will be able to

buy production and sales licences. Exploitation and dissemination of the results will start in 2006. The market for this new cleaning system is very large, and through this RTD project the competitiveness of the SME proposers will be much improved.

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Co-operative research

- 1 LAGAFORS FABRIKS AB (SE)
- 2 STIFTELSEN CHALMERS INDUSTRITEKNIK (SE)
- 3 INSTITUTTET FOR PRODUKTUDVIKLING (DK)
- 4 INNOVATIONTEAM AB (SE)
- 5 PROCORDIA FOOD AB (SE)
- 6 FAITECH OY (FI)
- 7 HYGIENOTEKNIKK A/S (NO)
- 8 VALD NIELSEN MASKINFABRIK AS (DK)
- 9 NORWEGIAN FOOD RESEARCH INSTITUTE (NO)

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**EC Contribution: € 454 000**

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Environment

# BEN-DET

## Improved Air Pollution and Worker-Exposure Monitoring and Control through the Development of a Near-Real-Time Benzene-Specific Gas Analysis and Measurement Instrument

212

Co-operative research

Over 10 000 European citizens are killed or poisoned by benzene emissions every year in the workplace alone. Control of benzene emissions depends upon accurate detection and recording of emission levels. This is currently undertaken using the pumped sampling method on a sorbent cartridge, followed by gas chromatographic determination that is currently being standardised by CEN. The problem with this method is that the sorbent cartridge samples have to be collected and transported to a laboratory for analysis by gas chromatography (GC), usually in conjunction with mass spectrometry (GC/MS). This time-consuming process runs the risk of sample degradation, only provides a snapshot in time, has a long time-delay between sample collection and availability of results and is extremely costly.

Our innovative concept or solution aims to tackle these problems by developing a hand-held, benzene-specific integrated measurement instrument, based on a state-of-the-art PID detector, in combination with novel or innovative inert polymer-based micro, pre-concentrator and GC column. The micro GC column will be capable of selection and separation of benzene from other similar species hydrocarbons. The system will also include an intrinsically safe GPS tracking and telecommunications module that can automatically record and encrypt (for data authenticity and integrity) the exact latitude and longitude of the sampling location using assisted GPS, along with the required pneumatic and electrical or electronic circuitry and an intrinsically safe rechargeable battery power source.

The economic objectives of this work are to create a market worth EUR 578 million in Europe for chromatography and gas sensors, and a global market of EUR 1.4 billion. This will also create in excess of 600 jobs for European citizens.

- 1 ION SCIENCE LTD (UK)
- 2 SARANTEL LTD (UK)
- 3 VIPEM HACKERT GMBH (DE)
- 4 SHELL INTERNATIONAL BV (NL)
- 5 SRA INSTRUMENTS (FR)
- 6 BRAUN FORMENBAU GMBH (DE)
- 7 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 8 PERA INNOVATION LTD (UK)



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**EC Contribution:** € 773 947

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# CHEM-FREE

## Development of a Chemical-Free Water Treatment System through Integrating Fibre Filters, Ultrasound and UV-C

The CHEM-FREE project proposes development of a process control instrument to integrate and optimise three well-known physical water treatment devices: fibre filter, ultrasound and UV-C. Both lab-scale and pilot-scale research and validation will be performed to combine, arrange and steer the efficiency of the physical and biological processes. The resulting integrated technology must combine the economic and ecological advantages of all the individual devices to achieve targeted application in specific water qualities without the use of chemicals.

Lab-scale experiments regarding microbiological decontamination and removal of algae will result in better understanding of the principal removal mechanisms to decrease the microbiological contamination for the applications, using the individual devices and their combinations to determine the optimal operational parameters. The applied experiments include different raw water qualities and requirements for the treated water. Four types of field-scale applications will be investigated within the project: closed-loop water systems, crop irrigation, fish farming and groundwater recharge. The legal regulations, technical standards, market and operational requirements of the potential uses will be analysed for integration into the prototype development process.

The main output of the CHEM-FREE project will be a prototype and technical specification as a basis for patent registration for a process control instrument allowing integration and optimisation of the three devices as an integral unit. The optimal integration and control of fibre filters, ultrasound devices, and UV-C sets will result in chemical-free water treatment ecologically enabling prevention of algae, prevention of biofilm growth on walls, in pipelines, on fittings and in containers and completely new solutions for sensitive water treatment systems where chemicals are an unsatisfying solution, like drinking-water production from surface waters, groundwater recharge, etc.

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- 2 UNIVERSITY OF PORTSMOUTH HIGHER EDUCATION CORPORATION (UK)
- 3 UNIVERSITÀ DEGLI STUDI DI CATANIA (IT)
- 4 TECHNISCHES BÜRO HAUER UMWELTWIRTSCHAFT GMBH (AT)
- 5 LG SOUND (NL)
- 6 DREMA WATERBEHANDELING BV (NL)
- 7 LIMNOS - COMPANY FOR APPLIED ECOLOGY (SI)
- 8 SAINT GOBAIN ISOVER G+H AG (DE)

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# CRIOSINTER

## Development of an Innovative Recycling Process Based in Cryogenic and Water-Jet Grinding and Sintering Techniques for Extending the Use of Recycled Rubber in the Development of High-Quality Products

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Co-operative research

Nowadays, an enormous quantity of used tyres are landfilled, and this is one of the main environmental problems worldwide. Estimates are that 250 million used tyres are accumulated each year in the countries of the EU-15. This could supply 45 % of European virgin rubber uptake. Only 24 % of used tyres is recycled, mostly in low-demanding, low-price products that yield low economical profit, stopping research and development (R&D) investment (most of the companies along the recycled rubber supply chain are small to medium-sized enterprises (SMEs)). Consequently, the main use of tyres is as fuel substituting one environmental problem for another, due to emissions.

In this sense, several efforts have been made in finding new high-demanding applications for recycled rubber, but with low success. This is mainly due to the approach followed. Attempts have aimed at mass low-demanding applications as asphalt infill, instead of trying to solve the main barriers for the application of rubber in high-demanding products: lower mechanical properties and an inferior market perception of recycled rubber.

The main goal of this project is to develop an innovative recycling process for producing recycled raw rubber with high enough quality to compete with virgin rubber in high demanding products. It will be achieved by integrating emerging grinding technologies, new transformation processes and new materials design technologies. Emotional engineering techniques will be also used to improve customer perception of recycled products. Products considered in the project are shoes, floorings and automotive applications. The following partial goals are scheduled:

- optimisation of cryogenic and water-jet grinding technology, by developing a grain morphology control system;
- development of procedures for optimising pressure-temperature sintering;

- development of a use-oriented material design methodology, allowing translation of product requirements into product properties;
- identification of emotional requirements to be translated into recycled products;
- integration of above results in a process for producing high added value products from scrap tyres.

www.criosinter-project.net

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- 5 REP INTERNATIONAL (FR)
- 6 ADRIATICA RICICLAGGIO E AMBIENTE (IT)
- 7 ANALCO AUXILIAR CALZADO S.A. (ES)
- 8 ALFREDO MESALLES S.A (ES)
- 9 RECIPNEU - EMPRESA NACIONAL DE RECICLAGEM DE PNEUS LDA (PT)
- 11 CAUCHO INDUSTRIAL VERDU S.L. (ES)
- 12 GEYER & HOSAJA ZAKŁADY GUMOWE W MIELCU SP. Z.O.O. (PL)
- 13 ASSOCIATION EUROPÉENNE POUR LE RECYCLAGE DES PNEUS (FR)



FP6 Project Catalogue

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# ECOSAM

## The Development of a Novel Hexavalent Chrome-Free Environmentally Sustainable Pre-Treatment for Plastic Surfaces Using Molecular Self-Assembly Nano-Technology.

The main objective of the proposed project is to develop a novel surface pre-treatment method for chrome plating on a broad range of plastics. The majority of industries worldwide use a hexavalent chrome-based pre-treatment. Its major disadvantage is that hexavalent chromium (Cr(VI)) is carcinogenic.

Therefore, the chrome plating industry is coming under increasing pressure from EU environmental, health and safety legislations, and many companies are facing a bleak future unless sustainable cost-effective solutions are discovered.

The project aims to develop a new process based on a molecular self-assembly technology (SAM) developed at laboratory level in Spain, in the manufacture of organic sensors, that eliminates the need for chemical etching and electroless nickel plating, and which provides a stable and secure surface suitable for subsequent chrome plating operations.

In line with the general objectives of the EU and the Sixth Framework Programme (FP6), this will achieve the following specific objectives:

- eliminate carcinogenic chromic acid from the pre-treatment process;
- decrease processing time and the number of plating/rinsing tanks;
- offer greater product flexibility, as the process will not be limited to a single polymer such as acrylonitrile-butadiene-styrene (ABS);
- reduce waste water and chemicals due to fewer process steps;
- reduce the cost of the plating process due to elimination of the expensive palladium catalyst and electroless nickel coating operations;
- increase process stability compared to classical wet chemical metallisation;

- maintain performance whilst lowering the cost of the chrome plating process.

The anticipated outcome of the project will be an optimised process for electroplating on plastic materials, that is both more economical and environmentally friendly compared to the conventional plating process.

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- 2 AVANZARE INNOVACIÓN TECNOLÓGICA (ES)
- 3 FAPERIN S.L. (ES)
- 4 CHORRO Y VERDU, S.L. (ES)
- 5 DMS PLASTICS LTD (UK)
- 6 INNOPLATE INTERNATIONAL B.V. (NL)
- 7 AUTOMET (PL)
- 8 QUALITY PLATED PLASTICS LTD (UK)
- 9 PR EUROCHEM LTD (IE)
- 10 KOHLER MIRA LTD (UK)
- 11 ASOCIACIÓN DE INVESTIGACIÓN DE MATERIALES PLÁSTICOS (ES)
- 12 INTER QUIMICA RIOJA (ES)

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# ECO-SOIL

## Innovative Process for the On-Site Decontamination of Soils

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Co-operative research

Today, there are many sites, worldwide, with heavy ground contamination from harmful substances, such as chlorinated hydrocarbons, heavy metals, PCB, etc. The current method generally used to address land pollutants is to excavate and remove the polluted land, which is then treated or transported to a landfill at another location. As a rule, these are costly methods that result in a heavy environmental load, due to long transport distances, among other factors. Furthermore, in many cases excavation is not an option owing to financial reasons. Thus the development of new technologies for the removal of poisons from the soil has become a priority.

The soil remediation technology to be developed and applied here focuses on local or point source contaminations originating from clearly defined sources, and is called the ECO-SOIL® Method. The ECO-SOIL® Method is an innovative, simple and economical technology for the on-site, *in situ* removal of all kinds of hazardous substances occurring as contaminants in soils as the result of local point source and/or diffuse contamination by adsorption mechanisms. The method is also appropriate for preventive applications for local and/or diffuse contamination from the soil through adsorption mechanisms. The ECO-SOIL® method consists of the insertion of several chords connecting a multitude of sockets inside the same number of parallel horizontal holes drilled in the ground.

The sockets serve as holders for appropriated biosorbents that absorb the contaminant material. After a period of time sufficient to attain the desired decontamination effect, the system is removed and the sorbent regenerated for further application.

The ECO-SOIL project intends to develop this patented system for its practical and commercial application in different types of contaminated soils, especially targeting cases where ground treatment has to take place under existing buildings and infrastructure which cannot be removed (e.g. petrol stations, airports, buildings etc.). The present project will promote the application of this new method for a wide range of

contaminated soils by adapting it to different types of ground, and by testing the performance of different sorbent materials in order to establish selective systems for each kind of contaminant.

- 1 VEREINS ZUR FOERDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 2 POLITECHNIKA WARSZAWSKA (PL)
- 3 LINKÖPINGS UNIVERSITET (SE)
- 4 ENVIROTREAT TECHNOLOGIES LTD (UK)
- 5 LANNEN ALITUSPALVELU OY (FI)
- 6 STADSPARTNER AB (SE)
- 7 HYDROGEOTECHNIKA SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA (PL)
- 8 GLOBE WATER AB (SE)
- 9 ARGUS UMWELTBIOTECHNOLOGIE GMBH (DE)
- 10 STYRUD INGENJORSFIRMA AB (SE)

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# EXTEND

## EXTENDING the Operational Lives of Water-Soluble Metalworking Fluids without the Need for Toxic Biocides and Chemicals

At Shearline, we have been experiencing increasing economic pressure in our metal-machining business, resulting from Far East low-labour rate competition. Further pressures have arisen from essential EC Directives, resulting in tightening of legislation concerning toxic components used in our metalworking fluids (MWFs) and tightening restrictions regarding their disposal. MWFs are an integral part of our business; they serve to cool and lubricate the machined parts. It has been calculated that 16 % of machining costs are attributed to the lubricant. As a result of these pressures, the population of metal-machining companies, currently consisting of 225 000 small to medium-sized enterprises (SMEs) in the EU, has been declining by a steady rate of 5 %, year on year.

We will create new cutting-edge technology to extend the lives of MWFs, doubling it (from typically 12 months to 24 months) without the need for these toxic chemicals. We will therefore significantly reduce the manufacturing costs associated with MWF use from 16 % to a target 8 %. This will be achieved through the development of new pulsed electric field (PEF) technology to control the diverse microbial culture found in MWFs, which are primarily responsible for reducing the lubricant operational life, and an ultrasonic system to effectively homogenise the MWF emulsion and thus increase the stability of the MWF. EXTEND will provide a direct benefit to the European metal machining sector, increase competitiveness, preserve machinists' jobs, and ease the path to comply with recent and imminent environmental and health and safety EC Directives. Even with a conservative market penetration, EXTEND has the potential to generate exports of EUR 6.65 million each year. In addition, we envisage new market opportunities for EXTEND to include waste-water treatment, swimming pool water and pharmaceutical preparations, etc.

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- 2 PLASMAAIR AG (DE)
- 3 NRS TECHNOLOGIES AB (SE)
- 4 MICROOMEGA SP. Z.O.O. (PL)
- 5 NOTECH AS (NO)
- 6 CLF TECHNOLOGIES LTD (UK)
- 7 POLARTECH LTD (UK)
- 8 PERA INNOVATION LTD (UK)
- 9 FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E. V. (DE)
- 10 TEKNOLOGISK INSTITUTT AS (NO)
- 11 NEW METALS & CHEMICALS LTD (UK)
- 12 BLASER SWISSLUBE AG (CH)

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# Green Concrete

Development of Gravel Turf Consisting of Recycled Construction Materials as an Economical and Ecological Method for Permeable and Absorptive Surface Consolidation Most Suitable for Parking Areas

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Co-operative research

The consortium of the Green Concrete project consists of nine small to medium-sized enterprises (SMEs) and three research and technological development (RTD) performers from three different EU Member States and the association of the Austrian construction material recycling sector.

The main objective of the Green Concrete project is to obtain extensive knowledge of gravel turf, consisting of recycled construction materials or natural gravel from quarries, as a new permeable and planted method for surface consolidation of parking and low traffic areas. Gravel turf is a biosphere, allows natural water circulation, infiltration and evaporation, and preserves natural soil functions as buffering of harmful substances. It improves the microclimate and thus the quality of life in urban areas. By absorbing precipitation, gravel turf relieves the burden on the sewage system, prevents flood damage and fosters the renewal of groundwater in urban areas. Therefore gravel turf contributes to the main objectives of the EU. Extensive investigations — going beyond the state of the art — will be carried out to prove the suitability of gravel turf as a cost-saving and ecological alternative to the common practice of sealing surfaces by means of asphalt or concrete. For the first time ever, recycled construction materials will be tested for their suitability for usage as gravel turf; all relevant and often interacting properties of gravel turf will be ascertained in the Green Concrete project, e.g. material combination, layer construction, load-bearing capacity, structural stability, evenness, infiltration rate, water permeability, water absorption capacity, seeping water properties, applicability and suitability of plants and microclimatic effects.

The outcome of the Green Concrete project is the product gravel turf: a scientifically save, sound and mature technology for surface consolidation of parking and low traffic areas. The product gravel turf opens a new market for participating SMEs and thus strengthens their competitiveness.

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- 2 FACHHOCHSCHULE ERFURT (UNIVERSITY OF APPLIED SCIENCES) (DE)
- 3 BAYERISCHE LANDESANSTALT FÜR WEINBAU UND GARTENBAU (DE)
- 4 ÖKOTECHNA ENTSORGUNGS- UND UMWELTECHNIK GESMBH (AT)
- 5 BÖHM TRANSPORTE GES.M.B.H (AT)
- 6 HOLLITZER BAUSTOFFWERKE BETRIEBS GMBH (AT)
- 7 MARX AG (IT)
- 8 DAL FARRA I. & G. GMBH (IT)
- 9 BALTHASAR HÖHN BAUUNTERNEHMUNG GMBH & CO. KG (DE)
- 10 KALKWERK HERBSLEBEN ERDENWERK GMBH (DE)
- 11 WÜRZBURGER KOMPOSTIERUNGS GMBH (DE)
- 12 ÖSTERREICHISCHER BAUSTOFF RECYCLING VERBAND (AT)

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# IMPACT-USS

## Innovative Manufacturing Process for Added-Value Car Tyre Re-Use into Safer Surfaces

At present there are 200 000 small building contractors throughout Europe who provide traditional hard surfaces in specific applications such as playgrounds, pathways, areas of gardens, public parks. The material in old tyres has for some time been used to produce impact-absorbing surfaces in sports and playground applications, but its use requires chemicals to be mixed on-site. These chemicals are potentially dangerous, and so special handling procedures have to be employed; what's more, the mixing ratios are difficult to control in such situations, leading to variability of the final surface and lack of control over the cost of the surface. With the chemicals typically costing ten times as much as the rubber crumb, this can have a devastating effect on the competitiveness of the contractor, hence this work is only carried out by a small number of specialist contractors, effectively excluding the larger community of small building contractors. As a consequence, these specialist surfaces are only used in very high-risk applications.

Every year, 22 000 European citizens are killed as a result of slips, trips and falls outside the home. At the same time, there is an increasing problem of the disposal of used car and other vehicle tyres, and by the end of 2006 it will be illegal to landfill even shredded tyres. There are therefore three unmet needs to be addressed: the need for a more application-friendly impact-absorbing surface which all contractors in the trade can handle; the need for more widely available, less expensive impact-absorbing surfaces; and the need to find a use for worn-out tyres.

This project proposes to develop a system for producing a surfacing material from recycled rubber tyre crumb, using water-curable polyurethane chemistry, in a format that can be sold to and used by general contractors. Controlled particle-size distribution and weak cross-linking of the pre-polymerised PU will ensure that the material is self-levelling and packing, so that no specialised techniques are required to lay the material. The development will include a knowledge-based expert system for modelling the performance of the surface

relative to the particle size distribution, so that different grades of product can be made to meet a range of application requirements. This will allow the manufacturers to offer differentiated products to contractors in different market segments, allowing added value to be maximised.

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- 2 MINOR INDUSTRIPLAST AS (NO)
- 3 2 K MASCHINENBAU GMBH (DE)
- 4 PIKEHAVEN LTD (UK)
- 5 IMS SUPPLIES LTD (UK)
- 6 INDUSTRIAL COPOLYMERS LTD (UK)
- 7 PROTECTIVE PACKAGING LTD (UK)
- 8 PERA INNOVATION LTD (UK)
- 9 THE NATIONAL INSTITUTE OF TECHNOLOGY (TEKNOLOGISK INSTITUTT) (NO)

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Due to the likely toughening of environmental legislation in the near future, many of the currently operating wastewater treatment systems will no longer be acceptable, and will have to significantly increase their efficiency. The Directive 2000/60/EC, establishing a framework for Community action in the field of water policy, says that Member States shall establish maximum annual averages for the release of certain pollutants, such as substances that have an unfavourable influence on oxygen balance. Stricter regulations can be found for especially sensitive areas, for areas of abstraction of drinking water or for bathing waters.

The problem of meeting existing and forecasted more stringent new regulations affects especially small communities, hotels, campsites, etc. in more or less isolated or remote areas, and without access to sophisticated centralised wastewater treatment plants. Moreover, in the case of tourist resorts, it is not unusual that the wastewater load is increased up to five times during holiday season, making it impossible for local treatment systems to maintain an acceptable organic removal. On the other hand, these tourist locations frequently require a very high water quality (including microbiological quality) in order to keep or increase the rate of visitors (especially in mountain lakes, coastal areas, etc.).

The aim of the present project IWAPIL is to develop and test an innovative a membrane bioreactor (MBR) intended for use in remote communities, mountain hotels, campsites, etc. The new system will be based on a newly developed membrane and membrane module and will allow us to overcome most of the problems that nowadays make MBRs impracticable for decentralised uses, where no skilled operators can be present. The innovative characteristics of the new membrane and membrane module mentioned above will make it possible to achieve a low-maintenance and extremely efficient wastewater system whose effluent can be even reused, either for irrigation or toilet flushing purposes, as it is totally germ free.

- 1 PURON AG (DE)
- 2 TRIQUA B.V. (NL)
- 3 ZUELLIG (DEUTSCHLAND) GMBH (DE)
- 4 RESTAURANTE LAS LOMAS (ES)
- 5 FORNELLA S.A.S DI CAVAZZA LIVIA EC. (IT)
- 6 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 7 RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN (DE)
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- 9 BIOAZUL S.L. (ES)



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# L-FIRE

## Long-Fibre REcycling, from optical cables, lines and ropes

Recycling of waste materials “stands or falls” with the economics of the process. This implies that there always will be competition for the best sources of secondary material and for the best applications with the highest added value. This L-FIRE project brings the solution for processing high-value long-fibre materials in a “fit-for-purpose” way, which means that they keep their economical value. L-FIRE combines waste streams of long fibres and a new economically feasible recycling technology is born.

For the small to medium-sized enterprise (SME) cable-recycling companies it will be possible to recover the long fibres from optical-fibre cables, and combine them with other waste streams of recycled long fibres. This will bring lots of benefits for the participating SME companies, like enhanced market positions by company innovations (this is an urgent matter, because of the decrease in the amount of existing cable recycling), higher prices for the recycle materials (a possible profit of  $2.40 - 0.14 = 2.26$  EUR/kg for optical fibre cables which are now incinerated), avoiding incineration costs (350 EUR/t) and an increase of job opportunities (over 5 000 jobs in Europe).

Long fibres (glass, aramid, polyester) are a source of material that is not yet recycled separately while the value of long fibres is a tenfold of that for pulp fibres. The collection scheme of materials (end-of-life and production waste) accounts for a large part of the total recycling cost. To set up separate collection schemes is difficult and usually not economically attractive.

Optical cables contain long fibres (glass and aramid or polyester); the logistics for electricity cables exist and can easily be used for optical cables (optical fibre cables weigh in at 310 000 million t each year and this is still increasing). Other relatively easily accessible sources for long fibres are climbing ropes (aramid), industrial fishing nets (polyamide 6.0), offshore lines (polyester, PA 6.6/6.0/4.6, PE (dymena), aramid), sails from competition sailboats, wind and kite surfing (aramid, dynema, sometimes polyester and polyamide). More complicated

sources are reinforced hoses (polyester, aramid, glass) conveyer belts (polyamide 6.6) and safety gear like bulletproof vests, helmets and industrial gloves (aramid, dynema).

The proposed project L-FIRE (Long Fibre REcycling) will develop a technological and economical attractive recycling process for optical communication cables, combined with lines and ropes. Once the process is running, different sources of long fibres can be incorporated. Using a new approach in cable and line recycling (reversed processing), the cables and lines will be selectively decomposed into their original raw materials. The recycle will be obtained in such a shape and size (fit-for-purpose size reduction) that it will be a valuable resource for new products.

The demand for optical fibre cables is continuously growing. Currently the end-of-life amount of cable waste is 310 000 t each year and estimates show that this amount will increase to about 450 000 t to 500 000 t each year in 10 years. On the contrary, the amount of electrical cables is drastically decreasing, mainly due to the liberalisation of the market (E-distribution companies leave the old cables in the ground, low investment and export to China). To survive, cable recycling companies therefore need new business. To benefit for 100 % of the economic value present in waste material, a “fit-for-purpose” size-reduction step is necessary. In electrical cable recycling, the optimal size reduction is about 4 mm (state-of-the-art technology).

By using this old type of recycling process for optical fibre cables, the recycling potential will be destroyed because the long fibres in the optical fibre cable lose their value. The long fibres and the plastics resulting from the recycling process will be used in non-woven applications instead of pulp applications. This makes the recycling process economically feasible and solves the environmental problem of burning or landfilling.



L-FIRE focuses on seven innovative developments, aimed at removing the current blockades for optical fibre cable and long fibre recycling:

- shear-force-based pre-size reduction (targeted throughput: 1.5 t/hr);
- reversed processing technique;
- gel liberation technique for fibre recycling;
- development of Resonance Disintegration technology for optical fibre cables;
- tribo-electric separation for plastic-glass and plastic-plastic fraction;
- re-use of recycled long fibres in non-woven applications and recovery of germanium;
- development of a quality system.

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- 2 OPTRAL (ES)
- 3 HAMOS GMBH, RECYCLING - UND SEPARATIONSTECHNIK (DE)
- 4 INDUSTRIAS DE CONDUTORES ELECTRICOS E TELEFONICOS - F. CUNHA BARROS S.A. (PT)
- 5 RECIPOR - RECUPERAÇÃO E VALORIZAÇÃO DE RESÍDUOS, S.A. (PT)
- 6 EURO METAL RECYCLING S.L. (ES)
- 7 TELJIN TWARON GMBH (NL)
- 8 MILIEU VISIE EUROPA B.V. (NL)
- 9 GAIKER (ES)



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# MESH

## Integrated Wastewater Treatment Process Using Mesh Filter Modules for Direct Activated Sludge Separation

The challenges of removing contaminations from wastewater with maximum reliability and efficiency by using wastewater treatment processes, plants and systems are growing, offering good opportunities for new and advanced technologies. One such innovative wastewater treatment system is the membrane bioreactor, an activated sludge process, where the secondary settling tank is substituted by a membrane filtration unit.

The main advantages are high sludge concentrations and an excellent effluent quality. The driving force for the application of membrane bioreactors is a small area requirement combined with effluent disinfection. Membrane bioreactors become a highly attractive system where stringent standards have to be met, e.g. for discharge in bathing water or for water reuse. However, membrane bioreactors still need further improvement for a wider spread application. The main hindrances are:

- high investments for membrane modules and high costs for membrane replacement;
- high operation costs due to increased energy demand.

The innovation of this project lies in overcoming these drawbacks by the substitution of membranes by a cheaper filtration technique, offering higher flux rates at lower filter pressures. As activated sludge appears in form of flocs, a coarser filter material can be used to separate activated sludge from treated wastewater. The retention of sludge flocs leads to the formation of a secondary layer on the mesh surface, which serves as the actual filter membrane. By this means, even smaller particles than suggested by the mesh size are retained. Because of its high pore size, the filter mesh resembles almost no filter resistance. Another principal problem of membranes is fouling. Persistent deposits can only be removed by intensive periodical cleaning with chemical agents. In the MESH system, the secondary layer is periodically removed and a fresh layer is built up.

Thus, the problem of fouling can be largely avoided and less frequent and intensive cleaning is necessary.

The expected advantages can be summarised as follows:

- cheap filter material
- high flux rates
- low filter resistance and hence trans-filter pressure
- low cleaning effort.

In summary, this results in high effluent quality and plant reliability at low investments and low operational costs.

- 1 UNIVERSITY OF NATURAL RESOURCES AND APPLIED LIFE SCIENCES - VIENNA, DEPARTMENT IFA-TULLN (AT)
- 2 MEMOS MEMBRANES MODULES SYSTEMS GMBH (DE)
- 3 ENVICARE ENGINEERING GMBH (AT)
- 4 GLOGAR UMWELTECHNIK GES.M.B.H. (AT)
- 5 SIDER ARC SPA (IT)
- 6 AQUAPLUS CZ (CZ)
- 7 SAATI S.P.A. (IT)
- 8 UNIVERSITY OF MILANO-BICOCCA, CENTRO DI ECCELLENZA PLASMA PROMETEO (IT)
- 9 INSTITUTE OF CHEMICAL TECHNOLOGY, PRAGUE (CZ)

**Contract: 33049**  
**Call: FP6-2004-SME-COOP**  
**Starting Date: 01/07/2006**  
**Duration (months): 27**  
**Total cost: € 1 397 950**  
**EC Contribution: € 999 850**

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# MICRODIS

## Soil Disinfestation Microwave System as an Alternative to Methyl Bromide

224

Co-operative research

The aim of the proposed project is to investigate, develop and validate a new efficient fumigation system based on electromagnetic radiation, at a range of between 950 MHz and 2450 MHz. Trials carried out to date have proven to be effective in terms of fumigation; however, they have proven to be insufficient in terms of energetic performance.

In order to ensure the system is viable in terms of energy efficiency, this project proposes the use of conventional agricultural machinery for soil removal and the exposure of this soil to EMF radiation within an enclosed resonant cavity. In this way, the energy required to ensure effective fumigation of the soil will be greatly reduced, and soil will also be left prepared for immediate cultivation. Given that this technology must be effective under current production conditions, this project will develop, test, and validate an industrial prototype, under a diverse sample of European growing conditions for strawberries and perennial crops. Although methyl bromide is used to some extent on more than 100 crops, nearly 80 percent of pre-plant methyl bromide soil fumigation goes to strawberries, tomatoes, peppers, and ornamentals and nursery crops, and this project will carry out extensive field trials on an extensive number of crops, as well as strawberries, tomatoes and peppers.

<http://microdis.cric-projects.com>

- 1 CENTRE DE RECERCA I INVESTIGACIO DE CATALUNYA S.A. (ES)
- 2 MONTAJES KIUP S.A. (ES)
- 3 J.C.B. ELECTROMECHANICA S.L. (ES)
- 4 AGRIFUTUR (IT)
- 5 SAIREM SOCIETE POUR L'APPLICATION INDUSTRIELLE DE LA RECHERCHE EN ELECTRONIQUE ET MICRO ONDES (FR)
- 6 ERKUS VE ORT.TARIM.LTD STI. (TR)
- 7 UYGUN TARIM AMBALAJ VE SERA MAL., DANISMANLIK LTD STI (TR)
- 8 CORNELIUS TRAAS (IE)
- 9 CYCLONE FRANCE (FR)
- 10 CAMPOSOL II, LTDA (PT)
- 11 PERA INNOVATION LTD (UK)
- 12 UNIVERSITY OF CUKUROVA (TR)
- 13 FELTALALOI ES KUTATO KOZPONT SZOLGALTATO KFT (HU)



FP6 Project Catalogue

**Contract:** 508465  
**Call:** FP6-2002-SME-1  
**Starting Date:** 01/11/2004  
**Duration (months):** 26  
**Total cost:** € 1 569 814  
**EC Contribution:** € 880 472

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# MOULDARRAY

## Novel DNA-Array for the Rapid Detection of Microbes in Sick Buildings

There is considerable public concern regarding harmful microbes in indoor air and human health. Microbial growth in damp homes, schools, children's daycare centres, offices and hospitals poses a severe hygienic problem and is a potential health risk. Chronic exposure to fungi (moulds) and actinobacteria by dispersal of antigens and toxins in indoor air may lead to a decrease in worker health and productivity. Severe intoxication has been reported, and even the possibility of fatal infection is not excluded. The closing of public "sick buildings" for reparation may also be complicated and expensive for the community, if not done in time.

The first steps in microbial colonisation of waters and building materials are done by fungi (moulds), which are the major agents of human allergy, followed by filamentous actinobacteria, some of which are toxic. Considerably less is known about the occurrence and effect of environmental mycobacteria, a group of actinobacteria, but they are also considered to be a health hazard, especially for immunocompromised people. However, there is no simple, reliable and rapid method which small to medium-sized enterprises (SMEs) could use for detection of these microorganisms.

The sampling and analysis methods currently available are time- and high-expertise-consuming, and the diagnoses based on those methods have given rise to confusion and misconception.

The aim of this project is to identify the harmful filamentous fungi (moulds) and actinobacteria present in water and wet buildings and to develop a rapid and simple-to-use molecular detection tool — a mould-array kit — for their detection. Furthermore, the mould-array kit developed will assist to certify the safe use of mould-damaged buildings after repair. The knowledge gained during this project and the technology developed will also improve the knowledge on the role of microbes in "sick building syndrome".

- 1 MOBIAIR DIAGNOSTICS OY (FI)
- 2 HEALTHY OFFICE FUGENEX LTD (UK)
- 3 ANOZONA AB (SE)
- 4 MICRO CLEAN LTD (DK)
- 5 KONINKLIJKE NEDERLANDSE AKADEMIE VAN WETENSCHAPPEN (NL)
- 6 VALTION TEKNILLINEN TUTKIMUSKESKUS (VTT) (FI)

**Contract: 17626**  
**Call: FP6-2003-SME-1**  
**Starting Date: 01/01/2006**  
**Duration (months): 24**  
**Total cost: € 1 051 544**  
**EC Contribution: € 544 701**

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The technical objectives of the project are to: develop a new sustainable technology for nutrient recovery and recycling from anaerobic digesters, which concurrently enhance the anaerobic digestion process. It also aims at the maximum valorisation of all residuals and to convert them into a marketable product, with standard quality specifications. It will develop, combine, scale up and test the different components and techniques of the processes to obtain a totally integrated solution. When the solid part of the anaerobic effluent is composted, the liquid part is recycled and the valuable compounds are sold, this process targets for a zero-emission solution.

The technical programme contains eight work packages (WPs), each addressing the main technological aspect. It starts with the pre-treatment of the substrate devoted for anaerobic digestion; another major activity is the development of a technical solution allowing stripping the ammonium directly in front or out of the anaerobic digester, and it deals with the emerging odour emission from a waste treatment plant. It includes a legal-economic WP dedicated to strengthen the acceptability of the developed process, and to fortify the potential end-users' position. The proposed work will be fulfilled in a framework of advanced management. Laboratory work will be carried out to develop new technical solutions.

The results will be used to design a pilot unit integrating all aspects investigated. After construction and start-up, a comprehensive evaluation with the pilot unit will be performed at a small to medium-sized enterprise (SME). The project has an important process dissemination and exploitation component, including a strategy for market introduction assured by legal and economic assessment and evaluation of the results. The cooperation between three SMEs and two end-users is beneficial for all SME partners involved. Moreover, five RDT performers contribute, all working on a European level.

- 1 SESA - SOCIETA ESTENSE SERVIZI AMBIENTALE (IT)
- 2 TECHNISCHE UNIVERSITÄT HAMBURG-HARBURG, INSTITUT FÜR ABFALLRESSOURCENWIRTSCHAFT (DE)
- 3 UNIVERSITY OF NATURAL RESOURCES AND APPLIED LIFE SCIENCES, VIENNA, DEPARTMENT IFA-TULLN (AT)
- 4 GIRO - FUNDACIO PRIVADA ESTUDIS DEL MEDI AMBIENT DE MOLLET DEL VALLES (ES)
- 5 UNIVERSITÀ CA' FOSCARI VENEZIA, DIPARTIMENTO DI SCIENZE AMBIENTALI (IT)
- 6 SCUOLA AGRARIA DEL PARCO DI MONZA (IT)
- 7 MACHOWETZ UND PARTNER CONSULTING ZT GMBH (AT)
- 8 CLENERGY (SK)
- 9 CHRISTIAENS CONTROLS BV (NL)
- 10 RUDOLF GROSSFURTNER GMBH & CO. (AT)

**Contract:** 33130  
**Call:** FP6-2004-SME-COOP  
**Starting Date:** 01/10/2007  
**Duration (months):** 27  
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**EC Contribution:** € 1 143 000

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# NOVPOL

## A New Concept for the Recycling of Incompatible Polymers Allowing the Creation of New Polymeric Materials with Enhanced Properties

Europe produces approximately 21.15 million t of post-consumer plastic waste every year, of which only 16.5 % is recycled. Current recycling technologies require the plastic waste to be either sorted into polymer families or to be made compatible by the use of expensive block copolymers. The sorting of polymers is vitally important, and less than 0.01 % cross-contamination can ruin the entire batch. Equipment to sort plastics is being developed, but currently most recyclers are still sorting plastics by hand, which is expensive and time consuming. For these reasons, the market for using recycled plastic is less developed than it might be and the market price reflects this.

The proposed cooperative project, NOVPOL, aims to address these problems by enabling the recycling of mixed plastic waste to produce a homogenised thermoplastic with enhanced mechanical and processing properties when compared to the average properties of the constituent plastics. Basic feasibility work has been carried out on the proposed process, that demonstrated the ability to recycle a mixture of incompatible plastics (such as a ground-up car interior) to create an all new homogenised thermoplastic polymer.

The technological objectives are as follows: to create a homogeniser to operate continually with an output of at least 500 kg/hr, based on a 100 kW drive motor; to create a homogeniser with the ability of generating a nominal tip speed of at least 30 m/s and the ability to process at least 6 000 000 kg of polymer before requiring a major service; to create a complete Novpol recycling system with the ability to recycle a mixture of at least five different polymers and produce "new" polymers with enhanced mechanical properties that are not currently available.

The economic objectives are to provide a cost-effective recycling route for mixed polymer waste that produces recyclate with enhanced mechanical properties suitable for engineering applications that can demand a selling price of at least 80 % of virgin polymers.

- 1 FILTRI CLEAN TECNICA S.R.L. (IT)
- 2 BEA TECHNOLOGIES SPA (IT)
- 3 L.T.S. DEMOLITION AUTOMOBILE (FR)
- 4 ZAKLADY MECHANICZNE WIROMET SPOLKA AKCYJNA (PL)
- 5 PERPLASTIC S.L. (ES)
- 6 O&S COMPUTER-SOFT ORLOWSKI SPOLKA LOMANDYTOWA (PL)
- 7 W.H.SMITH & SONS (TOOLS) LTD (UK)
- 8 PERA INNOVATION LTD (UK)
- 9 CENTRE DE RECHERCHES SCIENTIFIQUES ET TECHNIQUES DE L'INDUSTRIE DES FABRICATIONS MÉTALLIQUES (BE)

**Contract: 16764**  
**Call: FP6-2003-SME-1**  
**Starting Date: 01/07/2005**  
**Duration (months): 27**  
**Total cost: € 1 509 531**  
**EC Contribution: € 781 876**

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# OCEANSAVER

## Dramatically Reducing Spreading Of Invasive, Non-Native Exotic Species Into New Ecosystems through an Efficient and High-Volume-Capacity Ballast Water Cleaning System

228

Co-operative research

The transport of micro-organisms in ballast water represents a major contributor to the spreading of invasive, non-native exotic species into new ecosystems, which can result in serious effects on sensitive ecological communities around the world. Both regions in the North Sea and the Mediterranean have experienced uncontrolled growth of “killer algae” reaching pest proportions in many areas and causing huge economic impact by killing fish in fish farms. The degree of microbiological growth depends on several factors, such as water temperature, sunlight and the amount of nutrients in the water, and microbiological growth in ballast tanks results in increased maintenance of these tanks, including the use of VOC-containing tank-coating products. Microbiological growth, and especially of sulphate-reducing bacteria, is enhanced in ballast tanks, where sediments have accumulated due to ballast water not being filtered by intake, as the situation is for most ships today.

In 1997 the Commission proposed a European Parliament and Council Directive establishing a framework for Community action in the field of water policy (Water Framework Directive, WFD). This directive will replace the emission control policy established under Council Directive 76/464/EEC, and the WFD will be the basic legislation for the protection of the European aquatic environment. Our project will directly contribute to the objectives of the Water Framework Directive by contributing to reduction in water pollution and maintaining biodiversity in coastal areas and waterways across the EU, by contributing to reduction in spreading of non-native exotic micro-organisms to vulnerable ecosystems, and also to the IPPC Directive, i.e. the ‘Council Directive concerning integrated pollution prevention and control (96/61/EEC)’, and also other directives.

There is a global need for a ballast water-treatment system that meets the coming IMO objectives for BWT systems. Every year, more than 10 000 million t of ballast water is transported around the world. The objective for this project is to design and prototype-build a cost-effective ballast water treatment system

for use on board ships, through an innovative feedback controlled cavitation (C3) and nitrogen injection technology.

The innovations necessary to achieve this are:

1. a cavitation (C3) unit for creation of travelling and fixed cavitation to form an expanding gas bubble and its subsequent collapse in order to form extreme pressure and temperature;
2. a novel nitrogen injector unit for super saturation of ballast water; and
3. a feedback controlling unit to control the injected amounts through sensors fed feedback control.

The short time value for the global BWT systems (2003-2008) is estimated to give an annual EU market of EUR 194 million, which with a 6 % market penetration adds up to EUR 12 million in the EU market. The long-time market (2008-2015) is estimated to be EUR 1.1 billion each year, which with a 9 % market penetration in the EU market, and including the service and maintenance market and secondary markets, adds up to a global market value of EUR 110 million annually, in the period up to 2015.

- 1 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)
- 2 AIR PRODUCTS PLC (UK)
- 3 STERNER AQUA TECH AS (NO)
- 4 ABINGTON PARTNERS (UK)
- 5 STOGDA SHIP DESIGN | ENGINEERINGSP Z.O.O. (PL)
- 6 LYNG AQUA S.L. (ES)
- 7 PERA INNOVATION LTD (UK)
- 8 FOSS & VARENHED ENTERPRISES AS (NO)

**Contract: 508243**  
**Call: FP6-2002-SME-1**  
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**Total cost: € 1 362 299**  
**EC Contribution: € 705 411**

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# PIGMAN

## A Sustainable Solution for Pig Manure Treatment: Environmental Compliance with the Integrated Pollution Prevention and Control Directive

Pig farming is a major EU agricultural industry, with about 300 million t of manure produced annually by small to medium-sized enterprise (SME) farmers. This is a major environmental problem, resulting in severe pollution of ground water and eutrophication of surface waters due to high nitrate, ammonia and phosphate emissions. This project provides an integrated solution using a combination of innovative technologies, thereby enabling the farmers to attain environmental compliance with the IPPC, and Waste directives.

The project develops a pre-acidification and UASB technology for a digester, combined with dilution by Brammox effluent to prevent ammonia and sulphur inhibition. C-digestion with several other organic wastes will improve biogas output. The Anphos process will remove phosphate as struvite, as well as ammonia with precipitation of the non-digested solids. The Brammox process will be used for the first time for the removal of ammonia from the digested pig manure. PIGMAN will develop nitrification/denitrification in an activated sludge process combined with ultra-filtration membranes (Biomembrane process).

The project will result in a total treatment of pig manure. Anaerobic digestion will produce biogas (about 73 m<sup>3</sup> of biogas per pig, per year), for electric power and heat which can be used on the farms, and the remainder sold. Additionally, a struvite fertiliser and compost mixture (about 75 kg dry matter with 2.5 kg P and 2.7 kg N per pig, per year) is produced, which has a better fertilising value than untreated pig manure. The effluent of the process can be used as irrigation water, process water or discharged on surface water.

The consortium of expert research institutes, engineering firms and pig farmers from Cyprus, the Netherlands, Belgium, Poland, Israel, Denmark and Greece will develop the new combination of technologies in the first 12 months, and after a mid-term evaluation will build a pilot unit capable of assessing the performance and viability of the PIGMAN technology.

- 1 WASTEMAN & ENVIROTECH LTD (CY)
- 2 KNOOPS PORK B.V. (NL)
- 3 ROL-KON SPOLKA Z O.O. (PL)
- 4 HEGNDAL A/S (DK)
- 5 A. KAILAS & SONS LTD (CY)
- 6 INSTITUTE OF ANIMAL RESEARCH (IL)
- 7 UNIVERSITEIT GENT (BE)
- 8 DANMARKS TEKNISKE UNIVERSITET (DK)
- 9 ADVIESBURO VOOR MILIEUTECHNIEK COLSEN B.V. (NL)
- 10 SELOR EEIG (NL)
- 11 UNIVERSITY OF IOANNINA (GR)

**Contract: 17641**  
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**Total cost: € 2 086 058**  
**EC Contribution: € 1 235 329**

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# POLYVER

## Production of Polyhydroxyalkanoates from Olive Oil Mills' Wastewater

230

Co-operative research

Europe is the prime producer of olive oil, accounting for more than 95 % of the worldwide production. Olive oil benefits in human diet are nowadays well known to all consumers but few people are aware that, despite of its beneficial effects, its production process intrinsically has a huge impact on the environment, since olive oil mills' wastewater (alpechin) contains a high quantity of toxic organic and inorganic compounds such as lipids, pectin, xylan and related monosaccharides and polysaccharides, mono- and oligo-polysaccharides, phenols and salts. Given this huge problem for the environment, it is urgent that we find a very effective process for the olive oil mills' wastewater (OOMW) treatment, guaranteeing a very low impact on the environment.

In order to achieve this challenging goal, the POLYVER project proposers will put together their expertise to build up a research project whose main aim is to minimise the environmental impact of olive oil production, drastically reducing the water content in biological polluting substances by about 80 %.

In addition to such a relevant benefit, the POLYVER project intrinsically will bring considerable added value to small to medium-sized enterprises (SMEs). The treatment foreseen is based on a specific use of microorganisms that, digesting OOMW, will produce bioplastic monomers (PHAs) that are biodegradable substitutes of fossil fuel plastics and can be produced from renewable raw materials. Varying the production strains, substrates and co-substrates it will be possible to synthesise polyesters with different monomeric composition, resulting in PHAs with engineered physical characteristics and performances.

The main innovative elements of the project will be the development of a new, specific and highly efficient bioreactor for the treatment of olive mills' waste water, the development of a process for PHAs production by bacteria growing in alpechin-amended media, the individuation of the most cost-efficient treatment for the valorisation of bio-polyesters (PHAs).

[www.polyver-project.eu](http://www.polyver-project.eu)

- 1 LABOR S.R.L. (IT)
- 2 ARGUS UMWELTBIOTECHNOLOGIE GMBH (DE)
- 3 ANTICO FRANTOIO TOSCANO S.R.L. (IT)
- 4 SOCIEDAD COOPERATIVA AGRÍCOLA OLIVARERA NUESTRA SEÑORA DE LOS DESAMPARADOS (ES)
- 5 BIOLEA G. DIMITRIADIS & CO. (GR)
- 6 IOANNIS SKIADAS & CO. JOINT STOCK COMPANY (GR)
- 7 DEKONTA, A.S. (CZ)
- 8 IDROPLAX S.R.L. (IT)
- 9 UNIVERSIDAD DE GRANADA (ES)
- 10 FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS (GR)
- 11 UNIVERSITÀ DI PISA (IT)

**Contract: 32967**  
**Call: FP6-2004-SME-COOP**  
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**Total cost: € 947 658**  
**EC Contribution: € 600 988**

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# PURILEACH

## Modular Purification System for Heavily Polluted Leachate

European countries use landfill as a disposal method for 60 % of their municipal and hazardous waste. One of the main problems associated with landfills is leakage of potentially toxic liquids into soil and groundwater. Biological and chemical wastewater treatment units used separately, do not achieve high removal efficiency — microbial population is not able to survive in such a contaminated environment. There is a need to develop a new effective and inexpensive method, based on both microbial and non-microbial leverage, and to find the way for safe and efficient landfill water treatment, in accordance with the EC Landfill Directive.

The leachate is generated in the result of the aerobic and anaerobic decomposition of the landfill waste. Treatment of leachate is a complex task, due to its nature. A typical leachate is highly contaminated with ammonia, organic contaminants, halogenated hydrocarbons and heavy metals, and also with high concentrations of inorganic salts. This wastewater profile is changing from landfill to landfill, as well as with time within the same landfill. The key factors that must be considered and influence treatment facilities design include leachate character and loads, costs and effluent discharge regulations.

The research is designed to evaluate optimal leachate treatment technology, based on a modular solution, and to develop an integral operational system for wastewater analysis and feedback for working regimes optimisation. The novelty of the proposed technology is the flexible modular approach with “smart” feedback for a selection of treatment regimes relevant to the processing of the wastewater which varies in composition. The envisaged on-site adaptive leachate treatment system consists of the specific technological modules with an integrated operational system for regime optimisation, according to wastewater composition and quantity. The envisaged “online” system design is based on decision-table and expert systems’ techniques for knowledge processing.

- 1 L'UREDERRA, FUNDACIÓN PARA EL DESARROLLO TECNOLÓGICO Y SOCIAL (ES)
- 2 HIDRÁULICA, DEPURACIÓN Y ECOLOGÍA S.L. (ES)
- 3 BOMERS ENGINEERING (NL)
- 4 SERVICIOS DE MONTEJURRA S.A. (ES)
- 5 ÓZON KORNVEZETVEDELMI SZOLGALTATÓ KFT (HU)
- 6 LOKMIS UAB (LT)
- 7 AGAVA UAB (LT)
- 8 UAB-PREKYBOS NAMAI “KRIVIS” (LT)
- 9 AQUA ENVIRO LTD (UK)
- 10 BIOCENTRAS UAB (LT)
- 11 POLITECHNIKA SLASKA (PL)

**Contract:** 508698  
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**Total cost:** € 763 768  
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# RAP-EAT

An ultra-efficient, low-cost, biocatalytic material for use in RAPid oil-spill TrEATment applications, (inland and coastal) to dramatically improve bioremediation efficiencies and protect high-risk receptors through pathway activation

232

Co-operative research

Of the European contaminated land remediation industry, 85 % is led by small to medium-sized enterprises (SMEs), which total some 3 000 companies (consultancies and engineers). In western Europe alone there are approximately 350 SMEs dealing with the remediation of oil and chemical spills.

These SMEs hope to treat the oil spills in Europe, estimated at 50 000 incidents annually, and benefit from the ever-increasing European market for contaminated land where there are less than one million known or potentially contaminated sites which require EUR 100 billion worth of remediation. European SMEs have experienced growing pressure from large companies' expertise and products, especially from the US and Japan. The contaminated land remediation market sector is growing at a rate of 15 % annually in the UK, and is estimated at 6 % across Europe. With this rapid growth in the market and particularly with the introduction of bioremediation practices into Europe, we believe that we can only fight the globalisation in the supply chains by innovation in our products and services.

The proposed project is the development of an ultra-high performance, low-cost, biological catalysing medium to increase the efficiency of oil spill remediation (inland and coastal) by up to 50 %, and provide a technological solution for pathway interception without the use of engineered physical barriers. The developed technology will also be suited for use in the remediation of high concentrations of hydrocarbon contamination and recalcitrant products such as MTBE, PCBs and PAHs commonly identified on brownfield development sites. Our specific goal is to develop a Spent Brewery Grain (SBG)-based bioremediation package to promote bacterial degradation.

Current bioremediation systems cannot provide sufficiently improved levels of degradative performance that are required to sufficiently reduce the cost, time and increase the efficiency in treatment parameters demanded to replace the dig-and-dump methods.

The products derived from the waste stream of the brewing industry (Spent Brewery Grain) create an effective biocatalytic package that will degrade conventional hydrocarbon contaminants at over 8 times the rate of current bioremediation techniques and will have a major impact (27 times faster degradation) on the toxic recalcitrant compounds, where current techniques are unable to promote this form of degradation.

<http://rap-eat.pera.com>

- 1 RANDALL & WALSH ASSOCIATES LTD (UK)
- 2 I.D.E.A. S.R.L. TECNOLOGIE AMBIENTALI (IT)
- 3 STAVANGER INSTALLASJON AUTOMASJON AS (NO)
- 4 CHEMPRI B.V. (NL)
- 5 PVAXX RESEARCH AND DEVELOPMENT (UK)
- 6 KW FORAGE SYSTEMS LTD (IE)
- 7 MAXOL OIL LTD (UK)
- 8 PERA INNOVATION LTD (UK)
- 9 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)
- 10 INSTITUTE OF TECHNOLOGY, SLIGO (IR)



FP6 Project Catalogue

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**EC Contribution:** € 751 369

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Steel producers in Europe have maintained global competitiveness by using mini-mills with electric arc furnaces (EAFs) to make steel. However, during the recycling process, zinc and other non-ferrous metals, present in the scrap metal, as well as some of the iron, are “evaporated”, forming dust particles. Increasing levels of zinc in scrap steel are predicted, due to the increased use of galvanised materials in automobile manufacture.

Presently, part of the steel works dust incurred is recycled in pyrometallurgical processes, such as the waelz process. Problems faced include not only the high consumption of energy (the issue of greenhouse gas emissions) and the remaining slag share of approximately 70 %, but especially the risk of the occurrence of dioxins and their environmental impact. A high percentage of the dust is disposed of in landfills (waste of resources, waste disposal).

The objective of this project is to develop a “cold” process to remove the heavy metals, as well as zinc and lead oxide, from the dust, and use the remaining iron containing material as ingoing material for the blast furnace process.

The innovation of the process is mainly based on the grinding activation during the leaching phase. There are several further advantages:

- waste-free process is targeted (saving resources);
- optimised re-use of zinc, lead and iron oxide;
- climate protection by CO<sub>2</sub>-minimisation and reduction of greenhouse gas emissions;
- no environmental risks from dioxins;
- step-by-step procedure: lab-scale tests and manufacturing of a process prototype for the process evaluation.

However, earlier efforts in this direction (hydro-metallurgical processes) have not been entirely successful to date, since the spinel structure of the dust particles was not broken up and the iron oxide was thus not usable. A breakthrough shall be made owing to a process consisting of simultaneous mechanical graining combined with a high selective leaching. The first positive results were achieved in preliminary tests.

- 1 RELUX ENTSORGUNG GMBH & CO. KG (DE)
- 2 ECO-TRANSFER - GESTAO AMBIENTAL LDA (PT)
- 3 ZOZ GMBH (DE)
- 4 AQUA-BIOCARBON GMBH (DE)
- 5 PARTNERIS L.V., LTD (LV)
- 6 INSTYTUT METALI NIEZELAZNYCH W GLIWICACH Oddzial w Legnicy (PL)
- 7 OTTO-VON-GUERICKE UNIVERSITAET MAGDEBURG (DE)
- 8 INNOVATIVE GESELLSCHAFT FUR ANALYTISCHEN SERVICE UND HANDEL (DE)
- 9 UNIVERSITY OF MISKOLC (HU)

**Contract: 508714**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/11/2004**  
**Duration (months): 30**  
**Total cost: € 1 996 300**  
**EC Contribution: € 1 295 300**

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Liquid Crystal Displays (LCDs) are widely used in notebooks, organisers, mobile phones, pocket calculators, measuring and control instruments, electronic games, hand-held miniature TVs, audiovisual equipment, large signboards, automotive displays, and more and more also for PC monitors and TVs.

According to a study from Stanford Resources (San Jose, California), the annual value of LCD products reached EUR 35 billion in 2002, about 30 % of this within the European Union, representing a total area of 2,1 million m<sup>2</sup> Liquid Crystal Displays. An annual increase rate of about 15 % is estimated for the next years (up to 4,1 million m<sup>2</sup> in 2005).

As LCDs are already on the market for several years, larger quantities of the more than 2,5 billion LCDs are coming into their End-of-Life stage for treatment. In 2005, this figure will become even more dramatic — 40 000 t of LCD modules, contained in 2 million t of waste electrical and electronic equipment (WEEE), or about 30 % of total WEEE within the EU. This amount represents EUR 400 million in costs for incineration. Currently, the only method used to deal with redundant LCD units is incineration or landfill. Both are expensive and cause emissions into the atmosphere (global warming) respectively, water contamination (Class II) and difficulties in biodegradation. To date, no recycling solution for LCDs is available.

As a consequence, the European Commission has requested the disassembly of LCDs with an area bigger than 100 cm<sup>2</sup>, in Directive 2002/96/EC of the European Parliament and of the Council on Waste Electrical and Electronic Equipment (WEEE Directive) of February 13, 2003.

ReLCD will therefore develop novel processes for the disassembly, treatment and re-utilisation of LCDs, as well as possibilities for the *in situ* recovery of the 10-15 % LCD production scrap which does not pass the final test before shipment. In addition, design

guidelines for the new generation of LCDs will be elaborated and discussed in the User Advisory Board with several big producers, e.g. Apple, Motorola, Philips, Sony and TECDIS.

In several areas, ReLCD will go beyond the unsatisfactory state of the art:

- to find a cheap and fast test methodology to verify if the obsolete or excess LCDs are still working;
- to develop a technology to refurbish the working LCDs and reintegrate them into repair, and in exemptions also in production processes;
- to find a test method to detect hazardous substances in LC mixtures;
- to develop an eco-efficient disassembly and recycling technology for the non-working LCDs that fulfils the WEEE Directive of the European Commission;
- to research possible enhancements to the existing LCD design and production, in order to achieve a more sustainable lifecycle of LCDs (publication of guidelines);
- building up a pilot plant incorporating and testing the developed technologies;
- through all these measures, to decrease the amount going to landfill or incineration, as well as to decrease the threats to the environment and mankind of today's state-of-the-art technology.



ReLCD includes three industrial small to medium-sized enterprises (SMEs) and three research and technological development (RTD) organisations from five countries (Austria, Germany, Hungary, Spain, the UK). All of its members are deeply involved either in ecoefficient electr(on)ics or electr(on)ics recycling and are therefore capable of exploiting the results. In addition, technology dissemination will be performed by users, including producers of LCDs, producers of electronic and other products containing LCDs (including SMEs), companies active in repair (mainly SMEs), and recycling and waste management companies.

- 1 ECOTRONICS ECO-EFFICIENT ELECTRONICS AND SERVICES GMBH (AT)
- 2 BAY ZOLTÁN ALKALMAZOTT KUTATÁSI ALAPTÍVANY (HU)
- 3 OSTERREICHISCHE GESELLSCHAFT FÜR SYSTEM-UND AUTOMATISIERUNGSTECHNIK (AT)
- 4 FUNDACION GAIKER (ES)
- 5 RELEKTRA GMBH (DE)
- 6 ACTIVE DISASSEMBLY RESEARCH LTD (UK)

**Contract:** 508212  
**Call:** FP6-2002-SME-1  
**Starting Date:** 08/03/2004  
**Duration (months):** 24  
**Total cost:** € 1 395 448  
**EC Contribution:** € 842 049

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# REWARD

## Research on Energy, Water and Chemical Agent Reduction in Commercial Dishwashers

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Co-operative research

Commercial dishwashing consumes a huge amount of energy, water and chemical agents. Reducing this consumption could have a considerable environmental impact. Therefore, three small to medium-sized enterprises (SMEs) will develop new technologies for cleaning and filtering, ozone cleaning and microfiltering.

Despite being an air pollutant, ozone is well known for its cleaning and sanitising properties. It is widely used in drinking-water preparation. Most kinds of dish soils besides grease are affected by ozone. Consequently, a successful development of ozone cleaning would allow for a 50 % to 70 % reduction of chemical agents.

In commercial dishwashers, the same water is used in different cleaning steps. Intermediate filtering would reduce the water consumption by 50 %. The consumption of energy, mainly used for water heating, will be reduced by the same order of magnitude. Thus the CO<sub>2</sub> emission would drop by more than 820 000 t each year in the EU. The properties of the filters might be affected by the specific cleaning agent. Therefore, it is necessary to treat cleaning and filtering in the same project.

In order to perform these tasks, three SMEs are working together on this project:

- the UK-based Millenniumpore holds patents on innovative filtering;
- the German company Copperline specialises in optimising ozone generator;
- the Polish company Seaking is expert in different types of galley equipment and stainless steel appliances, and also as a system integrator;
- the Belgian Laboratory for Physical and Analytical Chemistry of the Katholieke Universiteit Leuven specialises in ozone cleaning in industrial applications;

- the German Fachhochschule Münster participates with its two laboratories for sanitary and domestic techniques and for sensor technology, the latter also acting as coordinator of the project.

In order to shorten time to market, the German Hobart company participates as a manufacturer of commercial dishwashers. The views of an end-user demanding high hygienic standards will be brought in by the German Studentenwerk Münster.

- 1 FACHHOCHSCHULE MÜNSTER, UNIVERSITY OF APPLIED SCIENCES (DE)
- 2 MILLENNIUMPORE LTD (UK)
- 3 COPPERLINE GESELLSCHAFT FUER ELEKTRONIKENTWICKLUNG, PLANUNG UND PRODUKTION MBH (DE)
- 4 STUDENTENWERK MÜNSTER, ANSTALT OEFFENTLICHEN RECHTS (DE)
- 5 HOBART GMBH (DE)
- 6 SEAKING POLAND LTD (PL)
- 7 KATHOLIEKE UNIVERSITEIT LEUVEN (BE)

**Contract: 513035**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/12/2004**  
**Duration (months): 30**  
**Total cost: € 1 741 124**  
**EC Contribution: € 1 139 352**

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# SAFEWATER

## Development of a Continuous Measuring Method for Adsorbable Organically Bound Halogens (AOX) in Waters

AOX (Adsorbable Organically Bound Halogens) are considered to be a very dangerous group of materials in that they produce toxic, mutagenic, and carcinogenic effects and some of them have a strong bioaccumulation property in fat-containing tissues. However, to date, no fast, automatic device for the monitoring of AOX exists in the market. The present project aims to develop a monitoring technology to keep track of the concentration of absorbable AOX present in water streams. Common sources of AOX are industrial processes, urban and agricultural activities, human activities, and even natural phenomena. Currently available methods to measure the AOX components in water involve arduous laboratory methods which prove slow and entail difficult and complex procedures. Hence, such measurement needs to be carried out in specialised laboratories by trained staff, rendering any automatic and/or continuous measurement of AOX simply unfeasible, and drastically reducing the number of analysis performed.

The proposed technology will provide a compact item of equipment based on a two micro-cell system. One entails a miniature and very effective plasma ashing cell, with low power consumption and that uses ambient air instead of noble gases to burn the sample.

The second cell is an electrochemical inorganic halogen detector designed to work with the products available from the adsorption/ashing unit. Initial tests have detected the outstanding sensitivity of the proposed detection method, proving that this new design allows continuous and automated monitoring of AOX in water. The main target parameters for the proposed system are as follows:

- halogen detector sensitivity two orders of magnitude higher than current methods;
- up to six measurements per hour and a maximum continuous operation of seven days without operator intervention;

- alarm and warning system for out-of-bounds analysis results and a data storage system for posterior retrieval and historical analysis.

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Co-operative research

- 1 FELTALALOI ES KUTATO KOZPONT SZOLG. KFT. (INVENTION AND RESEARCH CENTER SERVICES LTD) (HU)
- 2 JCB ELECTROMECÁNICA S.L. (ES)
- 3 SAROKO TECHNOLOGIES LTD (UK)
- 4 ELECTRONIC SYSTEMS DESIGN LTD (MT)
- 5 TISON TITLESTAD AS (NO)
- 6 UMWELT- UND INGENIEURTECHNIK GMBH DRESDEN (DE)
- 7 VELTA, S.A.U. (ES)
- 8 DIASA INDUSTRIAL, SA (ES)
- 9 MALTA RESOURCES AUTHORITY (MT)
- 10 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)
- 11 FOUNDATION FOR APPLIED RESEARCH - INSTITUTE FOR MATERIAL SCIENCE AND TECHNOLOGY (HU)

<http://safewater.mfkk.hu>

**Contract: 32058**  
**Call: FP6-2004-SME-COOP**  
**Starting Date: 21/02/2006**  
**Duration (months): 24**  
**Total cost: € 1 448 321**  
**EC Contribution: € 750 162**

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Environment

# SEPARATE

## Eco-Efficient Designs for End-of-Life, Anti-Counterfeit Electronic Device Recovery

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Co-operative research

<http://pera.projectcoordinator.net/~separate>

The proposed project is focused on creating a manufacturing process and cost-effective recycling route in response to the European Commission's Waste Electrical and Electronic Equipment (WEEE) Directive. The proposed project will impact upon a number of small to medium-sized enterprise (SME) communities containing a total of at least 45 000 SMEs, including the following; injection moulders, speciality polymer compounders, tool makers, injection moulding equipment suppliers and electro-polymer product producers.

The protection of our environment and the preservation of our natural resources for future generations are key challenges that we must face if we are to maintain Europe's prosperity and de-couple economic growth from environmental degradation. The WEEE waste stream has been identified as one of the fastest growing waste streams in the EU, constituting 4 % (7.5 million t/year) of municipal waste today, increasing by 16 % to 18 % every 5 years — 3 times as fast as the growth of average municipal waste.

The need, therefore, is to have a technology that enables WEEE to be cost-effectively disassembled at the end of life. The proposed Cooperative project, 'SEPARATE', aims to address these problems by creating a design, manufacturing and recycling technology for a specific segment of the total WEEE market, representing around 60 % of WEEE products and 4.5 million t of waste each year. This will be achieved by embedding the electronics in a water-soluble, bio-degradable, polymer shell. This will be specially formulated to withstand use up to 60°C at 100 % relative humidity for 3 years, and will fully encapsulate the electronics to form an electronics module. This module will be semi-encapsulated within the main body of the target product using novel thi-wall over-moulding processes, leaving one face exposed to facilitate its end-of-life separation. At the end of life, we propose to use a portion of the chip memory to identify and separate the main polymer product, and remove the electronics by dissolution at 75°C. We will do this by specially formulating the polymer, and by developing moulding

and recovery processes so as not to add more than 5 % cost, compared to traditionally employed materials and processing techniques. The project will develop a complete suite of innovative processing and reclamation techniques, required to provide a closed-loop product manufacturing system for use in the multi-billion euros, European thermoplastic market, while satisfying EU legislation, including the Commission's White Paper on Environmental Liability, relating to resource management, environmental protection and liability.

The resulting technology from the proposed project will provide the large community of SMEs with a cost-effective manufacturing process that allows for end-of-use recycling for electro-polymeric products. This will provide European moulders with a huge competitive advantage in offering a new level of functionality to their customers in helping them to design for recyclability. This, in turn, will help European SME moulders combat the huge price differential offered by Asia Pacific moulders, due to their low labour rates. It will also create new opportunities for export of these new more functional mouldings and will reduce their dependence on their continuously contracting domestic markets.

- 1 HASWELL MOULDING TECHNOLOGIES LTD (UK)
- 2 MAPRO SPOL. S.R.O. (CZ)
- 3 PVAXX RESEARCH & DEVELOPMENT LTD (UK)
- 4 UNITEAM ITALIA S.R.L. (IT)
- 5 NOVACARD INFORMATIONSSYSTEME GMBH (DE)
- 6 ROSTI AS (DK)
- 7 PERA INNOVATION LTD (UK)
- 8 TECHNICAL RESEARCH CENTRE OF FINLAND (FI)

**Contract: 513166**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/10/2004**  
**Duration (months): 27**  
**Total cost: € 1 161 499**  
**EC Contribution: € 601 262**

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# SEWERINSPECT

Integrated System for Structural Assessment and Upgrading of SEWERs, Based on Input from CCTV INSPECTION

The emphasis on sewerage has nearly always been on serious structural defects. With the new EU legislation that demands sewer water tightness and the need to reduce the costs associated with infiltration, wastewater utilities are now considering in more depth the problem of sewer deterioration. Closed Circuit Television (CCTV) inspection is by far the most common method utilised for the inspection of sewer networks. Existing software on sewer evaluation based on CCTV inspection results include rating systems that do no more than act as a coarse filter for a closer examination of the results of CCTV surveys. The crucial question in all CCTV surveys is how, based on the pictures of the pipe on the monitor, to decide what, if any, remedial measures are needed.

The objective of this work is to develop an integrated Decision-Support-System (DSS) for the rehabilitation planning of sewers that, based on CCTV inspection results, will assess the structural reliability of the inspected sewers as a function of time, taking into account sewer deterioration by the various degradation mechanisms (erosion of the surrounding soil, etc.), seismic forces (where relevant) and uncertainties (in loading, etc.), prioritise rehabilitation projects, select the best remedial measures and schedule re-inspection.

The proposed work comprises:

- development of a model for the assessment of sewer structural reliability as a function of time based on CCTV results;
- development of a model for the assessment of rehabilitation priorities, taking into account the structural condition of the sewer, blockage, risk of groundwater pollution and the criticality of the sewer in case of failure;
- production of an integrated DSS for the rehabilitation planning of sewers that will accept input from CCTV inspection results and will include the models in '1' and '2' and a

probabilistic model that optimises rehabilitation and schedules re-inspection;

- field evaluation of the DSS by the participating small to medium-sized enterprises (SMEs) and the end-user.

With this DSS, participating SMEs that provide sewer inspection services will expand their market by offering additional services. The SME that develops and markets software on sewer evaluation based on CCTV results will expand its market by offering upgraded software that will be in a unique position to market for the benefit of the SMEs in the group. Other SMEs will benefit through licenses of the technology. There will be environmental benefits and an 80 % reduction in the cost of sewer evaluation.

- 1 TECNIC TECNICHE E CONSULENZE NELL'INGEGNERIA CIVILE CONSULTING (IT)
- 2 GENERAL UNDERGROUND SERVICES LTD (UK)
- 3 A. TSOULOFTAS & SONS LTD (CY)
- 4 SEWERAGE BOARD OF LIMASSOL AMATHUS (CY)
- 5 OPTIMESS GESELLSCHAFT FÜR OPTOELEKTRONISCHE INSPEKTIONS UND MESSTECHNIK GMBH (DE)
- 6 RISA SICHERHEITSANALYSEN GMBH (DE)
- 7 ISTANBUL TECHNICAL UNIVERSITY (TR)

**Contract: 512540**  
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**Starting Date: 01/11/2004**  
**Duration (months): 27**  
**Total cost: € 1 528 856**  
**EC Contribution: € 856 416**

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Crystalline Silicon photovoltaic (PV) cells will be the dominant technology for the next 20 years, with a 30 % average annual growth rate. Currently, 17 % of module costs relate to feedstock. Even though cells will be thinner and more efficient, demand for solar grade silicon (SoG-Si) will grow from the current 7 000 metric tonnes (priced between EUR 25/kg and EUR 30/kg) to over 20 000 metric tonnes each year in 2010. A dedicated SoG-Si source is needed or growth will stagnate and feedstock prices will increase to EUR 40-60 per kg, jeopardising compliance with the EC White Paper objectives.

SISI aims at alleviating the PV industry dependence on the limited and expensive supply of silicon from the electronics industry. The consortium is convinced that the most promising option to provide the very large quantities of high-purity silicon required is the direct carbothermic reduction of quartz. The 6 SISI partners include the major European industry and institutes with expertise in ultra-high-purity quartz, silicon production and purification, and solar-cell processing.

The project's goal is to demonstrate, on an intermediate scale (approximately 200 kg per batch), an integral direct carbothermic route for SoG-Si production that can be industrialised. In the preceding SOLSILC project, the direct carbothermic process was developed based on a selected combination of raw materials and a two-step silicon production process with silicon carbide as an intermediate product. In the SPURT project, the most economical large-scale purification techniques were selected. This combination of technologies is integrally scaled up in the SISI project, with the following innovations:

- optimised raw material preparation and furnace operation for a stable and high-yield Si-production, and suitable quartz purification and pelletisation techniques;
- transfer of the purification techniques to intermediate scale, including new steps such as filtering.

The project is organised into six work packages, which follow the value chain and production steps: raw materials, Si-production, purification, wafer and cell process, technology implementation, and consortium management. Several integral production runs will be executed from raw materials to cells, to prove the reproducibility of the results. Successful completion of the project will result in the initialisation of a pilot plant.

- 1 ENERGIEONDERZOEK CENTRUM NEDERLAND (NL)
- 2 SCANARC PLASMA TECHNOLOGIES AB (SE)
- 3 SINTEF - STIFTELSEN FOR INDUSTRIELL OG TEKNISK FORSKNING VED NORGES TEKNISKE HOEGSKOLE AS (NO)
- 4 S'ENERGY B.V. (NL)
- 5 METALLKRAFT AS (NL)
- 6 NORWEGIAN CRYSTALLITES AS (NO)

**Contract: 508202**  
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**Starting Date: 15/09/2004**  
**Duration (months): 26**  
**Total cost: € 1 918 500**  
**EC Contribution: € 994 000**

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# SOILPREP

## Low-Cost High-Speed Soil Disinfestation System to Replace Methyl Bromide

With increasing EU population density leading to further projected increases in the intensity of horticultural cropping by 2 % each year, and the phasing out of methyl bromide with no chemical alternative available, there is an urgent need to provide horticulturalists with an environmentally friendly, safe, cost-effective disinfestation method for their land.

Our idea is to develop a high-speed treatment system based on a synergistic combination of injecting steam under pressure into the soil, a vacuum recirculation system and mixing of the particles to achieve rapid equilibration and low losses at high input rates. In addition, our idea efficiently generates the required steam directly from the soil moisture over a novel solid-state heat exchanger, removing the need for costly and cumbersome large boilers and water transportation bowsers which limit the speed of application and damage the soil. The heat penetration rate from this technique will be high enough to mount the unit on a standard soil preparation rig, removing the need for slow and costly separate disinfection passing over the ground, bringing down operating and capital costs to affordable levels.

The small to medium-sized enterprise (SME) partners constitute a supply chain partnership that includes a heat source and control systems manufacturer, a spray and injector manufacturer, a soil preparation equipment manufacturer, a control systems manufacturer, together with a systems integrator and service provider in the soil turning and granulation area. End-user input is also provided from a farming cooperative group and the technology developer who invented this concept. By helping leverage the limited research and technological development (RTD) resource of the SMEs, this project will allow them to afford to produce a truly innovative product and disseminate it to develop a new application market.

- 1 PERA INNOVATION LTD (UK)
- 2 ABM SOLID SA (PL)
- 3 SPRAY PROCESSES LTD (UK)
- 4 ANGUS SOFT FRUITS LTD (UK)
- 5 IMANTS BV (NL)
- 6 SIPMA S.A. (PL)
- 7 VESTFOLD JORDDAMPING DA (NO)
- 8 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)

**Contract: 508100**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/11/2004**  
**Duration (months): 32**  
**Total cost: € 1 130 807**  
**EC Contribution: € 584 402**

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# SORMEN

## Innovative Separation Method for Non-Ferrous Metal Waste from Electric and Electronic Equipment (WEEE) Based on Multi- and Hyper-Spectral Identification

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Co-operative research

SORMEN is a pre-competitive research project scheduled in two years. The main objective is to develop a new technology for the separation of non-ferrous metal Waste from Electric and Electronic Equipment (WEEE) based on multi- and hyper-spectral identification. The project is divided into seven work packages, including project management and exploitation and dissemination activities.

This new technology will overcome the shortcomings posed by current methods, which are unable to separate valuable materials very similar in colour, size or shape. The project will provide a reliable technology to automate scrap processing in the recycling sector for non-ferrous metals from WEEE, which nowadays is essentially manual, labour intensive and time consuming.

The main innovations are:

- a multi- and hyper-spectral identification device for recycling applications;
- a new separation method will be developed for distinguishing individual non-ferrous metals from the scrap of many different materials;
- an automatic machine with low maintenance for fractions between 10mm and 50 mm;
- a machine able to process around 3 t/hr, at a market target price of around EUR 90 000.

The development of this new method will increase the value of recycled materials sold in the market and reduce recycling cost, thus improving overall small to medium-sized enterprises' (SMEs') economic profit. Additionally, it will contribute towards reducing external costs, (that is, costs derived from destruction and landfilling), and complying with European directives.

The consortium of this project consists of five SMEs and two research and technological development (RTD) performers: three WEEE recycling companies

(INDUMETAL, PGP, and IGE HENNEMANN), one manufacturer of recycling equipment (HEVAC), one imaging system vendor (SPECIM), one association of recyclers (ACLIMA), and two RTD performers (ROBOTIKER and CSL).

- 1 FUNDACIÓN ROBOTIKER (ES)
- 2 INDUMETAL RECYCLING S.A. (ES)
- 3 ASOCIACIÓN CLUSTER DE INDUSTRIAS DE MEDIO AMBIENTE DE EUSKADI - ACLIMA (ES)
- 4 UNIVERSITÉ DE LIÈGE (BE)
- 5 IGE HENNEMANN (DE)
- 6 HEVAC AMBIENT S.L. (ES)
- 7 SPECIM OY/SPECTRAL IMAGING LTD (FI)
- 8 PROEKO GRUPA POLSKA S.J. (PL)



**Contract:** 32493  
**Call:** FP6-2004-SME-COOP  
**Starting Date:** 02/10/2006  
**Duration (months):** 24  
**Total cost:** € 1 032 295  
**EC Contribution:** € 686 060

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# STEPWISE EPD

## Stepwise Environmental Product Declaration

The overall objective of this CRAFT project is to develop a method for stepwise environmental product declarations suitable for small to medium-sized enterprises (SMEs), so that smaller companies can join emerging markets for “environmentally superior” products and services. Consumers and purchasers can make the difference through buying greener products. Their preference for environmentally friendly products is the major driving force for companies to reflect upon ways to make their products greener and win market shares through innovation and better design. Therefore environmental product declarations (EPDs) and other forms of credible eco-labelling are absolutely essential for an ecologically sustainable development.

However, it is difficult and expensive for smaller companies to make an EPD, mainly because EPDs are based on life-cycle assessments. But there is also a need to involve stakeholders and have a third party verify the data. The project will therefore develop a method for stepwise EPD, that even at early stages and at low cost, can be used in marketing and eco-design. The method for stepwise EPD, which will be embedded in the Swedish EPD system, will be tested in 10 SMEs in Denmark, Latvia, Portugal and Sweden. Research institutes in the respective countries will aid the SMEs with the life-cycle assessment and the EPD. A network for LCA information will be used and further enhanced.

The assumption that making an EPD furthers both sales, through opening green marketing possibilities, and product environmental performance, through identifying eco-design options, will be investigated and discussed at company level and amongst companies and other stakeholders across Europe.

- 1 IVF INDUSTRIFORSKNING OCH UTVECKLING AB (SE)
- 2 IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE LTD (SE)
- 3 2-O LCA CONSULTANTS APS (DK)
- 4 STOCKHOLM SCHOOL OF ECONOMICS IN RIGA (LV)
- 5 INSTITUTO NACIONAL DE ENGENHARIA E TECNOLOGIA INDUSTRIAL (PT)
- 6 HUSKVARNA PROTOTYPER AB (SE)
- 7 MERCATUS ENGINEERING AB (SE)
- 8 KONTO LTD (LV)
- 9 MELITEK A/S (DK)
- 10 NEBA A/S (DK)
- 11 NEW-LINE FAABORG A/S (DK)
- 12 CRUZINOX, INDÚSTRIA METALÚRGICA LDA (PT)
- 13 POLISPORT – PEDRO & PAULO ARAÚJO PLÁSTICOS SA (PT)
- 14 ETAC AB (SE)
- 15 CONCRETOPE-FÁBRICA DE BETÃO PRONTO, SA (PT)
- 16 AKTIEBOLAGET SVENSKA MILJÖSTYRNINGSRÅDET (SE)
- 17 VATTENFALL AB (SE)

**Contract: 513045**  
**Call: FP6-2002-SME-1**  
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**Total cost: € 1 210 499**  
**EC Contribution: € 639 621**

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# WAPSCIENCE

## Wastewater Treatment Plant Improvement by Smart Sensors and Computational Intelligence

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Co-operative research

The project aims to develop an integrated solution that will improve the efficiency of municipal and industrial wastewater treatment plants at comparatively small costs. Two work packages will be executed in parallel: WP1 refers to the development of a robust, smart, low-cost online sensor for the measurement of the concentration of nitrate and ammonia in wastewater treatment plants (WWTPs). WP2 refers to the development of a self-adaptive system to identify abnormal situations, predict critical states of the process and generate warnings about malfunctions of sensors and control-circuits.

Both work packages include an applied research phase where the state of the art, the requirements and specifications as well as the design of the hardware and software will be accomplished. Furthermore they involve a development phase to implement and test the sensor unit and the self-adaptive system. In WP1, a number of problems will be faced: one is membrane fouling, which will be handled using a robust mechanical cleanable anti-fouling membrane for which a patent has been applied for recently by one of the small to medium-sized enterprise (SME) partners, HYDRION. To avoid falsification due to interactions, additional sensors for chloride and potassium will also be included, and a mathematical algorithm for compensation will be implemented in the sensor. For simple installation, the sensor will be equipped with a standard computer interface (USB or Bluetooth).

In WP2, the development of a self-adaptive system will be based on Computational Intelligence to gain information about the present and future state of the plant and allow for automatic generation of predictive warnings and alarms. Predictions of state values will allow predictive feedback control. System development will be based on commercially available software tools and software libraries, but also new algorithms that will be developed.

Based on the deliverables of WP1 and WP2, prototypes of the sensors in combination with the self-adaptive system will be integrated (WP3),

while WP4, field testing in WWTP, will concentrate on adapting and upgrading of the prototype. By performing parallel field tests in three countries, a proven and practical working prototype for further exploitation will become available. In WP5, the results of the project will be evaluated and the technical documentation will be prepared.

- 1 EUDIG ELEKTRO UND UMWELTDIGITALTECHNIK AKTIENGESELLSCHAFT ENTWICKLUNGSABTEILUNG (DE)
- 2 UNIVERSITAET-GESAMTHOCHSCHULE-SIEGEN (DE)
- 3 HYDRION B.V. (NL)
- 4 RESEARCH ACADEMIC COMPUTER INSTITUTE (GR)
- 5 THE QUESTOR CENTRE APPLIED TECHNOLOGY UNIT (UK)
- 6 UNIVERSITY OF APPLIED SCIENCES COLOGNE - CAMPUS GUMMERSBACH (DE)
- 7 TECHNOR ENGINEERING LTD (GR)
- 8 ANORD CONTROL SYSTEMS LTD (IE)

**Contract: 507981**  
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**Total cost: € 1 009 200**  
**EC Contribution: € 754 200**

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# WashControl

Development of an Online-Sensor-Based WashControl System and Water Recycling for Use in Textile Dyeing Houses and Laundries

Washing and rinsing processes represent very important and cost-intensive steps in small to medium-sized enterprise (SME) dyeing houses and laundries. Rinsing and washing is mostly performed under weak process conditions and without any control, due to the lack of suitable sensors. In order to get high-quality products and excellent fastness properties, the goods are usually washed too long and too intensely. Such a non-controlled washing process is very time consuming and requires a lot of water and energy. Within this project, a very innovative online sensor-based WashControl system will be developed for use in discontinuous dyeing ranges and in laundries, which will specifically enable water savings of at least 30 % and economic recycling of process water with membrane technology. The sensor-controlled washing is marked by a online-measurement of the removed stain, so that several fillings of the washing apparatus can be saved.

The required multi-sensor device and controlling techniques as well as recycling technique will be developed and verified with respect to proper performance, and ecologically and economically optimised processing conditions, as well as high quality products. The WashControl system will be applied under real industrial process conditions and coupled with membrane filtration. The use of an optimised WashControl system will guarantee savings of water and time of at least 30 % . At the same time, the reuse of recycling water for rinsing and washing as well as for dyeing will be developed, which will enable closed water loops and will result in much less pollution. Results will be very profitable for the involved SMEs, which stem from the machinery industry and dyeing houses as well as laundries from five EU states. The outcome of this project will ensure a clean and proper production in an ecological and economical emphasised production environment and will refresh the competitiveness of the European SME textile industry, which suffers from cheap production in low-cost countries.

- 1 DEUTSCHE INSTITUTE FÜR TEXTIL -UND FASERFORSCHUNG STUTTGART (DE)
- 2 UNIVERSITY OF MARIBOR, INSTITUTE OF TEXTILE CHEMISTRY ECOLOGY AND COLORISTIC (SI)
- 3 INSTITUTE FOR PRODUCT DEVELOPMENT (DK)
- 4 THIES TEXTILMASCHINEN GMBH & CO. (DE)
- 5 BETI TEKSTILNA INDUSTRIJA - PROGRAM PLETIVA D.D. (SI)
- 6 F.O.V. FABRICS AB (SE)
- 7 PRALNICA LUCIJA D.O.O. (SI)
- 8 PUNTO BIANCO S.R.L. (IT)
- 9 MDS-PROZESSTECHNIK GMBH (DE)

**Contract:** 5864  
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**Total cost:** € 1 890 000  
**EC Contribution:** € 1 347 500

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# WATERTOOL

An Innovative Tool for Multi-Element Analysis of Ground and Surface Water

246

Co-operative research

Ground and surface water resources are essential for human health, economic productivity and social development. They are a recyclable but finite resource, and with careful use and treatment can be managed in a sustainable manner. Increased groundwater pumping, due to the development of agricultural and industrial activities, as well as increasing population pressures, result in the dramatic decrease of water resources, in addition to the associated deterioration of water quality.

Effective water-resource management depends on high-quality data from different sources, of which water quality analysis is one of the most important. In general, water quality instrumentation has failed to keep pace with the technological advances of the 1990s. The small to medium-sized enterprises (SMEs) in this project have been working together to develop a new, multi-variable analysis tool, which would be capable of giving a water quality analysis *in situ* at a glance, at a substantially lower cost compared to traditional monitoring techniques. This project will use, as a starting point, the experience developed by SMEs in water analysis, water management and equipment development, complemented by the essential input of the research and technological development (RTD) performers.

This CRAFT project aims at the development of an integrated water monitoring tool, in the form of a probe which can be inserted in boreholes, to measure and monitor up to 15 parameters simultaneously. The device will also be able to be used for long-term monitoring at selected sites. The proposed technology is non-invasive, with very low environmental impact. Especially difficult-to-access locations such as deep-well environments are an ideal application for this latest innovation. The data output from this device will be of use to a wide range of end-users, from water suppliers, pisciculture and agriculture associations' managers to local and national authorities and environmental organisations, and also for engineering groups involved in water treatment and sewage water utilisation.

www.terramentor.com

- 1 TERRAMENTOR EEIG (GR)
- 2 RNDR. KAMIL VRANA, PHD.-HYDEKO-KV (SK)
- 3 GEOINVEST LTD (CY)
- 4 WASTEMAN & ENVIROTECH LTD (CY)
- 5 GWM-SYSTEMS OY LTD (FI)
- 6 GEOLOGIAN TUTKIMUSKESKUS (GEOLOGICAL SURVEY OF FINLAND) (FI)
- 7 FOUNDATION IHE DELFT (NL)
- 8 SELOR EEIG (NL)
- 9 BOHRLOCHMESSUNGEN (DE)



FP6 Project Catalogue

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**Total cost: € 1 769 517**  
**EC Contribution: € 916 848**

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# WaterWingPower

Enabling Renewable Energy SMEs to Develop Submersible and Cost-Effective Vertical Axis Turbines for Energy Exploitation in Ultra-Low Head Streams

The project focuses on enabling competitiveness and internationalisation of the large European renewable-energy technology sector, mainly dominated by small to medium-sized enterprises (SMEs), with a third of the global market worth more than EUR 5 billion. However, the SMEs in the European RET sector are losing competitiveness compared to their non-European rivals, due to the following: innovative developments outside Europe; a weak European domestic market; as well as environmental and legal constraints. An attempt to make use of the renewable energy in ultra-low head streams, a resource so far unexploited, by employing a vertical-axis water turbine with adjustable but pre-programmed foils has shown promising results, but has simultaneously led to the identification of some technical limitations that must be dealt with before the concept can be industrialised to its potential. These limitations are mainly sub-optimal efficiency and energy outtake, and high maintenance costs due to vibrations.

Our idea is to develop a cost-effective Darrieus-type vertical-axis water turbine, that will efficiently exploit a minimum of 84.3 % of the theoretical available energy to be placed in ultra-low head streams, to increase European production of renewable energy, thus reducing the import and consumption of fossil fuels. This will be a novel design of a highly efficient, hydrodynamically stable, scalable and submersible vertical-axis water turbine with adjustable sturdy foils, with an installed capacity of minimum 200 kW. It will incorporate an innovative, autonomous and efficient constellation of a self-optimising pitch control unit, an embedded sensor configuration and drive motors facilitating real-time fine incremental-angle adjustments of the foils, up to a torque of 1000 NM, at a precision of 0,5 ° relative to the foil carrier, at a delay of maximum 0,1 ms, based on sensing of torque, thus controlling the speed, avoiding vibrations and optimising the energy outtake of the turbine.

- 1 WATER POWER INDUSTRIES AS (NO)
- 2 ALL MOTION TECHNOLOGY AB (SE)
- 3 TECHNOSOFT INTERNATIONAL S.R.L (RO)
- 4 BRØDRENE AS (NO)
- 5 GREENCHOICE (NL)
- 6 SCAN-SENSE AS (NO)
- 7 INSTITUTE FOR ENERGY TECHNOLOGY (NO)
- 8 BUSKERUD KRAFTPRODUKSJON AS (NO)
- 9 TEKNOLOGISK INSTITUTT AS (NO)
- 10 PERA INNOVATION LTD (UK)

**Contract:** 17941  
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**Duration (months):** 30  
**Total cost:** € 1 401 193  
**EC Contribution:** € 723 894

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# AQUAETREAT

Improvement and Innovation of Aquaculture Effluent Treatment Technology

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Collective research

The project examines the feasibility of cost-effective systems for the treatment and valorisation of aquaculture farm effluent, and the re-use of products and by-products of such systems, providing a solid base for reducing the environmental impact of commercial aquaculture and reinforcing the sustainable development of the sector. Systems and applicable technology will be designed, according to well-defined parameters, for installation in three European sites that are geographically and/or environmentally and operationally different. Their efficiency to prevent recipient ecosystem pollution will be verified and monitored through analytic characterisation of water, waste and the recipient's wetland ecosystems. Finally, the system output products and by-products will be fully identified and characterised, accompanied by identification of the potential and means of their further use.

The research programme encompasses a series of interdisciplinary and interconnected work packages which will complementarily contribute to the investigation of the technological, biological, physiological, ecological, environmental and economical aspects related to mentioned topic. The work packages contain well-defined tasks for laboratory investigations (research and technological development (RTD) performers) and/or field work (European fish farms). A specific training technical programme for small to medium-sized enterprise (SME) staff and young European researchers will be developed. This will be accompanied by the application of a capillary dissemination plan to allow the effective transfer of the innovative skills and technology developed by this project to the European aquaculture sector.

A consortium agreement between the participants, regarding the purpose of the collaboration, their interest in the exploitation of the results and IPR management and access, will clearly define all the rights, obligations and responsibilities of the partners. This agreement will be finalised upon implementation of the project, in agreement with the Sixth Framework Programme's (FP6's) rules for participation.

- 1 UNIVERSITA DEGLI STUDI DI LECCE (IT)
- 2 INSTITUT FRANCAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER (FR)
- 3 COMITE INTERPROFESSIONNEL DES PRODUITS DE L'AQUACULTURE (FR)
- 4 HOGHOJ DAMBRUG I/S (DK)
- 5 MARIBRIN S.R.L. (IT)
- 6 STM AQUATRADE S.R.L (IT)
- 7 FEDERATION OF EUROPEAN AQUACULTURE PRODUCERS (BE)
- 8 UNIVERSITY OF WALES SWANSEA (UK)
- 9 INSTITUTE OF GRASSLAND AND ENVIRONMENTAL RESEARCH (UK)

www.aquaetreat.org

**Contract: 500305**  
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**Total cost: € 1 695 847**  
**EC Contribution: € 1 383 741**

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Because of their large companies and customer pressure to comply to the new regulatory framework, around 10 000 European small to medium-sized enterprises (SMEs) operating in the field of electric, electronic and automotive industries have to face increasing information work on their supplies' environmental characteristics, which they are entirely unprepared and not instrumented for. To avoid European SMEs suffering from a zero value added reporting work, as well from customers' top-down environmental and industrial choices, ECODIS will offer them the opportunity to take advantage of this new policy context. In fact, through ECODIS, SMEs will have a genuine opportunity to develop their own product environmental strategy and to ecodesign their products in a life cycle/supply chain approach.

Through ECODIS, SMEs will be provided with an innovative ecodesign tool with:

- adequate supporting tools such as decision aid systems;
- appropriate methodology: POEMS, Product Oriented Environmental Management Systems.

ECODIS-leading IAGs, FP A (EDIT (Eco Design Interactive Tools ) programme) and FIEEC (EIME (Environmental Impacts and Management Explorer ) tool) have collaborated with major leading companies producing automotive equipment (5FP A) and electric/electronic appliances (FIEEC) to develop ecodesign tools since 1999. Within ECODIS, in collaboration with the other IAGs, FP A and FIEEC have decided:

- to exploit the synergies of existing systems: total past investment around 4 000 000;
- to adapt these existing ecodesign systems to current SMEs' needs and capabilities;
- to complement these systems in elaborating "missing" elements;
- to share results between IAGs operating on similar and complementary sectors;

- to train SMEs' management and technical staff;
- to disseminate ECODIS results to the largest European SMEs community and to other industries;
- To this end, ECODIS has built a consortium around major European IAGs and a strong SMEs core group. This consortium is still open and could be enlarged in the second step of the proposal, to involve other member states' IAGs and SMEs, as well as other industries' products.

- 1 FÉDÉRATION PLASTURGIE ACTIVITÉS (FR)
- 2 FÉDÉRATION DES INDUSTRIES ELECTRIQUES, ELECTRONIQUES ET DE COMMUNICATION (FR)
- 3 PROMECA (FR)
- 4 EUROPEAN PLASTICS CONVERTERS (BE)
- 5 MAGYAR VEGYIPARI SZOEVETSEG (HU)
- 6 WETENSCHAPPELIJK EN TECHNISCH CENTRUM VAN DE METAALVERWERKENDE NIJVERHEID (BE)
- 7 ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE EQUIPOS Y COMPONENTES PARA AUTOMOCIÓN (ES)
- 8 SOCIÉTÉ DE DOCUMENTATION, DE GESTION ET DE DÉVELOPPEMENT DES EQUIPEMENTS ET PIÈCES D'AUTOMOBILES ET DE CYCLE (FR)
- 9 ALENCON PLASTIC (FR)
- 10 TETRAS (FR)
- 11 ADDIPLAST (FR)
- 12 PRODHAG PLASTIQUES (FR)
- 13 AGOR GMBH & CO. KG (DE)
- 14 WIPAG SUED GMBH & CO KG (DE)
- 15 ARK HUNGARY PLASTIC PROCESSING LTD LIABILITY COMPANY (HU)
- 16 MIKROPÁK MŰANYAG ES FEMFELDOLGOZO KFT (HU)
- 17 SOLECO (FR)
- 18 MARMONIER S.A. (FR)
- 19 PE EUROPE GMBH (DE)
- 20 TECHNOLOGIEENTWICKLUNGS GMBH FÜR OKÖFFIZIENTE POLYMERVERWERTUNG (DE)
- 21 TECHNIDATA AG (DE)
- 22 PLASTURGIE SERVICES (FR)
- 23 ASSOCIATION FRANÇAISE DE NORMALISATION (FR)
- 24 COMFR (UK)
- 25 CENTRE TECHNIQUE DES INDUSTRIES MÉCANIQUES (FR)

**Contract: 500779**  
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# GREENROSE

## Removal of Hazardous Substances in Electronics: Processes and Techniques for SMEs

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Collective research

Electronic devices have been used by consumers and have been steadily increasing in production and service for many years, contributing to economic growth. But with this growing volume, there is rising concern about the environmental effects of the production, use, and disposal of electronic products. This project covers research, development and implementation of hazardous substances-free technology as a basis for small and medium-sized manufacturers of electrical and electronic products. Mastering such "green" technology is necessary for the existence, competitiveness and development of European electronic small to medium-sized enterprises (SMEs).

The scientific and industrial partners will collate and develop relevant knowledge. This will be used to carry out case studies incorporating hazardous substances-free assembly of targeted products, selected among members of partner industrial associations or groupings (IAGs). The results will be used to organise training and workshops, and disseminated to the whole sector through publications in European and national technical journals, international conference presentations and in electronic form.

These activities will ultimately create a "Virtual Academy" to deliver technical tools and guidelines. A pilot production facility, including automated and manual assembly, will increase practical experience and technical knowledge, especially with regard to lead-free soldering processes and accompanying conditions such as emissions, reliability and working conditions.

The proposed project will contribute to expanding the knowledge base of a very large group of European SMEs being confronted with new challenges. It will increase their awareness of sustainable technology development, taking into account not only technical and economical but also environmental and social issues (working conditions and safety), as well as the legislative requirements. This knowledge will help them meet future challenges and market demands.

As a final objective, the project aims, in a proactive dissemination (technology transfer) approach, through the network of Industrial Associations and Groupings, to help small and medium-sized enterprises in associated countries not represented in the consortium. This will help them meet future challenges in the field of environmentally benign electronics, through continuous improvement for an expanding European and global market.

- 1 ABELIA (NO)
- 2 CHAMBER OF COMMERCE AND INDUSTRY OF SLOVENIA (SI)
- 3 TECHNISCHE UNIVERSITÄT BERLIN (DE)
- 4 SINTEF - STIFTELSEN FOR INDUSTRIELL OG TEKNISK FORSKNING VED NORGES TEKNISKE HOEGSKOLE AS (NO)
- 6 JOZEF STEFAN INSTITUTE (SI)
- 7 ITRI LTD (UK)
- 8 CRAWFORD, HANSFORD AND KIMBER LTD (UK)
- 9 INSTYTUT TELE- I RADIOTECHNICZNY (PL)
- 10 ELDOS SP.Z O.O. (PL)
- 11 IVF INDUSTRIFORSKNING OCH UTVECKLING AB (SE)
- 12 FACHVERBAND ELEKTRONIK DESIGN E.V. (DE)
- 13 SVENSKA ELEKTRONIKINDUSTRIFORENINGEN (SE)
- 14 LET'S TRAIN A.S. (NO)
- 15 INSTITUTE OF SOLID STATE PHYSICS OF UNIVERISTY OF LATVIA (LV)
- 16 HIPOT - RR RAZISKAVE IN RAZVOJ TEHNOLOGIJ IN SISTEMOV D.O.O. (SI)
- 17 PROSOL ELECTRONICS LTD (UK)
- 18 NEWCAD AS (NO)
- 19 SEMICON SP. Z O.O. (PL)
- 20 RADOMSKA WYTWORNIA TELEKOMUNIKACYJNA S.A. (PL)
- 21 HIPOT - P & EMS PROIZVODNJA ELEKTROMEHANSKIH SISTEMOV D.O.O. (SI)
- 22 HIPOT-HYB PROIZVODNJA HIBRIDNIH VEZIJ D.O.O (SI)
- 23 HANZAS ELEKTRONIKA SIA (LV)
- 24 CYNEL UNIPRESS SP. Z.O.O. (PL)
- 25 UNIONE DEGLI INDUSTRIALI DELLA PROVINCIA DI PADOVA (IT)
- 26 LVN ELECTRICAL ENGINEERING AND ELECTRONICS INDUSTRY ASSOCIATION (LV)
- 27 KRAJOWA IZBA GOSPODARCA ELEKTRONIKI I TELEKOMUNIKACJI (PL)
- 28 POLITECHNIKA WARSZAWSKA (PL)

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**EC Contribution: € 2 216 917**

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# LABELAGRIWASTE

## Labelling Agricultural Plastic Waste for Valorising the Waste Stream

The extensive and expanding use of plastic in agriculture results in increased accumulation of plastic waste in rural areas. The majority of this waste is left on the field or burnt uncontrollably by the farmers, releasing harmful substances. Although it is mandatory, only a small percentage of agricultural plastic waste is collected, recycled or used for energy recovery, due to the high collection cost and the low value of the collected product. If the collected plastic waste meets certain specifications (i.e. cleanliness, composition, properties) by being collected and handled properly, and is tested (that it meets the required specifications) and labelled accordingly, it can be transformed into a valuable commodity.

The scope of this prenormative research work is to develop and integrate the collection, sampling and labelling procedures, and the methodologies to valorise the agricultural plastic waste streams by facilitating their routing to the best disposal alternative (technically feasible, most environmentally friendly and economically valuable). The labelling, in addition to facilitating and improving the efficiency of the disposal alternatives, will allow transport of labelled agricultural plastic waste across boundaries and valuation of the waste streams in an open European market, simultaneously preserving valuable material resources and protecting the environment.

The technical requirements of waste streams for each disposal alternative will be developed, as well as the methodology (use and collection) to reach these requirements. This will provide the farmer small to medium-sized enterprises (SMEs) with clean guidelines on how to collect and sort the waste to reach the specifications. Waste sampling and labelling methodology will be developed and field-tested. The marketability of the product "waste" resulting from the standardisation will provide strong incentives to achieve 100 % waste collection rates, resulting in a cleaner environment.

- 1 AGRICULTURAL UNIVERSITY OF ATHENS (GR)
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- 3 CICLOPLAST S.A. (ES)
- 4 PANHELLENIC CONFEDERATION OF UNIONS OF AGRICULTURAL COOPERATIVES (GR)
- 5 FEDERAZIONE REGIONALE AGRICOLTORI DI PUGLIA (IT)
- 6 FEDERATION REGIONALE DES COOPERATIVES D'UTILISATION DU MATERIEL AGRICOLE DE MIDI-PYRENEES (FR)
- 7 PANAGROTIKOS SYNDESMOS CYPRUS (CY)
- 8 ALFA EDILE S.R.L. (IT)
- 9 INDUSTRIA SEVILLANA RECICLAJE DE PLASTICOS S.L. (ES)
- 10 P.A.T.I. S.P.A. (IT)
- 11 SUOMEN UUSIOMUOVI OY (FI)
- 12 POLYECO S.A. MANAGEMENT AND VALORIZATION OF WASTE INDUSTRY (GR)
- 14 EUROPEAN PLASTICS CONVERTERS (BE)
- 15 CENTRE NATIONAL DU MACHINISME AGRICOLE, DU GENIE RURAL, DES EAUX ET DES FORETS (FR)
- 16 FUNDACION GAIKER (ES)
- 17 UNIVERSITA DEGLI STUDI DI BARI (IT)
- 18 UNIVERSITAET STUTT GART (DE)
- 19 TITAN CEMENT COMPANY SA (GR)

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# TESS

## Speciality Chemicals-Manufacturing SMEs: Toolbox to Support Environmental and Sustainable Systems

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Collective research

The present proposal focuses on the Speciality and Fines sector of the European Chemicals Industry. The 20 000 small to medium-sized enterprises (SMEs) operating here represent 94 % of all manufacturers and formulators, contributing EUR 157 billion to European GVA each year.

Following a major review of the EU's chemicals policies, these manufacturers and formulators are under increasing pressure to produce, in a sustainable manner, chemical products which are ecologically safe and of low risk to health. In particular, the imminent REACH legislation (Regulation, Evaluation, Authorisation of Chemicals) seeks innovation in the assessment and categorisation of all chemicals manufactured in Europe, in terms of their toxicological and health impacts.

However, SME experience tends to revolve around traditional product lines and this group will experience difficulty and high costs in innovating their manufacturing in keeping with the new imperatives. Survival may be threatened, particularly in speciality and fines where a large grouping produces a multiplicity of products, all needing attention. Research will be focused here, on the sustainability issues surrounding REACH. Green chemistry alternatives will be introduced and innovative supply chain configurations developed around them, offering enhanced approaches to sustainability.

A methodology will be developed to provide support to SMEs in migrating towards REACH-compliant and sustainable futures. It will be the basis of an online, self-help toolbox incorporating the research knowledge generated above. It will provide SMEs with an entry point from which to identify gaps in their current level of preparedness, and signpost approaches and tools to enable them to move cost effectively to the more sustainable supply chains essential for the future.

Dissemination and training will be key aspects of TESS, leading to awareness of the issues and stimulating take-up and use of the toolbox by

SMEs. Initial industrial use is planned for the later stages of TESS and the partners will support more intensive exploitation for an extended period after project completion.

www.reach-serv.com

- 1 CHEMICALS INDUSTRIES ASSOCIATION (UK)
- 2 EUROPEAN CHEMICAL INDUSTRY COUNCIL (BE)
- 3 FEDERATION OF BELGIUM CHEMICAL INDUSTRIES (BE)
- 4 FEDERCHIMICA - FEDERAZIONE NAZIONALE DEL INDUSTRIA CHIMICA (IT)
- 5 CHEMICAL INDUSTRY FEDERATION OF FINLAND (FI)
- 6 BRITISH ASSOCIATION FOR CHEMICAL SPECIALITIES (UK)
- 7 VERENIGING VAN DE NEDERLANDSE CHEMISCHE INDUSTRIE (NL)
- 8 ORGANICA FEINCHEMIE GMBH (DE)
- 9 UNIVERSITY OF YORK (UK)
- 10 ARRAN CHEMICALS LTD (IE)
- 11 ROBINSON BROTHERS LTD (UK)
- 12 VANTACO OY (FI)
- 13 VICKERS LABORATORY (UK)
- 14 UNIVERSITY OF HULL (UK)
- 15 GHENT UNIVERSITY (BE)
- 16 TECHNICAL RESEARCH CENTRE OF FINLAND (VTT) (FI)
- 17 CITY UNIVERSITY LONDON (UK)

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# FP6 Project Catalogue

Forestry

# BIO-SHELTER

A Novel, Innovative and Sustainable Technique for the Manufacture Of Biodegradable Tree Shelters with a Known Life

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Co-operative research

Each year, 80 000 deaths are caused worldwide by natural disasters triggered by weather: hurricane Mitch killed 7 500 in Honduras; China experienced flooding, killing 4 000 people; and India had 10 000 deaths caused by cyclone Orissa. Human activities have polluted the atmosphere to the extent of being able to affect the climate: the atmospheric concentration of carbon dioxide has risen to 31 %, causing more heat to be trapped, leading to global warming and changing weather patterns. One way to reduce carbon dioxide in the atmosphere is through the use of forests to create effectively carbon banks. Trees absorb the carbon dioxide, which is converted into carbon and stored as biomass. Young trees grow more rapidly and hence absorb more gas. Afforestation is a recognised method for carbon dioxide sequestration and can be used as mitigation under the Kyoto agreement.

Our idea is to use natural bio-degradable materials such as flax and hemp in conjunction with a tuned polymer matrix, which has a set life determined by its molecular structure, which will break down and biodegrade naturally with no harmful by-products to produce a lower-cost maintenance-free tree shelter. It is estimated that the market for tree shelters is worth EUR 400 million worldwide, with 25 % of the market in Europe, giving a European market value of EUR 100 million each year.

The major societal and policy objectives are to improve the quality of life for our citizens. This will involve:

- improving the yield of new tree plantations, to absorb 25 % more carbon dioxide for the same plantation area, through the use of tree shelters;
- producing a tree shelter, which fully composts — by microbial action — harmlessly into the soil within two months of its triggered breakdown.

The economic objectives to improve competitiveness are as follows:

- to create a domestic European sales market of EUR 100 million in five years post-project end, creating 800 jobs;
- to create an export market worth EUR 50 million in five years post-project end, creating 400 jobs;
- to displace EUR 40 million of inferior imports, safeguarding 330 jobs.

www.biocycle.co.uk

- 1 DAVID LLOYD CONTRACTORS LTD (UK)
- 2 HEMCORE LTD (UK)
- 3 ADEPT POLYMERS LTD (UK)
- 4 POLINTER S.A. (ES)
- 5 S.A.R.L. FLORIADES DE L'ARNON (FR)
- 6 PERA INNOVATION LTD (UK)
- 7 VTT TECHNICAL RESEARCH CENTER OF FINLAND (FI)
- 8 BUCHEM B.V. (NL)



FP6 Project Catalogue

Contract: 513116  
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EC Contribution: € 481 994

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# FORSTINNO

## Development of an Ecologically Compatible, Highly Productive Method of Timber Harvesting for Central European Forestry

The objective of this project is the development of ecologically compatible and highly productive timber harvesting techniques for central European forestry. The demand made of modern forestry is that it must work, under humane working conditions, in a highly productive manner, which is, however, environmentally friendly. In the project forstINNO, the special conditions and techniques will be worked out in the form of models for central European circumstances, the required means of work assembled, and the necessary purpose-built forest machines manufactured. The topics — processes of timber harvesting and transportation, economic efficiency and productivity, as well as environmental aspects and humanisation of the work place — are the focus of this project.

The subject of the scientific investigations are the geobotanical, orographic and edaphic parameters in the various participating central European states. Building upon these investigations, the following innovative ideas shall be developed along the process chain in the forest:

- innovative harvester technology for a highly productive method of timber harvesting;
- the harvesting of broad-leaved trees in central Europe;
- environmentally compatible timber harvesting with innovative transportation technology, having low pressure on the soil;
- use of a differentiated Global Positioning System (dGPS) for process optimisation of timber harvesting (telematic);
- design of the workplace with consideration for ergonomic and safety aspects.

The scientific and technical objectives of the project forstINNO come together:

- in the manufacturing of selected assembly groups and elements for prototypes of

purpose-built forest machines, such as harvesters, equipped with innovative harvester heads, and forwarders;

- in the formulation of sample work processes and organisation sequences for timber harvesting which are based on regional distinctions, in consideration of the following:
  - environmental compatibility,
  - economic efficiency and productivity,
  - humanisation of the work place and increase of safety (investigations related to noise, vibrations, stress, monotony, risk of loneliness).

For the competitiveness of the participating central European small to medium-sized enterprises (SMEs), the planned project forstINNO is an excellent example of an application-oriented technology transfer in Europe.

- 1 HOHENLOHER SPEZIAL-MASCHINENBAU GMBH & CO. (DE)
- 2 KONRAD ADLER GMBH & CO.KG (DE)
- 3 CTL TECHNOLOGY GMBH (DE)
- 4 S.C. ROTECA S.R.L. (RO)
- 5 CO. TREE WOOD HARVESTING (UK)
- 6 FOREST TECHNICAL LTD (UK)
- 7 NOVOTNY GMBH (CZ)
- 8 TECHNISCHE UNIVERSITÄT DRESDEN (DE)
- 9 LIETUVOS ŽEMŲŲ UKIO UNIVERSITETAS (LT)
- 10 NYUGAT-MAGYARORSZÁGI EGYETEM (HU)
- 11 AKADEMIA ROLNICZA IM AUGUST CIESZKOWSKIEGO W POZNANIU (PL)
- 12 ASSOCIATION FORÊT CELLULOSE (FR)
- 13 IMK ENGINEERING GMBH (DE)
- 14 MTN MECHANICAL TECHNOLOGY NEIER (DE)
- 15 IUP DESIGN (DE)

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**Call: FP6-2002-SME-1**  
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**EC Contribution: € 1 081 958**

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# PRE-FOREST

A New European Technology for Cost-Efficient and Environmentally Friendly Production of Pre-Cultivated Forest-Regeneration Materials

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Co-operative research

The PRE-forest project objectives are as follows:

- to introduce an innovative technology for production of forest regeneration material, and build on new technology for pre-cultivation (in mini-plugs) of forest regeneration materials, in a cost-efficient and environmentally friendly production unit;
- to develop a new technology for a grading and transplanting robot adapted to mini-plugs;
- to integrate these technologies into a functional, flexible system for large-scale production of pre-cultivated forest regeneration materials adapted to mechanical transplanting;
- to introduce this system at strategic locations in Europe.

The objectives will be achieved by basic technological, economical and biological studies during the first year. These studies will be the foundation to the development of a prototype pre-cultivation system adjusted to operational production at each of the small to medium-sized enterprises (SMEs) during the second year of the project.

The new technology can be used in all kinds of tree nursery production, with emphasis on the production of pre-grown forest regeneration materials.

The competitiveness of the SME proposers in the nursery market will be improved by applying the new technology, given that the SME will be able to reduce the functional costs of their units, increase the flexibility of the SME to market demands, improve the quality of their production, and decrease the use of chemicals and other inputs, such as energy and space.

Furthermore, the new technology being proposed will benefit biological diversity at species and genetic level.

The new technology will be expanded to strategic locations in other areas of Europe for production of various pre-grown forest materials that will be distributed in mini-plug trays to different nurseries in each area for transplanting and further growth.

- 1 VIVAI TORSANLORENZO SOCIETÀ AGRICOLA SEMPLICE DI MARGHERITI M. & CO. (IT)
- 2 QS FOREST & GARDEN AB (SE)
- 3 DYTIKOMAKEDONIKA FYTORIA (GR)
- 4 UNIVERSITÀ DEGLI STUDI DELLA TUSCIA (IT)
- 5 HOGSKOLAN DALARNA (DALARNA UNIVERSITY) (SE)
- 6 NATIONAL AGRICULTURAL RESEARCH FOUNDATION (GR)



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# COMFOR

## Collective Work Science Approach to Solving the Common Problems of Occupational Health and Performance in European Forest Operations SMEs

COMFOR will carry out research to develop an innovative knowledge transfer concept on behalf of forest operations small to medium-sized enterprises (SMEs). This will enable the adoption of ergonomically effective work practices, and will mitigate the problems of poor occupational health and economic performance. COMFOR will create added value through a more competitive and sustainable forestry workforce.

The change to outsourcing of forest operations, mechanised harvesting and poor financial returns are having a major effect on forestry SMEs throughout Europe. As a result of these structural changes, the occupational health problems in forestry work and economic pressure on SMEs are increasing.

Current ergonomic research provides answers for healthier working practices which also improve performance. However, putting science into practice is difficult for these SMEs, who face practical and financial barriers to changing their way of working and are not in a position to undertake research and development themselves.

To achieve its objective, COMFOR has gathered a consortium of 10 core SMEs, led by 2 industrial associations or groupings (IAGs), 3 universities and 6 field-based research and technological development (RTD) performers from across north, west-central and east Europe. The consortium, directed by the core SMEs, will undertake a three-year pan-European project of integrated work science research linked to the most effective ways of transferring knowledge to forestry operations SMEs. This will include new research into the impact of structural change across the European wood supply chain, the economic benefits of ergonomic investment and the learning patterns of SMEs. The main output will be an innovative knowledge transfer package for the improvement of health and performance, customised for SMEs operating in three European regions.

Core SMEs will trial the knowledge transfer package and the results will be disseminated widely to the forestry industry and other stakeholders. National IAGs will be trained in knowledge-transfer best practice, thus building capacity across Europe.

- 1 EUROPEAN NETWORK OF FOREST ENTREPRENEURS (DE)
- 2 QUALIFIZIERUNGSFONDS FORSTWIRTSCHAFT E.V. (DE)
- 3 SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES (SE)
- 4 WARSAW AGRICULTURAL UNIVERSITY (PL)
- 5 ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG (DE)
- 6 FORESTRY COMMISSION SCOTLAND (UK)
- 7 ASSOCIATION FORET CELLULOSE (FR)
- 8 KURATORIUM FUER WALD UND FORSTARBEIT (DE)
- 9 DELO - ORGANISATIONSBERATUNG (DE)
- 10 HUDSON CONSULTING LTD (UK)
- 11 WALDWIRTSCHAFT JACOB OHG (DE)
- 12 SUNDGAUBOIS (FR)
- 13 HARPERS HARVESTING & TRANSPORT (UK)
- 14 DYDUCH C. SP ZO.O (PL)
- 15 IL FOREST (RO)
- 16 WAND ENTERPRISES (IE)
- 17 GEBR. ZWEVERINK B.V. (NL)
- 18 METSAERAUKOINTI PIIRAINEN OY (FI)
- 19 DUNBERGS SKOGSSERVICE AB (SE)
- 20 GORHIN LTD (BG)
- 21 FOREST RESEARCH INSTITUTE OF POLAND (PL)

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# FP6 Project Catalogue

ICT & Electronics

# AIRSECURE

Risk-Based Detection and Protective Filtration System for Airports against Airborne Chemical, Biological or Radiological Hazards

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Co-operative research

The fear of terrorist attacks against civil targets has increased recently. One of the most frightful scenarios is the use of airborne chemical, biological or radiological (CBR) weapons against unprotected civilians. Of particular concern are airports, where such an attack may cause extensive injury and severely impact on the aviation industry and the whole economy of the European Union.

High-efficiency filtration is one of the few measures that can be implemented in advance to reduce the consequences of intentional CBR agent release. However, due to the high pressure drop, large space requirements and the high initial and operating costs, the present high-efficiency filters are not practical solutions for existing buildings. Moreover, their installation would need costly and time-consuming renovation of the whole ventilation system. The AIRSECURE system will improve the security of passengers and workers at airports using a comprehensive approach, including risk analysis for identifying high-risk areas, novel protective filtration systems, proper air distribution, and detectors for early warnings of threat.

The main idea of the AIRSECURE solution is to combine promising new filtration technologies for removal of both particulate and gaseous hazardous agents with a protective filtration unit. These distributed units can be flexibly and quickly installed in the supply air of the high-risk areas. The very low flow resistance of the filter allows its installation without extensive modifications to the ventilation systems. New particle detectors will be developed to monitor the performance of the filtration system for maximum security. The optimum number and location of both particle and gas detectors and protective filtration systems are based on risk analysis. The secure air-filtration and advanced warning systems can deter the attacks and reduce the effects of a CBR agent release by removing the toxic agents from the air supply of the building.

The project will generate new business areas for the participating small to medium-sized enterprises (SMEs). The project partners are able to use their existing know-how to generate the new system that offers a totally new approach into securing the quality of the air in an airport terminal in crisis situations. There are no existing solutions of this kind, but due to the insecure times, such systems are bound to enter the market in the coming few years. This project gives the participating small companies a unique possibility to combine their efforts and to utilise the expertise of the participating research institutes. The feasibility of the system is assured by the end-users that participate in the project as advisors and/or through providing their premises as test sites.

- 1 LIFA AIR LTD (FI)
- 2 I.E.C.A. ITALIA S.P.A. (IT)
- 3 SANI-DUCT INSTALLATIONS LTD (UK)
- 4 DEKATI OY (FI)
- 5 SMITHS DETECTION WATFORD LTD (UK)
- 6 VALTION TEKNIINEN TUTKIMUSKESKUS (VTT) (FI)
- 7 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK (TNO) (NL)



FP6 Project Catalogue

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**Duration (months):** 26  
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**EC Contribution:** € 772 000

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# Aladdin

## Mobile Destination-Management for SMEs

European small to medium-sized enterprises (SMEs) in the tourism and travel industry in the destination area are facing serious challenges from large international companies. Incoming-tour operators, tourist offices, restaurants and museums are typically SMEs which need to provide different services for the same customer, the tourist, in an cost-efficient but attractive way. For incoming agencies, optimised tour-transfer setups, tailored offers and the handling of last-minute changes for hotel-bookings are key issues to bear in mind, considering the near-future upcoming trends of mixed individual and group travelling and highly volatile business processes (last-minute bookings and changes of hotels and flights) that will increase the process complexity and therefore the costs. In addition, due to the rapid growth of mobile terminals (smart phones, pocket PCs), there will be also a substantial mobile market for leisure services in the destination area, but highly different device types make it almost unaffordable for service SMEs to participate in this new mobile marketplace.

Aladdin aims at developing a mobile destination system that combines both the provisioning of a mobile incoming tour operator workspace and mobile content and service management for the destination area. The Aladdin Destination Management System will provide, on the one hand, incoming tour operators with an optimised and cost-efficient mobile workspace that supports their business processes and allows small companies to compete with larger incoming-tour operators, and on the other hand aims to allow SMEs in the destination area, such as local service and commercial companies, to offer their services and content to customers in an attractive and easily accessible way.

In so doing, Aladdin will consider different usage scenarios, considering, on the one hand, an ageing society with the growing demand for safety, and on the other a young generation with their well-established mobile behaviour. Extensive dissemination in the public and scientific area will be the basis for good exploitation efforts. In addition, the lack of competition so far in the area of mobile applications for tour guides

opens a promising market for a standard product that will ensure that Aladdin is successful beyond this Co-operative Research project.

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Co-operative research

- 1 ISO SOFTWARE SYSTEME GMBH (DE)
- 2 YELLOWMAP AG (DE)
- 3 LANGUAGE TECHNOLOGY CENTRE LTD (UK)
- 4 UNIVERSITAET STUTTGART (DE)
- 5 UNIVERSITY OF ST GALLEN (CH)
- 6 INCOMING TOURISM SCANDINAVIA ITS AB (SE)
- 7 UNIVERSITY OF VESZPREM (HU)
- 8 ATLASZ WORLD TRAVEL IDEGENFORGALMI KFT (HU)
- 9 WOTEG WOLFGANGSEE TOURISMUSENTWICKLUNG GMBH (AT)
- 10 FHS KUFSTEINTIROL BILDUNGS GMBH (AT)
- 11 TOURISMUSVERBAND WILDSCHOENAU (AT)

<https://www.aladdin-project.org>

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Due to the enormous increase in stored digital content, any IT device must provide effective and intelligent search-retrieval functionality. Today, in order to retrieve a few relevant kilobytes (KB) from a large digital store, one moves in and out several (hundred) gigabytes (GB) between memory and processor over a restricted size band bus.

The only long-term solution is to delegate this task where it belongs: to the storage medium itself. By supporting at lowest level simple "broadband" micro-operations performed in parallel, the AMASS platform will provide a hardware platform for error-tolerant storage and retrieval of electronic objects described by a set of binary features.

The encoding and decoding of objects into and from binary features is performed externally on a general-purpose machine using current software tools. While encoding (indexing) is usually slower and performed offline, the retrieval phase and the evaluation of the response to a query or chain of queries sets stringent real-time requirements. By identifying and moving the most time-consuming retrieval processes to a hardware platform, this project aims at creating new application-oriented solutions for content-addressable database retrieval, ontology-based intelligent Internet indexers, and multimedia storage management using standard formats (i.e. MPEG7).

The main goal of the project is to develop the HW/SW intellectual property (IP) cores and platforms for implementing a general-purpose associative dynamic memory for storing and retrieving binary feature descriptors in silicon platforms.

This includes creating the general IP and system framework. Beyond developing an abstract hardware and software hybrid model supporting sophisticated pattern recognition and search tasks, the projects also targets a system design approach for a few concrete application fields, as required by small to medium-sized enterprise (SME) business domains. The project will deliver a Demonstrator for content-based text retrieval system. It includes the corresponding

IP core design and exploitation methodology, the system software, and the middleware resources needed by the full application for the three different companies and application domains. Based on this general architecture, AMASS will produce application-specific platforms for database, multimedia and Internet semantic search.

The hardware platform does not imply a fixed silicon implementation. In this project, both hardware and software processes will be mapped into prototyping platforms in order to determine the optimal balance between performance and cost, keeping the option to change or update both reconfigurable hardware and programmable software. This is possible because FPGA chips allow for downloading hardware, software, or even processor code. The price of these devices, counted per logic gate and Megahertz, is very competitive for devices requiring less than 100 000 units per year, as in our case. Furthermore, FPGA development platforms provide the fastest and most cost-effective entry on ASIC or standard technology mass-products by directly mapping functional entities into silicon structures.

- 1 LCI GMBH (DE)
- 2 INTELLIGENT SOFTWARE COMPONENTS S.A. (ES)
- 3 VISUAL CENTURY RESEARCH S.L. (ES)
- 4 UNIVERSITÄT ULM (DE)
- 5 UNIVERSITAT AUTÓNOMA DE BARCELONA (ES)
- 6 KEPLER RÖMINFO (RO)
- 7 UNIVERSITATEA ALEXANDRU IOAN CUZA (RO)





# AMI-SME

## Analysis of Marketing Information for Small and Medium-Sized Enterprises

Enterprises wanting to enter new markets with their products have a strong requirement to collect and analyse information (e.g. about target markets, customer needs, potential competitors, laws, rules and pending patents) to support marketing decisions. This task needs special know-how and considerable efforts, that exceed the capacity of small to medium-sized enterprises (SMEs). Today a vast amount of information is offered by research institutes, by information specialists and of course from the Web. Search and use of this information turns out to be difficult, because it is hard to ask questions regarding a foreign market, which is completely or partly unknown. Today these questions have to be answered by information specialists, but SMEs cannot afford extensive market research.

Therefore AMI-SME aims to provide a solution for the specific information requirements of SMEs, which need to acquire sound information as a base for decisions in the field of marketing and sales. This solution will consist of a software package and an organisational concept.

- An information agent that analyses digital information within the enterprise, at information providers, and on the Web. This system will work context-sensitively in terms of considering the role and the experience of the individual conducting the search, as well as the current business process.
- A methodological toolbox for SMEs to gather and document marketing information, making use of the potential state-of-the-art technology. AMI-SME will develop, adapt and evaluate this support system for SMEs, which will assist marketing and sales activities through collection and analysis of market information.

The benefits are described below.

- A simplified and speedy search for information on new markets. This search can be performed by employees inexperienced in the target market.
- Extraction of collected data, based on semantic analysis of documents.
- Simplified documentation of market information, addresses, products, etc. The solution will be implemented according to SME needs.

- 1 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 2 BIOZOOM GMBH (DE)
- 3 CENTRE INTERNACIONAL DE MÈTODES NUMÈRICS EN ENGINYERIA (ES)
- 4 FONDAZIONE GRAPHITECH (IT)
- 5 INSTYTUT INŻYNIERII INFORMATYCZNEJ SP. Z O.O. (INSTITUTE FOR COMPUTER AND INFORMATION ENGINEERING LTD) (PL)
- 6 INTRACOM GMBH (DE)
- 7 KMA KNOWLEDGE MANAGEMENT ASSOCIATES GMBH (AT)
- 8 QUANTECH ATZ S.A. (ES)
- 9 SEMTATION GMBH (DE)
- 10 CIAOTECH S.R.L. (IT)
- 11 POLITECHNIKA WARSZAWSKA (PL)
- 12 PROF. DR GERHARD HEYER (DE)
- 13 FHS KUFSTEINTIROL BILDUNGS GMBH (AT)

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# ASSIST

## Knowledge-Based Intelligent Design Assistant

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Co-operative research

The ASSIST project is aimed at achieving a breakthrough in the use of advanced agent-based knowledge management techniques in real industrial practice, within an innovative ICT solution that is affordable to small to medium-sized enterprises (SMEs). The main business aim is to make a leap forward in industrial design performance in SMEs. Knowledge useful to design engineers comes in many forms and useful knowledge can come from many sources inside and outside the SME. A common need amongst SMEs is to be able to acquire and process this knowledge so that a greater, richer, centralised source of knowledge and information is available to produce better designs, faster, with greater innovation, and with less re-inventing of the wheel. The most important needs of SMEs with regard to design are to get good products to the marketplace quicker, and to reduce costs related to design.

ASSIST is a unique agent-based knowledge-management approach, meeting these needs. Knowledge is key to this, as the right knowledge and ideas in a well-structured form will help designers to improve their design performance. With the wide diversity of knowledge to be acquired, managed and processed, this requires research into the latest thinking in terms of semantic- and context-sensitive knowledge. It requires investigation into agent-based knowledge-management systems that can understand the knowledge and the environment from which it stems.

ASSIST will develop an approach to be able to understand the semantics of the knowledge that it acquires, to be able to effectively manage it for the designers. This will enable ASSIST to effectively process context-specific knowledge, which exists in the industrial design domain, and to be able to process it into useful forms and present it to designers in a structured manner. The results will be the ASSIST methodology and prototype ASSIST system, implemented in seven demonstrators.

[www.labein.es/assist](http://www.labein.es/assist)

- 1 FUNDACION LABEIN (ES)
- 2 NORBERT BINKE UND PARTNER UNTERNEHMENSBERATUNG GMBH (DE)
- 3 CHARLES ROBINSON (CUTTING TOOLS) LTD (UK)
- 4 PRAESENTIS S.L. (ES)
- 5 RODOS AIR LTD (GR)
- 6 TÉCNICAS DE CALENTAMIENTO S.L. (ES)
- 7 THIELE SPEZIAL KAROSSERIEBAU GMBH (DE)
- 8 ASSANAKIS A&K CO. (GR)
- 9 INSTITUT FÜR ANGEWANDTE SYSTEMTECHNIK BREMEN GMBH (DE)
- 10 INTEGRATED INFORMATION SYSTEMS S.A. (GR)



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# CADPIPE

## CAD Production Pipeline

The CADPIPE project will create efficient tools to speed up and to simplify the laborious manual work sequences between 3-D CAD (Computer Aided Design) design and visualisation phases — especially when near photo-realistic visualisation quality is expected in real-time environment, e.g. in virtual reality visualisation. At this moment, high-quality visualisation is not supporting interactive 3-D design.

The reason for this is the time required and the expensive manual work needed after the design phase and before the visualisation. Normally, the visualisation business starts with a massive 2-D or 3-D CAD file, meant for design or production purposes. The whole production chain leading to visually attractive, light 3-D files is very expensive and time-consuming hand work.

The huge amount of visually meaningless tiny details, too complicated representations of many simple objects (e.g. circle or sphere) and the lack of visual lighting, dependent on the properties of surfaces and textures are the main causes of problems and poor visual quality. In addition, the files generated by conventional design tools do not take into account the needs of real-time visualisation software and the capabilities of accelerated 3-D graphic boards. CADPIPE project is targeting a production chain that will be as automatic as possible, for at least three of the commonest CAD file formats.

The production pipes ends each up to the most standard, visually powerful file format, ready for shooting by 3-D engines.

This problem in real-time rendering is worldwide, and solving it is not possible without wide European cooperation in the field.

The CADPIPE project aims to build solutions for the following.

1. Decreasing the amount of different working environments to CAD, 3-D visualisation and real-time rendering environment. There will be no longer be a need to use separate format conversion tools between CAD and 3-D visualisation tools, as well as visualisation tools and the real-time rendering system.
2. A smoother data conversion pipeline that allows more accurate information preservation within the pipeline.
3. The possibility to add basic interactive and physical behaviour properties to the models in the 3-D visualisation phase.
4. More efficient real-time rendering performance for the data, so it can be prepared in the modelling or visualisation tool to suit the needs for real-time rendering.

This will be achieved through:

1. research on the state of the art in real-time parametric surface-rendering techniques and the data reduction algorithms for efficient real-time data display, present CAD production pipelines and standards;
2. development of the surface property database and material editing tool;
3. development of the spatial database;
4. development of an Export/Import tool for the Visual Editor tool-set for multiple (at least



three) selected open or standard formats (IGES, STEP, VRML, OpenFlight, DXF/DWG (Autocad), 3DS (Kinetix), STL, Universal 3D, X3D or some other) to a selected CAD modelling tool as well as the development of the XML description standard and development of the interactivity tool;

5. development of spatial database manipulation tools.

<http://cadpipe.vtt.fi>

- 1 VTT - TECHNICAL RESEARCH CENTRE OF FINLAND (FI)
- 2 SENSE TRIX LTD (FI)
- 3 NIKI INFORMATION TECHNOLOGIES LTD (GR)
- 4 DELTACAD (FR)
- 5 INFOTRON A.S. (TR)
- 6 DESKARTES OY (FI)
- 7 INGENIERÍA Y SOLUCIONES INFORMÁTICAS DEL SUR S.L. (ES)
- 8 SIENABIOGRAFIX SR.L (IT)
- 9 MELON TECHNOLOGIES JSC. (BG)
- 10 NEMETSCHKE OOD (BG)
- 11 TESTALUNA SRL (IT)
- 12 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 13 EGE UNIVERSITY, INTERNATIONAL COMPUTER INSTITUTE (ULUSLARARASI BILGISAYAR ENSTITUSU) (TR)
- 14 MIRALAB, UNIVERSITY OF GENEVA (CH)



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 Call: FP6-2002-SME-1  
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 Duration (months): 27  
 Total cost: € 1 615 496  
 EC Contribution: € 980 390

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# CALM TRACKS AND ROUT

Innovation of Noise Barriers: Improved Noise Abatement for Motorways and Railway Tracks

The European Parliament and Council have established new standards of tolerance regarding traffic noise: reduction of dB (A) to current standards. To meet these improved environmental standards, more effective noise barriers are requested, as are better noise abatement technologies, new absorptive materials and higher sound screens, and eventually tunnels will be necessary. Impacts of traffic noise are widespread and harmful to people (heart attacks, stress, inability to sleep, aggravated aggression). Noise is the biggest challenge in towns and the countryside, and it needs to be lessened.

Our project deals with noise protection walls with improved noise-shielding abilities, through special shaping and the new absorptive qualities of materials and construction. The objectives are to achieve essential improvements in the shielding performance, acoustic quality and psycho-acoustic performance and innovative design of noise barriers. Building upon the innovations and improved effect achieved thus far, we want to:

- focus on further development of innovative designs, constructions, materials and effects increasing the shielding efficiency of noise barriers;
  - study the acoustic phenomena of sound barriers, and inside sound barriers, in theory and practical application;
  - find scientific evidence of the refraction edge performance of different shapes, materials and dimensions: the extinction and/or modulation of noise by interference;
  - search and evaluate new materials and surfaces (introducing nanotechnology) concerning their absorptive or interference behaviour;
  - create and evaluate new designs: we will consider optical appearance and attractive design;
- study psychoacoustic performance: the aim is for noise perception to be diminished and more "friendly";
  - study rigid function within overall road and track design: the aim is heavy-duty high-durability climatic resistance, shock resistance and crash performance.

- 1 CALMA-TEC LAERMSCHUTZSYSTEME GMBH (AT)
- 2 CORDES & PARTNER, BERATENDE INGENIEURE GMBH (DE)
- 3 OY MIZAR AB LTD (FI)
- 4 CELLOFOAM GMBH & CO.KG (DE)
- 5 ISOLITH M. HATTINGER GMBH (AT)
- 6 AUSTRIAN ACADEMY OF SCIENCES - ÖSTERREICHISCHE AKADEMIE DER WISSENSCHAFTEN (AT)
- 7 STOCKHOLMS UNIVERSITET (SE)
- 8 ASOCIACIÓN DE INVESTIGACIÓN DE LAS INDUSTRIAS DE LA CONSTRUCCIÓN (ES)
- 9 UNIVERSITEIT GENT (BE)
- 10 UNIVERSITY OF APPLIED SCIENCES KEMPTEN (DE)

**Contract: 17609**  
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**Total cost: € 1 658 473**  
**EC Contribution: € 1 004 015**

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# CITY-BEE

## Low-Cost Wireless Metropolitan Network For Location And Citizen Services

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Co-operative research

State-of-the-art LBS (Location Based Service) devices are unacceptable solutions for a daily use by older people, those with disabilities, or children. This is due to the large size of the device to be worn, the high cost of the service and their daily and/or weekly battery maintenance.

The proposed solution is based on the IEEE 802.15.4 radio frequency standard, and the project focuses on developing a private wireless metropolitan network specified for location- and guide-assistance services. The network will be designed to support large areas, being flexible enough to be easily scalable and implementable in a variety of scenarios, from large commercial areas and theme parks, to entire cities, including indoor places, such as underground premises. The standard will provide licence-free radio frequency bands, very low-cost infrastructure, reduced size and low-power consumption in the devices to be worn, with a battery life of some years.

The town council of Barcelona will commission and evaluate a City-Bee network in the district of Nou Barris, where a public institution for impaired people called IMD (L'Institut Municipal de Persones amb Disminució) is placed.

<http://city-bee.cric-projects.com>

- 1 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)
- 2 ELECTRONIC SYSTEMS DESIGN LTD (MT)
- 3 TRITEQ LTD (UK)
- 4 JCB ELECTROMECHANICA SL (ES)
- 5 INNOVATIVE BUSINESS SOFTWARE A/S (DK)
- 6 SONTON TEKNOLOGI AS (NO)
- 7 PACSCOM LTD (UK)
- 8 INSTITUT MUNICIPAL DE PERSONES AMD DISCAPACITAT DE BARCELONA (ES)
- 9 INNOWACJAPOLSKA SP. Z O.O. (PL)
- 10 FELTALÁLÓI ÉS KUTATÓ KÖZPONT SZOLGÁLTATÓ, KORLÁTOLT FELELŐSSÉG TÁRSASÁG (HU)



FP6 Project Catalogue

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EC Contribution: € 794 666

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# CODES

## Computing On Demand for Electromagnetic Software and applications

Electromagnetic software plays a key role in the design and manufacturing of innovative electronic sub-systems: wireless components, micro sensors, smart antennas, high-frequency active and passive devices, MEMS, etc. These new emerging devices have a major impact on a large number of strategic applications, such as mobile communication, broadband networks, security systems, earth remote sensing, transport monitoring, de-mining, telemedicine, etc. by determining their technical feasibility. During the last years, the small to medium-sized enterprises (SMEs) involved in this proposal developed and maintained state-of-the-art electromagnetic software, offering services to industries worldwide, and achieved solid international market success thanks to the resulting accuracy and reliability of their software tools.

New products coming from USA and Far East are now reducing the competitive edge and the proposer SMEs believe that, in the near future, the marketing success of their products will be strongly dependent on the computational speed of their software. In fact, higher and higher performances will be required to face increasing sub-system complexity and reduce design time. In the past, parallel mainframes were used to improve performance, but the high costs due to new hardware and software modifications limited its usage to very narrow applications. Today, GRID computational technology offers a robust and seamless environment to achieve high-speed performance, and in this frame, the involved research and technological development (RTD) providers are committed to develop a GRID solution, able to exploit at best the latest Information Technology developments applied to electromagnetic design.

The outcome of this research project will enable the proposer SMEs to commercialise a new software-platform product able to boost the quality and performance of their existing electromagnetic design tools. An internal exploitation of the product is also planned, in order to reduce the time-to-solution for the services provided by SMEs.

- 1 IDS INGEGNERIA DEI SISTEMI S.P.A. (IT)
- 2 COMPASS INGENIERÍA Y SISTEMAS S.A. (ES)
- 3 IMST GMBH (DE)
- 4 TICRA FOND (DK)
- 5 THALES AIRBORNE SYSTEMS (FR)
- 6 GRID SYSTEMS (ES)
- 7 ITLINK S.R.L. (IT)
- 8 CENTRE INTERNACIONAL DE MÈTODES NUMÈRICS EN ENGINYERIA (ES)
- 9 CONSIGLIO NAZIONALE DELLE RICERCHE (IT)
- 10 UNIVERSITÀ DEGLI STUDI DI LECCCE (IT)

**Contract: 18122**  
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# DEHUMID

## Novel Liquid Desiccant Dehumidification System

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Co-operative research

The goal of the DEHUMID project is to develop and test a low-cost, compact, and energy-efficient liquid desiccant dehumidification system that can precondition the outdoor air delivered to buildings and homes to save energy by reducing compressor size and eliminating excess chiller capacity. As an added benefit, the system will also improve indoor air quality and comfort by removing excess humidity, thus reducing the growth of mould and mildew that create “sick buildings” and destroy valuable property. To achieve satisfactory results with respect to the identified objectives, a three-stage research and technological development (RTD) project is anticipated.

During Stage 1, research will be conducted to define the functional specifications, as well as to identify how best to improve the lithium chloride delivery and recovery system, as well as the best formulation for the lithium chloride desiccant solution. Especially the creation of large (wetted) exchange surfaces with the very small specific-solution flow provides a big technical challenge because of the problem of carrying over LiCl to the airstream. The technical route to overcome this is applying the “falling film” principle.

To achieve maximum benefit from the desiccant dehumidification system and for proper sizing, understanding the variables that affect the performance is essential. Among the variables that have a major impact on the operation and effectiveness of a desiccant dehumidification system, are:

- process air moisture temperature;
- reactivation air temperature;
- velocity and moisture load of air passing through the desiccant;
- amount of desiccant presented to the reactivation and process airstreams;
- desiccant adsorption properties.

For this reason, the system will be modelled and a small-scale test bed will be designed to test system principles and verify system parameters.

In Stage 2, the system and its components will be designed, including the mechanical liquid desiccant delivery and recovery prototype system and a PC-based control system (including environmental sensors) to provide the interface for customised process control. The system components will be integrated into a working prototype.

In Stage 3, the system will be validated and tested, both in laboratory tests (technically, e.g. by carrying out calibration tests and checking the system response to varying environmental conditions) and in real-world applications under field conditions (environmental conditions, user-friendliness).

www.dehumid.info

- 1 PRO SUPPORT B.V. (NL)
- 2 PRZEDSIĘBIORSTWO PRODUKCJI URZĄDZEŃ CHŁODNICZYCH SPÓŁKA Z OGRANICZON (PL)
- 3 HIREF S.P.A. (IT)
- 4 LOKMIS UAB (LT)
- 5 SKAIDULA UAB (LT)
- 6 NET GREEN DEVELOPMENT LDA (PT)
- 7 TECNICA EN INSTALACIONES DE FLUIDOS S.L. (ES)
- 8 PIW COMPLEX SP. Z.O.O. (PL)
- 9 ISTITUTO GIORDANO S.P.A. (IT)
- 10 THE UNIVERSITY OF NOTTINGHAM (UK)
- 11 VILNIUS GEDIMINAS TECHNICAL UNIVERSITY (LT)



FP6 Project Catalogue

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# Detain

## DNA Evidence and Technology against Intruders

Domestic burglary is one of the most costly and frequent crimes in Europe, with the number of cases estimated to exceed 4.2 million each year, costing approximately EUR 19.7 billion.

Current home alarm and security systems do not act as compelling deterrents for burglars. They provide little effective alert, due to the high frequency of false alarms, or adequate evidence for the apprehension and conviction of a criminal. Consequently, there is the need for a home security system which accurately links an intruder to a specific burglary crime with irrefutable evidence, and which can be subsequently used to identify and convict the criminal.

Our idea is to develop a DNA-based marker, unique to each protected home, which can be sprayed on to an intruder and which will remain attached to the intruder's hair, skin and clothes for a sufficient length of time, i.e. until the criminal is apprehended. Detection and subsequent forensic analysis of the DNA marker will provide irrefutable evidence so the suspect can be convicted.

To achieve this we need to develop the following.

- A DNA marker in which specific structures and compounds will be incorporated to increase its binding longevity and stability to proteins in human skin, hair and clothes.
- An intruder detection system. This will be based on Video Motion Capture technology which will specifically detect the precise location of the intruder in a room. The information generated will then be relayed to a dispersal mechanism which will alter its trajectory to specifically target the intruder.
- A DNA dispersal mechanism. This will be based on inexpensive pyrotechnic technology and will be required to exert a sufficient force to spray an intruder wherever they may be in a room.

- The development of a hand-held DNA forensic analyser, designed to be operable by the police, which will allow the presence of the DNA marker to be detected on the intruder and provide immediate proof, so the suspect can be charged and detained.

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Co-operative research

- 1 SURE TECHNOLOGY LTD (UK)
- 2 CRIME SOLUTIONS LTD (UK)
- 3 MECANIZADOS NORTE BRAVO S.L. (ES)
- 4 EVOGEN LTD (UK)
- 5 ATD BIO LTD (UK)
- 6 HOTRONIC (EE)
- 7 DAVEY BICKFORD (FR)
- 8 PERA INNOVATION LTD (UK)
- 9 FRAUNHOFER TECHNOLOGIE ENTWICKLUNGSGRUPPE TEG (DE)

**Contract: 32994**  
**Call: FP6-2004-SME-COOP**  
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**Duration (months): 24**  
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**EC Contribution: € 811 778**

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# DISHEART

## Grid-Based Decision Support System for Assisting Clinical Diagnosis and Interventions in Cardiovascular Problems

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Co-operative research

The DISHEART project aims at developing a new computer-based decision support system (DSS) integrating medical image data, modelling, simulation, computational Grid technologies and artificial intelligence methods for assisting clinical diagnosis and intervention in cardiovascular problems. The research and technological development (RTD) goal is to improve and link existing state-of-the-art technologies in order to build a computerised cardiovascular model for the analysis of the heart and blood vessels. The resulting DISHEART DSS will interface computational biomechanical analysis tools with the information coming from multimodal medical images. The computational model will be coupled to an artificial neural network (ANN)-based decision model that can be educated for each particular patient, with data coming from his or her images and/or analyses. The DISHEART DSS system will be validated in trials of clinical diagnosis, surgical intervention and subject-specific design of medical devices in the cardiovascular domain. The DISHEART DSS will also contribute to a better understanding of cardiovascular morphology and function as inferred from routine imaging examinations. Four reputable medical centres in Europe will take an active role in the validation and dissemination of the DISHEART DSS, as well as the elaboration of computational material and medical images.

The integrated DISHEART DSS will support health professionals in promptly taking the best possible decision for prevention, diagnosis and treatment. Emphasis will be placed on the development of user-friendly, fast and reliable tools and interfaces providing access to heterogeneous health information sources, as well as on new methods for decision support and risk analysis.

The use of Grid computing technology will be essential in order to optimise and distribute the heavy computational work required for physical modelling and numerical simulations, and especially for the parametric analysis required for educating the DSS for every particular application.

The four end-user, small to medium-sized enterprises (SMEs) participating in the project will benefit from the new DISHEART DSS. The companies COMPASS, QUANTECH and Heartcore will market the DSS among public and private organisations related to the cardiovascular field. EndoArt will exploit the DISHEART DSS as a support for enhanced design and production of clinical devices.

[www.cimne.com/disheart](http://www.cimne.com/disheart)

- 1 CENTRE INTERNACIONAL DE METODES NUMERIC EN ENGINYERIA (ES)
- 2 UNIVERSIDAD DE ZARAGOZA (ES)
- 3 TECHNISCHE UNIVERSITAET GRAZ (AT)
- 4 UNIVERSITE JOSEPH FOURIER GRENoble 1 (FR)
- 5 VASCULAR FLUID DYNAMICS (US)
- 6 HOSPITAL DE SANTA CREU I SANT PAU (ES)
- 7 COMPASS INGENIERIA Y SISTEMAS S.A. (ES)
- 8 HEART CORE B.V. (NL)
- 9 ENDOART S.A. (CH)
- 10 QUANTECH ATZ S.A. (ES)

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# DRM

## Distribution networks Relationship Management in industrial SMEs

The strategic objective addressed by DRM is to define a business model to optimise distribution network relationship management and develop the required supporting software application. This objective is achieved in the context of industrial small to medium-sized enterprises (SMEs) with complex product design and development that commercialise their products in global markets through distribution networks with diverse levels of integration. For these industrial and export-oriented SMEs, the management of the relationship with their distribution networks is an strategic issue still not satisfactorily resolved.

In order to achieve this strategic objective, DRM will develop the business model and support tool for the three major processes involved in the headquarters-distribution network relationship.

- The product-related knowledge flow process. The correct management of technical, marketing and training material and competitor information, amongst others.
- The sale and commercial process. Planning, sharing and management of the sales process and more specifically the commercial activity, considering the full commercial network.
- The after-sales and technical assistance process. Establishment of technical assistance protocols and mechanisms to collect and cross-analyse customer complaints and incidents. Crucial aspects to be guaranteed are:
  - a bi-directional communication flow and feedback mechanisms,
  - security and profiling issues regarding the network topology,
  - a better distribution network relationship management that improves SMEs' competitiveness through:

- more efficient access to (technical) contents
- more efficient, distributed and controlled content deployment
- improved content quality
- better decision making through an improved control of activities
- enhanced team working.

In addition to tangible benefits, a strategic approach to distribution network relationship management make organisations more agile and better able to adapt to market forces, as distribution networks are their link with their customers and market.

- 1 FUNDACION TEKNIKER (ES)
- 2 RALPH ZERNISCH LICHTAKTIVE FLÄCHEN (DE)
- 3 TELLURE RÔTA S.P.A. (IT)
- 4 DEMOCENTER - CENTRO SERVIZI PER L'INNOVAZIONE S.C.A.R.L. (IT)
- 5 ONA ELECTROEROSION S.A. (ES)
- 6 SOFTEC SL SOFTWARE Y TECNOLOGIA (ES)
- 7 AIXONIX GMBH (DE)
- 8 BETT SISTEMI SRL (IT)
- 9 RCM S.P.A. (IT)
- 10 BOMBAS ITUR S.A. (ES)
- 11 MIGUEL CARRERA Y COMPANIA. S.A. (ES)
- 12 FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

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# ECOMP

## Agent-Based Engineering in a Cost-Estimation Model for Composites

276

Co-operative research

<http://ecompcric-projects.com>

The market for composites is growing steadily, including commodity-type applications in the automotive, civil infrastructure, and other emerging markets. A major obstacle to achieving the full potential of composite structures in many applications is cost-effective manufacturing.

The scientific challenge of this project lies in the application of agent-oriented software engineering to cover the real need of computing time and cost estimates in the expanding market of composite designs, as well as assisting designers in evaluating cost-reduction strategies based on advanced computing techniques, which can be easily and readily accessed and used by small to medium-sized enterprises (SMEs) in their efforts to remain at the forefront of technological developments and to be well-positioned to compete on the global scene. The technical objectives of this project lie in the development, verification and validation of a web-based multi-agent-based infrastructure that will assist composite manufacturers, equipment and tooling manufacturers, product designers and process engineers in developing new and better products, optimising processes, choosing equipment configurations and materials from a wide range of suppliers by providing them with a tool to assist them in evaluating cost-reduction strategies so that they can confidently make decisions early in the design phase.

Initial market research will be required to identify the needs, technological level, foreseen benefits, etc. of potential users of the proposed technology. This will be achieved through extensive mailing (written correspondence and via the Internet) and personal interviews. The knowledge base will span the production tasks of materials selection, process selection, and process design, and will encompass the experience of seasoned designers as well as theoretical models based on first principles. Composites technology knowledge will be gathered, mainly from partners and research and technological development (RTD) performers. The research seeks to capture the human solving knowledge

used in composites, organise this knowledge and other numerical computing required for control and design activities, and provide the computer software frameworks to strategically exercise this knowledge. This will result in the development of a cost-estimation model for composites and bio-composites, providing users with a sufficient knowledge base to resolve problems and assist decision making in composite cost issues. The proposed system will be validated among the partners, and other applications will be analysed.

- 1 CENTRE DE RECERCA I INVESTIGACIO DE CATALUNYA S.A. (ES)
- 2 IVA LEYING S.A. (ES)
- 3 NETCOMPOSITES LTD (UK)
- 4 IZR SOLUTIONS LTD (UK)
- 5 MOLDER DISNOVA, SL (ES)
- 6 ARISTEIDES STATHOPOULOS & CO.(GR)
- 7 GLAS-CRAFT (UK)
- 8 JAMES QUINN ASSOCIATES LTD (UK)
- 9 PERA INNOVATION LTD (UK)
- 10 ASOCIACION DE INVESTIGACION DE MATERIALES PLASTICOS Y CONEXAS (ES)
- 11 UNIVERSITY OF WALES, BANGOR (UK)



FP6 Project Catalogue

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**Total cost:** € 1 186 730  
**EC Contribution:** € 614 865

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# ELECTROBAND

## A Cost-Effective Treatment for Venous Leg Ulcers Combining Novel Compression Bandage and Electrical Stimulation to Dramatically Reduce Healing Time

It is an issue that there are approximately 2 million people who suffer from chronic wounds such as venous leg ulcers in Europe at the present time. These wounds typically take between 12 weeks and 24 weeks to heal. However, 30 % take over two years. This has a cost to European health services of at least EUR 8 billion a year in treatment. Two thirds of cases are released immediately for treatment in the community, and over 40 % of the community nurse's time is commonly taken up in the management, dressing and care of this type of wound. The problem is that current wound treatments are too expensive, inadequate or dangerous.

Our idea is to develop a novel wound dressing that includes a number of electrodes that can deliver electrical stimulation at the proven current, voltage and frequency to the ulcer area. The patient will wear a compact portable power supply that can be programmed to deliver ES for a predetermined length of time in a cyclic manner. This will eliminate the need for a nurse to undress the wound, apply the ES and redress the wound three times a week. The ES will be transferred from the electrodes to the wound through a saline-based amorphous hydro-gel. The dressing will be held in place by a novel electrode containing a compression bandage that exerts the correct compression pressure, regardless of the person's skill in applying the bandage. This will be achieved by incorporating a styreneethylene- butylene-styrene (SEBS) elastomer fibre that has a plateau on its stress strain curve, allowing large increases in strain with little increase in stress from a certain level of strain. It is envisaged that the combined novel ES dressing and compression bandage will be in contact with wound for at least seven days before a change of dressing is required.

However, our concept cannot be directly implemented as existing ES power sources rely on a mains electricity supply and are far too large to be worn by the patient, the electrodes are too large and inflexible to be incorporated in a compression bandage and the identified SEBS elastomer is not suitable for fibre extrusion. We plan to overcome these technical

barriers through innovations in power supply, electrode design, and wound-dressing-material development, chemical modification of SEBS and compression-bandage-weaving technology.

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Co-operative research

- 1 PERA INNOVATION LTD (UK)
- 2 POLYKEMI AB (SE)
- 3 FIBRE EXTRUSION TECHNOLOGY LTD (UK)
- 4 ROSTI AS (DK)
- 5 HC ELECTRONICS S.R.O. (CZ)
- 6 ORMISTON WIRE LTD (UK)
- 7 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)
- 8 LADKIN HOSIERY LTD (UK)

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**Total cost: € 1 228 585**  
**EC Contribution: € 624 580**

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# EMCI

## A New Process for the Realisation of Electrical Connections between the Layers of Printed Circuit Boards and a Method to Implant Micro Components Using the Proposed Embedded Micro Connector Injection Process

278

Co-operative research

The major objective of this project is the realisation of a brand new patent-pending Embedded Micro Connector Injection Process (EMCI-Process) technology, which has been developed by the company ITC INTERCIRCUIT, Munich, for the benefit of the printed circuit board manufacturing industry, with a special consideration for environmental and cost-cutting factors. The EMCI-Process together with Printed Circuit Boards (PCBs), of 100 µm microvias, will be used to establish a robust and reliable fine-pitch technology in combination with a traditional PCB printed wire pattern process sequence.

The EMCI boards will be developed so that they would then be compatible with fine pitch naked dice for flip-chip or wire bonding, and would also have an enhanced routing ability for dense area array packages (µBGAs or micro Ball Grid Arrays and CSPs or Chip Scale Packages), and ensured compatibility with SMD technology. The new developed connector pins (metal or eventually glass fibre) will meet the conditions of their use. Micro component inclusion in contact pins would be studied, together with injection methods for all pin types, into and under the surface of the PCBs, creating the possibility of a 3D circuit board space.

It will be necessary to develop the necessary machines and tools needed for the EMCI-process, for instance an accelerator or an injector to fire the pins into the board. Therefore, points to be considered include: production testing, quality control, reaching the aim of reducing the chemical use during the PCB production, the creation of a system suitable for the mass production market. It will also be necessary to create EMCI boards suitable for use as core multi-layer boards for sequential build-up. Also, during the research and development (R&D) stages it is envisaged to begin with the creation of a new printed circuit design layout system, adapting established CAD systems and determining special EDA designs. Finally, a functional demonstrator will be presented to validate the research work, thus proving that the process does indeed work and meets the required technological standards.

An Internet presence on an open-source basis will be established for the partners within the project, and eventually, a Internet website for publicity purposes. It will be important to meet the requirements which allow cooperation and communication amongst small to medium-sized enterprises (SMEs) and universities in this pan-European research activity.

- 1 I.T.C. INTERCIRCUIT ELECTRONIC GMBH (DE)
- 2 TECHNISCHE UNIVERSITÄT ILMENAU (DE)
- 3 FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN - NÜRNBERG (DE)
- 4 BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS (HU)
- 5 EUROPRINT N.V. (BE)
- 6 KEKON CERAMIC CAPACITORS (SI)
- 7 FEINWERKBAU WESTINGER & ALTENBURGER GMBH (DE)

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**EC Contribution: € 1 365 040**

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# E-MEETING PLATFORM

A Virtual Platform in which Participants in a Meeting Are Able to Communicate and Transmit Information in Real Time

In existing digital services and systems for meetings and conferences, the users are not flexible or mobile. They are tied to one supplier service and in general restricted to one type of information bearer. Most solutions are so technically advanced, that learning and handling are viewed as obstacles. These solutions are usually costly, and therefore not widely used.

Small to medium-sized enterprises (SMEs) need to increase their competitiveness by cooperation that is unrestricted by distances and national borders. There is also a need to increase efficient cooperation in public institutions and between these and society in general, thereby improving efficiency and reducing labour costs in the public sector. The proposed solution is intended to help meet these needs. The objective of the project is to create a platform, an easy-to-use, quick-access and low-cost tool, in which participants in a meeting are able to communicate and transmit information in real time. The unique aspect here is that the participants can do this independently of a specific place, supplier and choice of information bearer.

The method of the project is to utilise existing technologies for communication, that are accepted by users, and then create means to connect these to and through the platform. The project consists of two fundamental parts. One part entails adding softer functions, interfaces and tools to this real time platform. The other part is the technical development of the underlying platform. The proposed solution enables individuals to attend or run virtual online meetings while exchanging documents, participating in discussions and making comments, while keeping abreast with developments in projects. It could probably contribute to a better environment by reducing the need for business travel. The project's interdisciplinary approach, with a parallel development of the user interface and platform, and the fact that the project also has an end-user test partner, ensures that the timeframe between prototype and marketable product will be short.

- 1 YRA AB (SE)
- 2 SKANDINAVISKA INSTITUET FOR KREATIVT TANKANDE AB (SE)
- 3 FYRA SARL (FR)
- 4 KUNDLIGA TEKNISKA HOEGSKOLAN (SE)
- 5 TELENOR BUSINESS SOLUTIONS AS (NO)
- 6 STV SVENSKA TELE & VIDEO KONSULT AB (SE)
- 7 THE SWEDISH ASSOCIATION OF LOCAL AUTHORITIES (SE)

**Contract: 508145**  
**Call: FP6-2002-SME-1**  
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**Duration (months): 19**  
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**EC Contribution : € 416 512**

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# EMERGAPE

## Development of a Fully Integrated IT Solution for the Paper Industry Based on Emerging Opto-Electronic and Sensory Technologies

280

Co-operative research

The paper industry is a key element of the European industry, generating an annual turnover in excess of EUR 400 billion, providing direct employment for over 260 000 people and indirect employment for around 4 million. Paper is produced in hundreds of different grades — each has to meet certain requirements (some paper buyers impose special requirements).

For a small to medium-sized paper mill this means that the product variety could be exhausting, and the paper mill's bottom line result often depends completely on the efficiency of the adjustment procedure at grade changes. Even if a manual laboratory makes the final examination of paper for delivery, this will not help to improve the efficiency of the paper mill much. Mill production personnel have to trust in online instruments.

The scientific and technological objectives are to integrate existing QCS and DCS solutions in a total IT system and to develop advanced subsystems to be integrated into it, based on emerging opto-electronic and sensory technologies.

This will involve the following:

- an improved detector technology for basis weight sensors allowing fast sampling and higher sensitivity;
- a new optical design of an IR-based moisture gauge allowing high-frequency sampling;
- a new detector for measuring X-ray absorption in mineral compounds within the paper or in coating layers with faster sampling and higher sensitivity, exploiting emerging silicon-detector technology;
- a new material for the calliper measurement head, which can endure the heavy abrasion forces on contact with the paper;

- a new sensor based on NIR technology, able to measure coating layers, chemical compounds in the paper and the amount of binding forces between the cellulose fibres in the sheet, based on front-edge photo diode technology;
- a new sensor based on super-fast cameras and FPGA technology for image processing for surface analysis of paper webs in full speed;
- an improved induction-heated calliper control actuator for improved CD thickness control;
- a knowledge-based information system that automatically uses new data to update the mill condition, thus improving preventive maintenance;
- the introduction of robust process-control techniques based on dead-time compensated controllers and feed-forward links which could be introduced to small to medium-sized paper mills;
- Improved access to all mill data through open protocols and thin-client concepts, in accordance with recent Microsoft Window standards.

The major economic and industrial objectives are:

- a significant cost reduction for paper manufacturers (small and medium-sized paper mills);
- cumulative profits from the sales of the expert system to reach EUR 4.9 million, 4 years after the project end;
- further increasing EU competitiveness against US enterprises in the paper-production industry market.





The major social and environmental objectives are:

- elimination of labour-intensive and monotonous inspection tasks in labs;
- reduction of the exposure of operators to hazardous environments;
- elimination of operator stress and error caused by the need for great attention to detail and raw material variability;
- reduction of water consumption in paper mills, facilitating sustainable development. Currently, water consumption in European paper mills is over 80 million m<sup>3</sup> per day.

- 1 WEBRAY OPERATOR SYSTEMS AB (SE)
- 2 STFI, SKOGSINDUSTRINS TEKNISKA FORSKNINGSPENNINGEN AB (SE)
- 3 MONDRAGON SISTEMAS DE INFORMACION S. COOP. (ES)
- 4 DIGITAL ENGINEERING PROCESS SWEDEN AB (SE)
- 5 PUUMAN OY (FI)
- 6 BASQUE PAPER CONSORTIUM A.I.E. (ES)

**Contract:** 508340  
**Call:** FP6-2002-SME-1  
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**EC Contribution:** € 432 500

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# EMISHIELD

## A Novel Gasket and Seal System Used for EMI Shielding Using Double Percolation of Carbon Nanotube Technology to Improve Safety, Profitability and Productivity

282

Co-operative research

Roxtec AB in Karlskrona, Sweden has identified a considerable market need for an easy-to-mount EMC cable seal product. Today's solutions for EMI-shielding gaskets and seals are expensive and possess limited physical properties. The aim of this project is to develop a low-cost, environmentally friendly novel gasket and seal product with excellent physical properties, used for EMI shielding using Carbon Nanotube Technology (CNT). Single-wall carbon nanotubes (SWNT) and multi-wall carbon nanotubes (MWNT) are two alternative fillers in the project with excellent shielding properties. In the project, compounding of these fillers will be developed according to a double percolation concept with a polycarbonate/polyethylene blend. The compound will be processed into a 2-D film. The double percolation concept and the 2-D-film geometry together minimise material costs and at the same time maximize EMI-shielding performance. The process ability of the 2-D film into 3-D shapes by bending, gluing, welding and to some extent thermoforming secures the film apposition as a universal and cost-efficient shielding material.

The EU rubber processing industry involves more than 6 000 companies of which an estimated 90 % are small to medium-sized enterprises (SMEs). The sector employs more than 120 000 people and is responsible for a turnover of more than EUR 16 billion, making it a very important industrial sector in Europe and a main contributor to the economic strength of Europe. Despite a modest increase in total sales by 3.1 %, profits in the EU rubber processing industry have fallen by 28.5 % compared to the level in 1995. The relatively slow growth in the industry's EU sales is due to intense price competition in the seal and gasket market, a rapid increase in raw material prices including the cost of oil feedstock, and continuing growth in gaskets and seals imports, which deprives EU manufacturers of original equipment sales in this very important industry.

The market need for new and emerging EMI-shielding materials and technologies is clear, in spite of the increased appearance over the last few years of electronic devices that can be affected by EMI. This has created an emergent market need for new easy-to-use protection technologies to be implemented

in electrical installations and hazardous electronic devices where EMI shielding is needed.

The major needs for a new easy-to-use and low-cost EMI-shielding technology are:

- ever-increasing frequencies driven by higher chip speeds, in which traditional shielding options do not perform as well as with lower frequencies, resulting in leakage of extraneous electronic signals;
- increasing cost pressures due to a stagnant economy, especially in the SME telecommunications industry, driving cheaper shielding alternatives;
- increased overall potential of the EMI business, due to continual development of Bluetooth technology (wireless);
- environmental pressures on metal disposal, which affect conductive coating technologies;
- continued development of more costly "absorbent" EMI technologies that are more effective at higher frequencies than current "reflective" shielding technologies (excluding gaskets which are the most prominent of the absorptive traditional technologies).

There is an extended focus on EMI hazards from politicians and public and private end-user groups.

- 1 ROXTEC INTERNATIONAL AB (SE)
- 2 DKI PLAST A/S (DK)
- 3 PER VERNER FANGE-LARSEN (DK)
- 4 PIONET SP. ZO.O (PL)
- 5 TÉCNICA EN INSTALACIONES DE FLUIDOS S.L. (ES)
- 6 ABB POWER TECHNOLOGIES AB (SE)
- 7 PERA INNOVATION LTD (UK)
- 8 CRIF-WALLONIE (BE)

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**EC Contribution:** € 444 313

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# EMPOSME

## Enterprise Modelling and Performance Optimisation for SMEs

The primary objective of this consortium is to develop and implement an Enterprise Modelling and Performance Optimisation (EMPOSME) tool. EMPOSME will integrate Enterprise Modelling and Enterprise Optimisation so that the decision-maker can rapidly identify the risk and reward position of any choice he has to make vis-à-vis a suite of defined key performance indicators.

In this proposal, the focus is on firms that operate on an Engineer-to-Order (ETO) and Make-to-Order (MTO) basis. The complexity of the product life cycle in these industries has been continuously increasing. An integrated enterprise modelling and performance optimisation tool, such as EMPOSME, is an enabling technology for increasing both the speed and the flexibility of these manufacturing enterprises, and thus their competitiveness. EMPOSME will enable practitioners to efficiently create an enterprise model and automatically transform this model into an enterprise optimiser that will generate near optimal solutions to their required set of performance metrics.

While there are a range of commercial ICT technologies currently available that make a similar claim, in practice these solutions tend to model only small portions of the entire product life cycle. Manufacturing firms have an immediate requirement for enterprise modelling and performance optimisation that will enable them to deploy their limited resources for maximum economic yield for the entire life cycle of the products it places on the market.

EMPOSME will be based upon an existing Open Source ERP (ERP5) application. EMPOSME will comprise:

- an Open Source Enterprise Modeller which will enable the practitioner to succinctly describe the enterprise;
- an Automatic Enterprise Optimiser Software Generator and a Web Service for model execution that will be developed to generate near-optimal solutions to the user-specified set of performance metrics (closed source due to utilising existing commercial APIs);

- An Enterprise Performance Manager that will enable the practitioner to specify, evaluate, diagnose and improve performance outcomes (Closed Source due to utilising existing commercial APIs).

- 1 UNIVERSITY OF LIMERICK (IE)
- 2 AALBORG UNIVERSITET (DK)
- 3 UNIVERZITA KARLOVA V PRAZE (CZ)
- 4 UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK (IE)
- 6 NEXEDI SARL (FR)
- 7 FIRA INTERNATIONAL LTD (UK)
- 8 MANOPT SYSTEMS LTD (IE)
- 9 BURNSIDE EUROCYL LTD (IE)
- 11 TIPPO INTERNATIONAL LTD (IE)
- 12 DHW TRAEINDUSTRI A/S (DOLLE A/S) (DK)
- 13 UNIVERSITÄT DUISBURG-ESSEN (DE)
- 14 MILLHOUSE MANUFACTURING DESIGN LTD (UK)
- 15 MORSOE JERNSTOBERI A/S (DK)

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**EC Contribution: € 871 204**

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# ENERGYSAFE

## The Development of a New Low-Cost, Retrofittable, Wireless and Self-Powered Building Control System for Improving Energy Efficiency, Employee Comfort and Fire Safety in Commercial Buildings

284

Co-operative research

This project targets the European manufacturing supply chain for lighting and HVAC controls, consisting of more than 1 500 manufacturers, sub-suppliers, and installation and maintenance companies across Europe. These are mainly small to medium-sized enterprises (SMEs) employing more than 75 000 people that deliver building controls to increase the energy efficiency of lighting and heating, ventilation and air-conditioning (HVAC) systems in commercial buildings, and this is a global market valued at more than EUR 3 billion.

The industry is in a state of decline as the market is dominated by mature technology and the intensification of global competition has added to the competitive pressures on this sector, where price is now the main differentiator, which is evident from the fierce price wars in the market. The strategic objective of the project is to design, develop and manufacture a new innovative building control system platform and standards that provide Europe with leading-edge innovation in the development of next-generation control of HVAC systems. By developing new innovative platforms, new skills are developed that push forward Europe's competitive edge. The project will also increase the number of SME companies designing new systems on the back of the technology being developed, thus bringing new jobs and increased research and development (R&D) to Europe.

The proposed project will increase the market competitiveness and system effectiveness of European manufactures of lighting and HVAC controls market by providing them with a platform that significantly reduces the cost of installation, optimises employee comfort and increases the efficiency of lighting and HVAC installations, and provides a shorter return of investment for commercial buildings.

Although Intelligent Building Controls (IBC) can improve the energy efficiency of commercial buildings, they only have a few percent penetration of the market.

There are major barriers to the adoption of these technologies, such as high installation costs and the fact that the controls are fixed once installed and therefore are not adaptive to the changing needs of a commercial building.

Moreover, today's systems do not provide optimal energy-efficiency control and do not provide the ability to control the HVAC and lighting conditions for individual comfort zones to optimise the working conditions for employees. Our strategic objectives are specifically to:

- provide a high-value innovative technology platform for automatic lighting and HVAC control in commercial buildings to the 1 000 strong community of SME design and manufacturing companies in this industry, to increase their competitiveness and long-term growth;
- reduce the cost of manufacturing the platform, thus increasing the profit margin on selling the product and the ability to sustain higher revenues over a longer period of time;
- improve the health of employees in commercial buildings, by providing a low-cost technology for generating personalised comfort zones;
- generate increased revenue of EUR 180 million and provide an estimated additional 1 600 jobs across the respective SME communities;
- help the EU to meet its Kyoto commitments by developing a technology that will reduce the energy consumption in commercial buildings, by developing intelligent building controls that are 15 % more effective compared to normal controls;
- contribute to the implementation of European Directive for Energy Performance Buildings (2002/91/EC).

<http://energysafe.danishinnovation.dk>



We will satisfy the existing market need and associated problem of high installation costs by developing and demonstrating a working prototype of a programmable, modular, wireless, lighting and HVAC control system that can be used for both retrofit and new construction. The system design will have the following objectives.

- To wirelessly control HVAC and lighting conditions.
- To automatically adapt HVAC and lighting conditions to individual user preferences, thereby creating individual comfort zones. Behaviour patterns will be registered by the system and control algorithms will adapt to take these into consideration.
- To locate occupants in case of fire or other emergencies.

- 1 SERVODAN A/S (DK)
- 3 NOVACARD INFORMATIONS SYSTEME GMBH (DE)
- 4 HEIMANN SENSOR GMBH (DE)
- 5 CLIK AS (EE)
- 6 TECNICA EN INSTALACIONES DE FLUIDOS S.L. (ES)
- 7 ESBENSEN ROEDGIVENDE INGENIOERER A/S (DK)
- 8 ISS DANMARK A/S (DK)
- 9 DANISH INNOVATION INSTITUTE A/S (DK)
- 10 CENTRE DE RECERCA I INVESTIGACIONS DE CATALUNYA S.A (ES)

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**EC Contribution:** € 963 281

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# EXPLORE

## Gaming and Guiding System for Museum and Exhibition Environments

286

Co-operative research

The objective of this project is to develop a location-sensitive, interactive, guiding, infotainment, and entertaining system for museum environments. The positioning is based on Bluetooth technology and the terminal device used is the visitors' own mobile phone. This system is scalable to various sizes of museums and exhibitions and it can be built on various data management platforms.

The social objectives are to raise attendance rates and increase the attractiveness of museums and cultural exhibitions, which are in competition against other entertainment services, especially among youngsters, and also to offer a multilingual experience, thus offering a better service for foreign exhibition visitors. This system enables the networking of European museums through the Internet and thus emphasises the communal aspects between European countries as well as between individuals visiting the exhibition, at the same time.

The partners of this project are NitroFx Oy, a graphics design specialist, UI design, and mobile client software design. Profium Oy is providing the content management and distribution platform know-how. Lesswire AG and VTT are Bluetooth infrastructure and Bluetooth positioning experts. VTT are also experienced in technical system design, implementation and integration of systems, especially including mobile devices. Fraunhofer Gesellschaft provides context awareness, semantic ontology, and visitor profiling know-how. The entertainment, infotainment, and gaming system is developed through cooperation with VTT and NitroFx.

- 1 NITRO FX OY (NITRO FX LTD) (FI)
- 2 PROCESSWARE GESELLSCHAFT FÜR INFORMATIONS-, WISSENS- UND GESCHÄFTSPROZESSMANAGEMENT MBH (DE)
- 3 PROFIUM OY (FI)
- 4 CENTER FOR FORMIDLING AF NATURVIDENSKAB OG MODERNE TEKNOLOGI (FOND) (EXPERIMENTARIUM) (DK)
- 5 FONDAZIONE TITO BALESTRA ONLUS (IT)
- 6 CITY OF TAMPERE (FI)
- 7 VTT TECHNICAL RESEARCH CENTRE OF FINLAND (FI)
- 8 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)



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**Total cost:** € 1 164 411  
**EC Contribution:** € 601 309

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# FIDEMAS

## New Filter Design Based on Mathematical Structures for Very High Data-Rate Digital Subscriber Lines

Worldwide, the demand for faster and more complex communications systems will continue to drive the need for faster data transmission technologies. Significant advances have been made over the past five to six years in the subscriber loop, during which time the data rates typically available to the general public have increased from 33 000 bits per second from a traditional analogue modem, to several million bits per second from an Asymmetric Digital Subscriber Line (ADSL) modem. This dramatic increase is continuing with the latest Digital Subscriber Line (DSL) technologies which are expecting to offer up to 50 million bits per second over the next couple of years.

One of the key factors facilitating this progress is the performance of filters which give “clarity” to the signals as they are being both transmitted and received. Typically, the higher the frequency of transmission, the more complex the filters are, which clearly conflicts with the need to reduce system costs. This proposal will demonstrate that fractals and other geometrical structures can be used to achieve the filter function in future generations of VDSL (Very High Data-Rate Digital Subscriber Line) and subsequent high-speed data transmission technologies offering advantages in flexibility, performance and cost. The target devices will include integrated Filter/Hybrid Modules and Splitter Filters. The novel devices based on fractals and other geometrical structures, will reduce the components’ complexity as well as manufacturing costs. The new hybrid modules will improve the total performance of the VDSL, leading to an effective increase of communication quality by up to an order of magnitude. Success in the proposed work will enable a dramatic step forward in the compactness, cost and reliability of many electronic products. The resultant IPR will be European owned, and will give the participants a significant commercial advantage over world competitors. The IPR will also be licensed for use by others.

- 1 ADVANCED POWER COMPONENTS (UK)
- 2 ERZIA TECHNOLOGIES S.L.U. (ES)
- 3 ELEKTROTRYCK AB (SE)
- 4 LONDON SOUTH BANK UNIVERSITY (UK)
- 5 CHALMERS TEKNISKA HOEGSKOLA AB -  
CHALMERS UNIVERSITY OF TECHNOLOGY (SE)

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**EC Contribution: € 806 800**

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# FLEX-EMAN

## Flexible Soldering Cells for Agile Electronics Manufacture

288

Co-operative research

The electronics manufacturing sector has seen significant changes over the past two years. Volume manufacturing has become a commodity service resulting in: the creation of multinational manufacturing service providers; the migration of volume operations to low-cost locations external to EC; and the evolution of manufacturing technology ideally suited to high-volume production only. The future of the industry will be based on an evolving, dynamic small to medium-sized enterprise (SME) community. SME manufacturers survive by providing low-volume, high-variety, mixed-batch manufacture or production of niche and high-value added products. This community faces challenges from the market, manufacturing technology and legislative pressures. The pressures of mass-customisation and decreasing life cycles, and the integration of multifunctional features such as Microsystem Technology, require the adoption of sophisticated manufacturing capabilities with flexibility to cope with a broad mix of products and volumes. Manufacturing technology has evolved towards efficiency in volume production, with scant regard for flexibility and rapid changeover for lower-volume production. Agility will be a key element to SME survival and future investment. The WEEE directive banning lead requires SMEs to adopt new manufacturing practices, requiring another dimension of flexibility in capability and potential cost impacts from expensive consumables (N2) and higher energy requirements. The lead-free changeover also requires the understanding of these materials in production and product life cycles.

Flex-Eman offers a solution to these challenges by utilising individual precision soldering chambers combined in a work cell serviced by intelligent materials handling and control systems. This replaces an inflexible production process with an agile system, specifically designed for cost efficiency in the manufacture of mixed product and batch sizes. The system is inherently fault tolerant and eco-friendly, and incorporates state-of-the-art control strategies and innovative materials-handling solutions, offering benefits in improved product quality. The architecture of the system includes

modular components and automation concepts, and presents a new manufacturing concept in the electronics sector, based on the flexibility and scalability of the production resource.

- 1 PLANER PLC (UK)
- 2 MBDA UK LTD (UK)
- 3 CHALMERS TEKNISKA HOGSKOLA AB (SE)
- 4 CUSTOM INTERCONNECT LTD (UK)
- 5 LOUGHBOROUGH UNIVERSITY (UK)
- 6 REALTIME TECHNOLOGIES LTD (IE)
- 7 FOAB ELEKTRONIK AB (SE)
- 8 M & M QUALTECH LTD (IE)
- 9 SEREMAP S.A. (FR)



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**EC Contribution:** € 811 252

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# FLEXNOLEAD

Flexible Circuits Processing, Performance and Reliability, Using Lead-Free Soldering Process

Flexible circuit boards are a functionally pivotal and rapidly growing technology for electronics goods. Applications include: computer peripherals (e.g. flat-panel displays, ink-jet printers, disc drives), hand-held devices (e.g. GPS, personal digital assistants, membrane keyboards), telecommunications (mobile phones), automotive (e.g. engine controls, dashboards and/or connections), smart cards (antenna foils), aerospace (lightweight, compact systems) and medical devices (e.g. sensors). The drive to use flexible circuits is based on the technology's ability to: reduce size, weight, assembly time and cost, accommodate relative movement between component parts, increase system reliability (reduced interconnect), improve controlled impedance signal transmission and heat dissipation, and enable three-dimensional packaging. These benefits have resulted in a significant increase in the use of flexible circuits for electronics and systems assembly, particularly consumer products. The global market size has been estimated by various bodies to be between EUR 4 billion to EUR 7 billion, with anticipated growth rates of up to 15 % per year.

Flexible circuits are most commonly manufactured using one or two base materials, either polyimide or polyester. The former is favoured where soldering is required, the latter is generally used in low-cost applications. Both flexible circuit material systems are sensitive to temperature (continuous service temperature: polyimide ~177°C, polyester ~74°C), which raises considerable concerns as to their capabilities of withstanding the higher soldering temperatures, which will be imposed by lead-free solder and its impact on their operating properties. As flexible circuits are developing into such a significant technology for electronic products, with a major role in manufacturing and assembly being played by small to medium-sized enterprises (SMEs), it is essential that an understanding of the impact of this major change in technology on flexible circuits is understood and solutions found.

This project is aimed at assisting SMEs in electronics products by establishing solutions to the assembly of

flexible circuits when lead-free soldering is Introduced, and through this, opening up new opportunities via the development of new environmentally friendly technology for the current and next generation of electronics products.

- 1 TWI LTD (UK)
- 2 ELDOS SP.Z.O.O. (PL)
- 3 FLEXIBLE TECHNOLOGY LTD (UK)
- 4 FLEX-ABILITY LTD (UK)
- 5 KOMED MANUFACTURING AND TRADING COMPANY LTD (HU)
- 6 EPIGEM LTD (UK)
- 7 INTERNATIONAL CONSULTING BUREAUX (DE)
- 8 EMERSON & CUMING (BE)
- 9 KIC INTERNATIONAL SALES INC. (UK)
- 10 FREUDENBERG FORSCHUNGSDIENSTE KG (DE)
- 11 GTS FLEXIBLE MATERIALS LTD (UK)
- 12 BUDAPEST UNIVERSITY OF TECHNOLOGY AND ELECTRONICS (HU)
- 13 UNIVERSITY OF GREENWICH (UK)

**Contract: 513163**  
**Call: FP6-2002-SME-1**  
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**Total cost: € 1 764 480**  
**EC Contribution: € 972 778**

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**ICT & Electronics**

Small to medium-sized enterprises (SMEs) offering already products with Aml elements, intend in the near future (the next one to two years) to introduce new and/or to improve their current products with even more Aml features, seeing this as their crucial competitive edge. For such products they need a sophisticated support system.

The business objective to be achieved within the FOKSAi project is to provide a comprehensive solution of support to extended products from the ambient intelligence domain, which will be affordable for SME manufacturers (such a solution has to considerably enhance SME business performance by assuring higher acceptance of Aml products by customers, reduction of the time and costs needed for customer support (product maintenance, solving customer problems etc.).

Four industrial SMEs, having the common needs of extending their Aml-products by a product and customer support system, have entered the consortium with three research and technological development (RTD) partners, to launch the project to develop:

- a methodology for extensions of Aml-products which will strongly observe business and organisational issues relevant for SMEs;
- a knowledge -based system to support extended Aml-products, which will be affordable for the SME manufacturers.

The intention is to make this solution general enough to be used for different products and scalable to support the future Aml-products in order to achieve a product (methodology and KM system) which can be offered to a wide spectrum of SMEs intending to introduce Aml-products in their production plans. The customer and product support to be developed will be demonstrated as pilot installations within the environments of four SMEs.

- 1 REGIODATA GMBH (DE)
- 2 LANEX CONSULTING LTD (HU)
- 3 DISSENY I SUBMINISTRES TÈCNICS S.L. (ES)
- 4 ROTAFORME ENGINEERING LTD (UK)
- 5 ATB - INSTITUT FÜR ANGEWANDTE SYSTEMTECHNIK BREMEN GMBH (DE)
- 6 COMPUTER AND AUTOMATION RESEARCH INSTITUTE - HUNGARIAN ACADEMY OF SCIENCES (HU)
- 7 FUNDACIÓN LABEIN (ES)



**Contract:** 508637  
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**Total cost:** € 1 385 870  
**EC Contribution:** € 685 410

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# GPM-SME

## Global Performance Management for SMEs

The new business ecosystem realities are the result of three major cyclones: globalisation; increasing competition moving more and more from enterprises to value chains; and an ever-increasing customer dictatorship which is introducing an enriched definition of business excellence, enhancing the traditional quality, cost and time variables with new views such as eco-responsibility (environmental impact, green products and services), ethics and social responsibility (including gender issues).

This new environment is increasing pressure on small to medium-sized enterprises (SMEs) involved in the so-called business-visibility vicious cycle, where large companies get bigger and bigger, and SMEs get smaller and smaller and thereby less and less visible.

This vicious cycle often ends with the SMEs being dismissed from the marketplace. The solution is to break this cycle — SMEs need to find a way get visible despite being small.

The approach is necessary in three areas: SMEs must first of all improve their business excellence; then, they need to find a way to expose this enhanced excellence to the market (customers, consumers, competitors); and finally, there is a need for the market itself to enhance its end-to-end transparency.

The approach Performance Management (PM) is embedded in the roots of all of these three axes. Indeed, in order to be more excellent, SMEs need to be able to measure, broadcast and monitor better performance both internally, externally (i.e. with suppliers, resellers, carriers, logistics operators, etc.) and in the networks to which they belong (Extended Performance Management or ExPM), always bearing in mind that performance itself has changed following business excellence mutations (Enriched Performance Management or EnPM). Global Performance Management (GPM) is indeed the answer to these challenges, combining ExPM and EnPM.

Our goal is to transform GPM into a common practice for SMEs. In order to achieve this challenging goal, we have built a consortium, integrating SMEs in four different countries and belonging to two prime sectors for the European SME market-space (Automotive, Consumer Goods/Retail). Also, a harmonious “puzzle” gathered together the relevant research and technological development (RTD) performers, with three main objectives:

- on a cross-sectorial basis, to assess why PM is not working for SMEs. Focusing initially on two sectors, to define a general framework for GPM in SMEs, including:
  - a methodology to help SMEs in defining, developing, deploying and operating GPM,
  - an SME-oriented architecture providing reference models and supporting tools and techniques;
- an ICT toolset, specifically adapted to SMEs, to support them in bridging the gap between concepts and efficient and effective executable instruments;
- to pave the way for broad dissemination and exploitation of the results on a cross-sectorial basis.

- 1 EVERIS (ES)
- 2 CCR LOGISTICS SYSTEMS AG (DE)
- 3 CABLERÍAS CONDUCTORAS S.L. (ES)
- 4 PROTEx AS (NO)
- 5 TEMA - TÉCNICAS DE MOBILIÁRIO S.A. (PT)
- 6 PERMASA S.A. (ES)
- 7 SINTEF-STIFTELSEN FOR INDUSTRIELL OG TEKNISK VED NORGES TEKNISKE HØGSKOLE (NO)
- 8 UNIVERSIDAD POLITÉCNICA DE VALENCIA - CIGIP R&D CENTER (ES)
- 9 ICON GES. FÜR SUPPLY-CHAIN-MANAGEMENT MBH (DE)

**Contract: 5857**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/10/2004**  
**Duration (months): 14**  
**Total cost: € 1 982 236**  
**EC Contribution: € 1 123 518**

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# HEATCONDUCTIVES

New Highly Heat-Conducting Materials and Manufacturing Processes for Improved Efficiency of Heat Management and Packaging Components in Electronics

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Co-operative research

HeatConductives is a pre-competitive research PROJECT scheduled for two years. The main objective is to develop a new high-heat conducting composite material which is a copper combined with extremely heat-conductive carbon nanofibres (Cu/C) for its use in a vast range of different industrial devices in order to enable a more efficient heat removal in power electronics. The project is divided into seven work packages, including the project management and the exploitation and dissemination activities.

HeatConductives specifically addresses the requirement for a new low-cost and easy-to-process material for the industrial requirement of adaptive thermal heat-sinks to assist thermal management. This is a current and paramount problem which is rapidly becoming more and more urgent, especially for state-of-the-art new semiconductors based on GaAs and GaN, which needs further improvement of the heat control (dissipation) to achieve full potential. It critically affects the electronics, microelectronics, telecommunications, automotive and avionics industries. Thermal management is an increasingly critical part of achieving competitive functionality in these industries, impacting speed, size, weight and reliability of components. This is especially important in the case of future components which will need to control electric currents and packaging densities that are orders of magnitude higher than those in use today. A new economically viable material is urgently needed to solve this problem and enable components with the highest level of product performance, thermal performance and reliability that are crucial in the areas of microelectronics, avionics and automotive industries. So, the HeatConductives project will develop a generic solution suitable for use across a wide range of European industries serving the high thermal performance and reliability markets.

The small to medium-sized enterprise (SME) partners of the consortium are: Marion Technologies, producer of carbon nanotubes and nanomaterials; and Semelab, IMT, and Acorde, electronic end-user industries interested in the capabilities of the products to be developed in the project. The large companies

GAI, the only European producer of carbon nanofibres at industrial scale with their own technology, Esvres Mat, producer of high-precision parts made from non-ferrous alloys for electro-technical equipment, such as heat-management layers, and Alliance, producer of special materials for several industries, are also part of the consortium, while the company Siemens will act as sponsor (supporter) of the technologies and materials developed. The research and technological development (RTD) performers are INASMET, specialised in materials research and development, and ICMCB.

- 1 FUNDACIÓN INASMET (ES)
- 2 ADVANCED COMMUNICATION RESEARCH AND DEVELOPMENT S.A. (ES)
- 3 SEMELAB PLC (UK)
- 4 ESVRES MATRIÇAGE SAS (FR)
- 5 IMT S.R.L (IT)
- 6 MARION TECHNOLOGIES S.A. (FR)
- 7 ALLIANCE (FR)
- 8 GRUPO ANTOLIN-INGENIERIA S.A. (ES)
- 9 CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS) (FR)



FP6 Project Catalogue

**Contract:** 17687  
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**EC Contribution:** € 725 132

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The global ageing population is growing inexorably, and in few years half of the adult population will be over 50. These trends are more significant in developed countries such as EU countries. These trends have several implications: there will be more elderly people in absolute as well as relative terms, there will be considerably more older "old" people, there will be fewer family carers and there will be a smaller productive workforce to contribute to the financing of health and social services.

Concerning this scenario, this project intends to develop an outdoor remote activity-monitoring and automatic alert system, based on the use of accelerometers and additional supporting sensors to evaluate user mobility and to detect user falls. Falling is one of the most common problems for elderly people, especially those living alone. Actually, 30 % of older people fall at least once a year.

There are different alert systems in the market, but most of them respond to user input when a button is pressed. The system presented in this project will alert automatically, (even if the user is not able to move because of injuries suffered during the fall), indicating the localisation of the fall through GSM and GPS technology.

Consequences of late assistance are dangerous: hypothermia, dehydration, infections, etc. that can be fatal. Additionally, the system will be supported by a call centre that will manage user assistance. The system will be able to distinguish between static and dynamic movements, and will periodically send user activity data via GSM. Mobility is a subjective quality that indicates user vitality and well-being.

The relevance of the project for the small to medium-sized enterprises (SMEs) is high since the demand for remote care devices for elderly people is growing exponentially. The lack of reliable solutions in the market brings a great opportunity for care-products developers. Moreover, the emerging care market offers new opportunities to SMEs developing new technologies.

- 1 FUNDACIÓN FATRONIK (ES)
- 2 INSTITUTO GERONTOLÓGICO MATIA SOCIEDAD LIMITADA UNIPERSONAL (ES)
- 3 NET TECHNOLOGIES LTD (GR)
- 4 INGENIERA DE LA CALIDAD DE VIDA SL (ES)
- 5 IKNOWHOW INFORMATICS S.A. (GR)
- 6 WANY S.A. (FR)
- 7 COM Y MEDIA TECNOLOGAS DE LA COMUNICACION S.A.L. (ES)
- 8 CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (FR)
- 9 ZENON S.A., ROBOTICS & INFORMATICS (GR)

**Contract:** 5935  
**Call:** FP6-2002-SME-1  
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**Duration (months):** 18  
**Total cost:** € 1 003 000  
**EC Contribution:** € 501 500

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Several pipe organs in newly built concert halls or churches are not well matched to the acoustics of the room. The resulting bad sound quality is dangerous for the organ-builder small to medium-sized enterprise (SME) because the negative opinion of a single customer can destroy their market position.

This project aims at cost reduction and quality improvement, due to new developments which can improve the market position of SMEs. As a result, the number of orders of new pipe organs can be increased. So SMEs will maintain or increase the number of their employees.

The leading position of the European organ builders on the world market will be strengthened. In order to ensure an optimal matching, the knowledge of room and organ pipe acoustics and the tradition of organ building will be combined to form a new, innovative design method. The degree of innovation is high, because the state-of-the-art method is based on tradition only, whereas the new method would use and further develop up-to-date results from acoustics.

The expected innovations are as follows.

- New data and knowledge base of the emitted sound power of the most important pipe ranks: development of physical model of the dependence of the emitted power on wind pressure, shape and size of the pipe.
- New, scientifically based method and instrument for the measurement of room acoustical properties required by the organ builders. For the instrument, a very intensive low frequency (16-64 Hz) sound source and a sound source with simulated organ pipe sounds for the middle frequency range (64-512 Hz) will be developed. New measurement methods and software will be developed for the evaluation of the acoustic properties of the room from the "viewpoint" of the organ.

- New acoustic design method of pipe organs for optimal matching of the organ to the acoustics of the room: The wind pressure, geometrical dimensions of the pipes and the location of the divisions will be designed to provide the required loudness, and spatial and spectral distribution of the sound in the room.

- 1 WERKSTÄTTE FÜR ORGELBAU MÜLHEISEN GMBH (DE)
- 2 MANUFACTURE D'ORGUES MUHLEISEN G. WALTHER & ASSOCIÉS SARL (FR)
- 3 FLENTROP ORGELBOUW B.V. (NL)
- 4 ORGELBAU SCHUMACHER GMBH (BE)
- 5 BLANCAFORT, ORGUENERS DE MONTSERRAT S.L. (ES)
- 6 OFICINA E ESCOLA DE ORGANARIA LDA (PT)
- 7 FAMIGLIA ARTIGIANA FRATELLI RUFFATTI SNC (IT)
- 8 JOHANNES KLAIS ORGELBLAU GMBH U. CO. KG (DE)
- 9 ORGAN WORK MANUFAKTURE OF PECS LTD (HU)
- 10 ORGELMAKERIJ BOOGAARD (NL)
- 11 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 12 STEINBEIS GMBH AND CO.FÜR TECHNOLOGIETRANSFER (DE)
- 13 AFT ACOUSTICS LTD (HU)



# InterPROM

## Interoperable Collaborative Process Management

InterPROM enables European small to medium-sized enterprises (SMEs) to acquire long-ranging outsourcing projects advertised by large companies and to carry out these projects effectively and profitably in accordance with the given quality standards. Following a research report conducted by KPMG across 164 large European companies, only 15 percent of such long-ranging projects are completed in time, while the majority of projects is cancelled, consequently drawing a loss of approximately EUR 41 billion.

The SME partners of the InterPROM project have already identified the more important weak points, and aim at developing a platform for the coordination, supervision and execution of projects and processes (e.g. development projects or distributed manufacturing projects) between large companies and SMEs.

PAVONE — itself a typical European SME software company — attempted to enter the market for outsourcing projects, due to the increasingly difficult nascent environment for SME software companies. After unsuccessfully detecting a suitable solution to meet the requirements of the large companies, the InterPROM idea was born.

InterPROM's main innovation is preventing, bridging and avoiding communication and media breaks between large companies and SMEs through the elimination of incompatibilities between different systems and the bundling of the information contained therein.

To realise this goal, the SMEs complemented the consortium with three internationally renowned research and technological development (RTD) performers, one designated project management specialist, one Europe-wide operating sales expert and EADS as pilot user.

The purpose of the consortium is InterPROM's sustainable establishment as the standard product for the allocation and execution of projects between

large companies and SMEs within the European market. According to figures from Gartner, Frost and the Carnegie Mellon University, the consortium estimated the market for a solution like InterPROM at about EUR 1.6 billion.

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Co-operative research

- 1 INVERA GMBH (DE)
- 2 PAVONE AG (DE)
- 3 CORPORATE PROJECT SOLUTIONS LTD (UK)
- 4 H&S HEILIG UND SCHUBERT SOFTWARE AG (AT)
- 5 EADS DEFENCE AND SECURITY SYSTEMS S.A. (FR)
- 6 UNIVERSITY OF PADERBORN (DE)
- 7 UNIVERSITY OF ESSEX (UK)
- 8 TECHNICAL UNIVERSITY OF VARNA (BG)

**Contract: 512683**  
**Call: FP6-2002-SME-1**  
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**EC Contribution: € 1 278 171**

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# IPC-OCT

## In-Process Control with Optical Coherence Tomography

296

Co-operative research

The production industry is facing increased challenges in delivering the highest quality in a short time at competitive prices. As the dimensions or crucial features of products and parts become smaller, down to the micrometre range, the effort and connected costs needed to characterise and evaluate the product's properties accordingly are increasing dramatically. Especially for the characterisation and inspection of complex geometries or critical features located inside the materials, non-destructive imaging technologies are a great advantage. Unfortunately, available conventional non-destructive imaging and evaluation methods are either very costly and/or rather slow (e.g. X-ray computer tomography), or they do not fulfil the requirements (like standard ultrasonics) for advanced applications, e.g. for high resolution inspection of micro-parts.

This project aims to solve these problems by developing a novel, fast, compact, user-friendly, cost-effective (affordable by small to medium-sized enterprises (SMEs)) tomographic characterisation tool for industrial applications, based on optical coherence tomography (OCT). The OCT method was originally developed for medical diagnostics and is intensively pursued for medical purposes, but not for industrial applications.

In this project, a competent all-European consortium, with nine partners from four European countries, covering the set requirements for the development and application of OCT, could be established. The consortium includes SMEs as technology providers, supported by the research and technological development (RTD) performers, and SMEs as technology users who will directly test and evaluate the novel method to shorten process development times and to control their products in the production process. An additionally established industry-supporter group and the technology-user SMEs in the project are already defining a future market for fast and effective exploitation of the project's results.

- 1 HIGH Q LASER PRODUCTION GMBH (AT)
- 2 ISIS OPTRONICS GMBH (DE)
- 3 ACCENT PRO 2000 S.R.L. (RO)
- 4 PRAEZISIONSKUNSTSTOFFTECHNIK BUERTLMAIR GMBH (AT)
- 5 MICRO RESIST TECHNOLOGY GESELLSCHAFT FUR CHEMISCHE MATERIALIEN SPEZIELLER PHOTORESISTSYSTEME MBH (DE)
- 6 BOEHRINGER INGELHEIM MICROPARTS GMBH (DE)
- 7 UPPER AUSTRIAN RESEARCH GMBH (AT)
- 8 FACHHOCHSCHULEN OBERÖSTERREICH F&E GMBH (AT)
- 9 UNIVERSITY OF BATH (UK)

www.ipc-oct.com



FP6 Project Catalogue

**Contract:** 507825  
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**Duration (months):** 27  
**Total cost:** € 1 477 439  
**EC Contribution:** € 955 831

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# MAP2

## Micro-Architectural Power Management: Methods, Algorithms and Prototype Tools

The MAP2 project will enable innovative extensions to existing products of BullDAST (Italy), and ChipVision Design Systems (Germany). Both small to medium-sized enterprises (SMEs) are technology leaders of Electronic Design Automation (EDA) tools for the design of power-efficient systems.

CMOS technologies below 90 nm will enable the addition of value to many products and services, e.g., in mobile communication and transportation. However, the use of these technologies is severely limited by the increase in design cost and power consumption. This is a challenge, but also a large opportunity for EDA vendors. The current products of BullDAST and ChipVision are complementary, working at different, but adjacent phases of the design chain. The ORINOCO tool by ChipVision allows power analysis and optimisation at the pre-implementation phase, when the micro-architecture of a subsystem is designed from C or SystemC specifications. The PowerChecker tool by BullDAST performs architectural power estimation and optimisation before RTL synthesis. The new prototype products of MAP2 will allow a seamless design flow between both tools and an automatic insertion of power management structures. This will be done at the earliest possible phases of design development, thus ensuring the highest efficiency. Such solutions will secure both SME EDA vendors a privileged position in their market. The new tools will also put the users of such tools in a favourable situation, because they will be able to design low power devices in the shortest possible time.

The third SME partner will be such a user: CSEM, Switzerland, a world-leading circuits and systems design house with a well-established business in the domain of full-custom and semi-custom design services. The envisioned tool solution will not be possible without the contribution of two research performers, i.e., Politecnico di Torino (Italy) and OFFIS (Germany), whose expertise and competence in the specific domain of low-power electronic design is recognised worldwide.

- 1 KURATORIUM OFFIS E.V. (DE)
- 2 POLITECNICO DI TORINO (IT)
- 3 BULLDAST S.R.L. (IT)
- 4 SWISS CENTER FRO ELECTRONICS AND MICROTECHNOLOGY (CH)
- 5 CHIPVISION DESIGN SYSTEMS AG (DE)

**Contract: 31984**  
**Call: FP6-2004-SME-COOP**  
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**Duration (months): 18**  
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**EC Contribution: € 740 000**

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# MCPA

## Machine Controller for High-Precision Applications

298

Co-operative research

MCPA will develop machine and motion controllers that will be PC-based, hardware-independent and open for modification. It will include a dual SERCOS Drive, will have a sophisticated error-handling and machine-control framework software, and the accuracy of +/-50 nm.

The consortium is composed of three small to medium-sized enterprises (SMEs) and two research and technological development (RTD) providers from three countries. Each SME poses a different set of requirements to the control system; therefore the universal product will cover a large area of machine control needs. The RTD providers are very experienced in machine control design and can meet those needs. Most available machine and motion controllers are produced in the US or Japan. Almost all such products do not allow the making of changes in the code of the machine, undermining the sorely needed flexibility of today's production. In addition, the large number of controllers needed for one production cell creates severe problems in setting up, operation and maintenance.

The present-day controllers are either inflexible, or flexible, but very expensive. In addition to the work package on management, five technological work packages are included: writing of detailed specifications, development, integration, verification and validation in conditions similar to those of a client. One RTD provider develops most of the controller's functions, while the other develops the high-accuracy calibration equipment as well as the process and motion control software for the ion-beam milling machine of NTG.

The SMEs will increase their sales and their employment. It is expected that SME clients will reduce their operating costs, and hence, keep employment high. Workers' safety and product quality will also gain. MCPA contributes to European policies on competitiveness.

The SMEs will exploit the results commercially; the RTD providers will get access rights and use them for further

research and development (R&D). Dissemination will take place by publishing articles in technical and trade journals, by participating in international exhibitions and by promoting MCPA through the websites and sales literature of the SMEs.

- 1 MANZ AUTOMATION AG (DE)
- 2 NTG NEUE TECHNOLOGIEN GMBH & CO. KG (DE)
- 3 TIJHUIS HOUTBEWERKINGSMACHINES (NL)
- 4 KOLLMORGEN-SERVOTRONIX LTD (IL)
- 5 OPTEG GMBH (DE)



**Contract: 512558**  
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**EC Contribution: € 763 651**

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# MEDISUMM

## The Development of a Low-Cost, Easy-to-Use Primary Healthcare Consultation Recording, Transcription and Summarisation Multi-Modal Patient-Data Capture Device

The principal objective of this project is to develop a new integrated device for use in the primary healthcare sector in recording, transcribing and intelligently summarising consultations between the healthcare practitioner and the service user, to address the fact that each year, 168 000 EU citizens suffer injury or death as a consequence of incorrect or incomplete medical records.

Our proposed programme of work encompasses the following major components:

- WP1: the creation of new knowledge in of the following fields: spectral analysis of human voice, microphone design and placement for n-person dialogue capture, communication and vocabulary paradigms within primary healthcare;
- WP2: development of the Speaker Differentiation Module, capable of digitally recording the consultation and differentiating between the speakers;
- WP3: development of the Transcription Module, capable of processing the previously recorded digital-audio stream and persistently storing the transcript;
- WP4: development of the Summarisation Engine, capable of generating a user-configurable contextual summary of the transcript;
- WP5: integration and testing of the developed technological innovations into a prototype MEDISUMM device;

- WP6: carry out innovation-related activities such as protection of IPR, absorption of results by participants, dissemination activities, socioeconomic studies and promotion of exploitation;
- WP7: manage the consortium by the active management of innovation-related activities, technical activities, legal aspects and other issues

European social and economic cohesion will benefit from our consortium of five small to medium-sized enterprise (SME) partners from four Member States, incorporating large markets within the healthcare and medical devices arena within the UK, Italy, the Czech Republic and Sweden.

In addition, the consortium also includes one large company based in the UK with distribution and after-sales support in Denmark, Sweden, Norway, Finland and the UK. This will help us to ensure that the developed technology is exploited worldwide.

These activities may be carried out by innovative and high-tech SMEs in cooperation with research centres and universities.

Co-operative Research contributes to the objectives of the Sixth Framework Programme (FP6) as regards the SMEs, that is, it serves the following purposes:

- supports SMEs to respond to the pressures for continuous innovation and technological adaptations that are exacerbated by the completion of the European internal market and the intensification of competition;



- facilitates transnational cooperation in research between SMEs, research institutions and other organisations, which is essential to SMEs' competitiveness and internationalisation strategy; and
- facilitates cooperative relations in research activities between SMEs, research institutions and other organisations, and enables SMEs to benefit from the many advantages of networking for innovation.

- 1 PERA INNOVATION LTD (UK)
- 2 CENTRE DE RECERCA I INVESTIGACIO DE CATALUNYA S.A. (ES)
- 3 EXAGO LTD (UK)
- 4 TUNSTALL HOLDINGS LTD (UK)
- 5 PEARL MIKROFONLABORATORIUM AB (SE)
- 6 DSM SAS DI SAUDELLA AURELIANA (IT)
- 7 LISOVNA PLASTU SPOL S.R.O (CZ)
- 8 THINKINGOLEM P.S.C.R.L (IT)



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**Duration (months):** 30  
**Total cost:** € 1 238 786  
**EC Contribution:** € 641 392

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# MICROSCAN

## Development of Comprehensive In-Line Quality Control System for Printed Circuit Board Assemblies

Microscan will produce a powerful tool in the total quality control of PCB assemblies, which can also reduce the cost of the manufacturing process and will provide an impetus to the PCB industry in Europe. It will greatly improve the employment prospects of the region, as well as improving the quality of life for Europe initially, and then worldwide.

In addition to the advantages mentioned above, this project will aid in the introduction of a lead-free solder by developing the NDT techniques on a selection of lead-free samples and provide genuine environmental benefits.

It complies with European Parliament Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment and Directive 2002/96/EC on waste electrical and electronic equipment.

The project will achieve this by developing a non-destructive system, providing full coverage of all defects in PCB manufacturing, as illustrated below.

- Assembled PCBs can suffer from many defects. It is highly beneficial for these defects to be detected at the production stage, as failure in the field can result in massive financial costs for the manufacturer, which are then passed on to the consumer.
- There is no existing non-destructive testing (NDT) system which incorporates all of the available techniques to form an integrated in-line quality control system. This gap in the market means that flaws will be missed and adds to the financial burden of the manufacturers and the whole European community.
- There are currently specific limitations to the NDT techniques and equipment, which prevent them being combined in an integrated system, which can be operated in-line.

The Microscan project will overcome the current limitations and develop new techniques for X-ray detection, develop novel improvements for Automated Optical Inspection (AOI) and innovative and novel acoustic and thermal techniques. It is intended that the developed systems be combined with a PCB assembly system to produce new in-line inspections, providing full quality control of PCB assemblies.

- 1 X-TEK SYSTEMS LTD (UK)
- 2 LOT ORIEL GMBH & CO.KG (DE)
- 3 MACHINE VISION PRODUCTS INC. (UK)
- 4 MICROTREL TECHNOLOGIE ELETTRONICHE (IT)
- 5 BETA ELECTRONICS LTD (IE)
- 6 ULTRASONIC SCIENCES LTD (UK)
- 7 GOODRICH CONTROL SYSTEMS LTD (UK)
- 8 TWI LTD (UK)
- 9 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 10 KAUNAS UNIVERSITY OF TECHNOLOGY (LT)

**Contract: 508613**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/11/2004**  
**Duration (months): 28**  
**Total cost: € 1 936 735**  
**EC Contribution: € 1 034 167**

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# MOBILE

## MOveable Bearings Innovation Launch in Enlarged Europe

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Co-operative research

Bridge weight and traffic loads, as well as braking and wind forces generate a number of different forces that must be transmitted to the ground through bridge piers and abutments. This is the task of bridge bearings, designed, manufactured and installed to permit movements and torsional effects caused by traffic, temperature variations, pre-stress, shrinkage and creep. Bridge bearings are therefore critical components of a bridge structure and demand high-quality standards.

An ongoing increase of traffic volume, higher cruising speeds and more flexible structures result in a redefinition of requirements for bearing systems. Furthermore, the ambitions of bridge engineers to exceed constructions not even finalised, in dimensions and technical performances, are transferring their challenge to bridge bearing manufactures, too.

The lack of reasonable technologies to meet these extreme product specifications mainly results in expensive custom-made products with reduced lifetime performance. To face the current situation with sustainable structure life-cycle costs (LCC), the bridge-bearing manufacturers agree on the potential of reconsidered sliding bearings. Therefore the consortium is ready to develop a new generation of sliding bearings with higher performance, advanced materials, better constructability and maintainability, as well as significantly extended lifetime.

The corporation of the participating manufacturers has to be seen as alliance against competition from the US and Asia. Especially eastern Europe, where the establishment of a sustainable infrastructure has priority for the whole European Union, was recognized as potential market. A high number of eastern European end-users confronted with accumulated needs for sustainable products, support the project with valuable requests and therefore guarantee a huge market for the developed product from the very beginning.

- 1 VCE HOLDING GMBH (AT)
- 2 REISNER & WOLFF ENGINEERING GMBH (AT)
- 3 MAGEBA BÜLACH S.A. (CH)
- 4 RW SOLLINGER HÜTTE GMBH (DE)
- 5 MAURER SÖHNE GMBH & CO. KG (AT)
- 6 MATERIAL TESTING INSTITUTE, UNIVERSITY OF STUTTGART (DE)
- 7 INSTITUTE OF STRUCTURAL ENGINEERING, UNIVERSITY VIENNA (AT)



**Contract:** 31951  
**Call:** FP6-2004-SME-COOP  
**Starting Date:** 01/02/2007  
**Duration (months):** 24  
**Total cost:** € 917 500  
**EC Contribution:** € 517 000

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# MULTITURF

## Innovation in Multifunctional Artificial-Turf Fields for Sports: Development of New Concepts Using a New Predictive Design Tool

In recent years, artificial turf has become more and more important as a sport surface in Europe. The advantages of artificial turf fields are obvious: more usage hours, lower maintenance costs, much more constant performance and usable in a large variety of climates. However, until now, only specialised artificial-turf fields for single sport use have been developed, mainly in use for high-end purposes: top hockey fields, top soccer fields, etc. Local governments, schools, amateur sport clubs and owners of sports facilities would like to profit from the advantages of artificial sport and playing fields, but are now forced to invest in different highly specialised fields. They call for a multifunctional, more general-use field, without the desire to compromise on sport and safety needs. This need for multifunctional artificial turf fields is even more urgent because in most European cities, space is becoming both scarce and expensive. The current technology is inadequate to fulfil these needs; new concepts have to be developed.

This project's innovative aspects will be implemented in the following ways.

- By developing a predictive design tool for multi-use artificial turf fields. With such a tool, different functional and technical requirements can be tailored for multifunctional fields in a short time, that is, without 'trial and error' experimental work, making field development more economical, friendly and "first time right".
- Through user-centred research (biomechanics and human modelling) for the determination of needs and requirements of users for both optimal performance and prevention of injuries.
- Through cooperation of all partners in the production chain and research partners involved in sports and technology.

These innovations will make it possible to develop new concepts for artificial turf fields, which can then

be evaluated in short time and in an economically friendly way. This will help to ensure that safe sports and recreation are possible for a larger part of the European population.

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Co-operative research

- 1 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 2 INSTITUTO DE BIOMECÁNICA DE VALENCIA. (ES)
- 3 INSTITUUT VOOR SPORTACCOMMODATIES B.V. (NL)
- 4 POLIGRAS IBERICA S.A. (ES)
- 5 EDEL GRASS B.V. (NL)
- 6 SALTEX OY (FI)
- 7 RECIPNEU - EMPRESA NACIONAL DE RECICLAGEM DE PNEUS LDA (PT)
- 8 TEN CATE THIOLON B.V. (NL)
- 9 ARCADIS REGIO B.V. (NL)

www.multiturf.com

**Contract: 16456**  
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**EC Contribution: € 706 192**

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ICT & Electronics

# MULTIWAVE

## Cost-Effective Multi-Wavelength Laser System

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Co-operative research

The deployment of wavelength-division-multiplexed (WDM) systems has allowed for unparalleled network upgrading in network capacity and transmission lengths. As WDM technology advances towards cost-sensitive Metropolitan Area Networks (MAN) and even Access Networks, a major problem identified is the high complexity and cost of WDM transmitters. WDM test and network architectures currently rely on large banks of continuous-wave lasers, which are often tuneable in wavelength. Each single laser source acts as an optical source for a single wavelength (channel), requiring its own drive electronics and current/temperature controlling. Aside from the high initial cost of this approach, upgrading such high capacity WDM network means adding a laser source for each additional channel required, leading to unacceptable installation costs.

MULTIWAVE aims at developing a compact, cost-effective light source suitable for deployment in current and future broadband optical networks, reducing the complexity of the transmitter architecture and relaxing the demands on power, heat, inventory and space of optical network terminals. MULTIWAVE will provide a single plug-and-play device that can be used as a high-channel-count, multi-wavelength optical source with the potential to cover all optical telecommunication windows.

MULTIWAVE was conceived and designed giving the highest priority to cost effectiveness and upgradeability. The proposed optical source is based on a solid theoretical understanding, and preliminary research activity shows promising results. MULTIWAVE envisages the development of a complete WDM optical source, significantly broadening the expertise of the partners and strengthening the participating small to medium-sized enterprises (SMEs) as well the European position in the worldwide market of optical telecommunications.

[www.multiwave.eu.com](http://www.multiwave.eu.com)

- 1 EIDGENÖSSISCHE TECHNISCHE HOCHSCHULE ZÜRICH (CH)
- 2 INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS OF THE NATIONAL TECHNICAL UNIVERSITY OF ATHENS (GR)
- 3 TIME-BANDWIDTH PRODUCTS INC. (CH)
- 4 PHOTON LASEROPTIK GMBH (DE)
- 5 CRYSTAL FIBRE A/S (DK)
- 6 SLS OPTICS LTD (UK)



FP6 Project Catalogue

**Contract:** 18074  
**Call:** FP6-2003-SME-1  
**Starting Date:** 01/11/2005  
**Duration (months):** 24  
**Total cost:** € 2 087 499  
**EC Contribution:** € 1 490 608

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# MYSELF

## Multimodal E-Learning System Based on Simulations, Role-Playing, Automatic Coaching and Voice Recognition Interaction for Affective Profiling

The MySelf project is intended to emphasise experiential training by developing and validating a multimodal learning platform based on vocal recognition, role playing via the Web and collaborative learning. The innovation here will constitute the use of the affective computing and recognition of the user's emotional state. In addition, the platform will be designed and validated for online fruition; the focus is on the enrichment of the simulations and the affective computing methodologies traditionally carried out in didactic classroom with the recognition of user's emotions through his or her learning path and systematic distance-learning based on the Internet.

The goal is, in fact, to expand the potentialities of multi-user e-learning towards the implementation of interactivity standards and online learning with typical simulation methods. The multimodal interface will be developed considering the technical chain of the tool: microphone (voice), monitor (vision), earphone (hearing), cooperation (emotional state). An extensive implementation of training and learning methodologies based on the experiences of research and technological development (RTD) performers and some small to medium-sized enterprise (SME) proposers, coupled with appropriate IT solutions, developed by high-skilled partners, will form the basis for the final tool. Furthermore, considering the great potential of mobile technologies, it will be implemented as a task aimed at the PDA fruition of some of the functionality of the MySelf tool.

The project MySelf, by taking an important step forwards using the state of the art, thanks to new methodologies and tools, will ensure that it is relevant to several EU policies and main programmes such as eEurope and EQUAL. It integrates the gender dimension by its nature: during the project the role of women will be significant. Moreover, the consortium is composed of two partners from new EU Countries (one Polish and one Romanian). The project will be developed with two main different targets in mind: social (the paramedical field and people with disabilities), and profit (the financial field and economics). The translation into several languages

and the validation of the prototype through testing by two end-users, will provide the right exploitation, achieving wide distribution and good visibility for both the tool and the consortium.

- 1 ACSE SRL (IT)
- 2 UNIVERSITA DEGLI STUDI DI MILANO - BICOCCA (IT)
- 3 DIGITAL HOLDING OU (EE)
- 4 UNIVERSITEIT TWENTE (NL)
- 5 DYNAMIC DIGITAL BUNCH (IT)
- 6 ENTE ACLI ISTRUZIONE PROFESSIONALE (IT)
- 7 UNICREDIT BANCA SPA (IT)
- 8 HAUTE ECOLE VALAISANNE/  
UNIVERSITY OF APPLIED SCIENCES VALAIS (CH)
- 9 S.D.C. DI FLAVIO ZARDUS (IT)
- 10 FUNDACJA WARSZAWSKI INSTYTUT BANKOWOSCI (PL)
- 11 DOCETIS-ERGOFIRMA S.A./AG (CH)
- 12 PSICOLOGIA Y REALIDAD VIRTUAL S.L. (ES)
- 13 SUPPORT IT (UK) LTD (UK)
- 14 LEARNING EDGE SRL (IT)

**Contract: 508259**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/09/2004**  
**Duration (months): 29**  
**Total cost: € 1 901 100**  
**EC Contribution: € 1 199 843**

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# OPTIPOINT

## The Development of a New, More Efficient and Safer Portable Traffic Optimisation System for EU Ports

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Co-operative research

Maritime industries in the EU had a turnover of EUR 159 billion and employed 1 545 000 people in 1997. They added value of EUR 70 billion (1 % of GDP) and contributed EUR 23 billion (33 % of VA) to EU funds. The project will increase the competitiveness of European industrial ports by increasing port throughput by 10 %.

It will achieve this by improving the accuracy of calculation of under keel clearance (UKC) from 50 cm to 10 cm, enabling more ships to pass through the ports during a tide. The project will also increase real-time ship movement, forecasting and position accuracy: this will reduce accidents and groundings in narrow waters, which will improve safety and increase port throughput. It will introduce a new sensor that will provide very accurate real-time ship movement forecasting in the case of GPS system blackout.

The market for OPTIPOINT could be very large in this growing and increasingly competitive industry. Our provisional analysis of the target market size indicates that within Rotterdam port, there are potentially 1 000 users for 300 OPTIPOINT systems. A provisional estimation of demand is 15 000 European systems and 20 000 in North America. At a target selling price of EUR 25 000, this gives a market value of EUR 375 million in Europe and EUR 500 million in North America.

The proposed project will create international export opportunities for those involved in the manufacture of this new ship navigation technology, will help to protect the sector they serve from globalisation effects, and will increase their competitiveness through the following OPTIPOINT key product features:

- increased port throughput;
- improved ship safety during port entry;
- low cost.

A consortium of six companies propose to develop a new more efficient and safe portable traffic optimisation system at a total integrated system cost of less than EUR 25 000 (OPTIPOINT). This is well within the spending profile of the average ship pilot agency and industrial port, while still remaining competitive compared with navigation applications having lower performance.

Leading EU research performers will develop this technology for the commercial benefit and exploitation of a European consortium of small and medium-sized enterprises.

- 1 MARIMATECH AS (DK)
- 2 SEVEN CS AG & CO. KG (DE)
- 3 PORT AUTONOME DE NANTES SAINT-NAZAIRE (FR)
- 4 GRAM AND JUHL APS (DK)
- 5 WADIM PLAST SP. J. WANDA NAROJEK, ZENON NAROJEK (PL)
- 6 RCD RADIOKOMUNIKACE SPOL SRO (CZ)
- 7 ECI SECURITY LTD (UK)
- 8 PERA INNOVATION LTD (UK)
- 9 TEKNOLOGISK INSTITUTT AS (NO)



**Contract:** 33015  
**Call:** FP6-2004-SME-COOP  
**Starting Date:** 01/09/2006  
**Duration (months):** 24  
**Total cost:** € 1 553 570  
**EC Contribution:** € 803 719

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We aim to support small to medium-sized enterprises (SMEs) to respond to the pressures for continuous innovation and technological adaptations that are exacerbated by the completion of the European internal market and the intensification of competition from globalisation.

The global fireworks market has trebled to EUR 683 million in the last ten years, and in Europe the sales of fireworks have increased five-fold since 2000. At the same time, the European SME manufacturers' share of this market has continued to decline. It is vital that we recover this situation, and the perfect mechanism by which to achieve this is through enhanced firework safety. In so doing, we will develop an IPR protectable technology that will allow us to exploit the knowledge-based economy and add value to our products. We seek to develop a product that has performance and safety levels beyond those offered by any competing or existing technology.

We aim to facilitate transnational cooperation in research between SMEs, research institutions and other organisations, which is essential to SMEs' competitiveness and internationalisation strategy, facilitates cooperative relations in research activities between SMEs, research institutions and other organisations and enables SMEs to benefit from the many advantages of networking for innovation. Within this specific project, the need for transnational cooperation is even more pronounced, since although the SMEs have the desire and capacity to innovate, they don't necessarily have the finances or the leading-edge scientific research facilities to make it happen. Furthermore, some of the key skills we are seeking (RFID, coil insert moulding, pyrogen materials) are only available in specific regions, as is described in detail in this proposal.

We also aim to ensure that the relationships established during this project will stimulate new innovation and technology ventures in the future. We see this project as being the start of a number of future highly innovative, commercially successful projects.

The firework industry is growing at a tremendous rate. The global market is now worth EUR 683 million, and sales in Europe alone have increased five-fold since 2000. However, according to the EU's own reports, up to 45 000 people are injured every year as a direct result of fireworks or firework misuse.

The obvious solution to the problem is to ban the sale of fireworks; however, lengthy national and international studies have concluded that injuries actually escalate under these conditions, due to the growth in more dangerous home-made and illegal black-market fireworks. There is therefore a clear and urgent societal need to overcome this problem.

This proposal will develop an innovative, ultra-safe firework activation system to reduce these injuries by 84 % (at maximum market penetration) preventing 37 800 people from being injured in Europe alone, and saving EUR 332 million in healthcare costs. The technology will mitigate all of the key injury modalities relating to firework usage.

There is currently no technology available globally (or under development) that can offer these benefits. The total market potential for the new technology and its spin-offs is EUR 2.1 billion, with our penetrable market target being EUR 107 million. Our aims will be achieved by innovations in wireless communications technology, RFID, insert injection moulding, novel-materials science and advanced electronic sensor technology.



The proposal is particularly relevant to the objectives of cooperative research, since all the SMEs in the consortium (including European firework-manufacturing SMEs) are under intense threat from low-labour-rate competition, particularly from China. Whilst we recognise that this project would revolutionise our sectors, we need to access scientific and technological research skills to enable us to overcome the significant technical barriers.

This Cooperative research programme will enable us access some of Europe's leading research and technological development (RTD) organisations to ensure success.

- 1 PERA INNOVATION LTD (UK)
- 2 X-IDENT TECHNOLOGY GMBH (DE)
- 3 MICRO OMEGA SP. Z.O.O (PL)
- 4 ATEMIP S.A (FR)
- 5 JENNIC LTD (UK)
- 6 AURA A.S. (CZ)
- 7 HANS HAMBERGER AG (CH)
- 8 ZINK-FEUERWERK GMBH (DE)
- 9 FIREWORKS INTERNATIONAL (UK)
- 10 DAVEY BICKFORD S.N.C (FR)
- 11 PURCHASE ENGINEERING LTD (UK)
- 12 D'APPOLONIA S.P.A (IT)



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 Total cost: € 1 485 985  
 EC Contribution: € 765 726

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# RADIOTECH

## Ultra-Wideband Radio Application for Localisation of Hidden People and Detection of Unauthorised Objects

The goal of the project is to support four small to medium-sized enterprises (SMEs) to become more innovative, to adapt their technology, to develop transnational cooperation and to extend their cooperative relations. These goals are to be achieved in the specific area of wideband radio for the detection of hidden people and objects. All the SMEs are innovative in their own right and together they wish to bring new products to the market, utilising a world-patented technique for ultra-wideband technology called the Maximum Length Binary Sequence technology. The SMEs require the support of leading universities as research and technological development (RTD) providers in order to develop the best data extraction techniques for through-wall imaging products and through-dress imaging products, to advise on hardware development and in general to give a "push" to the development process with their expertise and capacity.

The SMEs intend to sell the products to the security and rescue markets. There are a handful of organisations in the world that provide ultra-wideband products, most of which are in the USA. The SMEs in the project should be supported in order to help ensure that Europe capitalises on the knowledge and expertise which it has for ultra-wideband technology, which is proving to be more and more suitable for diverse applications.

- 1 TECHNISCHE UNIVERSITÄT ILMENAU (DE)
- 2 ING. ALEXANDER PIVOVARNIK - INGMETAL (SK)
- 3 MEODAT MESSTECHNIK, ORTUNG UND DATENVERARBEITUNG GMBH (DE)
- 4 VRIJE UNIVERSITEIT BRUSSEL (BE)
- 5 GEOZONDAS LTD (LT)
- 6 TECHNICKÁ UNIVERZITA V KOŠICIACH (SK)
- 7 TECHNISCHE UNIVERSITEIT DELFT (NL)
- 8 STATENS RAEDDNINGSVÄRK (SE)
- 9 INGENIEURBÜRO RALF KLUKAS – DRESDEN (DE)
- 10 CRABBE CONSULTING LTD (DE)

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**EC Contribution:** € 1 614 650

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# RAPSODI

## Radiation Protection with Silicon Optoelectronic Devices and Instruments

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Co-operative research

<http://rapsodi.dfm.uninsubria.it/Home.html>

The aim of the project is the development of a set of radiation detectors for three different applications, based on novel Silicon Photo-Multipliers (SiPM), which have numerous advantages over traditional photosensors: high sensitivity, high speed, compactness, robustness, low operating voltage and power consumption, low cost.

The selected applications are: real-time dosimetry in mammography, radon concentration measurement, and detection of radioactive material for homeland security. These demanding applications will demonstrate superior performance and the numerous advantages that SiPM have over traditional vacuum photo-multiplier tubes. They open perspectives for a much wider implementation of new technology, thus creating a benchmark for a global upgrade of radiation detectors. Although the project is highly innovative, the pre-existing, long-term experience of the partners ensures success.

The consortium is composed of four highly innovative small to medium-sized enterprises (SMEs) from the Czech Republic, Germany, Ireland and Switzerland, specialised in SiPMs and selected Applications, and three research and technological development (RTD) performers from Italy, Poland and Russia with extensive expertise and high research potential in the fields of particle detectors and electronics. This consortium ensures full mobilisation of European potential and market coverage. These new products will not only significantly increase competitiveness of partners at a world level, but will reinforce the leading role of Europe in the future development of new methods of detection and diagnostics based on this technology.

Development of these highly innovative instruments will be undertaken according to European standards and will ensure technical support of the new International Radon project of WHO, the European Security Programme of FP7 and the EURATOM Basic Safety Standards Directive (BSS) on dose control in mammography.

As a result, society will gain from better control of radiation in the environment and medicine, as well as higher security against illegal transport or use of radioactive materials.

- 1 INSUBRIA UNIVERSITY (IT)
- 2 AGH - UNIVERSITY OF SCIENCE AND TECHNOLOGY (PL)
- 3 FORIMTECH S.A. (CH)
- 4 PTW-FREIBURG PHYSIKALISCH-TECHNISCHE WERKSTATTEN  
DR. PYCHLAU GMBH (DE)
- 5 SENSL (IE)
- 6 RUSSIAN STATE SCIENTIFIC CENTER INSTITUTE FOR THEORETICAL AND  
EXPERIMENTAL PHYSICS (RU)
- 7 JIRI PLCH - SMM (CZ)



FP6 Project Catalogue

**Contract:** 32993  
**Call:** FP6-2004-SME-COOP  
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**Duration (months):** 24  
**Total cost:** € 2 199 800  
**EC Contribution:** € 1 521 700

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# RECOVER

## Photorealistic 3-D Reconstruction of Perspective Paintings and Pictures

Being appealing to a wide audience, the cultural sector can supply several compelling forms of digital content suited for a diverse spectrum of uses, ranging from learning and entertainment, to study of art history and cultural documentation. For this reason, the development of culture-related IT products and services has been the focus of a large number of efforts worldwide, originating both from companies and government agencies. This is particularly true in Europe because of its immense repository of artistic treasures.

RECOVER proposes to develop a system for the semi-automatic extraction of three-dimensional (3-D) models of scenes depicted in perspective paintings. 3-D models of paintings constitute a new and exciting way for the general public to experience and appreciate fine art. The viewer can experience a feeling of immersion; paintings are no longer perceived as static artefacts from a long-gone past but as living, vibrant entities. With the aid of appropriate software and hardware, the viewer can literally dive into the painting, interacting with it and observing it from various viewpoints in impressive walk-throughs and inspiring fly-bys. This enables non-specialists to step into history and experience the scene in the space and time frame perceived by the artist. Ultimately, the viewing of paintings becomes a more appealing, exploratory endeavour, arousing the public's interest in fine art and cultural heritage in general.

According to the state of practice, fully manual reconstruction techniques based on the use of CAD and 3-D modelling tools are extremely tedious and labour intensive, and therefore time consuming and expensive. Conventional 3-D laser scanning techniques are inapplicable due to the fact that the canvas used for painting is 2-D. RECOVER will capitalise on a vast body of research knowledge, in order to bridge the gap between state of the art and state of practice in the construction of 3-D models from 2-D paintings. To achieve this, RECOVER will employ non-contact computer vision techniques to infer 3-D scene structure by "inverting" the geometric rules followed by painters when drawing. The focus will be on the reconstruction of paintings that are rich in planes, colinearities, symmetries, orthogonalities and

other forms of geometric regularity. Furthermore, the resulting 3-D information will be refined and enhanced with the aid of interactive editing tools, yielding a photorealistic 3-D model of the depicted scene. By doing so, the resources required for constructing such models will be drastically reduced, thus increasing the competitiveness of the companies commercialising the underlying technology.

RECOVER technology can have a broad spectrum of possible practical applications, ranging from the study of art history and assistive technologies for people with special needs to video metrology, architectural photogrammetry and surveying engineering, urban visualization and planning, monuments preservation and conservation, real-time virtual reality, forensic science, maintenance, medical visualisation, guidance and information and E-learning. RECOVER partners also aim to validate the developed technology and define detailed exploitation plans. This will, in turn, facilitate the conception of novel applications and services that will increase revenue and create more jobs. Apart from the economic issues, RECOVER will also have important societal implications related to improved accessibility and visibility of European cultural resources.

The RECOVER consortium is a well-balanced blend of technology developers (research institutions and companies that are active in computational vision and graphics) and technology brokers (dynamic small to medium-sized enterprises (SMEs) active in the production, management and distribution of multimedia content, advanced visualisation techniques, with emphasis on cultural heritage applications).

- 1 FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS (GR)
- 2 SPACE S.P.A. (IT)
- 3 CULTURAL HERITAGE ON LINE (FR)
- 4 GRUPPO ABACO S.P.A. (IT)
- 5 RIGEL ENGINEERING S.R.L. (IT)

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**EC Contribution: € 835 585**

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# SAFEPHONE

The Development of an Intelligent, Physical-Condition-Monitoring, Illuminated, Self-Powered Emergency Telephone Casing for Use in Hazardous, Arduous or Safety Critical Situations

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Co-operative research

The Safephone project aims to complement the corpus of recent research studies concerning Pan-European road transport safety and the proliferation of vehicular telematics, exploiting the growing array of communications architectures technologies. Utilising the extensive networks of emergency telephone infrastructures already in existence, Safephone aims to support a step change in the personal safety of the travelling public, cost effectively, enhancing security and communications systems integrity.

Over the last 10 years there has been a steady rise in the number of accidents and incidents in tunnels across the EU, with 66 deaths recorded for road tunnel accidents and 31 recorded for metro fires. Many more civilians were affected by smoke inhalation and had to be evacuated through emergency procedures. The direct costs of the recent tunnel fires, such as those in the Tauern, Mont-Blanc and Gotthard incidents has been estimated to be about EUR 210 million per year, while the indirect costs to the economy resulting from tunnel closures are huge. In the case of the Mont-Blanc tunnel alone, these costs have been conservatively estimated at EUR 300 million to EUR 450 million per year for Italy alone.

The EU Commission proposed harmonisation measures on 30 December 2002 in the form of a new Directive aimed at improving the safety of the trans-European road network. A recent survey found that four of the UK's busiest road tunnels are among the worst in Europe, and a recurring factor in these findings is the predominance of non-soundproofed emergency telephones.

The success of this project will address EU transport safety needs and the interoperability requirements across multi-system architectures in line with the need for continuous feedback dialogue between safety communications systems' stakeholders. This will facilitate moves towards the recommendations outlined in the ERTICO project .

The technology developed under the Safephone proposal will complement the research findings of the FP5 SAFE TUNNEL research and technological development (RTD) project. The SAFE TUNNEL project is concerned primarily with vehicle telematics and aims to achieve a high integration of onboard vehicle devices and the relevant communication infrastructures. This vehicle-infrastructure integration shall be achieved at three levels: check of onboard devices to detect and/or predict anomalies and the relevant information transmission to the control centre; control of the access inside the tunnel and management of the communication vehicle-infrastructure; and control of the speed inside tunnels by vehicle telecontrol and a moving spotlight system.

A recent joint study on road transport safety standards, carried out by the UK's leading motoring membership bodies and the police, made a number of recommendations, including the need to upgrade emergency telephones . In Britain alone, 250 people are killed or injured on Britain's hard shoulders: this is equivalent to one in nine motorway deaths . Rebecca Rees, a spokesperson for the AA ,commented that 200 000 breakdowns are attended by their rescue teams on hard shoulders each year, putting their personnel at unnecessary risk .

The composite polymer Safephone enclosure falls within the WEEE directive legislation that came into force in February 2003, and Member States must achieve a minimum separation collection of 4 kg per inhabitant by 31 December 2006. Europe produces approximately 6 million t of electronic and electrical equipment each year, and this is expected to grow by 3 % to 5 % year on year, and in 1998, electronic components comprised 4 % of the municipal waste stream, with electronic and electrical equipment being one of the largest pollutants within the waste stream.





Under the new legislation, both IT and telecommunication equipment, together with monitoring and control instruments, fall within the scope of the legislation governing electrical and electronic equipment. To help counter the problem of disposal, Safephone will incorporate eco-design as an underlying principle.

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- 2 PROFITEK AŞ (NO)
- 3 COMPOSITE INTEGRATION LTD (UK)
- 4 INFO MANAGEMENT SYSTEMS AG (CH)
- 5 ELECTRONIC SYSTEMS DESIGN LTD (MT)
- 7 ARNESYS LTD (UK)
- 8 CENTRE DE RECERCA I INVESTIGACIO DE CATALUNYA S.A. (ES)

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# SafeTalk

## Development of a Continuous-Sweep, RF Harmonic Spectral Analysis Detector

314

Co-operative research

EUR 120 billion is lost to Intellectual Property theft in Europe every year alone, with additional uncountable losses in competitiveness and fraud that can be attributed to the intentional use of electronic devices for the capture, storage and transmission of confidential information. A significant proportion of this crime affects 750 000 innovative, high-tech European small to medium-sized enterprises (SMEs). The losses incurred by knowledge theft impact on other sectors, such as the 120 000 commercial law firms (predominantly SMEs), the 250 000 SME accountants and 200 000 SME insurers.

We have pulled together a supply chain of SMEs to propose a solution that will prevent the theft of vital secret knowledge, the lifeblood of all organisations. Every year over 2 million bugging devices are sold across Europe and potentially tens of millions globally. These eavesdropping devices, if not detected, have the potential to steal billions of euros of "secret knowledge" from unprotected, knowledge-reliant SMEs. The only current counter-measure is "sweeping": a "sweep" service costs around EUR 4 000, potentially EUR 48 000 yearly, for monthly cover per SME, which very few can afford.

Specifically, the system developed will bring a preventative measure for both large and small knowledge-reliant companies: a new affordable integrated detection and identification system that integrates the key technology elements of developed NLJD technology, into an arch-architecture system capable of detecting a threat to IPR, capable of detecting the threat of an individual's ability to steal secret knowledge, for which there is no currently available alternative. SafeTalk will allow for detection of various types of electronic devices that prevent owners of surveillance devices from entering information-sensitive areas and prevents potential sensitive-knowledge theft attempts.

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- 3 NAVTEL SYSTEMS (FR)
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- 5 SOCIETAS SP. Z O.O. (PL)
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# SCREENS

## New Method of Video Transfer and Control Functions for Training in Computer Classroom and for Audiovisual Applications

The objective of the project is to improve the competitiveness of European small to medium-sized enterprises (SMEs) in the field of E-learning and the audiovisual industry by providing improved screen-transfer equipment for audiovisual applications and especially for computer classrooms training. Five European SMEs involved in designing and manufacturing equipment for screen-transfer systems and three research and technological development (RTD) performers have decided to join efforts to innovate and develop a new technical solution for screen transfer and control functions, because of the technological changes described below.

Flat panel displays (LCDs) are rapidly replacing CRT monitors in computer classrooms, due to their dramatic price reduction and smaller space requirement. A new digital display connector (DVI) for flat panel displays is replacing the analogue display (VGA) connector in next two to three years, giving better picture quality for LCDs. This technological change will render the current equipment obsolete and will cause great technological challenges for European SMEs in the screen transfer business. The goal is to increase the transfer distance up to 20 m for computer classrooms (the DVI standard specifies 5 m only).

Another technological change in PCs is that USB connectors will replace old keyboard and mouse connectors in next two to three years. USB brings true Plug and Play to PC users, but at the same time it is a challenge for developers, especially to SMEs due to its complexity. USB technology will be used for connecting keyboards and mice to screen transfer networks in the new system.

The third technological and also social objective is to develop an easy-to-use user interface, which better supports different European languages. A rapid development in small-size colour LCD displays and their price reduction has made their use favourable for SMEs in user interfaces.

These technological changes will force European SMEs to innovate and develop their products accordingly. Video transfer solutions are typically provided only by SMEs.

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- 2 DATAINNOVATIONS OY (FI)
- 3 VTT - TECHNICAL RESEARCH CENTRE OF FINLAND (FI)
- 4 SYSTECH GMBH (DE)
- 5 AVISION AS (EE)
- 6 DATIM S.R.L. (IT)
- 7 CONSORZIO ROME RICERCHE (IT)
- 8 ELECTRO-HILL OY (FI)

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# SNOCER

## Low-Cost Tools for Secure and Highly Available VoIP Communication Services

316

Co-operative research

While the standards and products for providing VoIP calls and services have reached a mature state, experience in deploying and concepts and technologies for securing and ensuring the reliability of VoIP infrastructures is still in its infancy. VoIP technologies are very similar in their nature to Web and email services.

This due to the fact that VoIP services are based on standardised and open technologies (i.e. SIP, H.323, MEGACO), using servers reachable through the Internet, implemented in software and provided often over general-purpose computing hardware. Therefore, such services can suffer from security threats in the same manner as Web services. These include denial of service attacks and spam on the one side, and unavailability of the services due to network, hardware or software failures on the other.

In SNOCER, we will be investigating approaches for overcoming temporal network, hardware and software failures and ensuring the high availability of the offered VoIP services, based on low-cost distributed concepts. That is, instead of relying solely on expensive hardware and multiple network connections as is the case today in PSTN networks, in SNOCER we will be investigating the possibility of providing highly reliable services based on cooperation between independent providers in a manner ensuring the privacy and security of the customers and providers.

In this context, denial of service and intrusion detection tools will be developed that allow VoIP providers to monitor their infrastructure, detect irregularities and specify rules and actions that should be automatically executed for handling such cases. This will then be coupled with strategies to achieve high available VoIP infrastructures in a secure and low-cost manner. Addressing issues of securing VoIP infrastructures is not only challenging from a research and development point of view, but also from a commercial one. The current market trends suggest that large enterprises will monopolise the VoIP market for gateways and IP Phones. Similar to the PSTN market, such equipment

is based usually on general standards with price playing a major differentiating factor and thereby providing large enterprises with clear advantages due to their lower production costs. In contrast, security solutions need to be adapted to the exact needs of the providers and their infrastructure. This requires a high level of specialisation and technical excellence, as well as flexibility in adapting general concepts and mechanisms to the exact needs of the providers.

This makes the security market more accessible and attractive to small to medium-sized enterprises (SMEs), due to their flexible structures and high specialisation level. With SNOCER, a number of concepts, solutions and tools will be developed that will provide the involved SMEs with the technical basis for offering cutting-edge solutions which they can deploy in their respective markets. While primarily benefiting the SMEs involved, the results of the project will help in advancing the deployment of VoIP technologies in general.

The consortium is a healthy mixture of SMEs, covering the areas of VoIP service and solution provisioning, security and system integration as well as reputed research organisations with long experience in the areas of security and VoIP. The complementary expertise of the partners, their geographical distribution and product and service offers will not only ensure that the goals and objectives of the project can be met but will also intensify transnational cooperation between SMEs and research institutes.

www.snocer.org

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FP6 Project Catalogue

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# SPIDER

## Spam Over Internet Telephony Detection Service

Interest in Voice over IP (VoIP) has risen substantially in recent times, both from service providers' and from consumers' point of view. While the concept of transferring Voice over data networks like the Internet has already been known for a long time, only now has this technology become a major counterpart to the classic Public Switched Telephone Network (PSTN).

With Voice over IP calls being offered for free or for a flat rate, Spam over Internet Telephony (SPIT) has at least the same potential to become a major annoyance for users worldwide, as the current situation with e-mail spam has proved. From a technological point of view, both communication methods have many similarities. For example, calling a huge user-base through a VoIP solution can be very cost effective for any sender; it can also be easily personalised. While such a development would naturally be annoying to individual users, a large spread of SPIT would reduce the attractiveness of VoIP in general and slow down its further commercial development.

The SPIDER project will deliver a solution for the participating small to medium-sized enterprises (SMEs) to detect and prevent unsolicited VoIP calls and instant messages. This solution will not only be designed to achieve a high detection rate, but will also be optimised to be resource efficient. Without such balance, SPIT prevention will introduce high deployment costs and large processing delays, and will reduce the incentives for providers and users to actually deploy such tools.

The design of the SPIDER SPIT prevention tools will be based on two aspects. On the one hand, we will be benefiting from well-known SPAM prevention technologies, such as white and black lists or filtering algorithms. These technologies will be investigated so as to assess their suitability for VoIP and be adjusted to take into account the characteristics of the VoIP technologies and systems. On the other hand, novel approaches, which are derived from the VoIP technology itself, such as inter-provider peering mechanisms or security enhancements for

the signalling protocols used, will be also investigated and developed. The knowledge and tools used by current and innovative schemes will then be combined into the SPIDER SPIT prevention solution, in order to provide users and service providers with a customisable and configurable platform that takes into account both the needs and capabilities of large service providers and those of individual private users. To assess the efficiency and usability of the developed tools and mechanisms, the SPIDER SPIT prevention system will be intensively tested and probed throughout the project, by deploying it in SPIDER partners' service offerings.

In this way, in the context of SPIDER, a set of tools and mechanisms will be designed, developed and extensively tested, so as to enable the participating partners to provide products and services for anti-SPIT. Not only will these tools and technologies will be based on the latest technologies and innovative research solutions, but they will also be strengthened through the practical experience gained through the deployment of those tools and technologies during the project period.

Addressing the issues involved in securing VoIP infrastructures is not only challenging, from a research and development point of view, but also from a commercial one. The current market trends suggest that large enterprises are expected to monopolise the VoIP market for gateways and IP Phones. Similar to the PSTN market, such equipment is usually based on general standards, with price playing a major differentiating factor; consequently this provides large enterprises with clear advantages due to their lower production costs. In contrast, security solutions need to be adapted to the exact needs of the providers and the required infrastructure (e.g. VoIP signalling server, application server). This requires a significant level of specialisation and technical excellence, as well as flexibility in adapting general concepts and mechanisms to the exact needs of the providers. This makes the security market more accessible and attractive to SMEs due to their flexible structures and high specialisation level.



With SPIDER, a number of concepts, solutions, and tools will be developed that will provide the involved SMEs with the technical basis for offering cutting-edge solutions, which they can deploy in their respective markets. While primarily benefiting the involved SMEs, the results of the project will help in advancing the deployment of VoIP technologies in general.

The consortium is a balanced and healthy mixture of SMEs (covering the areas of VoIP service and solution provisioning and security and system integration), as well as reputed research organizations with long experience in the areas of security and VoIP. The complementary expertise of the partners, their geographical distribution, and their product and service offers will not only ensure that the goals and objectives of the project can be met, but will also intensify transnational cooperation between SMEs and research institutes.

www.projectspider.org

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- 3 ELEVEN GMBH (DE)
- 4 IPTEGO (DE)
- 5 TELIO (NO)
- 6 VOZTELECOM (ES)



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# SprayTec

## Low-Cost Thermally Sprayed and Structured Conductive Layers for Power Electronic Printed Circuit Boards

Nowadays, electronic modules on printed circuit boards (PCB) are glued to the heat sink. Although thermally conductive glues are used, the thermal resistance of the junction limits the achievable power density of the modules. Thus the heat sinks, which are essential parts of the module's housings, have to be made in a dimension much bigger than required solely by the dissipated power. Higher thermal conductivity at the PCB/heat-sink junction would therefore allow us to significantly reduce the size of such modules, saving space, weight and material. Energy savings are substantial, as the heat sink's material, aluminium, is very energy-consuming in the production process.

Thermal sprayed coatings are used extensively for a wide range of industrial applications. The technique generally involves the spraying of molten powder or wire feedstock, the melting being achieved by oxy-fuel combustion or an electric arc (plasma). The molten particles are accelerated by the flame, and then impacted onto a properly prepared substrate, usually metallic. To adapt this process to spray the substrates of PCBs, several barriers like the implementation of the right materials or the adjusting of the PCB manufacturing process have to be overcome, through the help of the European consortium.

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- 2 PNC S.C. NATRYSKIWANIE CIEPLNE POWLOK (PL)
- 3 LIFCO INDUSTRIE (FR)
- 4 ANDUS ELECTRONIC GMBH LEITERPLATTENTECHNIK (DE)
- 5 P4Q ELECTRONICS S.L. (ES)
- 6 SECTRONIC SAS (FR)
- 7 S.P.R.I.N.T. S.R.L. (IT)
- 8 SULZER METCO AG (SWITZERLAND) (CH)
- 9 EUPEC EUROPÄISCHE GESELLSCHAFT FÜR LEISTUNGSHALBLEITER (DE)
- 10 HELLA KG HUECK & CO. (DE)
- 11 APTRONIC AG (DE)
- 12 PERA INNOVATION LTD (UK)
- 13 ZENTRUM FÜR AUFBAU- UND VERBINDUNGSTECHNIK GMBH (DE)

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# TRACK&TRADE

## Creating a Data Mart for Floating Car Data

320

Co-operative research

With the number of vehicles, both private and commercial, in urban areas steadily increasing, accurate traffic information has become an increasingly important commodity. A change in transport policy, e.g. increased use of public transport and efficient inter-modal transport, will only have a medium- to long-term effect on improving the traffic situation in inner-city areas. To create high-quality content for traffic management applications and mobility services, reliable and inexpensive real-time traffic is essential. The TRACK&TRADE project relies on floating car data (FCD) to solve a number of well-known problems generating traffic content. While conventional traffic data collection systems have high infrastructure maintenance and communication expenses, TRACK&TRADE will exploit the FCD approach synergies with existing GPS-based fleet disposition systems.

The scope of the project is to develop an FCD data mart that allows for the collection and integration of FCD data from as many data suppliers as possible. In turn, the data mart will supply aggregated datasets as well as valued-added services. Services include the provision of maps, visually illustrating travel times and the provision of current and predicted travel times for parts of the road network. These services will be provided using XML and Web services and should simplify the creation of more complex services such as routing and navigation as well as traffic forecasts.

Trading FCD data and the provision of related services would serve two main purposes: (a) It creates an additional income stream for the data producers from an otherwise worthless resource; and (b) given that such data becomes generally available, it will allow for the provision of improved traffic information services through a series of more or less technological means. With an increasing number of commercial vehicles (e.g. taxi fleets) being equipped with GPS, a successful business case for the FCD technology can be demonstrated.

[www.trackandtrade.org](http://www.trackandtrade.org)

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- 4 EMPHASIS TELEMATICS (GR)
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- 6 GREENWAY SYSTEME GMBH (DE)
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# TYRECHECK

An Integrated, Automated, Real-Time, Tyre Management System for the Commercial Vehicle Sector

During 2000 there were 41 083 road deaths across the EU; 185 000 persons were seriously injured and a further 1.56 million persons were casualties. Of the 41 083 deaths, 8 217 (20 %) can be attributed to, or were caused by, commercial vehicles including, buses, trucks and vans: of these, 1 297 (15.79 %) can be attributed to tyre failure resulting from worn-out tyres and low tyre pressures. In addition, over 360 million vehicle tyres enter the EU waste stream each year, representing a waste load of 2.5 Million tonnes of which 38 % belonged to commercial vehicles. Research shows that the average life of a leased commercial vehicle tyre is 130 000km, but that this could be increased to 320 000km by proper tyre management. Poor tyre management leads to 576 million litres of fuel wasted across the EU by commercial vehicles alone, producing an additional 1.55 Million tonnes of CO<sub>2</sub> emissions.

The European Commission's 2001 White Paper 'Transport Policy for 2010: Time to Decide' states the EU's commitment to reducing the number of road deaths within the EU by 50 % by 2010; what's more, the situation is getting worse, as 'heavy goods traffic alone will increase by nearly 50 % over its 1998 level'. The White Paper also states that 'strong economic growth in the candidate countries will also increase transport flows, particularly road haulage traffic', and this will exacerbate an already bad situation.

The underlying cause of these problems is a lack of regular tyre management on all vehicles, with the current process reliant on manual tyre checking. Therefore, we propose to develop an integrated, automated, real-time tyre management system incorporating an automatic tyre-tread depth monitor. This proposal complies with the Work Programme for Horizontal Research Activities 1.2.2. In addition, this proposal conforms to parts of IST Thematic Area 2 Information Society Technologies 2.3.1.10 – 'eSafety for Road and Air Transport'.

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- 4 PRZEDSIĘBIORSTWO WIKOM-SEAL (PL)
- 5 MICROOMEGA SP.Z.O.O (PL)
- 6 HASWELL MOULDING TECHNOLOGIES LTD (UK)
- 7 ELECTRICIDAD INDUSTRIAL SALVIO BUSQUETS S.A. (ES)
- 8 BARTEC AUTO ID LTD (UK)
- 9 D'APPOLONIA S.P.A. (IT)
- 10 AUTOCONNECT (UK)

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# U-CREATE

## Creative Authoring Tools for Edutainment Applications

322

Co-operative research

U-CREATE is initiated by Alterface, Imagination and ion2s, three small to medium-sized enterprises (SMEs) which are primarily active in the field of edutainment, i.e. the joining of education and entertainment (customers are museums, cultural institutions, entertainment parks, etc.) They share a common and important problem: efficient content creation. Be it interactive setups, Mixed Reality experiences, or location-based services, all these technologies are worthless without content: content is always to be tackled or delivered at the same time as technology. However, content creation is a long process that can become a nightmare when implementing large-scale projects.

The solution is two words: authoring tool. A powerful, graphical, beyond the state-of-the-art authoring tool is needed, that allows one to create elaborated contents in a fast and easy way. To date, no such tool exists due to the highly innovative products commercialised by the SMEs. Such a tool will be created by the project. The authoring tool will increase competitiveness, because it significantly shortens production time (50 % reduction of integration time) and effort (creation process affordable to non-specialists) for content development. It will also enable other people to create content for the intended systems: SMEs can then sell more software while subcontracting or licensing the content production. It will also strengthen the European position in an authoring market dominated by US companies.

SMEs alone cannot afford such a task, in terms of expertise but also in terms of resources. This project gathers highly-specialised expertise from ZGDV, TUW and DIST, which allows for the delivery of a prototype authoring tool. HadroNet will be the end-user serving the consortium and helping it to gather a larger community of end-users, in order to assess requirements, validate results and construct the basis of a commercial distribution system. In doing so, the project will set the first basis of a longer-term collaboration amongst all partners.

[www.u-create.org](http://www.u-create.org)

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# W-RESPONSE

## Workflow and RFID-Enabled System for Automated and Paperless Warehouse

The major scientific and technical objective of the W-RESPONSE project is to investigate and assess the potential of combining workflow and RFID technology, in order to implement a totally reconfigurable and automated warehouse management system that could be easily adopted by European small to medium-sized enterprises (SMEs), independently of the business sector to which they belong.

The configuration capabilities of the W-RESPONSE system itself will more or less position the overall solution as a warehouse process automation system-implementation platform, efficiently coping with both conventional barcode and emerging RFID technology. The core business objective of the project is to analyse the factors that present diversity per company and business sector (e.g. Product Labelling Model, Warehouse Operation Model, Warehouse Implementation Model, etc.), in order to provide a fully integrated corporate resource that could be widely adopted within the European SME community and evolve, following the evolution of its user enterprises.

The aim is to model all these factors and provide a system that could adjust to each deployment environment without the need to alter the code, but only through configuration activities. Moreover, its configuration ability will enable enterprises to utilise the same software even when they wish to modify their operation model (e.g. building of a new larger warehouse), since the aim of the software itself will be to become embedded within the enterprise (not just used), and change according to the enterprise's requirements by its own personnel, as they understand the warehouse operation model and depict it in software configuration semantics.

This is feasible only when the software has been built with meta-modelling techniques, employing a flexible way to design and simulate flows of activities and documents, and incorporating strong mechanisms for performance monitoring for continuous improvement. In this context, one of the major policy objectives of the project is to deliver a

best-practice guide for European SMEs, reflecting a step-by-step approach in building and operating efficient warehouses through advanced technology and process orientation.

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Co-operative research

- 1 POULIADIS ASSOCIATES CORPORATION (GR)
- 2 MESHED SYSTEMS GMBH (DE)
- 3 ATOS ORIGIN SAE (ES)
- 4 UNIVERSITY OF CYPRUS (CY)
- 5 THE UNIVERSITY OF SURREY (UK)
- 6 WARDI S.A DISTRIBUTION & LOGISTICS (GR)
- 7 EGA SYSTEM S.L. (ES)
- 8 DAVID STEPS LTD (CY)

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# WS-Talk

## Web Services Communicating in the Language of their User Community

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Co-operative research

[www.lemon-labs.de/ws-talk](http://www.lemon-labs.de/ws-talk)

The Web Service (WS)-Talk interface Layer is a structured natural language interface for the inter-service communication, which extends service virtualisation to strengthen consumer self-service. In a growing proliferation of Web service networks, the representation of context becomes more and more an issue for both service providers and service consumers. While providers will concentrate more on the technical levels of activation and communication within a service network, the users, i.e. the service consumers, will form, at the semantic level, ad hoc collaborations between services that suit their own specific needs. We present the Web Service (WS)-Talk layer as a structured-language interface for Web services.

This “open building block” can be implemented by both the service designers who as providers are more concerned with the architecture of the underlying service model and the service consumers who as users will seek to specify Web services as solutions to specific problems. Through a semantic layer, WS-Talk creates an abstraction layer that enables views on services expressed in natural language. Whilst the objective of bringing together the service providers with relevant task-competent end-users in the architectural design of Web service applications is, on the one hand, to build interconnected and interoperable applications, on the other hand, the WS-Talk Layer enables service consumers and providers to design and implement ad hoc new services or fine-tune existing ones. We want to help users and developers to create re-usable and flexible components. In turn, this will facilitate construction of ad hoc micro applications (or rapid prototypes).

The resulting wrapper, WS-Talk, helps to establish interoperable Web services across platforms. As in the vision of JXTA, a Web service announces its service context through advertisements in domain talk defined by its user community. The non-standardised part reflects the “enterprise talk”, the well-established way for an enterprise to describe its business processes. To ensure that the advertisements are machine processable, we apply robust text-mining

methods that map advertisement content into a suitable controlled vocabulary. Our approach fosters quick ad hoc solutions for a small network of peer organisations. The advertisements cooperate with the transport level of well-established Web service standards. WS-Talk can be applied in a variety of areas that require simple, but powerful and flexible, ad hoc solutions. One such solution addressed in this project is the community-wide establishment of a population of Web services for a variety of business intelligence environments.

- 1 LEMONLABS GMBH (DE)
- 2 ARCHIMEDIA S.A. (GR)
- 3 AKRA GMBH (DE)
- 4 LUCKYEYE BILGISAYAR TANITIM HIZMETLERI YAYINCILIK TICARET A.S. (TR)
- 5 SOLUCIONES S.A. (CL)
- 6 ROYAL HOLLOWAY, UNIVERSITY OF LONDON (UK)
- 7 UNIVERSITÉ PAUL SABATIER (FR)
- 8 FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS (GR)
- 9 UNIVERSIDAD DIEGO PORTALES (CL)

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# E-SUPPORT

## A Knowledge Transfer and On-Site Information Agent-Driven Access System for SME Field Service Engineers

Maintenance associations and small to medium-sized enterprises (SMEs) have manifested a need to provide their field service engineers (FSEs) with an affordable, flexible, easy-to-use, practical system for delivering on-site, remote and timely access to accurate technical data. Current systems are insufficient in terms of data retrieval and/or management and impractical in field situations like confined spaces, awkward locations or where hands-free operation is safer.

The mobile nature of a FSE's work also necessitates effective E-learning be available to SMEs so they can rapidly and remotely train their FSEs on new or modified machinery, parts, etc.

This proposal will employ novel intelligent agent-based technology in delivering two SME-adapted systems: one for the management and deployment of corporate knowledge (CK), in the form of PDF documents, CAD files, e-mails, word documents, training videos, etc. and other utility tools (FSE assistant). An open E-learning system also will be developed by incorporating processes, templates and web-based tools to create a flexible and adaptable training programme (FSE master). Both systems will be easy to operate and maintain, easily configurable by SMEs and low cost.

Due to growing customer focus on value added and effective service, the competitiveness of over 15 000 European SMEs involved in maintenance and repair of industrial plants, machinery and buildings hinges on the quality and reliability of the on-site service delivered by their FSEs, as is the competitiveness of EU SME manufacturers of plants, equipment and machinery, who could benefit from an improved after-sales service to enable them to compete against cheaper equipment manufacturers from Asia. SMEs, like their larger competitors, are seeking ways to adopt a knowledge approach and equip their FSEs to become more productive via ready access to user manuals, technical drawings, etc. while on site. LEs have access to costly tools and elaborate information systems which go far beyond the scope of SMEs.

- 1 FELTÁLLÓI ÉS KUTATÓ KÖZPONT SZOLGÁLTATÓ KFT (HU)
- 2 COMITATO ITALIANO PER LA MANUTENZIONE (IT)
- 3 PIMEC, PETITA I MITJANA EMPRESA DE CATALUNYA (ES)
- 4 SLOVAK PRODUCTIVITY CENTER (SK)
- 5 DEN DANSKE VEDLIGEHOLDSFORENING (DK)
- 6 THE GENERAL ASSOCIATION OF ENGINEERS IN ROMANIA (RO)
- 7 AIRAT S.A. (ES)
- 8 MERUSA MANTENIMIENTO Y SERVICIOS S.A. (ES)
- 9 ZANZISERVIZI S.P.A. (IT)
- 10 COMBUSTIBILI NUOVA PRENESTINA SRL (IT)
- 11 BASS, S.R.O. (SK)
- 12 HRH EL A/S (NL)
- 13 INTRO BILGI VE TELEKOMUNIKASYON SISTEMLERI SAN. VE TIC. LTD ŞTİ. (TR)
- 14 I+ S.R.L. (IT)
- 15 ACENO MOBILE SERVICES LTD (IE)
- 16 TEKEVER S.A. (PT)
- 17 ELECTRONIC SYSTEMS DESIGN LTD (MT)
- 18 GAMO A.S. (SK)
- 19 SIMPPLE SL (ES)
- 20 D'APPOLONIA S.P.A. (IT)
- 21 MALTA INDUSTRIAL INNOVATION FOR SMES LTD (MT)
- 22 CENTRE DE RECERCA I INVESTIGACIO DE CATALUNYA S.A. (ES)

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# INTRINSIC

INtegrated TRansactions and Imagination eNginering to Support the Identity Value Chain

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Collective research

In the global economy, important opportunities are created for regional products that can qualify as unique and identity-rich. These products can reach the global market using the Internet and the new opportunities provided by the information society, provided these solutions are made available to small to medium-sized enterprises (SMEs) in easy, unobtrusive ways that allow electronic transactions while preserving the rich legacy of the evocation and charm of identity productions.

The INTRINSIC project is set to deploy a comprehensive solution to this challenging scenario. To this end, INTRINSIC will:

- analyse SME actors and processes in two major production fields (identity food and quality handicrafts products), developing and integrating optimal e-business applications and services to support the transactional value chain;
- develop and integrate the applications and services that help convey the image and identity of the products, effectively supporting an imagination-engineering value chain;
- implement the above solutions into Regional Service Centres acting as Application Service Providers where transactional e-business applications are managed and offered to the SMEs by means of lightweight interfaces, while promotional applications are run on behalf of the entire local system, in order to attain integration and critical mass;
- perform a two-phase training activity: initially by training, through services and facilities made available by the associations and the operators of the SME core group; then, at a later stage, by transferring knowledge to the operators of a larger number of SMEs belonging to the same sectors, through a direct, on-the-job involvement of the “champions” of the SME core group.

- 1 SPACE S.P.A. (IT)
- 2 FUNDACION ROBOTIKER (ES)
- 3 MERVES GUMUS (TR)
- 4 DISTRIBUDORA ESPECIALITZADA EN QUALITAT S.L. (ES)
- 5 BODEGUES SUMARROCA S.L. (ES)
- 7 SAT EL PANTAR (ES)
- 8 COOPERATIVA ARTIGIANA SU TROBASCIU SOCIETA A.R.L. (IT)
- 9 PICCOLA COOPERATIVA SU MARMURI A.R.L. (IT)
- 10 THE CHAMBER OF COMMERCI OF BEYPAZARI (TR)
- 11 INSTITUT CATALA DE LA CUINA (ES)
- 12 CONFEDERAZIONE NAZIONALE DELL'ARTIGIANATO E DELLA PICCOLA E MEDIA IMPRESA (IT)
- 13 F2 SRL (IT)

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# KNOW-CONSTRUCT

Internet Platform for Knowledge-Based Customer Needs Management and Collaboration among SMEs in Construction Industry

The project aims to develop a common internet-based platform for small to medium-sized enterprises (SMEs) from the construction sector, to provide functionalities: (1) Customer Needs Management (CNM) System: an innovative decision-making support system regarding product characteristics, effective combination of two general applications and other consultancy services for SMEs' customers applying the "Web-enabled dialogue"; and (2) Knowledge Communities Support (KCS) System: a system for SMEs to support an advanced form of cooperation through the creation of Knowledge Communities of SMEs in CI. The system should support the integration, management and re-use of the area-specific knowledge via a common knowledge base. The platform will be owned by associations, offering members the opportunity to establish individual CNM systems and benefit from the KCS System.

The system will be used within the associations to collect and exchange the business-area-specific knowledge among the members (SMEs) in a form of essential expertise, reachable anywhere, at any time.

Such a system, applying the common knowledge base and KM tool, will be a low-cost solution, affordable for SME community. It will satisfy SMEs' urgent need for a radical improvement of communication with customers and will offer effective knowledge-sharing with other SMEs as a base for further implementation of new cooperation forms. The system will be tested in project partner (and other similar) organisations from the CI. For a successful solution, it is obviously necessary to establish a multidisciplinary science and technology (S&T) approach, combining research activities in different areas, such as KM (particularly the creation of the adequate ontology), effective forms of online interaction among customers and SMEs (Web-enabled dialogue with expert/technical advisors), as well as product classification system for this sector, new forms for a representation of the CI knowledge (e.g. experience-based) and investigation of efficient approaches for training.

- 1 FUNDACIÓN LABEIN (ES)
- 2 ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE FACHADAS LIGERAS Y VENTANAS (ES)
- 3 ASSOCIAÇÃO PORTUGUESA DOS COMERCIANTES DE MATERIAIS DE CONSTRUÇÃO (PT)
- 4 CONFÉDÉRATION DE L'ARTISANAT ET DES PETITES ENTREPRISE DU BÂTIMENT (FR)
- 5 BAUSTOFF-ALLIANZ NORD GMBH & CO. KG (DE)
- 6 ELKA CONSTRUCCIONES DEL ALUMINIO S.L. (ES)
- 7 PROCEDIMIENTOS DE CONSTRUCCIÓN MODERNA, S.A. (ES)
- 8 BCM - BARROSO, CAVADAS & MARQUES LDA (PT)
- 9 CRUMAR - COMERCIO INTERNACIONAL LDA (PT)
- 10 SCHROEDER BAUZENTRUM GMBH & CO. KG (DE)
- 11 T. WURBS & CO. GMBH (DE)
- 12 INESC PORTO - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES DO PORTO (PT)
- 13 INSTITUTO DA CONSTRUÇÃO (PT)
- 14 INSTITUT FÜR ANGEWANDTE SYSTEMTECHNIK BREMEN GMBH (DE)

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# LEADOUT

## Low-Cost Lead-Free Soldering Technology to Improve Competitiveness of European SMEs

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Collective research

The electronics industry in Europe is about to experience one of the biggest single changes it has seen since around 1960, when it started. The combination of the Waste Electronic and Electrical Equipments (WEEE) and Restriction of Hazardous Substances (RoHS) Directives, due to be effective on 1 July 2006 will mean that the industry will have to change from the tin and/or lead solder used to join the electronic components to the PCB to a lead-free solder (LFS).

The main objective of this proposal is to provide technical support to the small to medium-sized enterprises (SMEs) in the European electronics industry production chain during the introduction of LFS alloys, and assist in the implementation of LFS technology. The new alloys and fluxes with their consequential higher-soldering temperature and wetting characteristics will mean that process parameters and quality and product reliability data generated over many years will no longer be relevant. This will result in immense challenges to European manufacturers, especially SMEs, as nearly all research in this area has been conducted by and for large-volume manufacturing companies. Solutions for SMEs will be significantly different as they will not have budgets for large research programmes or new equipment, and their production profiles tend to be more flexible, with small batch quantities and manual assembly. Of particular concern to SMEs in supply chains is the potential of their customers imposing extremely rapid changeover times (e.g. six months) for conversion to lead-free soldering.

The present proposal results from the merging of two retained Stage 1 Collective projects, LEADOUT and SMEAID, focused on providing technical support to small-scale production SMEs in lead-free implementation. Technically, the merged project will be focused on process optimisation and joint reliability, using commercially available lead-free solders. This proposal on the lead-free soldering processes aims to overcome these challenges by helping European SMEs to implement the changeover with minimal impact on quality, lost production hours and rejected products.

This will be achieved by establishing, and where necessary developing, best practice in lead-free small- and medium-volume assembly techniques. The promotion of the project by the involved industrial associations or groupings (IAGs) will allow direct dissemination to more than 2 000 SMEs, in 10 different European countries.

- 1 ANIMEE - ASSOCIAÇÃO PORTUGUESA DAS EMPRESAS DO SECTOR ELÉCTRICO E ELECTRÓNICO (PT)
- 2 APEMETA - ASSOCIAÇÃO PORTUGUESA DE EMPRESAS DE TECNOLOGIAS AMBIENTAIS (PT)
- 3 SMART - SURFACE MOUNT AND RELATED TECHNOLOGIES LTD (UK)
- 4 AETIC - ASOCIACIÓN DE EMPRESAS DE ELECTRÓNICA, TECNOLOGÍAS DE LA INFORMACIÓN Y TELECOMUNICACIONES DE ESPAÑA (ES)
- 5 MEISZ - MAGYAR ELEKTRONIKAI ÉS INFOKOMMUNIKÁCIÓS SZÖVETSEG (HU)
- 6 JEMI FRANCE (FR)
- 7 FORSCHUNGSVEREINIGUNG SCHWEIBEN UND VERWANDTE VERFAHREN E.V. DES DVS (DE)
- 8 ITEK/DANSK INDUSTRI (DK)
- 9 CCIAA - CAMERA DI COMMERCIO, INDUSTRIA, ARTIGIANATO E AGRICOLTURA DI MILANO (IT)
- 10 EWF - EUROPEAN FEDERATION FOR WELDING, JOINING AND CUTTING (BE)
- 11 SILGAL - SOCIEDADE INTERNACIONAL DE IMPORTAÇÕES LDA (PT)
- 12 EMLPLACE - PRODUÇÃO ELECTRÓNICA SA LDA (PT)
- 13 TELCA - TELECOMUNICAÇÕES E ASSISTÊNCIA LDA. (PT)
- 14 ALCAD S.A. (ES)
- 15 IDK - INTEGRACIÓN INDUSTRIAL ELECTRÓNICA S.L. (ES)
- 16 ZUBELZU S.A. (ES)
- 17 CANFORD AUDIO PLC (UK)
- 18 JJS ELECTRONICS LTD (UK)
- 19 DKL METALS LTD (UK)
- 20 BETA ELECTRONICS LTD (IE)
- 21 SZEM - SZÁMÍTÁSTECHNIKAI ELEKTRONIKAI MÉRÉSTECHNIKAI IPARI, KERESKEDELMI, SZOLGÁLTATÓ KFT (HU)
- 22 ELSZETRON TECHNOLÓGIAI SZOLGÁLTATÓ ÉS KERESKEDELMI KFT (HU)
- 23 AMTECH - AUTOMATED MICRO TECHNOLOGY LTD (UK)
- 24 ISELQUI TECHNOLOGY S.R.L. (IT)
- 25 MESATRONIC S.A. (FR)
- 26 ISQ - INSTITUTO DE SOLDADURA E QUALIDADE (PT)
- 27 TWI LTD (UK)
- 28 FUNDACIÓN INASMET (ES)
- 29 BME - BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS (BUDAPESTI MŰSZAKI ÉS GAZDASÁGTUDOMÁNYI EGYETEM) (HU)

www.leadoutproject.com

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EC Contribution: € 2 695 778

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# SAFETYLON

## Development of an Interoperable Platform Technology for Safety-Related Data Transfer and Secure Communication in Local Operating Networks

The Local Operating Network (LON) technology is one of the most common network solutions worldwide for automation control in buildings. The technology, described in the standards ANSI/EIA-709 and prEN14908, is based on a non-proprietary interoperable fieldbus system, which is currently implemented in a large percentage of all train stations, airports, hospitals, office towers, and other buildings of public interest. Recent political and technical developments have increased the need to establish a technology for safety-related and safe-data communication with automation systems.

A new international standard (IEC 61508) has been developed that defines the requirements for functional safety-related applications of programmable electronic systems. A feasibility study has shown that safety features can be directly integrated into already existing LON communication structures by developing a safety chip and adapting the respective tools to control a safety network. At the moment, all solutions require the installation of additional communication lines, causing extra costs that are usually prohibitive for carrying out such a project.

Despite the need for the integration of this safety feature and the potential impact on society and building automation, the development and integration of the safety concept cannot be pursued without collective research efforts. The LON community is formed mainly by small to medium-sized enterprises (SMEs).

The development of a non-proprietary and interoperable platform technology to incorporate the safety feature is beyond the capabilities of single enterprises and the goal can only be achieved by mobilising the respective synergies. The European LON user community is organised in national industrial associations or groupings (IAGs). Within SAFETYLON the national user organisations of Germany, Sweden and Poland are coordinating their activities, and can consequently guarantee a direct distribution of the research and technological development (RTD) results to all European LON technology and application

providers. The development of the SAFETYLON will have consequences beyond automation control, e.g. in public buildings like airports, train stations, etc. that are on the one hand extremely demanding regarding functional safety, and on the other hand require fast and efficient disaster management.

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Collective research

- 1 LON NUTZER ORGANISATION E.V. (DE)
- 2 LON USER SWEDEN (SE)
- 3 POLSKA GRUPA UZYTKOWNIKOW TECHNOLOGII LONWORKS "PLUG" (PL)
- 4 IBT INGENIEURBUERO BROENNINGMANN THUN (CH)
- 5 CANDELUX S.A. (CH)
- 6 INTRON ENGINEERING, MIKROELEKTRONIK UND SYSTEMENTWICKLUNG GMBH & CO.KG (DE)
- 7 JÜRGEN FLEISCHMANN (DE)
- 8 ZAKLAD DOSWIEADCZALNY APARATURY NOKOWEJ I AUTOMATYKI SP ZOO (PL)
- 9 NODEX AB (SE)
- 10 APICE S.R.L. (IT)
- 11 NEWRON SYSTEM S.A. (FR)
- 12 TECHNISCHE UNIVERSITÄT WIEN (AT)
- 13 FACHHOCHSCHULE DORTMUND (DE)
- 14 AKADEMIA GORNICZO-HUTNICZA W KRAKOWIE (PL)
- 15 WHO INGENIEURGESELLSCHAFT MBH (DE)
- 16 LOYTEC ELECTRONICS GMBH (AT)
- 17 INNOTECH GMBH (DE)

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# WEB-TEXpert

## Research for a New Generation of Integrated Innovation and Knowledge Management and Development of Appropriate Web-Based Training Methods, Tools, and Best Practice Demonstrators

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Collective research

The textile and clothing industry is one of the pillars of the EU economy, representing a EUR 190 billion turnover, employing more than 2.2 million people and building one of the longest and most complicated industrial chains in the manufacturing industry.

It is a fragmented and heterogeneous sector dominated by a majority of small and medium-sized enterprises (SMEs). Textile SMEs are generally specialised in specific process stages or even process steps of the product life cycle.

The concentration on core competencies makes them, on the one hand, high potential innovative partners, while on the other, a great many partners are involved in the development and production of the final product. This leads to complex networks requiring new coordination and networking approaches, methods and tools.

The industrial association or grouping (IAG) members of the consortium have taken up this challenge and will support their members with web-based training and best practice demonstrators.

The research activities of WebTEXpert aim at sophisticated methods and tools for the innovation management adapted to the specific needs of SMEs in the textile and clothing sectors. They will concentrate on New Product Development (NPD), New Product Introduction (NPI) and Networking for NPD/NPI with a specific focus on integration of the life-cycle phases, value added stages and innovation processes.

The research will be performed in seven research groups covering all relevant textile applications and textile processes as well as European textile regions. The research groups comprise 4 research and technological development (RTD) performers, 31 SMEs and 8 out of the 11 participating IAGs, with the remaining 3 IAGs primarily active in the field of transfer of project results and dissemination.

Based on the research results, courseware and training methodology will be developed to form the basis for transfer and dissemination.

The courseware together with appropriate knowledge sources will be provided as web-based services on the WebTEXpert portal. The development of the web-based services represents the core of the innovation-related activity of the project.

To transfer the research results to the SME core group and beyond, the work plan foresees a “train the trainer” concept. Out of each pilot research group, a pilot group will be created.

These pilot groups will train the members of SME core group. Furthermore, other IAGs will be trained to achieve an additional multiplier effect.



- 1 FORSCHUNGSKURATORIUM TEXTIL E.V. (DE)
- 2 HELLENIC FASHION INDUSTRY ASSOCIATION (GR)
- 3 ATHENS TECHNOLOGY CENTER S.A. (GR)
- 4 EUROPEAN APPAREL AND TEXTILE ORGANISATION - EURATEX ADF (BE)
- 5 IRIS S.P.A. (IT)
- 6 DEUTSCHES INSTITUT FUER TEXTIL- UND FASERFORSCHUNG STUTTGART (DE)
- 7 HILATURAS LLAUTET S.A. (ES)
- 8 D'APPOLONIA S.P.A. (IT)
- 9 INSTITUT FRANCAIS TEXTILE HABILLEMENT (FR)
- 10 A.CHRISTOPOULOS & CO. (GR)
- 11 TK TSAMADOS & CO. EE (GR)
- 12 DIPLEX-THEO DIMITRAS S.A (GR)
- 13 KATASKEYASTIKI EMPORIKI ENDYMATON S.A. (GR)
- 14 TEXTOR S.A. (RO)
- 15 S.C. ARGOS S.A. (RO)
- 16 SC TEXTILA ARDELANA SA SATU MARU (RO)
- 17 SC FILBAC S.A. TG. LAPUS (RO)
- 18 STYL COUTURE SARL (FR)
- 19 DARDEN (FR)
- 20 BLEU OCEAN (FR)
- 21 GROUPE FLORY S.A. (FR)
- 22 GIOTEX- FRATELLI GIORGETTI & C PRATO SRL (IT)
- 23 TEMAT SNC (IT)
- 24 BIANCALANI SPA (IT)
- 25 GRADO ZERO ESPACE SRL (IT)
- 26 INTES SPA (IT)
- 27 CROSERIO SRL (IT)
- 28 STAMPERIA DI LIPOMO (IT)
- 29 GAETANO ROSSINI HOLDING SPA (IT)
- 30 ITV DENKENDORF PRODUKTSERVICE GMBH (DE)
- 31 TVW TEXTILVEREDLUNGS-UND HANDELSGESELLSCHAFT WINDEL MBH (DE)
- 32 GEBR. RODERS AG (DE)
- 33 HUBERT EING TEXTILVEREDLUNG GMBH & CO. (DE)
- 34 DYCKHOFF GMBH (DE)
- 35 WILHELM ZULEEG GMBH (DE)
- 36 BUNTWIRKEREI GUSTAV GONNER GMBH & CO. KG (DE)
- 37 FRITZMOLL TEXTILWERKE GMBH & CO. (DE)
- 38 CORPORATE FABRICS GMBH (DE)
- 39 ASSOCIAZIONE PICCOLE E MEDIE INDUSTRIE DELLA PROVINCIA DI VARESE (IT)
- 40 ASSOCIATION OF TEXTILE CLOTHING AND LEATHER INDUSTRY (CZ)
- 41 ASOCIATIA MICROREGIUNEA DE DEZVOLTARE ECONOMICO-SOCIALA A TARIU LAPUSULUI (RO)
- 42 OUEST MODE INDUSTRIE (FR)
- 43 TEXCLUBTEC (IT)
- 44 CNA ARTIGIANO PRATESE (IT)
- 45 VERBAND DER NORDWESTDEUTSCHEN TEXTIL UND BEKLEIDUNGSINDUSTRIE E.V. (DE)
- 46 VERBAND DER BADEN-WURTEMBERGISCHEN TEXTILINDUSTRIE E.V. (DE)

Contract: 500223  
 Call: FP6-2002-SME-2  
 Starting Date: 16/06/2004  
 Duration (months): 36  
 Total cost: € 2 811 601  
 EC Contribution: € 2 039 319

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# FP6 Project Catalogue

Management Sciences

InCaS aims at strengthening the competitiveness and innovation potential of European small to medium-sized enterprises (SMEs) by systematically activating their intellectual capital. This will involve:

- establishment of the intellectual capital statements (ICSs) as an important and valuable management tool in a knowledge-driven economy;
- integration and consolidation of single national approaches on ICSs at European level.

To obtain competitive advantage in Europe, it is crucial for SMEs to utilise knowledge efficiently and to enhance their innovation potential. Furthermore, reporting those intangible assets systematically to customers, partners and investors, as well as creditors has become a critical success factor. Thus, managing their specific 'intellectual capital' (IC) becomes increasingly important for future-oriented organisations.

Conventional balance sheets and controlling instruments are not sufficient anymore, because intangible assets have not been considered so far. The ICS is the instrument to assess, to report and to develop the intellectual capital of an organisation. The collective research project 'Intellectual Capital Statement — Made in Europe (InCaS)' aims at implementing ICSs in over 1 000 European SMEs, based on an EU-wide consolidated ICS methodology.

To achieve this overall objective, research and technological development (RTD) work on existing, but scattered ICS approaches is needed in order to identify common grounds as well as cultural differences and national and branch-specific requirements. InCaS puts emphasis on a practical approach, suitable for SMEs, combined with maximum benefit regarding the improvement of exploitation of existing IC and revealing unused innovation potentials. Focusing an SME core group in five core branches, the project aims at minimising complexity and implementation effort. A systematic

dissemination of the developed European ICS Guideline is carried out by a consortium of multipliers in five core countries. The tested ICS methodology will set pre-normative standards for assessing and reporting intellectual capital in European SMEs.

The consolidated and well-proven ICS methodology will set pre-normative standards for assessing and reporting intellectual capital in SMEs at European level. The main results of InCaS are:

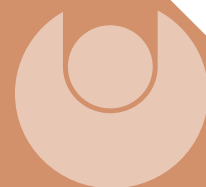
- European ICS guideline for SMEs;
- harmonised branch-specific ICS modules;
- supporting software: "ICS-Toolbox";
- an IC benchmarking concept;
- 25 pilot implementations;
- more than 100 European ICS Trainers;
- more than 1 000 SMEs who know about the benefits of ICS and want to implement it;
- a sustainability and quality assurance concept.



- 1 CONFEDERATION EUROPÉENNE DES ASSOCIATIONS DE PETITES ET MOYENNES ENTERPRISES (BE)
- 2 BUNDESVERBAND MITTELSTÄNDISCHE WIRTSCHAFT - UNTERNEHMERVERBAND DEUTSCHLAND E. V. (DE)
- 3 GOSPODARSKA ZBORNICA SLOVENIJE - CHAMBER OF COMMERCE AND INDUSTRY OF SLOVENIA (SI)
- 4 POLSKA KONFEDERACJA PRACODAWCOW PRYWATNYCH LEWIATAN (PL)
- 5 ASSOCIATION FRANÇAISE DES DIRIGEANTS D'ENTREPRISE EN EUROPE (FR)
- 6 FOMENT DEL TREBALL (ES)
- 7 HELMUT BEYERS GMBH (DE)
- 8 JRC CAPITAL MANAGEMENT CONSULTANCY & RESEARCH GMBH (DE)
- 9 PASS STANZTECHNIK (DE)
- 10 MALERGESCHÄFT BETHEL-ECKERTS (DE)
- 11 BALANCE TECHNOLOGIE (DE)
- 12 BLOOMING TECHNOLOGIES SP. Z O.O. (PL)
- 13 ARR S.A. W KONINIE (PL)
- 14 GARTEN POLSKA (PL)
- 15 ZAK SP.Z O.O (PL)
- 16 NEXBAU MAG INZ. ROMAN BAUTA (PL)
- 17 KAC D.O.O. (SI)
- 18 INDUSTRIJSKA OPREMA BREŽICE D.O.O. (SI)
- 19 GLOTTA NOVA, CENTER ZA PRAVO UČENJE IN POUČEVANJE D.O.O. (SI)
- 20 INTER DISKONT D.O.O. EXPORT-IMPORT (SI)
- 21 LE-TEHNIKA PODJETJE ZA PROIZVODNJO IN TRGOVINO Z ELEKTROTEHNIČNIMI IZDELKI D.O.O. (SI)
- 22 SISTEPLANT SL (ES)
- 23 FORMACIÓN DIGITAL SL (ES)
- 24 VERTISUB S.L. (ES)
- 25 ASOCIACIÓN INDUSTRIAL DE OPTICA, COLOR E IMAGEN (ES)
- 26 SIDASA (ES)
- 27 BUSINESS AND DEVELOPMENT LEARNING INSTITUT (FR)
- 28 EBS EESPÉRANCE SCOOP (FR)
- 29 PROJIRIS (FR)
- 30 B.G.M.E. FINANCES (FR)
- 31 VENDEE MECANIQUE INDUSTRY (FR)
- 32 FRAUNHOFER INSTITUT FÜR PRODUKTIONSANLAGEN UND KONSTRUKTIONSTECHNIK (DE)
- 33 TECHNISCHE UNIVERSITÄT BERLIN (DE)
- 34 LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE (UK)
- 35 UNIVERSITAT POLITÈCNICA DE CATALUNYA (ES)
- 36 ARC SYSTEMS RESEARCH GMBH (AT)
- 37 INTANGIBLE ASSET CONSULTING (AT)

Contract: 30485  
 Call: FP6-2004-SME-COLL  
 Starting Date: 01/07/2006  
 Duration (months): 30  
 Total cost: € 3 481 738  
 EC Contribution: € 2 186 609

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# FP6 Project Catalogue

Materials & Processes

# 3-DMultiCam

Accurate and Instantaneous Subsea 3-D Measurement by Use of Laser Projection and Parallelised Close-Range Photogrammetry

338

Co-operative research

The project focuses on enabling greater competitiveness and internationalization to the large groups of European small to medium-sized enterprises (SMEs) in the shipbuilding and ship-repair sector and the oil and gas industry, by making available a new tool for accurate and fast 3-D measurement.

This new tool, the 3DMultiCam, will enable us to provide a new and value-added service we have identified an industrial need for in the market. We will develop the 3DMultiCam based on the current state of the art, and plan to:

- cut computer data processing time to a fraction by optimisation and parallelisation of the photogrammetry software compared to present solutions;
- integrate a camera calibration device on the 3DMultiCam system, by placing a remotely operated calibrating reference plate connected to the camera frame;
- include an innovative laser grid generator which projects a highly focused and water particle insensitive laser grid on the target, thus avoiding touching the object to be measured and save time;
- illuminate the target with a novel laser or led light system insensitive to disturbing water particles, and thus ensure high density of measuring points and thereby increased resolution;
- achieve instantaneous measurement by photographing the target with several synchronised cameras. The cameras are controlled by a camera control system which synchronises the digital photos, stores them and sends them to the surface in near real-time;

- attach the cameras, laser and control system to a rigid frame that keeps the geometry of the cameras with a very high degree of accuracy. The frame will also be light and collapsible for easy, fast and economical transport;
- achieve an accuracy in the subsea measurement of at least 0.1mm.

The partnership behind this project constitutes an entire value-chain for delivering both the tool to the market and serving the identified industrial need. We have also included an end-user group representing the markets we will target.

www.3dmulticam.com

- 1 TORDIVEL AS (NO)
- 2 LASEROPTRONIX AB (SE)
- 3 IDEAL TEKNOLOJI A.S. (TR)
- 4 MEDIALAS LASERPRODUCTS GMBH (DE)
- 5 BIT AUTOMATYKA SP.Z.O.O (PL)
- 6 CT OFFSHORE APS (DK)
- 7 SCAN MARITIME AS (NO)
- 8 ESTALEIROS NAVAIS DE VIANA DO CASTELO S.A. (PT)
- 9 BP PLC (UK)
- 10 TEKNOLOGISK INSTITUTT AS (NO)
- 11 PERA INNOVATION LTD (UK)



FP6 Project Catalogue

Contract: 32940  
Call: FP6-2004-SME-COOP  
Starting Date: 01/11/2006  
Duration (months): 24  
Total cost: € 1 693 115  
EC Contribution: € 877 243

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# 3DNANOPRINT

## Nano Imprint Lithography for Novel Two- and Three-Dimensional Nanostructures

The main problem in nanotechnology is the lack of methods for mass production. This is especially true for small to medium-sized enterprises (SMEs), who do not have the ability to invest in expensive equipment for large-scale production of nanostructures. Nanoimprint lithography on the other hand provides a tool that is comparably cheap and suited for massproduction. 3D NANOPRINT aims at the development of a complete process technology with the necessary tools to produce 3-dimensional nanostructures with ultra high precision. In comparison to deep or extreme UVlithography this research paves the way for the widespread use of a nanoscale production technology also by smaller companies, since the investment costs of nanoimprint production lines are less than 1 % of the DUV or EUV investments.

The project consist of two levels, a directly process-oriented part dealing with nanoimprint lithography itself, nanoimprint resists, reactive ion etching and alignment problems and an application oriented part. In this part requirements for nanoimprint lithography as a production tool are defined, assuring that the final result of the project is a cost effective, high throughput, ultra-precise tool for the production of 3-dimensional nanostructures. As a reference application, 3-dimensional photonic crystals have been chosen, since the optical properties of such devices are extremely sensitive to the quality of the production process (therefore are excellent indicators) and assure a high economic impact since the photonics market is growing quickly. Other applications considered are micro- and nano-optical devices.

The consortium consists of a well balanced mixture of SMEs and researchers. EVG manufactures nanoimprint equipment and MRT and SENTECH provide resists and etching equipment necessary to perform the whole imprinting process. BSP and HEPTAGON are end-users of nanoimprint equipment.

- 1 PROFACOR PRODUKTIONSFORSCHUNGS GMBH (AT)
- 2 SENTECH INSTRUMENTS GMBH (DE)
- 3 HEPTAGON OY (FI)
- 4 BROWN & SHARPE-PRECIZIKA (LT)
- 5 EV GROUP, E. THALLNER GMBH (AT)
- 6 MICRO RESIST TECHNOLOGY GMBH (DE)
- 7 JOHANNES KEPLER UNIVERSITY LINZ (AT)
- 8 INSTITUTE OF PHYSICAL ELECTRONICS OF KAUNAS UNIVERSITY OF TECHNOLOGY (LT)
- 9 FRIEDRICH SCHILLER UNIVERSITÄT JENA (DE)

**Contract: 512667**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/11/2004**  
**Duration (months): 30**  
**Total cost: € 1 467 262**  
**EC Contribution: € 1 007 894**

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# AGATE

## Ammonia Gas Absorption Technology

340

Co-operative research

The project Agate develops and investigates the highly effective removal of ammonia from stack gasses, with a new pilot unit, based on hollow fibre membrane absorption.

The strategic objective of the project is to develop a new gas absorption technology for the reduction of ammonia emissions from point sources. This will result in a substantial closing of the ammonia life-cycle at industrial and agricultural facilities. The project partners and the future users of the new technology will gain significant economic and competitive advantage.

The technical objectives of the project are to:

- develop a new sustainable technology for ammonia recovery from off-gas with more than 99 % efficiency, which is also reliable, safe and has 50 % lower operational costs than current technology;
- convert ammonia from the off-gasses into a product that either can be re-used directly in a production process, or can be sold on the market as a product with standard quality specifications;
- develop, integrate, scale up and test the different components of the processes to obtain a totally integrated solution, with a flexible and efficient character.

The technical programme contains 11 work packages (WPs), 10 addressing the main technological aspects: starting from the quantification of the ammonia emissions from flue gas streams at the end-users and ending with the implementation of the new technology. Laboratory experiments will be carried out to develop the membrane gas absorption technology for the ammonia recovery.

One of the major activities is the generation of new membranes suitable for rapid ammonia transmission through the membrane interface, while retaining the absorption liquid. The results will be used to design a pilot unit. After construction and start-up, long term trials with the pilot unit will be performed at two end-users. Special attention is devoted to the review and assessment process. WP 9 contains objectives and tasks regarding review and assessment and technical, economical and environmental evaluation.

The review and assessment part of this work package is intertwined with all other work packages, because it contains measurements, and if necessary, actions to bring the progress of the milestones, etc. in line with the project plan. An economic and technical evaluation quantifies the costs and benefits in comparison with the existing practices.

This determines the economical-ecological win-win situation. The project has an important dissemination and exploitation component including a strategy and plan for market initiation and information. The market objective is to have this new technology implemented in at least 20 % of the suitable facilities with the first 10 years, leading to a total cumulative sales of EUR 2 940 000 000.

The participation of Acheson Productie B.V., one of the end-users, is essential for the project because it exemplifies the cooperation of the small to medium-sized enterprises (SMEs) with a large enterprise which in turn strengthens the SMEs in this consortium by offering opportunities of innovation.

The international network of Acheson offers many opportunities for the introduction of the technology.



The major accomplishments of the proposed project are:

- WP3:** completed basic design of the membrane gas absorption (MGA) pilot unit;
- WP7:** completed two six-month testing periods of the MGA pilot unit at two partner end-users;
- WP11:** completed research and development project within the budget with a final report and exploitation plan.

The expected result is successfully tested pilot units with a performance according to the objectives.

- 1 CIRMAC INTERNATIONAL B.V. (NL)
- 2 WATERLEAU GLOBAL WATER TECHNOLOGY (BE)
- 3 AURA METALLURGIE GMBH (DE)
- 4 CARLTECH B.V. (NL)
- 5 INNOVATIVE MEMBRANE TECHNOLOGY B.V. (NL)
- 6 CONSTRUCTIE-EN LASBEDRIJF BESARIS B.V. (NL)
- 7 GEMINI ENTERPRISES (NL)
- 8 EIDOS SPOLECNOST RUCENIM OMZENYM S.R.O. (CZ)
- 9 ACHESON PRODUKTIE B.V. (NL)
- 10 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 11 PROMIKRON B.V. (NL)
- 12 VYSOKÉ UČENÍ TECHNICE V BRNE - BRNO UNIVERSITY OF TECHNOLOGY (CZ)

**Contract: 508178**  
**Call: FP6-2002-SME-1**  
**Starting Date: 15/06/2004**  
**Duration (months): 30**  
**Total cost: € 1 467 764**  
**EC Contribution: € 758 998**

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# AGAVE

## AGV Navigation System Based on Flexible and Innovative UWB Positioning

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Co-operative research

The AGAVE project's overall objective is the development of an advanced guidance system for automatic guided vehicles (AGV), focusing on a next-generation positioning system development, allowing indoor and outdoor goods transportation within the warehouse through a flexible material handling system. The AGAVE system is a free-range system allowing a high level of optimisation in the routes to be executed, with performances superior to those currently available on the market. It will be an integrated system, easily adaptable to production environment changes and able to improve overall quality, whilst reducing the total lead-time.

The following outcomes are expected:

- a stand-alone plug-in positioning system, based on ultra wide band (UWB) technology, exploiting computational hardware commercialised by the company Time Domain, with a time to market of about 15 months after project completion;
- a navigation system, installed onboard, based on the improvement of the existing systems, optimised for the new potentialities;
- an integrated software definition for fleet management, route optimisation and integration with operating machines, installed on a fixed host, optimised for the new potentialities.

The AGAVE system's main technical advantages are:

- it can operate in a very wide warehouse (average indoor route: 150-200 m);
- it is a very flexible system, easily adaptable to outdoor applications (expected average route: 4-5 km);
- it is compatible with all AGV configurations, even platform carriers — this is currently impossible with laser-based positioning systems;

- it is compatible with all warehouse layouts, with narrow corridors or the occupation of the overhead volume now kept free to ensure line-of-sight conditions for laser systems;
- it is easily manageable and configurable through an advanced user interface;
- it automates the goods transportation logistic phase well, ensuring the smooth functioning of the several pick-and-drop phases required to reduce the total lead-time of the entire industrial process.

- 1 LABOR S.R.L. (IT)
- 2 NUOVAFIMA S.P.A. (IT)
- 3 PRO-CERAM GMBH (DE)
- 4 DIRK SCHUMANN GMBH (DE)
- 5 COSMOTEK S.R.L. (IT)
- 6 MESUREX S.L. (ES)
- 7 UNIVERSITÀ DEGLI STUDI DI UDINE - DIPARTIMENTO DI INGEGNERIA ELETTRICA GESTIONALE E MECCANICA (IT)
- 8 INSTITUTO AGILUS DE INOVAÇÃO EM TECNOLOGIAS DE INFORMAÇÃO LDA (PT)
- 9 UNIVERSIDAD DE MÁLAGA (ES)



# AGRONETS

## Development of Protective Structures Covered with Permeable Materials for Agricultural Use

Permeable covers are extensively used in certain types of cultivation such as fruit-tree farming, for bird and insect protection as well as anti-hail and anti-frost shields or windbreaks. Moreover, nets are used as insect protecting screens along greenhouse ventilation openings, shading screens above greenhouse roofs, etc. In these applications, plastic nets are considered as an environmental and human health friendly alternative to pesticides, which also reduces the risk of damage of the production under adverse climatic conditions. In this respect, agricultural nets support the production of higher quality, lower input products using lower levels of agri-chemicals and, in some cases, reducing or eliminating the need for energy consumption.

However, their design and use is more or less empirical and the design and construction of the supporting structures are grossly empirically modified greenhouse frames or farmer-made constructions, which usually pay little respect to the environment.

Therefore, the design properties of agricultural nets should be further investigated and new optimised net-supporting structural systems should be developed, fully exploiting the advantages offered by these interesting novel materials, while aesthetic aspects are also taken into account for a better protection of the landscape. Proper evaluation schemes for the most critical mechanical and physical properties of permeable materials, directly related to the needs of the specific agricultural applications, should be established. Technical requirements for permeable materials to be used specifically in agriculture and for the corresponding supporting structures have to be defined in order to obtain optimised structural stability and correct indoor microclimate. An economic evaluation taking into account the benefits achieved by their use and the cost of the alternatives will be part of the exploitation plan.

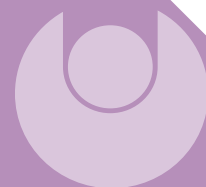
New integrated products for protected cultivation, such as ready-to-use deployable structures covered with nets, appropriately designed for specific applications, will be developed following

scientifically defined technical requirements. These structures should guarantee to the farmers optimal performance at a minimal cost, without detracting from the landscape aesthetics.

- 1 HOWITEC TRADING B.V. (NL)
- 2 ARRIGONI SPA (IT)
- 3 AGREK C. SAMANTOUROS S.A. (GR)
- 4 AGRICULTURAL UNIVERSITY OF ATHENS (GR)
- 5 PLANT RESEARCH INTERNATIONAL B.V. (NL)
- 6 UNIVERSITÀ DEGLI STUDI DI BARI (IT)

**Contract: 507865**  
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**Starting Date: 20/09/2004**  
**Duration (months): 27**  
**Total cost: € 1 247 336**  
**EC Contribution: € 824 710**

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## Combination of AI Techniques and Software with Advanced Reactor Equipment for Efficient Kinetics Analysis in the Chemical Industry

344

Co-operative research

Reactors are the core elements of chemical processes, which consist of reactors and unit operations for the transformation of feedstocks into final products. Several advanced commercial products are available for both simulation and optimisation of unit operations under steady and transient conditions.

This is not the case for chemical reactors, due to the variety and complexity of industrial reactions: in most commercial simulators the description of reactions is left to the user. This requires many experiments and the skill of highly qualified theoretical chemists, which can lead to unacceptably high costs. They can be reduced by software tools for the identification of arbitrarily complex kinetics and for the advanced control based on this identification step.

The project result is a prototype plug flow reactor with the necessary hardware to carry out temperature scanning kinetic experiments and the AI based software necessary to identify the kinetic mechanism and design the industrial scale reactor and its control system with little human involvement.

This objective can be divided into a number of intermediate steps, each of which is an important result of its own:

- a laboratory plug flow reactor for temperature scanning experiments;
- the automatic generation of reaction schemes, using graph theory with the possibility of modifying the kinetic mechanisms suggested by this expert system;
- a symbolic translator from a chemical to an algebraic language for further data analysis;
- the rigorous regression analysis of temperature scanning experiments data, based on sensitivity equations, followed by model discrimination, if more than one kinetic mechanism was found;

- the design of an industrial scale reactor, its optimal control system and the automatic generation of computer code for use in a process simulator.

This project includes a methodology for the smooth cooperation of scientists with different backgrounds: theoretical chemists, artificial intelligence specialists, software developers, control engineers.

www.cpi.umist.ac.uk/aitekin

- 1 TECHNOSIND S.R.L. (IT)
- 2 EVECO BRNO S.R.O. (CZ)
- 3 FIRTH EXECUTIVE LTD (UK)
- 4 BIURO USLUG TECHNICZNYCH I HANDLU (PL)
- 5 NOVA SYSTEMS ROMA S.R.L. (IT)
- 6 POLIMERI EUROPA S.P.A. (IT)
- 7 UNIVERSITY OF MANCHESTER INSTITUTE OF SCIENCE AND TECHNOLOGY (UK)
- 8 UOP LTD (UK)



**Contract:** 506667  
**Call:** FP6-2002-SME-1  
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**Duration (months):** 24  
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**EC Contribution:** € 795 000

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# ALAMO

## Development of Innovative High-Performance Anodised Aluminium Moulding Tools for the Thermoplastic Processing Sector to Achieve Competitive Advantage

The use of aluminium mould tools for thermoplastic processing is becoming increasingly popular within the EU: driven by cost, reduced cycle times, reduced lead times and reduced energy cost. The growth rates for aluminium tools for thermoplastic processing applications are expected to increase significantly over the next few years. However, limitations of aluminium tools in regards to their corrosion, wear and abrasion resistance have prevented even greater up-take. Traditional anodising technologies (that produce surfaces with regular pore structures) have failed to overcome these limitations as the surfaces produced develop micro-cracks under mechanical or thermal strain (at temperatures as low as 200°C), leading to reduction in the wear resistance, corrosion resistance and other properties.

Two innovative technologies have been developed by UK small to medium-sized enterprise (SME) anodisers that allow for the production of anodised surfaces that prevent micro-crack formation and can make possible the production of aluminium tools that have wear resistance better than that of steel with cyclic heat resistance up to 500°C and, in addition, very high thermal emissivity. The proposed project aims to develop these technologies for the manufacture of aluminium tools (with optimised mechanical and thermal properties) for thermoplastics processing applications.

The main objective of the project is to develop pre-competitive, innovative anodised aluminium mould tools for Injection moulding, blow moulding and rotational moulding. These moulds will have surface mechanical and thermal properties, exceeding those presently on the market with regards to:

- wear resistance
- thermal emissivity
- corrosion resistance.

If the project objectives are achieved then the SME participants will obtain a technological edge leading to

increased competitiveness. In-line with the objectives of the EU and the Sixth Framework Programme (FP6), the product and process developed will contribute towards sustainable manufacturing.

- 1 SMITHERS RAPRA TECHNOLOGY LTD (UK)
- 2 BRITA FINISH LTD (UK)
- 3 JUAN CARLOS MARN RIQUELME - SI2M (ES)
- 4 SIGMA ENGINEERING GMBH (DE)
- 5 ANDALPLAST S.L. (ES)
- 7 PPA TEO (IE)
- 8 PECHINEY CENTRE DE RECHERCHES DE VOREPPE (FR)
- 9 HEYWOOD METAL FINISHERS LTD (UK)
- 10 FUNDACIO ASCAMM (ES)
- 11 ASSOCIATION POUR LA RECHERCHE ET LE DÉVELOPPEMENT DES MÉTHODES ET PROCESSUS INDUSTRIELS (FR)
- 12 QUEEN'S UNIVERSITY BELFAST (UK)

**Contract: 512833**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/11/2004**  
**Duration (months): 24**  
**Total cost: € 1 401 049**  
**EC Contribution: € 725 024**

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The textile product manufacturing sector in Europe is facing decline as a result of the labour-intensive methods used and competition from the Far East.

There are 20 000 European companies involved in the protective-clothing value chain, many of which are small to medium-sized enterprises (SMEs). In the last five years, imports to the EU have increased by 34 %, resulting in a reduction of employment in Europe by 14 %. Competition will undoubtedly increase as of January 2005, when all textile and clothing import quotas will be removed, and the EU protective clothing market will be open to unfettered competition as a result of the expiry of the Agreement on Textiles and Clothing (ATC) on 31 December 2004.

Laser welding of textiles has been demonstrated to provide high-quality seams with good aesthetic appearance and offers an excellent opportunity to increase automation in the production of many textile products, because the process can be carried out using non-contact methods from one side of the joint. This project aims to develop the fabric materials, equipment and procedures required to allow use of laser welding with robotic manipulation of seams in textiles.

The main development areas will be in the provision of a flexible support surface for the textiles, using an array of actuated pins covered by a membrane, clamping methods to hold the fabrics and seam shape in position, and in the design of a pressure application device to consolidate the laser weld as it is made. Prototype equipment will be built, and process operating routines will be developed to ensure that seams are made which meet the requirements of ISO6529 and ASTM D1683-04 for barrier performance and seam strength.

By replacing stitching and seam taping with welding, the seam barrier properties, reliability and endurance will be improved. Applications benefiting from the improved performance and automation, such as clothing for weather, nuclear biological or

chemical protection, fire fighting, wet suits, sealed furniture upholstery for medical use, as well as the more general garment and upholstery seaming will be studied.

As a result of these developments, a new market will be created in the supply of automated equipment and fabrics for textile welding, the competitiveness of SMEs that invest in these methods will be improved, jobs will be created, the safety of those using protective clothing will be improved and land-filling rates will be reduced as a result of the increased lifetime of the textile products.

- 1 TWI LTD (UK)
- 2 PROLAS GMBH (DE)
- 3 PIL MEMBRANES LTD (UK)
- 4 HIGHTECH ENGINEERING S.R.L. (IT)
- 5 ARLEN SPOLKA AKCYJNA (PL)
- 6 FRIZZA S.P.A. (IT)
- 7 PRZEDSIĘBIORSTWO  
PRODUKCYJNO-HANDLOWO-USŁUGOWE "AKATEX" (PL)
- 8 ALBASHOW LTD (UK)
- 9 DORIMI S.R.L. (IT)
- 10 SILENTNIGHT BEDS LTD (UK)
- 11 D'APPOLONIA S.P.A. (IT)
- 12 GRADO ZERO ESPACE S.R.L. (IT)



# BARRIER

## A New Concept for Improving the Barrier Properties of Commodity Polymers in Thick Sections, Enabling their Long-Term Use in Aggressive Environments as Effective Barrier Layers

The need for increased barrier properties in commodity polymers for use with aggressive substances or hot liquids is growing. Specific needs for better solutions in underfloor heating and oil exploration are our identified markets. At present, barrier properties in thick section polymers are very limited, as molecular orientation of the barrier filler can not be influenced by the extrusion process, as can be done in extruding thin sections (<100µm thick). To compensate for this, solutions using highly expensive materials (PVDF, EVOH), or complex multilayer systems, that can not be recycled either during manufacture or at end of life are selected.

Through Cooperative research and development, our small to medium-sized enterprise (SME) consortium intends to penetrate these markets with a new technology, developed with the help of research and technological development (RTD) performers.

The proposal is to enable low-cost commodity polymers to be modified by adding a nickel-plated nano-filler. The addition of a nano-filler alone will enhance the properties of the material, however the project progresses by then influencing orientation of the plated nano-platelets, such that they lie in the same plane, therefore creating a tortuous path (1 000 000 times more tortuous) for gases trying to permeate through the polymer. The resultant ultimate barrier property will then be proportional to the thickness of the polymer.

The strategic objectives are to produce extruded pipes with barrier properties superior to current single layer solutions, and equal to multilayer solutions, using modified cost-effective commodity polymers that can be recycled, for use in the two identified markets.

The economic objectives are to develop the pipe product and process such that extrusion companies and compounders can tailor the ultimate barrier performance and cost by controlling the amount of plated nano-filler added into the polymer, and

controlling the thickness of the finished barrier layer, thereby being able to balance cost verses performance for various end-user requirements.

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Co-operative research

- 1 REDDIPLEX GROUP PLC (UK)
- 2 PERPLASTIC S.L. SOCIEDAD UNIPERSONAL (ES)
- 3 ATLAS-SOLLICH ZAKLAD SYSTEMOW ELEKTRONICZNYCH ANDRZEJ SOLLICH (PL)
- 4 QUALITY PLATED PLASTICS LTD (UK)
- 5 MAILLEFER S.A. (CH)
- 6 WELLSTREAM INTERNATIONAL LTD (UK)
- 7 RETTIG ICC B.V. (NL)
- 8 PERA INNOVATION LTD (UK)
- 9 FRAUNHOFER-GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

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# BIOMON

## Towards Long-Life Bio-Lubricants Using Advanced Design and Monitoring Tools

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Co-operative research

The objective of BIOMON project is to develop long-life biolubricants based on high performance native esters (TMP, Pentaerithrol) and high temperature and oxidation-resistant biodegradable greases based on polyurea thickeners (methyl diisocyanate types) mixed with native esters. Advanced design techniques (Latin squares, DoE, etc.) will be coupled with advanced maintenance and monitoring strategies (Root-cause analysis, Condition monitoring, Reliability based maintenance) to provide optimised quality lifetime for bio-lubricant operation. These advanced techniques will be finally automated so that monitoring means can be available to small to medium-sized enterprises (SMEs).

It is expected to increase by 10 % to 20 % the speed limits and performance (20 % reduction of wear and life improvement) of actual lubricants. The use of advanced tools and the reduction of 10 % in the quantity of used lubricant, should help to decrease the maintenance cost by 30 %. This project will contribute to increasing the agricultural activities, like growing vegetable oils as a source of native esters. The advanced system for monitoring biolubs and the data base for selecting biolubricants will be available on the Internet (website of the project at different access levels).

The consortium is led by the SME manufacturer of lubricants ROWE (Germany) who will develop suitable lubricants for different applications: rolling bearings manufactured by the SME FERSA (Spain), gears manufactured by BRITO (Portugal) and screw balls manufactured by SHUTON (Spain). The consortium is completed by MONITION (UK), organisation in charge of developing advanced monitoring tools for the control of the biolubricants. The consortium is supported by two centres of excellence in Tribology, formulation of biolubricants and condition monitoring of oils, TEKNIKER (Spain) and greases, INEGI (Portugal) will support the research activities of the project. According to the report from Frost and Sullivan, a potential market of EUR 516-614m of biolubs is waiting.

The project will contribute to standards elaboration, in the field of laboratory simulation of critical components, analysis methods for used and artificially contaminated biolubs, biodegradability and ecotoxicity of non water soluble compounds and thickeners, seals compatibility, condition monitoring and end of life practices with biolubs.

- 1 ROWE MINERALOLWERK GMBH (DE)
- 2 INSTITUTO DE ENGENHARIA MECANICA E GESTAO INDUSTRIAL (PT)
- 3 RODAMIENTOS EUROPEOS SAL - FERSA S.A. (ES)
- 4 SHUTON S.A. (ES)
- 5 A.BRITO - INDUSTRIA PORTUGUESA ENGRENAGENS LDA (PT)
- 6 FUNDACION TEKNIKER (ES)
- 7 MONITION LTD (INTERNATIONAL) (UK)



FP6 Project Catalogue

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**EC Contribution:** € 870 000

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The main objective of this project is to develop the appropriate metal injection moulding (MIM) technology for titanium processing, employing a novel plasma-atomised titanium powder of perfect sphericity for manufacturing high-quality biomedical implant devices meeting the stringent standards imposed for these kinds of materials, in a cost-effective way. MIM technology is the only one that can successfully take on the cost-effective production of very complex shapes with thin sections, including micro-sized and functionally graded devices. However, no real success has been identified for MIM of titanium, because of titanium's tendency to react with the binder and the sintering atmosphere, and the poor availability of suitable fine, high-purity titanium powders.

The project comprises two main research activities:

- the optimisation of a breakthrough plasma atomisation process for the cost-effective production of a high-quality, fine, spherical titanium powder;
- the optimisation of the processes for the production of high quality titanium components using the MIM technology.

The final outcome of the research has the following targets:

- to overcome the difficulties related to the specifications and cost of the commercially available powders;
- to determine the optimal de-binding and sintering parameters for obtaining Ti-MIM implants meeting the stringent standards;
- to formulate the requirements of industrial equipment for new and conventional de-binding and sintering processes of Ti-MIM.

The project objective's achievement would represent a tremendous step towards the fabrication of high-quality implants at an affordable price, with a

consequent direct effect on the quality of health of European citizens. The technology would be also feasible for the automotive and aerospace markets, where Ti-MIM components could replace other metallic parts, contributing to the total structure weight reduction, with significant impact on metallic material resources and fuel consumption. Furthermore, the novel de-binding techniques that will be developed could prove beneficial to various sectors of the ceramic industry.

- 1 PYROGENESIS S.A. (GR)
- 2 FUTURE TECHNOLOGY SYSTEMS (GR)
- 3 EROTHITAN TITANIPLANTATE AG (EROTHITAN TITANIUM IMPLANTS S.A.) (DE)
- 4 DENA SYSTEM BK LTD (UK)
- 5 SC TEHNOTON S.A. (RO)
- 6 LITTLEJOHN, SONS DTS (DENTAL TECHNOLOGY SERVICES) INTERNATIONAL (UK)
- 7 NATIONAL TECHNICAL UNIVERSITY OF ATHENS (GR)
- 8 NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS (GR)
- 9 TECHNISCHE UNIVERSITÄT BERGAKADEMIE FREIBERG (DE)
- 10 TECHNICAL UNIVERSITY "GH. ASACHI" OF IASI (RO)
- 11 FUNDACIÓN INASMET (ES)
- 12 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

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**EC Contribution: € 1 367 000**

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# BIOTPHEX

## Multiplex Bioassays Using the Two-Photon Excitation Method

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Co-operative research

The project aims to develop the two-photon excitation (TPX) method for the measurement of fluorescence from antibody labels on the surface of micro- and nano-sized carrier particles. The proposed two-photon excitation (TPX) method, which is based on fluorescence caused in micro-volumes by two-photon excitation, combines the most advanced technology in micro-fluidistics, micro-mechanics, laser scanning microscopy and flow cytometry applications.

The method will enable multiplex identification of antibody labels and the project will develop new antibodies suitable for high sensitivity assays. The current microchip laser will be developed to increase pulse frequency and reduce pulse duration. The TPX plate reader will allow multiplexed analysis through the use of fluorescent labelling agents which have different emission wavelengths. The microplate to be used will significantly reduce reagent requirements and dispense with the multiple washing currently required in conventional methods. The project will extend the method to be suitable for cell counting by combining it with oxygen up-take measurement technologies and an appropriate laser model. A fibre laser based on the VIOLA laser will be developed and tested in parallel with the current microchip laser.

The objective of the project is to produce pre-production models to allow large-scale screening of a biomaterials and pharmacological compounds which can be carried out in distributed centres, improving the logistics involved in current bio-assays. Significant attention will be paid also to reducing waste and reagent use. The technology to be developed will enable the multinational small to medium-sized enterprises (SMEs) involved to create significant products for global markets to be commercialised by the partners through an agreed action plan, taking into consideration the IP-rights developed. The exchange of know-how between the partners will also benefit and support their own development efforts and provide access to EU funding models for the non-EU partner.

- 1 ARCTIC DIAGNOSTICS OY - EQUIPMENT FOR LASER LABORATORY AND INDUSTRY (FI)
- 2 UNIVERSITY COLLEGE CORK, NATIONAL UNIVERSITY OF IRELAND, CORK (IE)
- 3 JYVAESKYLÄEN YLIOPISTO (FI)
- 4 UNIVERSITY OF TURKU (FI)
- 5 NEW OPTICS LTD (UK)
- 6 STANDA OPTOMECHANICAL PRODUCTS (LT)
- 7 LUXCEL BIOSCIENCES LTD (IE)
- 8 MERLIN TECHNOLOGIES GMBH (DE)



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**EC Contribution:** € 774 778

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# BrightLight

## Periodic-Dispersive Photonic Components for Control of Spectral, Spatial and Temporal Characteristics of Laser Diode Radiation

Diode lasers are more efficient than any other laser and feature the highest reliability. They are already very strong contenders in the commercial marketplace. Laser diodes are a basic technology for a diversity of applications, such as pumping of solid-state lasers, communications and material processing. At the same time, there are clearly certain deficiencies in their performance that have become critical for many demanding applications, e.g. their low spatial and temporal coherence. The consequences of this are excessively broad spectral line-width and a poor beam quality.

With respect to the spectral range, present laser diode technology (especially for high power) is limited to the near infrared region. Recent advances in gallium nitride (GaN) technology has resulted in the commercialisation of low-power (several tens of mW) blue laser diodes, of around 400 nm. However, large portions of the spectrum are not yet covered by laser diodes.

The main aim of this project is the development of low-cost, mass-production technology for optical components based on volume Bragg gratings in advanced photorefractive materials that control the spatial and temporal coherence of laser diode radiation. As a result, a new generation of diode lasers with a very narrow line width and high spatial coherence will be developed and commercialised. As a logical continuation, the second aim is the integration of non-linear crystals with periodic domain inversion. These will enable the efficient frequency conversion of the high-brightness, narrow-band laser diode radiation by means of second harmonic generation.

This new generation of lasers will find many new applications in different markets. The frequency converted lasers will cover large portions of the spectrum that are not attainable at present by laser diodes. The partners have extensive academic and technological backgrounds in lasers, materials and non-linear optics. The successful completion of this project will give them a worldwide competitive status.

- 1 BIAS - BREMER INSTITUT FÜR ANGEWANDTE STRAHLTECHNIK GMBH
- 2 SICO TECHNOLOGY GMBH (AT)
- 3 DAREN LABORATORIES AND SCIENTIFIC CONSULTANTS LTD (IL)
- 4 ALPHALAS GMBH (DE)
- 5 INSTITUTE OF RADIO ENGINEERING AND ELECTRONICS, ACADEMY OF SCIENCES OF THE CZECH REPUBLIC (CZ)
- 6 FOUNDATION FOR RESEARCH AND TECHNOLOGY-HELLAS (FO.R.T.H.) (GR)
- 7 UNIVERSITAT DE VALENCIA- ESTUDI GENERAL (ES)

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**EC Contribution: € 1 525 500**

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The growth of marine fouling (e.g. barnacles, algae, etc.) on boat hulls presents a serious problem for boat owners. It increases friction and drag of a moving boat, reduces speed, causes higher fuel consumption and generally raises ownership costs. Effective antifouling coatings containing copper and biocides have now been shown to be harmful to the marine environment and an EU-wide ban of such chemicals is expected. For merchant ships, alternative antifouling solutions exist, which unfortunately are not suited to low-speed pleasure boats.

That leaves leisure boat owners without an effective non-toxic product to combat fouling. Extensive research in Europe has not yet resulted in mass production of commercial products with a quality comparable to toxic paints. The lack of strong ties between research institutions and the end-users is a main reason for such failure.

To resolve the problem, Lotréc, an experienced marine coatings manufacturer will lead a consortium, which will provide the missing link. The consortium's joint efforts will satisfy the company's need for external expertise and advanced test equipment and improve cooperation between regional specialists, and as a result bring European countries closer to creating optimised test protocols for marine coatings. The main goal of the project is to bring an effective and accessible product to European leisure boat owners. The aim is to create antifouling coatings where substances poisonous to fauna can be substituted with environmentally safe but efficient components.

The goal will be achieved through:

- extensive research of surface micro-topographies potentially unfriendly to fouling;
- development of tools adjustable to surrounding water conditions to control the release of antifouling components;
- evaluation of the possibility of combining the technologies mentioned above in a "hybrid" product.

The new products will be tested in a real-life environment, and then introduced initially in the main European boat trade shows in 2009.

- 1 LOTRÉC AB (SE)
- 2 LABORATORY FOR FRESHWATER/MARINE RESEARCH AND COMPARATIVE PATHOLOGY - LIMNOMAR (DE)
- 3 MUH VON DER LINDEN (DE)
- 4 SOTHOLMSBRUK AB (SE)
- 5 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH TNO (NL)
- 6 KUNGLIGA TEKNISKA HÖGSKOLAN (THE ROYAL INSTITUTE OF TECHNOLOGY) (SE)
- 7 UNIVERSITY OF GDANSK (PL)
- 8 PINMAR SL (ES)





# CHAINTEST

## Autonomous Robotic System for the Inspection of Mooring Chains that Tether Offshore Oil and Gas Structures to the Ocean Floor

Floating platforms for plant, machinery and accommodation are being used increasingly in offshore oil and gas production. Semi-submersible drilling rigs have for some time been common in offshore exploration, but now floating structures are to be found in "Tension Leg" platforms, "Spar" platforms, "Floating Production Storage and Off-loading vessels" and support structures such as "Flotels" (accommodation) and crane barges. As oil fields are opened up in deep water at the margins of the continental shelf, production platforms that are fixed to the sea bed are no longer feasible; moreover, floating production platforms can be moved from one field to the next, allowing smaller, marginal fields to be exploited.

Permanent floating production platforms must be moored to the sea bed. The integrity of the mooring system is critical, because the consequences of failure could be oil pollution on a catastrophic scale. The rupture of a well head off the coast of Mexico in 1985 released 64 million barrels of oil (compared with the 200 000 barrels of oil from the Exxon Valdez). Floating structures are designed, in common with all offshore structures, to survive the 15-metre waves derived statistically from the "hundred-year storm". However, there is evidence of much greater freak waves, for example the 26-metre wave which hit the Draupner platform in the North Sea in 1995. Also, climate change suggests that storms will become more frequent in the future, increasing the risk of damage to offshore structures. Recorded instances of damage to the mooring system of floating offshore structures already indicate a problem. Current cable-chain break frequency is as high as one break for every three years of operation. Breaks often go unnoticed, increasing the probability of multiple breaks and total mooring system failure.

There is therefore an urgent need to improve the integrity management of mooring systems. One issue is the inspection of chain links. Regulatory visual inspection is currently done with the cable chain brought up on deck, or, for greater sensitivity to defects using non-destructive tests (NDT), with

the cable chain taken onshore. Increasingly, interim "swim-by" inspections of the chain *in situ* are being conducted from remote-operated vehicles. The inspection however is unreliable, susceptible to human error, because of the hundreds of metres of chain involved and the short times allowed for inspection. Industry recognises the need for more effective inspection.

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Co-operative research

- 1 TWI LTD (UK)
- 2 MILTECH HELLAS S.A. (GR)
- 3 TECHNICAL SOFTWARE CONSULTANTS LTD (UK)
- 4 BYTEST S.R.L (IT)
- 5 INTERLAB INGENIERÍA ELECTRÓNICA Y DE CONTROL S.A. (ES)
- 6 NUCLEAR ENGINEERING SERVICES LTD (UK)
- 7 VICINAY CADENAS S.A. (ES)
- 8 PETROLEO BRASILEIRO S.A. (BR)
- 9 ZENON S.A. ROBOTICS AND INFORMATICS (GR)
- 10 NDT CONSULTANTS LTD (UK)

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Materials & Processes

# CLAREFOSS

## Clean And REliable Forming Of Stainless Steel

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Co-operative research

Sheet metal working is an essential technology for manufacturing goods in Europe. A specific part of this sector, targeted in this proposal, comprises approximately 500 small to medium-sized enterprises (SMEs) with a press shop and employs an estimated 65 000 people in the European Union. This sector experiences strong competition from low labour-cost countries, and a significant portion of these jobs are lost to non-EU countries each year. The only sustainable way to end this is permanent innovation, not only by developing new products, but equally importantly by adapting new production technologies. This proposal addresses both.

Reliability and cleanliness play an important role in sheet metal forming of stainless steel. The lack of these factors leads to scrap, and hazards for the environment and the workers. Because stainless steel is a relatively costly sheet material (ten times more expensive than low carbon steel), a drop in production yield, for instance, due to climate influences or variations in material batch properties, is a serious problem. As things stand at present, an improvement of reliability can only be realised at the cost of cleanliness and vice versa.

The technical limitations of the present state-of-the-art, and key barriers to growth of clean and reliable forming of stainless steel are that: (1) clean processes lack forming reliability, since galling occurs after a few operations; and (2) reliable processes involve chlorinated paraffin and solvents based on HFCs and involve controlled temperature forming, which are respectively non-sustainable or hardly assessable for SMEs.

The objective of the proposed research is to develop innovative solutions comprising easy-to-clean ECO lubrication, optimised anti-galling tool surfaces and forming with active temperature control, that will increase the lifetime of the forming tools hundredfold. The proposed work will increase employability, increase worker safety, decrease harmful emissions to the environment and increase quality of life for European citizens.

- 1 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 2 FUNDACIÓN TEKNIKER (ES)
- 3 AWAB UMFORMTECHNIK UND PRAEZISIONMECHANIK GMBH (DE)
- 4 BRUGAROLAS S.A. (ES)
- 5 STALA OY (FI)
- 6 PAUL KUPPEL B.V. (NL)
- 7 NOVATEA SPA (IT)
- 8 TRATTAMENTI TERMICI FERIOLI & GIANOTTI SPA, DIVISIONE GENTA PLATIT (IT)
- 9 TRATAMIENTOS TÉRMICOS T.T.T. S.A. (ES)
- 10 UGINE & ALZ FRANCE / ARCELOR (FR)



# COCON

## Coated CONductor by economic processing route

The COCON project is targeting the creation of a new and more economic production technology for Coated Conductors. By producing Coated Conductors, the high temperature superconductor (HTS) Yttrium-Barium-Copper-Oxide (YBCO) is deposited on a buffer layer and a metal substrate tape. High Temperature Superconductors (HTS) are seen as one of the key technologies in the near future. By cooling below the critical temperature with liquid nitrogen, the electrical resistance disappears in HTS materials.

To enable a broad market introduction in electrical applications superconducting tapes and wires have to be available at a competitive cost/performance level. The second generation of HTS tapes, so called Coated Conductor is considered to have the potential to meet customer's requirements. To meet especially the required cost level, the consortium is focussed on the development of chemical coating techniques like chemical solution dipping (CSD) and ink jet printing.

The project consortium consists of small to medium-sized enterprises (SMEs) with special knowhow in design and manufacture of HTS wires, design of HTS-tape architecture, construction and production of manufacturing lines, manufacturing and characterisation of chemical coating solutions and layers made thereof. The research and technological development (RTD) partners involved have the skills to design, model and test the new production technology for Coated Conductors. They also have the knowledge to analyse and to solve material problems. The project's objectives will be addressed by a new economic manufacturing process for Coated Conductors in a length of more than 100 million.

- 1 TRITHOR GMBH (DE)
- 2 LEIBNIZ-INSTITUT FÜR FESTKÖRPER-UND WERKSTOFFFORSCHUNG DRESDEN (DE)
- 3 KRAFT ELECTRONICS INC. (HU)
- 4 THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE (UK)
- 5 POLYTEKNISK FORSKNING & UDVIKLING APS (DK)
- 6 WERKSTOFFZENTRUM RHEINBACH GMBH (DE)

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# COLORMATCH

## Development of an Expert System for the Colorant Formulation in the Dyeing Process of Veneer in Furniture Industry

356

Co-operative research

Colorant formulation is used extensively in the worldwide furniture industry to provide different finishes of different colours to furniture pieces like: (1) pieces of furniture for the home; (2) kitchen and bathroom furniture; (3) office and commercial establishments furniture. Colour differences quantification and colorant formulation is currently made by semi-automated or manual methods and have many drawbacks as they involve operators acting in a decisive task, such as the colourant formulation, along the production of furniture pieces. There is a lack of methods capable of quantifying colour differences of non-uniformly coloured surfaces such as wood surfaces.

The major technical objectives of this project are to develop a computer vision system capable of:

- quantifying and describing the colour of non-uniformly coloured surfaces such as wood samples in furniture industry;
- proposing a colourant formula for achieving a target colour when it is applied over a wood sample.

The major economic and industrial objectives are:

- a significant cost reduction in the furniture manufacturers;
- cumulative profits from the sales of the expert system to reach EUR 6,5 million, four years after project end;
- increase even more EU competitiveness against the US and Japan enterprises in the furniture industry market.

The major social and environmental objectives are:

- elimination of labour intensive and monotonous inspection tasks;
- reduction of the exposure of the operator to work in hazardous environments;

- elimination of operator stress and error caused by the need for great attention to detail and raw material variability;
- reduction of wastes of wood panels, facilitating the sustainable development;
- reduction of the amount of employed dyes, which constitutes dangerous and toxic products.

- 1 INDUSTRIAS QUIMICAS IRURENA S.A (ES)
- 2 INSTITUT FÜR HOLZTECHNOLOGIE DRESDEN GMBH (DE)
- 3 CIDEMCO-CENTRO DE INVESTIGACION TECNOLOGICA (ES)
- 4 CAMILA MOVEIS INDUSTRIA DE MOBILIARIO LDA (PT)
- 5 3H-LACKE LACKFABRIK HAMMEN GMBH & CO. KG (DE)
- 6 METROTEC S.A (ES)
- 7 ALBERTO MORA GALIANA S.A (ES)
- 8 WESSENDORF OBERFLAECHENTECHNIK GMBH (DE)
- 9 UNIVERSITY OF LEEDS (UK)



# Coloured Gold

## Surface-Engineering Colour Effects for Gold Alloys

The European jewellery industry is at crisis point and faces severe competition from countries from Asia and the Middle East, in both the home as the export market. The import of large volumes of low-cost jewellery puts the margins under pressure. As the production of this jewellery takes place in countries with lower wages and less or even no regulations, these factors make it very hard for the European industry to compete only on a price-based level. The rapidly changing environment also reflects on consumer-buying behaviour.

Lesser sales on traditional precious jewellery, in favour of more instant spending and "gratification" spending, like holidays and leisure. But this thread is also a new opportunity. Marketing studies have shown that demand for all types of jewellery is becoming more fragmented and the future market will be driven by more personalised and high-quality jewellery. The key opportunity is bright-coloured real gold, like green and blue alloys, which are not possible at the moment. Combining this opportunity with personalised and colourful jewellery will have a substantial added value, resulting in an increased turnover of 20 % in the first 2 years for the small to medium-sized enterprise (SME) participants. The research conducted in COLOURED GOLD will enable SMEs to offer new and innovative products to their customers with healthy margins, and therefore substantially contributes to the competitiveness of the European jewellery industry.

The technological objectives of COLOURED GOLD are:

1. developing specific surface-engineering processes and materials, through two main approaches: surface alloying by laser surface treatment and surface alloying by diffusion-annealing treatment, resulting in strong colours like purple and blue in a thick surface layer, thereby circumventing the drawbacks of the bulk alloy materials and thin coatings;
2. metallurgical research into further variations of alloy composition, aiming at completely new bright gold alloy colours (red, green) as well as

specific property improvements (addressing corrosion, oxidation, wear resistance, joinability);

3. focused research on the surface engineering process, equipment and materials parameters enabling personalised, patterned surface alloying, and stage-by-stage development of the process from flat surfaces to more complex shapes, in close cooperation with a complete chain of manufacturers and suppliers of raw materials, equipment and services, covering different applications and sectors.
4. utilising innovative manufacturing equipment, e.g. multiple-axis laser equipment assisted by CAD/CAM technologies, thereby establishing new methods of personalised and creative colour design (local colouring, multicolouring, and patterning).

The experienced research and technological development (RTD) partners will lead the project to viable processes, which are shared by existing dissemination and training activities to SMEs, thereby leading to a highly practical outcome for the complete sector.

- 1 FORSCHUNGSINSTITUT FÜR EDELMETALLE UND METALLCHEMIE (DE)
- 2 CHRISTIAN BAUER GMBH (DE)
- 3 CLOGAU GOLD OF WALES LTD (UK)
- 4 STEPHEN WEBSTER LTD (UK)
- 5 MICRONOR (FR)
- 6 LASER CHEVAL S.A. (FR)
- 7 MORENO/ATELIER DE BRUIJN (NL)
- 8 EDELSTIJL (NL)
- 9 LEG. OR S.R.L. (IT)
- 10 VENDORAFA LOMBARDI SRI (IT)
- 11 REISCHAUER GMBH (DE)
- 12 NETHERLANDS ORGANISATION FOR APPLIED RESEARCH (NL)
- 13 CENTRE TECHNIQUE DE L'INDUSTRIE HORLOGÈRE ET BIJOUTERIE (FR)
- 14 UNIVERSITY OF CENTRAL ENGLAND (UK)

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Contract: 32497  
Call: FP6-2004-SME-COOP  
Starting Date: 01/12/2006  
Duration (months): 24  
Total cost: € 1 109 316  
EC Contribution: € 646 627

# COMBIO

## Composite Materials for the Immobilisation of Biocatalysts

358

Co-operative research

The aim of the proposed work is to enable a substantial increase in the rate and extent of the uptake of biocatalysis processes by industry, i.e. the use of biological catalysts to facilitate chemical reactions. The objective is to provide a generic approach to the immobilisation and/or stabilisation of enzymes using low-cost, renewable support materials and novel internal cross-linking methods where the enzyme becomes its own support and compatible microenvironments are created to improve stability.

The research will focus on the immobilisation/stabilisation techniques and will assess the enhancement in performance produced in the main target application of the synthesis of fine chemicals. However, the potential applicability of the technology is very broad, and applications in textile processing and a novel fuel cell development will also be explored, to a more limited extent. The production of low-cost immobilisation materials will be studied. They will be designed to be commercially viable regarding the cost-to-use ratio. Increased stability in commercial preparations of supported biocatalysts will be sought. The ultimate aim is to produce biocatalytic enzyme nanocomposites as free-flowing dry powders that may be stored at room temperature for many months (possibly years), and used off the shelf ,for the manufacture of fine chemicals, etc.

<http://ktn.globalwatchonline.com>

- 1 C-TECH INNOVATION LTD (UK)
- 2 NAMOS GMBH (DE)
- 3 DI DR ANDREAS PAAR KEG – QUALIZYME (AT)
- 4 ALKOMOHR BIOTECH OY LTD (FI)
- 6 CLEA TECHNOLOGIES B.V. (NL)
- 7 KYLOLAB S.L. (ES)
- 8 MACROSYNTH LTD (UK)
- 9 UNIVERSITY OF LEEDS (UK)
- 10 DUBLIN CITY UNIVERSITY (IE)
- 11 DELFT UNIVERSITY OF TECHNOLOGY (NL)



FP6 Project Catalogue

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Starting Date: 01/10/2006  
Duration (months): 24  
Total cost: € 1 903 386  
EC Contribution: € 1 394 780

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# CONNECT

## Design of Advanced Controllers for Economic, Robust and Safe Manufacturing Performance

The main objective of the proposed cooperative research project CONNECT is to achieve a significant increase in the range of control problems to which advanced optimisation-based controllers can be reliably applied. This will be achieved through the investigation and development of an integrated set of advanced control algorithms and software and/or hardware tools for applications in a broad range of systems which exhibit significant operational difficulties and limitations (e.g. industrial systems requiring fast control actions, safety-critical applications as encountered in automotive control or in chemical reactor control, energy application, wire manufacturing requiring extremely tight product quality control, etc.).

The work in the proposed project includes research activities and novel research and technological development (RTD) approaches for: (a) the development of more efficient and fast MPC techniques utilising recent advances developed by RTD performers in the area of parametric programming; (b) the design of robust model-based controllers, for hybrid and continuous dynamic systems; and (c) the development of reduced order models. The activities of the project will make extensive use of a field of mathematics, called parametric optimisation, to shift offline (hence out of the controller) the computational burden traditionally associated with model-based optimal control techniques. The remarkable feature of the CONNECT advanced controllers is that the control performance is identical to what would have been achieved with a full online optimisation approach but without the computational burden and related software.

The consortium brings together three leading research groups in process systems engineering, control, optimisation, and embedded systems design, five small to medium-sized enterprises (SMEs) which will carry out software development activities and additionally provide real-life industrial problems from the polymer, energy generation, chemical, automotive and wire manufacturing sectors, and two end-users who will additionally provide realistic

industrial problems to apply, validate and assess the performance of the developed algorithms, methodologies and tools.

- 1 PROCESS SYSTEMS ENTERPRISE LTD (UK)
- 2 CYBERNETICA AS (NO)
- 3 ESTIA CONSULTING S.A. (GR)
- 4 PLASMA IT GMBH (AT)
- 5 PARAMETRIC OPTIMIZATION SOLUTIONS LTD (UK)
- 6 INEA CONTROL AND MANAGEMENT OF INDUSTRIAL PROCESSES (SI)
- 7 AKTIONERNOE OBSHESTVO SODRUGESTVO-T (UA)
- 8 NORWEGIAN UNIVERSITY OF TECHNOLOGY AND SCIENCE (NO)
- 9 THE UNIVERSITY OF MANCHESTER (UK)
- 10 JOZEF STEFAN INSTITUTE (SI)
- 11 IMPERIAL COLLEGE OF SCIENCE, TECHNOLOGY AND MEDICINE (UK)
- 12 KERAMOPIIA KOTHALIS S.A. (GR)

**Contract: 31638**  
**Call: FP6-2004-SME-COOP**  
**Starting Date: 01/10/2006**  
**Duration (months): 24**  
**Total cost: € 1 758 900**  
**EC Contribution: € 1 188 900**

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# CoolHead

## Development of a Cooler and Lighter Crash-Helmet Technology

360

Co-operative research

On Europe's roads 43 000 people died and 1.7 million were injured in 2002 and 236 300 people are annually injured in motorcycle/moped accidents with head injuries costing the European Community EUR 6.9 billion annually. It has been shown that the weight of the helmet contributes to accident seriousness, and heat inside helmet also leads to overheating and dizziness causing accidents.

Our idea is to develop a low-cost, lightweight cooling helmet that would contribute to a reduction in motorcycle accidents, especially in the countries with warm climate conditions, as it will provide a cooling effect that is not influenced by speed; the CoolHead helmet. Currently, there are no crash helmets with a cooling system that works when not in speed, and currently all crash helmets with cooling systems approved according to safety standards as DOT, Snell or ECE 22.05 have a weight greater than 1.4kg. The outer shell of most current helmets are made of an external rigid fibre-filled composite shell with an internal lining made of compressed Polystyrene or Acrylonitrile Butadiene Styrene (ABS), which distributes and absorbs the impact energy.

To obtain the cooling effect of 10 W we will develop a 3-D spacer fabric inner liner with approximately 60 % free spaces in the middle section allowing 48 litres per minute passing through all over the head. The liner will be developed with a hydrophilic polyester layer absorbing moisture and sweat from the head and transmit it through the spaces and to the PP-glass top layer where it condenses and creates a thermal barrier lasting three minutes even when the vehicle is stationary..

To achieve this we need to develop:

- a 3-D knitted spacer fabric with 50 % to 60 % open spaces allowing airflow of 48 litres/minute securing the 10W cooling effect at a speed of 50km/h;
- a 3-D knitted spacer fabric with a compression strength of minimum 0,39MPa;

- a microwave curing process for resin transfer moulding (RTM) securing curing of the resin in 15-20 seconds preventing the penetration of the resin to the liner and only the wetting of the interface to secure total integration of the liner and shell with an adhesion strength of minimum 3 MPa.

<http://coolhead.pera.com>

- 1 MONARCH KNITTING LTD (UK)
- 2 FRICKE AND MALLAH (DE)
- 3 WYKES INTERNATIONAL (UK)
- 4 E.CIMA S.A. (ES)
- 5 HEXEAL (UK)
- 6 SUOMY SPA (IT)
- 7 TEKNOLOGISK INSTITUTT AS (NO)
- 8 PERA INNOVATION LTD (UK)



FP6 Project Catalogue

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**Call: FP6-2004-SME-COOP**  
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**Duration (months): 24**  
**Total cost: €1 379 915**  
**EC Contribution: € 714 817**

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# CORRLOG

## Automated Corrosion Sensors as Online Real-Time Process Control Tools

Today, corrosion measurements in process plants, soils, or atmospheric conditions are usually a part of expert-conducted surveys, the results of which are presented to end-users in written reports. This project is based on the need to implement corrosion sensors as a process control tool, because the information on actual corrosivity of the environment is crucial for effective corrosion protection. Implementation of online and real-time monitoring enables operators to take immediate counter-measures if corrosion is accelerating, and thus decrease the costs of corrosion.

The proposed project includes two dimensions. The first one is related to optimisation of the direct accessibility of the data for the end-user with minimum need for interpretation. The second dimension is related to the accuracy and reliability of the sensors in their individual application platform. This part of the project is focused on three broad areas: indoor and outdoor atmospheric corrosion sensors, fluid or soil media corrosion sensors for internal or external corrosion detection, and sensors specifically designed to detect non-uniform corrosion.

The most innovative objectives of the project consist of:

- (a) high sensitivity and reliability of the sensor device, i.e. short time to response;
- (b) small-size and battery-driven measuring device, which can be placed virtually anywhere and monitor the aggressiveness of the environment for long time-periods;
- (c) simple operation not requiring skilled personnel;
- (d) possibility for remote control due to GSM reading; and
- (e) detection of localised corrosion. To achieve the objectives, strong expertises in three fields of technical activity, i.e. corrosion engineering, metal deposition, and electronics, must meet.

The principal areas of application of the sensor devices are industry, telecommunications, transportation, electronic equipment, and cultural heritage protection.

- 1 INSTITUT DE LA CORROSION SAS (FR)
- 2 VYSOKÁ ŠKOLA CHEMICKO-TECHNOLOGICKÁ V PRAZE (CZ)
- 3 DANMARKS TEKNISKE UNIVERSITET (DK)
- 4 MICREL S.A. (FR)
- 5 GALVANOTECHNA, DRUŽSTVO (CZ)
- 6 METRICORR APS (DK)

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**Contract: 18207**  
**Call: FP6-2003-SME-1**  
**Starting Date: 01/09/2005**  
**Duration (months): 30**  
**Total cost: € 979 240**  
**EC Contribution: € 507 368**

# custocer

## Mass Customisation of Ceramic and Glass Decoration — A Contribution to the Future Manufacturing Industries

362

Co-operative research

The objectives are the product customisation of a computer tool; it will be developed for the client to generate his own product design via the Internet; confirmation will then automatically commission production, thus providing a fully customised service. This involves the development of a prototype for decoration by application of an industrially feasible laser. Prototypes will be based on one or several laser techniques, classified in two groups: deposition and activation techniques. In the former, decoration occurs by depositing colouring materials on the surface of the fired ceramic tile and glass. The laser fuses the colorants and incorporates them into the surface, producing the design. Deposition occurs beforehand using a digital printing system. In another deposition technique, the laser head itself feeds the material, with parallel fusion or “cladding”. In the activation techniques, decoration occurs by changing surface colour by exposure to laser radiation. In both techniques, the development of colouring materials and optimum glaze compositions is critical.

Production optimisation occurs as the tile decoration is customised by so-called “third-fire” manufacture; tiles fired by conventional techniques are decorated and then refired. Third fire requires relatively large production lots to be cost effective, thus limiting production of small customised orders. Decoration by laser technology will eliminate this last firing stage, reduce energy costs and gas emissions, and enable us to make small, fully customised lots. It will also greatly reduce factory work space with the envisaged prototypes. In glass and ceramic tiles manufacture, organic colouring materials are mainly used for decoration, which are a source of pollutants and potential VOCs. The techniques envisaged will enable us to eliminate these. With regard to laser techniques currently used for decorating small pieces, the development will raise production rates, optimise the quantity of deposited colorant, and increase the exposure area, thus facilitating the decoration of large-size pieces.

- 1 DECORKER S.L. (ES)
- 2 CERAMICHE SAVIO DI ELIO & C. SNC. (IT)
- 3 LIMATOOLS GLAS B.V. (NL)
- 4 SMALTICERAM UNICER S.P.A. (IT)
- 5 TECNOLOGIA E COMUNICAZIONE DI GRUPPO GHELCO SRL (IT)
- 6 CERLASE (FR)
- 7 NOVEL TECHNICAL SOLUTIONS LTD (UK)
- 8 3D-MICROMAC AG (DE)
- 9 CAM-SERVICE GESELLSCHAFT FÜR SOFTWARE UND AUTOMATIONSTECHNIK GMBH (DE)
- 10 ASOCIACIÓN DE INVESTIGACIÓN DE LAS INDUSTRIAS CERÁMICAS (ES)
- 11 ASOCIACIÓN INDUSTRIAL DE ÓPTICA (ES)
- 12 INSTITUTO PER LE RISERCHE DI TECNOLOGIA MECCANICA E PER L'AUTOMAZIONE S.P.A. (IT)
- 13 LASER ZENTRUM HANNOVER E.V. (DE)
- 14 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH (NL)



FP6 Project Catalogue

**Contract:** 18081  
**Call:** FP6-2003-SME-1  
**Starting Date:** 05/10/2005  
**Duration (months):** 24  
**Total cost:** € 1 596 200  
**EC Contribution:** € 893 700

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# DISBLADE

## A New Concept for the Hardening of Polymers Allowing the Production of Disposable Surgical Blades Preventing the Need for Sterilisation

The economic objective of our work is to: enable the partners and the estimated 10 licences to displace at least 0.1 % of the 9.8 billion each year of imported medical technology and devices; substitute into at least 0.20/ % of the European market of 39 billion each year for existing medical technology and devices and 0.04 % by 2012; and provide at least 6.324 million each year of automated, disposable surgical blade manufacturing cells.

The technological objective of our work is to produce a process for the manufacture of disposable polymer surgical blades that: achieves a polymer blade with a surface hardness of at least 7 Mohs'; achieves a blade surface hardness of at least 5 Mohs' to a depth of at least 15 microns; achieves blade stiffness comparable to existing stainless steel blades; has the ability to produce a blade that can be cost effectively sharpened to a level of sharpness comparable to existing stainless steel blades and conform to the relevant sections in BS 2982:1992; and achieves a hot plate disposal route that renders the blade sharp safe in less than 1 second.

A polymer scalpel will be designed using finite element analysis (FEA) to model the blade stiffness and rapid prototyping techniques to verify "feel" and ergonomics. A prototype two shot injection moulding tool with an innovative injection compression feature on the blade cavity to ensure sharpness will be designed and manufactured. The resultant polymer blades will be surface hardened using ScCO<sub>2</sub> to plasticize the outer layers of the polymer and innovative Sol-Gel chemistry will be used to increase surface hardness. The resultant blades will be tested for blade hardness and stiffness. A grinding and polishing system will be developed to obtain a blade sharpness comparable to existing stainless steel blades.

The resultant blades will be tested for sharpness and blade durability. The resultant scalpel handles will be tested for stiffness and "feel". A sharp safe blade disposal system will be created consisting of an enclosed hot plate to render the polymer blade blunt within one second.

- 1 A/S KENNETH WINNER-VÆRKTØJSFABRIK (DK)
- 2 MAPRO SPOL S.R.O. (CZ)
- 3 CLINIPART LTD (UK)
- 4 FEDEGARI AUTOCLAVI S.P.A. (IT)
- 5 ROSTI AS (DK)
- 6 PERA INNOVATION LTD (UK)
- 7 STIFTELSEN TEKNOLOGISK INSTITUT (NO)
- 8 CHARPAK LTD (UK)

**Contract: 508225**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/03/2004**  
**Duration (months): 27**  
**Total cost: € 1 251 570**  
**EC Contribution: € 640 222**

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The project aims at developing innovative systems for load- and non-load-bearing reinforced masonry walls, based on the advancement of vertical reinforcement and fastening, of mortar and concrete, and on their integration with special blocks for the definition of a new constructive system. The adopted approach, from materials through technology and research to case studies, is directed towards product development. The experience of different agents in the process ensures constructability, a key issue in sustainability, rationalisation, quality and cost control in the building industry.

The foreseen advantages are:

1. new possibilities for masonry;
  2. more economical construction;
  3. quality increase for masonry walls; and
  4. crack-free and earthquake-resistant construction. This is of basic importance, since damage in masonry walls represent 25 % of the reported damage in buildings, and safety in case of earthquake is a major issue.
2. development of the construction technology, including cost assessment and productivity;
  3. experimental and numerical characterisation, to obtain a set of values for validation and certification, to define the influence of individual material properties, to perform parametric studies and to provide feedback for further developments;
  4. calibration and application of NDT methods for the quality assessment of reinforced masonry buildings; and
  5. development of guidelines and software for the design of masonry walls according to the new solution, and for the updating of codes of practice and standards.

The project follows these steps:

1. assessment of the technical and economical feasibility of the envisaged production and construction technologies by performing parallel experimental and theoretical studies;
2. construction of prototypes as a demonstration of the proposed technology and materials; and
3. in situ testing to completely validate the system.

The main novelties are:

1. development of new products (masonry units, steel reinforcement and fasteners, special mortars and concrete);

- 1 UNIVERSITÀ DEGLI STUDI DI PADOVA (IT)
- 2 LATERIZI ALAN METAURO S.R.L. (IT)
- 3 CIS EDIL S.R.L. (IT)
- 4 COSTA & ALMEIDA LDA (PT)
- 5 TASSULLO S.P.A. (IT)
- 6 UNIPOR-ZIEGEL MARKETING GMBH (DE)
- 7 ANDIL ASSOLATERIZI (IT)
- 8 BEKAERT S.A./NV (BE)
- 9 ARBEITSGEMEINSCHAFT MAUERZIEGEL E.V. IM BUNDESVERBAND DER DEUTSCHEN ZIEGELINDUSTRIE E.V. (DE)
- 10 RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN (DE)
- 11 TECHNISCHE UNIVERSITÄT MÜNCHEN (DE)
- 12 UNIVERSIDADE DO MINHO (PT)



# DOLFIN

## Development of Innovative Plastic Structures for Aquaculture Using a New Composite with Crop Waste as Reinforcing Filler

The main objective of the project is to design, produce and optimise innovative aquaculture structures using a new plastic composite reinforced with organic filler (crop waste) specially developed in the project for applications in permanent contact with water. The new composite will have the necessary characteristics to obtain new structures and devices with enhanced properties compared to the present ones.

The project will combine two completely different waste flows (plastic and crop) to produce new aquaculture structures, both for a totally innovative concept for mollusc farming rafts and for replacing other materials (metals or non-reinforced plastics) in already existing structures (flotation rings and devices for sea-based fish farms and tanks for land-based fish farms).

The project will also help to solve the problems associated with rafts or other wooden structures in permanent contact with water, such as the reduction of mechanical properties (due to the effects of water) and rotting. Simultaneously, it aims to find an economically viable solution for crop residues, using them as fillers in the manufacture of this new plastic composite. The new composite will be 100 % recyclable. There is currently crop waste (husks, stalks and leaves) from rice, sunflower, wheat, barley and other cereals, whose economic exploitation is next to nothing or nil, and whose burning in croplands constitutes a significant source of environmental pollution in production areas. The project aims to obtain a low-cost plastic composite taking advantage of unexploited or underexploited crop waste, applying the new material (in an initial stage) to manufacture water contact applications.

The environmental aspects of the project (with their intangible costs), looking for a useful approach for these residues, increase the relevance of the proposed research. The small to medium-sized enterprise (SME) proposers will exploit the project results in the short term. The new composite material will be obtained by incorporating the selected crop waste (husk and

short natural fibres to improve mechanical properties) into a recycled thermoplastic polymeric matrix. The use of recycled plastics as polymeric matrix shall be a priority. The best proportion of polymeric matrix/crop waste shall be defined accordingly primarily on, among other factors, the mechanical characteristics of the final product and the existing polymer processing technologies suited to their manufacture. Special emphasis will be paid on the polymer matrix / crop waste compatibility in order to reach the desired mechanical properties in the final product. This aspect of the compounding process is critical, because if a good adhesion between both components is not obtained the properties of the material will be poor and of no use.

The project will achieve both the technical objective of developing a new product, and the environmental objective of recycling waste materials for which currently there are few other options. A life cycle assessment will be carried out to determine the raft's environmental impact from the beginning to the end of its life cycle, in order to position it compared to rafts used up to now.

- 1 ASOCIACION DE INVESTIGACION DE MATERIALES PLASTICOS Y CONEXAS (ES)
- 2 NORTH BAY SELLFISH LTD (UK)
- 3 MEXIANA PRODUCAO DE MEXILHOES LDA (ES)
- 4 INPLASVA S.A. (ES)
- 5 RONAUTICA S.A. (ES)
- 6 CENTRIFORCE PRODUCTS LTD (UK)
- 7 GIGANTE AS (NO)
- 8 PLASTSVEIS AS (NO)
- 9 MIFSUD S.L. (ES)
- 10 UNIVERSITY OF WALES - BANGOR (UK)
- 11 UNIVERSIDAD DE VIGO (ES)
- 12 ENTEX RUST & MITSCHKE GMBH (DE)
- 13 AKUMPLAST JSC (BG)
- 14 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)

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**EC Contribution: € 612 482**

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# Eco2Painter

Economical and Ecological High-Quality Painting at Highly Scaleable Batch Sizes

366

Co-operative research

European industry is in a transition phase, from mass production industry towards a more competitive, knowledge-based, customer- and service-oriented one. Production on demand, mass customisation, rapid reaction to market changes and quick time-to-market of new products and variants at small batches are needed — at low cost and high quality. Realisation and economic exploitation of innovation in Europe require European production to support a smooth introduction of innovative products in uncertain or emerging markets — from the very beginning — with small volumes. Highly flexible, scaleable and user-friendly production equipment is needed, including robotic systems for painting — a common process in production.

The necessity for the project arises from the significant disadvantages of current automatic painting systems, robotised as well as non-robotised ones. The missing flexibility and high costs for generating and adapting programmes to new products or to shape modifications, cause down times and high costs that limit the economic benefit of introducing product innovations.

Overcoming these limitations is highly important to European small to medium-sized enterprises (SMEs) dealing with the intensification of worldwide competition: (a) SMEs, often suppliers or small-volume producers would benefit greatly if they could produce even very small batches on demand, at very high quality and low costs; and (b) new technology which enables them to efficiently customise and to rapidly and smoothly launch new products, would speed up the product-innovation cycle — one of the strongest economic impacts in worldwide competition.

ECO2PAINTER aims at the development of such a novel technology for self-programming painting robots that are capable of learning. The project results will allow eco-efficient high-quality painting even of very small lot-sizes with down times during product

changes that are 10 times to 100 times shorter than those of conventional systems.

Within this project, a system will be developed that uses sensors to reconstruct, recognise and decompose the products to be painted. Using this information, the process is automatically planned and robot programs are generated and executed subsequently.

Quality improvements are achieved automatically or by ergonomic user interaction and will be re-applied in planning future product variants. Results (full systems or retrofits) will be ready to market right before standards on emissions (1999/13/EG) require replacements or updates of existing painting-systems. The resulting improvements in the competitiveness will improve the return of investment (ROI) in eco-friendly painting-lines.

The major innovation beyond the state of the art is clearly the novel system that efficiently paints products even at very small batch-sizes, with very high quality and with down times near zero. The required breakthroughs are as follows.

1. Robust adaptive and active controlled 3-D sensing, recognition and categorisation, able to deal even with very large uncertainties, and with very large sets of parts of near arbitrary and complex shapes.
2. “Closed loop” process and motion planning, full application simulation and adaptation for increased satisfaction of user criteria (paint usage, quality, time to production).
3. User-centred technology featuring intuitive interaction via augmented application-animation, automatic adaptation and learning, that make use of optimisation and knowledge, even at new product variants.

www.eco2painter.org



4. Efficient interfaces for non-robotic experts and down times near zero without a redundant teach-in system reflects especially the personal and equipment situation for SME end-users. Being manageable to end-users reduces the risks of SMEs that export such technology.
5. An improved paint-stroke scheduler significantly increases the economic efficiency of robotic painting.

- 1 PROFACOR PRODUKTIONSFORSCHUNGS GMBH (AT)
- 2 ATENSOR ENGINEERING AND TECHNOLOGY SYSTEMS GMBH & CO.KG (AT)
- 3 LACTEC GESELLSCHAFT FÜR MODERNE LACKIERTECHNIK GMBH (DE)
- 4 INROPA APS (DK)
- 5 AMROSE ROBOTICS APS (DK)
- 6 ASIS AUTOMATION SYSTEMS & INTELLIGENT SOLUTIONS GMBH (DE)
- 7 FKI LOGISTEX CRISPLANT A/S (DK)
- 8 AALBORG UNIVERSITY, DEPARTMENT OF PRODUCTION (DK)

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**EC Contribution:** € 808 701

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# ECOHYB

## Ecological and Economical Machining of Magnesium-Based Hybrid Materials

368

Co-operative research

Developing an experimental machine prototype, capable of safe machining of magnesium-based hybrid materials, optimised tools and strategies, and development of lubricants for Minimum Quantity Machining of Magnesium-hybrids is the main goal of EcoHyb. In the automotive industry as well as in other sectors where parts are moved, a general desire to reduce the energy consumption exists. Mg-alloys have a 33 % lower density in comparison to aluminium (and 77 % compared to steel). Therefore the application of lightweight construction with hybrid material parts has been extended in the last few years.

Magnesium – aluminium (Mg-Al) hybrids and magnesium – sintered metal (Mg-Sint) hybrid constructions are used more and more. The hybrid material is advantageous due to its low weight combined with high strength and wear characteristics. Increased difficulties in machining are the main disadvantage of hybrids. Specially designed tools, machine tool with safety concept and lubricants are required to safely machine hybrid materials particularly Mg-Sint due to the high temperatures of Sinter metal chips and the flammability of Mg chips. Also the different cutting forces between the materials call for detailed investigations of the cutting tools, their cutting edges and coatings, stable machine tools are also a necessity.

To avoid dangers of ignition, current technologies for machining of magnesium use high amounts of cooling lubricants - oil or emulsions - for flushing chips from the working area. This results in additional hazards such as the possible ignition of oil mist or the release of free hydrogen. The main target of the ECOHYB project is to make the machining of magnesium (Mg) based Hybrid materials an effective, safe and environmentally friendly process in metal cutting at conventional cutting speeds as well as in High-Speed-Cutting (HSC) conditions. For small to medium-sized enterprises (SMEs) working as suppliers for automotive industry, there is a need to manufacture Mg-based hybrid parts.

www.ecohyb.com

- 1 ANGER ANTON GESELLSCHAFT MBH (AT)
- 2 BRUGAROLAS S.A. (ES)
- 3 LOSCONCZI MERNOKI, SZOLGALTATO ES KERESKEDELMI KFT (HU)
- 4 PROTAN PRODUKTIONSTECHNIK GMBH & CO.KG (AT)
- 6 PROFACOR PRODUKTIONSFORSCHUNGS GMBH (AT)
- 7 FUNDACION TEKNIKER (ES)
- 8 BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYETEM (HU)



FP6 Project Catalogue

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**Call:** FP6-2002-SME-1  
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**Total cost:** € 1 393 951  
**EC Contribution:** € 750 620

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# EDY

## Development of a Clean and Efficient Automatic Textile Dyeing Control System

Several innovations were introduced in the textile sector during the past few years but several others are needed to keep the European textile industry competitive in comparison with countries that have minor manufacturing costs and more tolerant legislation.

Quality and environmental aspects have a great impact on the competitiveness of the European textile companies. The objective of the EDY project is to approach these two primary issues by providing the textile-finishing industry with an efficient, cost-effective tool for monitoring and controlling the process of fabric and yarn dyeing.

EDY builds on the application of a VOPS probe (variable optical path spectrometer) and an Adaptive Control Loop.

The spectrometer is able to measure the spectral composition of the dyeing bath in order to provide a new observation perspective to the control system. The adaptive control system is based on fabric specific dyeing models that allows it to estimate the status of the process by analysing the response of the dyeing machine to the control actions.

The application of the EDY system will provide the following technical advantages to the dyeing small to medium-sized enterprises (SMEs) and to the whole dyeing industry:

- less dyeing defects on dyed product due to easier online correction of the dyeing recipe;
- lower environmental impact of the dyeing process by avoiding wrong processes and consequently dyeing bath disposal;
- lower dyeing time due to a more controlled process.

Partners in the Consortium include end-users from the dyeing textile sector involved in the definition of requirements and system validation, and system

developers involved in prototyping and testing. Research and technological development (RTD) performers are in charge of design and optimisation. Transnational features are granted.

369

Co-operative research

- 1 IRIS SPA (IT)
- 2 CENTRO TECNOLOGICO DAS INDUSTRIAS TEXTILE E DO VESTUARIO DE PORTUGAL (PT)
- 3 DV S.R.L. (IT)
- 4 MS MACROSYSTEM COMPUTER NEDERLAND TT & T TURKISH TEXTILES & TECHNOLOGIES (NL)
- 5 ITALDENIM SPA (IT)
- 6 GIUSSANI S.R.L. (IT)
- 7 FELLI COLOR S.P.A. (IT)
- 8 CROSERIO SRL (IT)
- 9 GESTENERGE - SISTEMAS DE ECONOMIA DE ENERGIA (PT)
- 10 ACABAMENTOS TEXTEIS DE BARCELOS (PT)
- 11 D'APPOLONIA SPA (IT)

**Contract: 508180**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/11/2004**  
**Duration (months): 24**  
**Total cost: € 1 336 510**  
**EC Contribution: € 692 490**

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# Electroclean

Development of a Novel Dust Cleaning and Collecting Device for the Production and Cleaning Industry Based on Electrostatic Principles

370

Co-operative research

This project will provide a more efficient and safer way of removing hazardous silicate dust, which will contribute to safer work environments and avert 150 cases of silicosis, in addition to assisting in implementing the work currently being conducted by the EU Scientific Committee on Occupational Exposure Limits for establishing common maximum accepted concentration (MAC) for respirable silicate. Furthermore, providing this new technology for use in another application area of critical cleaning of product surfaces from dust, will increase the ability of the small to medium-sized enterprise (SME) sub-tier supplier community in various sectors like polymer and steel to comply with large enterprises demand for higher cleanliness levels. Finally, through the innovative technology transfer, the project will increase the competitiveness of the SME dust control and cleaning community.

Our idea is to develop a novel and effective dust-cleaning and collection device to be used both for continuously collecting fine dust particles from products' inline production and for periodic cleaning of dust from surfaces of products and production facilities. The major barriers are to make this work on even the fine dust particles, down to the size of 0.5  $\mu\text{m}$ , without touching the surface and without re-suspending the dust; this implies no use of compressed air, which today is the normal way of removing and collecting dust. We will overcome these challenges by specific developments to fulfil our objectives to create:

1. a bond-breaking device based on the combination of an alternating field and polarised air, to work on dust particles larger than 0.5  $\mu\text{m}$ ;
2. a dust moving component using airflow less than 0.05 m/s for transporting the dust particles away from the surface in a controlled manner towards the cathode collector;

3. a cathode collector to attract the dust for collection within a range of up to 20 cm from the cathode;
4. an internal dust-transport unit made of smaller charge-shifting cathodes in a matrix with a nozzle to connect to a disposable unit for safe dust depositing without suspension risk.

Furthermore, the Electroclean project will investigate the electrostatic influence on quartz (silicate dust type), since there is only limited scientific literature dealing with this subject. Enhancing scientific understanding in this field will provide our SME community with access to new valuable knowledge with the potential of creating new innovative products based on new methods for electrostatic bond-breaking for cleaning silicate dust particles, which is a major problem for semi-conductor, high-voltage fuses, optical-disc production and electronics industries.

www.electroclean.danishinnovation.dk

- 1 NITO A/S (DK)
- 2 ZIEGENER & FRICK GMBH (DE)
- 3 SEMJOB AB (SE)
- 4 DVGATEL RAKIS AS (EE)
- 5 AZE TECHNOLOGIES (FR)
- 6 LUIS PEREZ ULECIA S.L. (ES)
- 7 ISS DANMARK AS (DK)
- 8 DANISH INNOVATION INSTITUTE AS (DK)
- 9 FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)



FP6 Project Catalogue

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# ENZUP

## Enzymatic Up-Grading of Wool Fibres

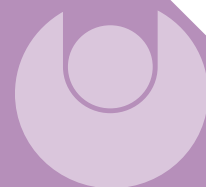
The market value of wool is limited by the fact that consumers place increasingly high demands on machine washability and soft handle. Felting shrinkage, which is a typical property of wool due to the configuration of the scales of the wool fibre, is a serious problem, especially during washing. Chlorination, followed by polymer deposition, is commonly used to modify the scales of wool fibres in order to confer shrink-resistance, but this involves major drawbacks with respect to contamination of the wastewater with adsorbable organic chlorides (AOX) and the environment.

The main innovative aspect of this proposal is to develop novel, genetically engineered proteases with increased molecular size for producing shrink-resistance and other improved properties on wool fibres and fabrics. The project aims to develop machine washable wool by limiting the enzymatic degradation of wool fibres to their cuticle scales. Furthermore, other new environmentally friendly processes including efficient bio-scouring and bio-finishing processes and low temperature dyeing processes for wool fibres will be developed via treatments with a range of specifically engineered proteases. The application of different specifically engineered proteases will also be extended to new detergent formulations for industrial and domestic washing and wool carpet cleaning and thus improve hygienic aspects of wool based textile materials.

- 1 THE MONTFORT UNIVERSITY (UK)
- 2 TINTS ENRICH SL (ES)
- 3 COLOR-CENTER S.A. COLORANTES Y PRODUCTOS QUIMICOS (ES)
- 4 LOKATEKS, SKOFJA LOKA D.O.O. (SI)
- 5 I DR ANDREAS PAAR KEG (AT)
- 6 V. O. F. OVIS TEXLA (NL)
- 7 JAMES WEEKERS V.O.F. (NL)
- 8 GRAZ UNIVERSITY OF TECHNOLOGY (AT)
- 9 UNIVERSITY OF MINHO (PT)
- 10 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST  
NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 11 UNIVERSITAT POLITECNICA DE CATALUNYA (ES)
- 12 UNIVERSITY OF MARIBOR (SI)

**Contract:** 32877  
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**EC Contribution:** € 1 382 500

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# EXTRU CO<sub>2</sub>

## Development of a Low-Temperature Processing Method for the Production of Natural Long-Fibre Filled Polypropylene Sheet for Automotive Applications

372

Co-operative research

[www.rapra.net/projects/index.asp?project\\_code=1](http://www.rapra.net/projects/index.asp?project_code=1)

The use of natural fibres as reinforcing fillers in polypropylene sheet for automotive applications, is becoming increasingly popular within the European Union. This has been driven by environmental concerns, increased recyclability and a move towards more sustainable products and processes. The growth rates for natural fibres in automotive applications are predicted to increase by 4 % over the next 7 years. However, due to the relatively low thermal degradation temperature of natural fibres, they degrade under 'normal' processing temperatures, resulting in odours, loss of mechanical properties and discolouration. This has prevented even greater uptake of natural fibres for sheet applications.

Technology developed by one of the consortium partners has shown that traditional plastics processing equipment can be modified to allow for liquid CO<sub>2</sub> to be used as a processing aid that allows for processing at lower temperatures. However, this technology is a high pressure and high shear process, unsuitable for the processing of shear and thermally sensitive natural fibres.

The proposed project aims to develop the necessary extrusion and mixing technologies to allow for the low-temperature processing of natural fibre filled polypropylene (using liquid CO<sub>2</sub> as a processing aid) to produce a non-woven polypropylene sheet suitable for thermoforming automotive applications.

The main objectives are:

- to produce a sheet material based on renewable resources with better mechanical and thermal properties and recyclability than those currently on the market;
- to develop innovative technologies for low-damage sheet production;
- to remove the need for expensive and environmentally harmful fibre chemical treatment.

If these objectives are achieved, then the small to medium-sized enterprise (SME) participants will obtain a technological edge leading to increased competitiveness. In line with the objectives of the EU and its Sixth Framework Programme (FP6), the product and process developed will contribute towards sustainable manufacturing.

- 1 E.S.P. PLASTICS LTD (UK)
- 2 PLÁSTICOS FLOME S.L. (ES)
- 3 ASPIN ENGINEERING LTD (UK)
- 4 HEMCORE LTD (UK)
- 5 WHITAKER TECHNICAL PLASTICS LTD (UK)
- 6 CANDEA INDUSTRIAS PLÁSTICAS S.A. (ES)
- 7 KENAF ECO FIBERS ITALIA S.P.A. (IT)
- 8 SIVEL LTD (BG)
- 9 CARCOUSTICS ESPAÑA S.A. (ES)
- 10 SMITHERS RAPRA TECHNOLOGY LTD (UK)
- 11 ASOCIACIÓN DE INVESTIGACIÓN DE MATERIALES PLÁSTICOS Y CONEXAS (ES)



FP6 Project Catalogue

**Contract:** 507666  
**Call:** FP6-2002-SME-1  
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**Duration (months):** 28  
**Total cost:** € 1 357 955  
**EC Contribution:** € 698 213

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# FASTCAST

## Fast Manufacturing Process for Complex Cast Components

The European Foundry industry is an essential provider of complex cast components to strategically important engineering sectors such as transportation, energy generation and fluid transmission. The small to medium-sized enterprise (SME) sector of the foundry industry supplies many “one-off” or small numbers of complex castings, but is facing severe competition from low-cost producers outside the EU. Short manufacturing and delivery lead times are essential in this ‘fast manufacturing’ environment, and rapid production of castings is critical for survival and success of SME foundries. Complex, intricate castings can only be produced using a lengthy trial and error method which takes weeks or even months: this impacts not only on the competitiveness of SME foundries, but also on the thousands of businesses in strategically important engineering sectors whose performance is adversely affected by the outdated, low technology casting process.

This project will develop a high technology process for rapid and accurate casting of complex, intricate components, such as automotive cylinder heads and heat exchangers. Its objectives are to make significant advances to the “Patternless” technique, which despite having been proved industrially for large castings up to 3m in size, is limited and cannot be applied to delicate components. This project will unlock the potential of the process for small, delicate, intricate or complex castings — a significant proportion of annual casting production in the EU.

The SME partners, and ultimately the rest of the foundry sector in the EU, will gain a significant competitive advantage through increased market share and secured employment, thereby helping to safeguard the industry from decline. The project will encourage the adoption of high technology in a traditional, skill-based industry, and will stimulate training and utilisation of local skills at a heightened level of competence.

- 1 F. BAMFORD & CO. LTD (UK)
- 2 FOUR TRADE S.R.O. (SK)
- 3 ING. LADISLAV ANDRASIK VRYOBA ODLIATKOV (SK)
- 4 MAUS MODELL-UND FORMENBAU GMBH (DE)
- 5 OSHAUG METALL AS (NO)
- 6 WALTER FRANK & SONS LTD (UK)
- 7 CASTINGS TECHNOLOGY INTERNATIONAL (UK)
- 8 TRENČIANSKA UNIVERZITA ALEXANDRA DUBČEKA V TRENČINE (SK)

**Contract: 507729**  
**Call: FP6-2002-SME-1**  
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**EC Contribution: € 669 883**

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**Materials & Processes**

# FLEXTRONIC

## The Development of a Novel Laser-Inkjet Hybrid Printing Technology for Additive Printed, High-Resolution, Mass-Customised Conductive Copper Tracks

374

Co-operative research

We intend to enable greater competitiveness and internationalisation of the SME-dominated printing community. There are some 68 000 EU SMEs in the printing sector, 6 percent (4 000) of which use laser or ink-jet printing systems to print products such as plastic films for in-mould labelling, packaging, and smartcards.

The proposed technology could enable these printers to sell their services into an entirely new, and much higher added value application, printing flexible electronic circuits as components for the manufacturing industry. In addition, SMEs already in the electronics sector, of which there are 17 500, could also exploit the proposed technology to add functionality to the circuits they currently manufacture in-house.

The printing industry is characterised by SMEs providing varying printing services, from large format through to commercial printing of company brochures. The vibrant growth in the Asian printing market of 10.6 % has resulted in a reduction in growth of the European printing industry. Printed media of all forms are purchased on a quality-cost basis, the delivery of such products being less of an issue and resulting in European SME printers losing a market share to the Asian and Latin American lower labour-rate regions.

Therefore European SME printers are seeking new ways to add value to their services and become involved in the printing of higher added value goods or products, within which print is a key added value stage of manufacture.

Our concept for the technological adaptation and enhancement of current ink-jet printing to enable printers to print low-cost electrically conductive products onto films, components and products could potentially deliver such an opportunity. Such a technological capability could provide the ink-jet segment of the print sector with an entirely new product, offering (in addition to their current publications products) access into the manufacturing

sector as a supplier. This would help to protect and sustain this segment of the print sector from low-labour cost competitors in Asia Pacific that have already captured 8.2 % of the European paper/publications print market.

- 1 TOVOLI PRINTERS SRL (IT)
- 2 SARANTEL LTD (UK)
- 3 VIPEM HACKERT GMBH (DE)
- 4 UVASOL LTD (UK)
- 5 POINTL BULGARIA LTD (BG)
- 6 CODICO DISTRIBUTORS LTD (IE)
- 7 CLICKTOUCH NV (BE)
- 8 PERA INNOVATION LTD (UK)
- 9 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH (NL)



FP6 Project Catalogue

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**Call:** FP6-2002-SME-1  
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**EC Contribution:** € 719 936

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# FIREEATER

## The Development of a New Lightweight, Application Tailored Thermoplastic Composite High-Pressure Gas Cylinder for Fire Suppression Systems

The proposed technology development project targets the more than 750 000 EU small to medium-sized enterprises (SMEs) that are active in high-tech industries, as well as hotels, public institutions and private homes that are in need of a low-cost, lightweight application tailored fire suppression system for the protection of both personnel and high value assets such as computers, servers and other business critical equipment. This will provide the more than 750 000 high tech SMEs with an alternative technology to cost effectively and to safely protect their workers and their valuable assets from fire.

To achieve this we will need to develop:

- a new combination of composite and thermoplastic materials;
- a new manufacturing process that enable the pulltrusion of a thermoplastic pipe that can be further processed into a high pressure gas storage cylinder capable of withstanding pressures of 300 bar through braiding, extrusion and blow moulding techniques;
- the incorporation of new barrier/lightweight composite technologies into the design to render the cylinder impermeable to gas;
- a new software modelling tool to predict the braiding angle structure very precisely.

- 1 FIRE EATER AS (DK)
- 2 RESINE ITALIANE S.P.A. (IT)
- 3 EUROCARBON B.V. (NL)
- 4 CORVAISIER SA (FR)
- 5 SYMBOLIC SYSTEMS LTD (UK)
- 6 FÖRENADE BRANDREDSKAP AB (SE)
- 7 TECHNOR ASA (NO)
- 8 DANISH INNOVATION INSTITUTE AS (DK)
- 9 D'APPOLONIA S.P.A. (IT)

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**Call:** FP6-2004-SME-COOP  
**Starting Date:** 01/09/2006  
**Duration (months):** 24  
**Total cost:** € 1 301 403  
**EC Contribution:** € 673 770

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# FOINMOULDS

## Increase of the Productivity and Efficiency of Injection Processes through the Use of Metallic Foam Concepts in the Production of Moulds

376

Co-operative research

The main objective of the FOINMOULDS project is a challenging improvement of quality and performance of metallic and plastic components produced by high pressure die casting, injection and blow moulding, in order to meet the increasing demands of customers and end-users.

To achieve this, an outstanding weight reduction of moulds, increased efficiency in heat removal and process control is addressed through a new concept of moulds in which metallic foams (cellular materials) are integrated. This totally new approach will lead to dramatic improvements in production rates (10 % reduction in cycle times for injection and 30 % for blow moulding), lower prices and easier handling and maintenance of moulds. In order to meet these strategic objectives, the new concept of moulds will be achieved through the following scientific technological approaches: better mould temperature control, controlled local solidification, avoidance of component distortions, improved feeding and shorter processing time. The project is conceived in 10 work packages planned in a logic way. The first five containing important work of research and development prior to final design and manufacture of demonstrators.

First stages of the project will deal with the conceptual design of moulds and gathering information to establish a first approach. First thermal and structural analysis will be made to study dimensional stability, stresses in thermomechanical loads and interactions of mould, metal foam insert and solidifying components. Based on this, a proper material selection and final prototype design will be performed.

The next step will consist of manufacturing cellular metals at lab scale and testing (feed-back to previous tasks). Once first stages are completed, an assessment of how to integrate metallic foams into moulds will be necessary (fastening, bonding, clamping, *in situ* foaming, etc.) in order to achieve the best thermomechanical integration between mould and foams.

All previous steps are the basis for the manufacture of final demonstrators and for further testing in-service conditions. The demonstrators will be constructed and tested in service conditions with a thermal, structural and geometry analysis that will permit the feedback of information and optimise the results obtained to finally validate the prototypes. Finally, a technical and economical evaluation will be made.

Exploitation and dissemination of results and management activities are also key points for the successful completion of the project objectives.

www.inasmnet.es

- 1 ERKU PRAEZISIONSTEILE GMBH (AT)
- 2 MOLINAO PLASTICOS S.A. (ES)
- 3 MAQUINARIA Y UTILES S.A. (ES)
- 4 M.PORE GMBH (DE)
- 5 MOLDE MATOS S.A. (PT)
- 6 OLABERRIA SCOP (FR)
- 7 INYECTADOS GABI S.A. (ES)
- 8 FUNDACION INASMET (ES)
- 9 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)



FP6 Project Catalogue

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Duration (months): 29  
Total cost: € 1 182 872  
EC Contribution: € 587 098

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Nitriding of forging tools is a well known technology to extend the service life of the tools due to the higher wear resistance of the nitrided surface layer. A good approach to improve the wear resistance is to combine a laser-alloying surface treatment with a subsequently nitriding or nitrocarburising.

Main innovation of this surface treatment method is the investigation of new alloy-material compositions regarding the newly-created material properties. Both the influence of laser-alloyed and subsequently nitrided (or nitrocarburised) and the influence of nitrided (or nitrocarburised) and subsequently CMSII treated surfaces will be investigated regarding the surface layer properties and in particular regarding the increase of the service lifetime of the forging tools.

The project is divided into three phases: research, development and validation.

### Research:

The composition of the alloy-materials for the laser alloying process and the combination of the surface treatment technologies, which will be investigated in this project, have never been tested before. The basic research will be done on samples with a simple geometry, which will be analysed by metallographic research.

### Development:

The process parameters will be adapted to test forging tools, which will be run under industrial conditions and compared to conventionally treated tools. Based on the results of the investigation of the used tools, the process parameters for the surface treatment of new forging tools will be continuously optimised.

### Validation:

In this phase the surface treatment combination will be assessed. At the end of the project a plan about the exploitation of the results will be set up and the knowledge about the increase of service life time on forging tools will be disseminated in different routes.

- 1 FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 2 KLF-ZVL MTK SPOL. S.R.O. (SK)
- 3 RASCHE UMFORMTECHNIK GMBH & CO.KG (DE)
- 4 FORJACO-ACO FORJADO (PT)
- 5 DMF WERKZEUGBAU GMBH (DE)
- 6 A. BENEVENUTA & C.S.P.A. (IT)
- 7 NATIONAL INSTITUTE FOR LASER, PLASMA AND RADIATION PHYSICS (RO)

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Starting Date: 01/11/2004  
Duration (months): 24  
Total cost: € 523 712  
EC Contribution: € 301 606

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# FPSO-INSPECT

Non-Intrusive In-Service Inspection Robotic System for Condition Monitoring of Welds inside Floating Production Storage and Offloading (FPSO) Vessels

378

Co-operative research

Floating Production Storage and Offloading (FPSO) and Floating Storage and Offloading (FSO) vessels are increasingly being used for production and storage of oil from offshore fields. A typical FPSO contains 20 km of internal safety critical welds that require detailed offshore inspection on a 5 year cycle. These welds are prone to fatigue cracking due to the drastic increase in loading; as the majority of FPSOs in the world are converted ocean-faring vessels, which are now carrying heavy oil that exceeds their original design loads.

The FPSOs are currently carrying up to 1 million tonnes of oil per day. Over 2.5 billion tonnes of oil are used around the world every year and 3 million tonnes are discharged every year into the oceans as a result of oil tanker and FPSO failures. These accidents typically account for 12 % of all oil pollution. Current methods of inspection of these welds have major drawbacks as they require the FPSOs to be dry docked, emptied and cleaned with consequent disruption to production. This means that 90 % of the costs of inspection are associated with the disruption of production and emptying and cleaning the FPSO. The inspections are also mainly visual and manual and therefore subjective with no hardcopy results. Operators and surveyors are exposed to hazardous conditions eg. toxic gases, working through abseiling, on ropes and via scaffolding.

- 1 TECNITEST INGENIEROS SLL (ES)
- 2 NDT CONSULTANTS LTD (UK)
- 3 TECHNICAL SOFTWARE CONSULTANTS LTD (UK)
- 4 ISOTEST ENGINEERING S.R.L. (IT)
- 5 ZENON S.A. ROBOTICS AND INFORMATICS (GR)
- 6 SPREE ENGINEERING LTD (UK)
- 7 BP EXPLORATION OPERATING COMPANY (UK)
- 8 PETROLEO BRASILEIRO S.A. (BR)
- 9 TWI LTD (UK)
- 10 MILTECH HELLAS S.A. (GR)
- 11 LONDON SOUTH BANK UNIVERSITY (UK)
- 12 KINGSTON COMPUTER CONSULTANCY LTD (UK)



FP6 Project Catalogue

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**Duration (months):** 30  
**Total cost:** € 1 999 040  
**EC Contribution:** € 1 093 120

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# GREASOLINE

## New Technology for Conversion of Waste Fats to High-Quality Fuels

GREASOLINE is a process concept to convert waste fats to high-quality, fossil-fuel-like diesel and kerosene fuel. A consortium of six small to medium-sized enterprises (SMEs) from two European countries is ready to build GREASOLINE plants, aiming at a commercial potential of EUR 173 million for SMEs during the first five years — if only some technological barriers are overcome. To reach this aim, the SMEs and two highly recommended research and technological development (RTD) providers will advance the process concept and build a small technical scale plant for prototype operation. Far more than 3 million t of waste fats arise annually within the EU. Since 2001, their use for animal feed has been prohibited due to BSE, and other means of utilisation had to be developed.

The most advanced waste-fat-derived product is biodiesel-type fuel. This fuel is chemically different to fossil fuel, it is corrosive, and it has limited acceptance. Moreover, a low-budget thermal use has to be chosen for the by-product glycerol. Based on a patent applied by one of the RTD performers, the GREASOLINE process generates hydrocarbons known from fossil diesel fuel. Process-internal catalytic upgrading can lead to fuels that match fossil-fuel standards. Glycerol is converted to propene, to be either sold as feedstock, or to contribute to process-internal, autothermic heating. Other processes have been developed to produce fossil-type fuel from waste fats, but did not manage to achieve a market breakthrough.

GREASOLINE introduces a new catalyst: activated carbon! It displays major advantages concerning applicability, catalyst structure and regeneration possibilities. Moreover, activated carbon has a certain inherent resistance against ageing effects, and it is a well-proven support material for additional upgrading catalysts. GREASOLINE-derived fuel does not contribute to the greenhouse effect, but helps to reduce fossil CO<sub>2</sub> emissions, in line with the Kyoto protocol.

GREASOLINE will open the fossil-style fuel market for SMEs. The technological barriers are serious, but the project will surely lead to solutions. Funding will enable European SMEs to put a innovative, commercially promising technology into practice. Other SMEs will collect the waste fats and operate the plants. A strong impact on Europe's ecology and SME competitiveness will be ensured, even resulting the technology being exported beyond the EU's borders.

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Co-operative research

- 1 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 2 WETEC ELEKTROTECHNIK GMBH (DE)
- 3 BIOXY B.V. (NL)
- 4 SILCARBON AKTIVKOHLE GMBH (DE)
- 5 RALF HACKER EDELSTAHL (DE)
- 6 ENR - ENERGIEGESELLSCHAFT NACHWACHSENDE ROHSTOFFE MBH (DE)
- 7 MASCHINENFABRIK DINNISSEN B.V. (NL)
- 8 PERA INNOVATION LTD (UK)

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Materials & Processes

# HardPrecision

## Five-Axis Hard Milling for Highest Precision

380

Co-operative research

European tool and die making small to medium-sized enterprises (SMEs) are facing a steady loss of competitiveness in their markets, since existing manufacturing technologies cannot fulfil the increasing demands on part quality. These companies are eagerly seeking for new technologies to enhance the economic production of high-quality tools and dies.

The main objective of this project is to develop a five-axis hard milling process for the highest precision. This new technology will enable end-users to produce high-quality products in less than 62 % of the current times required. This will provide them with a substantial lead over their overseas competitors.

The project will encompass the optimisation of a milling machine by applying lightweight parts and the enhancement of milling technology for high-hard materials by process monitoring, as well as of cutting tools and tool coatings for high-performance hard milling operations. Moreover, a part measurement system capable of quality control within the machine tool will be developed. The main work packages are:

- development of a light-weight carbon-fibre spindle box and integration into the milling machine;
- development of a novel in-machine measurement device;
- optimisation of a clamping device;
- development of a process monitoring system for small milling tools;
- enhancement of cutting tool accuracy and coating technology;
- adaptation of the CAD/CAM process-chain and development of specialised tool path strategies;
- machining technology optimisation.

Besides contributing to an improvement of the bonds between Member States and new members, the project will encompass scientific, technical and wider societal objectives:

- better scientific and technological knowledge about milling of high-quality surfaces on hardened materials;
- lifetime enhancement of tools and dies, contributing to further knowledge and productivity of the EU industry;
- drastic reduction of hazardous substances in the production of tools and dies, significantly improving environmental and health conditions in Europe.

- 1 HEMTECH MACHINE TOOLS B.V. (NL)
- 2 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 3 CZECH TECHNICAL UNIVERSITY IN PRAGUE, FACULTY OF MECHANICAL ENGINEERING, RESEARCH CENTRE OF MANUFACTURING TECHNOLOGY (CZ)
- 4 WALTER DITTEL GMBH (DE)
- 5 MODULEWORKS GMBH (DE)
- 6 CEMECON AG (DE)
- 7 NORMA B.V. (NL)
- 8 MOLDIT S.A. (PT)
- 9 SYSTEM 3R INTERNATIONAL AB (SE)
- 10 JABRO TOOLS B.V. (NL)
- 11 HIRSCHVOGEL UMFORMTECHNIK GMBH (DE)
- 12 EBNER-TEC GMBH (AT)



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# HIGINS

## Highest Magnetic Field Insert Coil Made from High-Temperature Superconductors for a 25-Tesla Breakthrough

The HIGINS project is targeting the design, construction and test of extra high field insert coils made from high temperature superconductors to create a breakthrough with magnetic fields of up to 25 Tesla. Today's state-of-the-art magnets are limited to magnetic field strengths of about 21 Tesla due to the performance of the low temperature superconducting wires, i.e. Nb3Sn and special alloys of Nb3Sn.

By combining low temperature superconductor (LTS) outer sections for the fields up to 20 Tesla with high temperature superconductor (HTS) inner sections, the field will be boosted up to about 25 Tesla. This means a breakthrough in the magnet technology. High field magnets are necessary for various material developments in physics, chemistry, for the genomic and biotechnology research for better health care (NMR), and higher fields than feasible today are urgently needed by industry and research laboratories.

The project consortium consists of small to medium-sized enterprises (SMEs) with special know-how in design and manufacture of low temperature superconducting high-field magnets, manufacture of HTS wires and high strength alloy tubes. The research and technological development (RTD) partners involved have the skills to design, model and test the new component HTS high field insert coil. The project's objectives will be addressed by a new design of the magnet, development of high field HTS wires and thorough testing.

The project will strengthen the market position of the SMEs involved and result in a world-leading position in the high field magnet market. This will save existing jobs and create new ones not only for the participants in the project, but also for other companies.

The innovative high field magnet will strongly reinforce European competitiveness and put Europe in a leading position in this market segment. Compared to copper magnet systems, superconducting magnets save energy. The energy demand of resistive magnets is in the range of three orders of magnitude higher than for superconducting solutions, thus superconductors strongly decrease greenhouse gas emissions.

- 1 TRITHOR GMBH (DE)
- 2 LEIBNIZ-INSTITUT FÜR FESTKÖRPER-UND WERKSTOFFFORSCHUNG DRESDEN (DE)
- 3 TECHNOLOGY TRANSFER AGENCY TECHTRA SP. Z O.O (PL)
- 4 THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE (UK)
- 5 CRYOGENIC LTD (UK)

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# HIPROTIG

## High-Productivity Gas Tungsten Arc Welding (GTAW) Technology

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Co-operative research

The gas tungsten arc welding (GTAW) process, also well known as tungsten inert gas (TIG) process, is a very precise and clean process that is used for joining a wide variety of materials, such as carbon steels, stainless steels, nickel, titanium, zirconium and tantalum alloys, as well as aluminium and copper-based alloys. The process allows us to produce high-quality welds. Its main limitation is the slow deposition rate and additionally the quite low energy density that restricts the range of materials thickness that can be processed without filler metal and joint preparation (actually 2-3 mm).

Some variants of the conventional GTAW have been developed, but until quite recently, none of these have shown an high potential to revolutionise the process and create a new technology. HIPROTIG will be an automated, high-productivity and high-quality welding process based on the conventional GTAW process.

HIPROTIG is based on a new concept developed by CSIRO, the Commonwealth Scientific and Industrial Research Organisation (Australia). CSIRO's torch is able to work in keyhole mode, like the high-density beam processes, at low cost. The main advantages are:

1. it performs up to 16 mm thick material weld in just one pass;
2. it requires reduced time in joint preparation (i.e., just square groove preparation);
3. it gives significant reductions in filler material consumption (just when required);
4. welding speed is increased in the order of 50 %;
5. total welding time is reduced to approximately one-tenth of what is required with conventional processes; and
6. it is an automated process.

The required accuracy of joint preparation is lower than that required for the high-energy density beam processes (i.e., laser, electron beam and plasma), which represents an additional advantage relative to these processes. This is a primary condition for its applicability under small to medium-sized enterprise (SME) conditions. Therefore, CSIRO's torch represents a key step in the development of a new GTAW technology accessible to SMEs, that is expected to contribute significantly to their productivity growth and therefore their competitiveness.

The innovative technological developments in HIPROTIG are based on the development of a new product, up to 1 000 A intensity power source, fitted to the specificities of the torch, the process and the process development in terms of its flexibility concerning operational conditions and control.

www.hiprotig.net

- 1 INSTITUTO DE SOLDADURA E QUALIDADE (PT)
- 2 PLASMA TEAM DI LORETO SILVANA & S.N.C. (IT)
- 3 SERVICE GESELLSCHAFT THÜRINGEN GMBH SUHL (DE)
- 4 SDMS LA CHAUDRONNERIE BLANCHE (FR)
- 5 INACEINOX, INDÚSTRIA DE EQUIPAMENTOS INOXIDÁVEIS S.A. (PT)
- 6 EDELSTAHLBAU TANNRODA GMBH (DE)
- 7 JOÃO R. MATOS S.A. (PT)
- 8 VALINOX, INDÚSTRIAS METALÚRGICAS LDA (PT)
- 9 ISTITUTO ITALIANO DELLA SALDATURA – ENTE MORALE (IT)
- 10 INSTITUT FÜR FÜGETECHNIK UND WERKSTOFFPRÜFUNG GMBH JENA (DE)
- 11 INSTITUT DE SOUDURE (FR)
- 12 COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION (AU)
- 13 COOPERATIVE RESEARCH CENTRE FOR WELDED STRUCTURES (AU)

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# HULL INSPECTOR

## Development of an Autonomous Mobile Inspection Vehicle for Detecting Structural Defects in Ships' Hulls

The maritime industries, which include ship building and ship operations are vital to Europe's economy. The EU is still third behind Korea and Japan in ship building, and dominates the market for high value ships, such as cruise liners and ferries.

Ship-building capacity will increase when countries such as Poland join the EU. However, in the supply of ship-building components and services, the EU is a world leader, accounting for about 31 % of the EUR 19 billion market. With regard to ship operations, the EU operates 38.5 % of the world's fleet. Maritime transport is involved in 90 % of its external trade and 40 % of its internal trade.

In the future, ships will be designed with tough lightweight hulls. The benefits will be faster speeds and reduced fuel consumption. Among the drawbacks will be tighter tolerances and the need for stricter quality control. Hull inspectors will provide confidence in new hull designs.

The scientific and technical objectives are:

1. to overcome the limitations of manual and current automated inspection of ship's hulls by developing an autonomous vehicle, which will carry a range of sensors to automatically inspect ship hulls;
2. to develop a range of electromagnetic and ultrasonic sensors for locating the position of the inspection vehicle on the hull, tracking its movement along features such as welds and detecting defects such as corrosion and weld fatigue cracks that may be detrimental to the structural integrity of the hull;
3. to develop an intelligent inspection system that is able to control inspection coverage according to the geometry of the test piece and the severity of flaws detected;
4. to build a prototype vehicle and sensors for inspecting steel hulls, which range from those

of small harbour boats through coastal ships to large ocean-going liners, oil tankers and container ships;

5. to improve the control of weld quality during hull fabrication;
6. to improve the maintenance of hull structural integrity during service.

- 1 TWI LTD (UK)
- 2 TECNITEST INGENIEROS SL (ES)
- 3 SONATEST LTD (UK)
- 4 TECHNICAL SOFTWARE CONSULTANTS LTD (UK)
- 5 ISOTEST ENGINEERING S.R.L. (IT)
- 6 MIKRON LTD (GR)
- 7 ATLANTIC ENGINEERING LTD (UK)
- 8 BP SHIPPING LTD (UK)
- 10 SPREE ENGINEERING LTD (UK)
- 11 ZENON S.A. - ROBOTICS & INFORMATION (GR)
- 12 NAFTOSOL S.A. (GR)

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# HYCORE

## Hygienic Coatings with Active Ingredient Controlled Release

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Co-operative research

Current applied hygienic coatings (in food processing areas, hospitals, etc.) are vulnerable to microbial surface colonisation and can even be focuses of bacterial and fungal contamination. Nowadays, a more restrictive legislation is being introduced concerning safety and health in sanitary places demanding new solutions.

The novel approach to avoid microbial surface colonisation in sanitary places is based on the development of a high tech coating by means of the incorporation of reservoirs (in micro-gels, in micro-particles or grafted on polymer chains) containing anti bacterial active ingredients (biocides) which will be released in a controlled way.

The main advantages over current coatings are:

- high anti-microbial protection and cleanliness in sanitary places by using a smart and environmentally friendly coating providing constant microbiological protection;
- efficient use of the active ingredients, released only when contaminant agents are present and not in constant way;
- development of water-based formulations which are less hazardous than organic solvent systems;
- longer life of products therefore requiring, less cleaning work.

The success of HYCORE requires a multidisciplinary approach and complementary expertises: ITECH and ARMINES (France) have a wide experience in the field of micro-encapsulation, polymer grafting and micro-gels. BARBOT (Portugal), FARBE (Spain), LIPPENS (Belgium), are coatings manufacturers with experience in multiple sectors, CIDEMCO (Spain) is expert on development and characterisation of coatings and their biological efficiency. LAMIRSA (Spain) manufactures biocides for several industrial sectors having a vast knowledge on Active

Ingredients (biocides). ZIMTEC (Russia) is a company which manufactures High Tech specialty Chemicals and microcapsules, which among other applications, are used for the controlled release of substances. PROTEC (Spain) is dedicated to the application of coatings, their maintenance and cleaning.

- 1 CIDEMCO - DENTRO DE INVESTIGACIÓN TECNOLÓGICA (ES)
- 2 BARBOT INDUSTRIA DE TINTAS S.A. (PT)
- 3 W. LIPPENS NV. (BE)
- 4 LABORATORIOS MIRET S.A. (ES)
- 5 PROTECCION TECNICA DE SUPERFICIES S.L. (ES)
- 6 FARBE PINTURAS INDUSTRIALES S.A. (ES)
- 7 ZIMTEC (RU)
- 8 INSTITUT TEXTILE ET CHIMIQUE DE LYON (FR)
- 9 ASSOCIATION POUR LA RECHERCHE ET LE DÉVELOPPEMENT DES MÉTHODES ET PROCESSUS INDUSTRIELS (FR)





# HYMOULD

## Development of a Hybrid Machine Tool Concept for Manufacturing of Free-Form Surface Moulds

The competitive strength of European industry is based on continuous product innovation, reduced production time, costs, and the maintenance of high quality in manufacturing. In this field, the small and medium-sized enterprises (SMEs) play a major role in supporting the “global players” like automotive, aircraft, or capital goods industries or tapping the full potential of traditional sectors by the use of advanced technologies.

An important market sector is the injection moulding of plastics for household or industrial use. Today's applications require extensive throughput time and costs in mould and die making. Modern applications in heat resistant metal dies suffer significantly from a lack of suitable machining capabilities.

Therefore, the intended project aim is an integrated hybrid machine-tool solution on basis of three manufacturing technologies – HSC-milling, laser ablation, and dry-ice blasting – for automated machining high-quality free-form moulds and dies. The integration of closed-loop CAD/CAM strategies represents a direct information chain from design to manufacturing sequences for mould and die design regarding industrial standards. A software package for a manufacturing database to accumulating machining parameters and verification procedures concerning industrial requirements will support the SMEs to shorten production time and costs as well as to raise their quality. The development of an internal adaptive sensor system for offset-parameterizations and compensation will provide the accuracy of the manufacturing process. This will help mould and die makers to reduce the typical manufacturing cycles of SMEs by 35 %. The saved costs would be at least 30 % better than those available today.

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- 3 BRANDENBURGISCHE TECHNISCHE UNIVERSITÄT COTTBUS (DE)
- 4 GESELLSCHAFT FÜR FERTIGUNGSPROZESSPLANUNG MBH, FORSCHUNG & ENTWICKLUNG (DE)
- 5 KLASEN & PARTNER GBR (DE)
- 6 MEC S.R.L (IT)
- 7 SORALLUCE S. COOP (ES)
- 8 NISAFORM S.R.O. (CZ)
- 9 WALTER PACK S.L. (ES)

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Co-operative research

[www.hymould.eu](http://www.hymould.eu)

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Materials & Processes

# HYPONICK

## Hypoallergenic Nickel-Free (Imitation) Jewellery by Employing Nano-Structured Galvanic Coatings

386

Co-operative research

It is the aim of the project to reinforce the technological position of European eyeglass frames, watches and (imitation) jewellery manufacturing industry and thereby improve competitiveness by developing innovative, low-cost nickel-free undercoats for hypoallergenic gold-plated jewellery, by electroplating nanostructured materials.

The need to eliminate nickel emissions from metal parts that are in prolonged contact with human skin, because of allergic reactions, is challenging the jewellery, eyeglasses, fashion accessories and watch-making industry. To protect customers, the European Union has set out European Directive 76/769/EEC-12th Amendment (94/27/EC), effective from January 2000, which requires minimal nickel release from finished products over prolonged time periods. This has far-reaching consequences, since nickel is traditionally used extensively both as an undercoat for gold-plated articles and as an alloying element in casted gold. For the latter case, the nickel emission problem is solved by selecting alloys free of nickel. However, the nickel-release problem has not been solved for gold-plated articles.

Jewellery manufacturers cannot fulfil customer demands by using technological alternatives offered today, since these have their distinct economic and/or technical drawbacks. The development of a real technological solution requires research work that jewellery manufacturing small to medium-sized enterprises (SMEs) cannot afford, due to size (which is typically small in this industry), lack of skill and high costs.

The proposed technical solution to nickel replacement is created by combination of advancements in nanostructuring of electroplated films and jewellery electroplating technology.

The innovative work focuses on two routes:

- synthesis of nano-structured base coatings that eliminate the need for additional barrier coatings;

- synthesis of nickel-free barrier coatings that can be applied on conventional base materials.

Nanoparticle co-deposition, pulse (reverse) technology and electrodeposition of alloying elements will be used to induce nano-structured undercoats. As matrix materials, the focus will be on copper and copper alloys. The target is a coating or coating stack that surpasses nickel in all technical aspects relevant to its application as an undercoat for electroplated gold jewellery and related items, and that can be deposited through an economically viable process.

The project runs for 24 months and passes through specification, research, upscaling, industrial pilot, demonstrator product manufacturing and economic evaluation phases. At mid-term a go/no go decision is scheduled, to decide on continuation, depending on the technical results at that point. Exploitation will be through the network of SMEs present in the consortium. An international seminar will be organised at the end of the project to disseminate results, in close cooperation with the EJTN (European Jewellery Technology Network).

- 1 ELSY RESEARCH DI ENNIO GAJO & C. SNC (IT)
- 2 GALVAFIN - ITALY S.R.O. (SK)
- 3 LIW LEWANT (PL)
- 4 SARL MSO (FR)
- 5 VENROOY GOUD- EN ZILVERINDUSTRIE B.V. (NL)
- 6 UNIVERSITÀ DEGLI STUDI DI TRENTO (IT)
- 7 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)



# ICACOST

Individually Configurable, Automatic Cost Calculation System for 3-D Laser Cutting

At present, small and medium-sized enterprises (SMEs) in the sheet metal industry have to invest much time in offer preparation, while there is a low probability of getting the job. The offer calculation is mostly done manually, as estimation. For example, the length of the contours to be cut are extracted from drawings and summed up. Actual production time for workpiece problem areas like sharp angles and narrow radii can only be calculated by a post-processor simulation, or by a comparison with a similar workpiece that was manufactured before. This complicates the cost calculation and adds an unknown factor to calculation. Therefore, only experienced employees can estimate the costs for the cutting of 3-D workpieces.

The aim of the proposed software ICACOST is the quick and automatic cost calculation for 3-D laser cutting. Less experienced persons should be able to use the configured tool. Characteristic numbers are generated on the basis of the workpiece geometry. They describe all necessary machine work, and the workpiece specific problem areas. As a next step, the dynamic machine behaviour for these problem areas is projected to specific machine parameters. By connecting the characteristic numbers with the machine parameters, the machining time for a specific machine is calculated. This machining time is an important factor for the cost calculation. The characteristic numbers are also used to find similar workpieces within the planned offer database. This database is also implemented during the project, and contains all created offers.

As a plausibility check, the user can search for similar offers and compare them with the new one. A complete cost calculation must include all costs which are important for the production, not only the machining time. These diverse parameters come from various sources, and must be added to each other to get precise results. This will be done by standard forms stored within the database.

- 1 LZH - LASER ZENTRUM HANNOVER E.V. (DE)
- 2 DISMODEL S.A. (ES)
- 3 MARS LASERTECHNIK GMBH (DE)
- 4 GUALINI LAMIERE INTERNATIONAL SPA (IT)
- 5 FUNDACION ROBOTIKER (ES)
- 6 CLW CLAUSTHALER LASER- UND WERKSTOFFTECHNIK GMBH (DE)
- 7 LASER-TECH SPOL. S.R.O. (CZ)
- 8 TUBECUT EINGETRAGENER KAUFMANN (DE)
- 9 WILCO WILKEN LASERTECHNIK GMBH & CO. (DE)

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# IMMEDIATE

## Inexpensive, High-Performance, Lead-Free Piezoelectric Crystals and their Applications in Transducers for Ultrasonic Medical Diagnostic and Industrial Tools and Equipments

388

Co-operative research

KNbO<sub>3</sub> and its recently discovered modifications exhibit properties that can be advantageous in a variety of piezoelectric devices, in particular for medical and industrial ultrasonic transducers. However, due to a high production cost, crystals of these compositions have not been considered to date for commercial use in ultrasonic transducers.

The present project addresses both the issue of implementation of pure and modified KNbO<sub>3</sub>-based transducers in the product line of small to medium-sized enterprises (SMEs) and the cost-reduction issue in the crystals fabrication. The issue of the cost reduction will be addressed by growing crystals from dense ceramics using the template-assisted solid state single crystal growth (SSCG) method and by domain engineering. These cost-effective procedures will be implemented on an industrial scale by the SME specialising in crystal growth. Ceramics used as substrates for SSCG will be further optimised and commercialised by the SME specialising in piezoelectric ceramics. The crystals prepared using the SSCG method and domain engineering will provide device SMEs with high-performance transducer materials that are substantially less expensive than those produced by traditional crystal-growth methods, with the added value of being biocompatible and environmentally friendly.

Since new modified KNbO<sub>3</sub> compositions exhibit overall properties comparable to those of presently used lead-based ceramics, the results of the project will potentially have a significant impact on the wide spectrum of piezoelectric applications and will provide a leading edge on the global market to all participating SMEs, even beyond applications that will be directly evaluated in the project. The project conforms to the cooperative action requirement by the close integration of activities of non-competing SMEs and research and technological development (RTD) performers, by introducing a radically new processing technique, improving devices used in health and safety domains, and by addressing environmental issues with the removal of lead from the production and device exploitation lines.

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- 2 JOZEF STEFAN INSTITUTE (SI)
- 3 FORSCHUNGSINSTITUT FÜR MINERALISCHE UND METALLISCHE WERKSTOFFE - EDELSTEINE/ EDELMETALLE GMBH (DE)
- 4 FERROPERM PIEZOCERAMICS AS (DK)
- 5 IMASONIC S.A. (FR)
- 6 CERAM AB (SE)
- 7 MEDIZINTECHNIK BASLER AG (CH)



FP6 Project Catalogue

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# IATROFORM

## The Development of a Novel, Smart, Active Modular Seating System for Cerebral Palsy Patients

Our idea is to use shape memory alloys, composites, spring damping and automation to build a pressure-sensing and -relieving, mass-customised, modular seating system that is also lightweight, adjustable, and programmable and/or automated.

Our new seat will be:

- modular in design and made of lightweight composites (reducing weight by 15 %), thus increasing mobility and reducing carer injury and fatigue;
- more adjustable and able to grow with the CP patient, thereby increasing its life from typically 3 years to 6 to 10 years;
- able to sense stresses and movement, and return to the “ideal” posture setting (which is the purpose of the chair), improving posture and reducing deformity;
- able to actively relieve pressure, which is a major cause of injury to CP patients.

These features specifically provide reductions in pressure ulcers, ease of movement and adjustment of the chair. The mass-customised and modular aspects of the seating system provide better support for patients and retard the loss of muscle tone by fitting patients better and “growing” with patients. The major function of the chair is to support patients and “hold” them in good posture. Our novel damping system is able to prevent damage to patients during a spasm (e.g. extensor thrust), and has a “memory” allowing it to return to the optimum posture setting afterwards.

- 1 JENX LTD (UK)
- 2 VANEL POLSKA SP.Z.O.O. (PL)
- 3 TOP GLASS S.P.A. (IT)
- 4 PELISSIER INGENIERIE (FR)
- 5 FOTHERGILL ENGINEERED FABRICS LTD (UK)
- 6 WARSZAWSKIE KOŁO POLSKIEGO STOWARZYSZENIA NA RZECZ OSOB Z UPOŚLEDZENIEM UMYSŁOWYM (PL)
- 7 ENABLE IRELAND (IE)
- 8 PERA INNOVATION LTD (UK)
- 9 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)
- 10 STIFTUNG ORTHOPADISCHE UNIVERSITÄTSKLINIK HEIDELBERG-SCHLIERBACH (DE)

**Contract:** 17933  
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**Starting Date:** 01/02/2006  
**Duration (months):** 30  
**Total cost:** € 1 553 012  
**EC Contribution:** € 804 587

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The main objective of this proposal is to develop new technologies of restoration in specific difficult situations and a mobile, flexible laser-based system for the *in situ* cleaning of easel- and mural-painting artworks and online control of their quality. The proposal aims to develop more advanced approaches towards cultural heritage preservation by taking advantage of the technological and scientific advances in several fields. Heritage preservation is a crucial issue in society today, and therefore, development or adaptation of new and/or innovative technologies to the specific requirements of cultural heritage preservation will open up new opportunities for the progress of innovative conservation strategies.

An innovative strategy for the cleaning of painted artworks is thus envisaged by using laser radiation with different wavelengths and by developing a new laser-based system able to be displaced and integrated in the conservation and restoration operations of artworks *in situ*. The scientific and technological research objectives are to resolve very specific problems of restorers by providing a new system, integrating a mobile laser source that will transmit its radiation through an optical fibre which will be delivered to the artwork surface through a robotised device; it also comprises diagnosis and monitoring tools for the control of the cleaning operation. In parallel, cleaning methodologies for some of the most relevant problems encountered in paintings will be developed. The constituents of artwork paintings, such as pigments, will also be analysed and characterised chemically and physically. At the same time, the interaction study of these materials with the laser radiation will be performed. A database related to this aspect will be defined and made available by the end of the project.

- 1 INSTITUTO DE SOLDADURA E QUALIDADE (PT)
- 2 SIGNINUM, GESTÃO DE PATRIMÓNIO CULTURAL LDA. (PT)
- 3 DANART, IMPORT-EXPORT SRL LTD (RO)
- 4 BRESCIANI MATERIALI ED ATTREZZATURE PER RESTAURI S.R.L. (IT)
- 5 NICOLA RESTAURI, S.R.L. (IT)
- 6 INSTITUTO VALENCIANO DE ARTE MODERNO (ES)
- 7 ESTUDIO METODOS DE LA RESTAURACION S.L. (ES)
- 8 QUANTA SYSTEM S.P.A. (IT)
- 9 INSTITUTUL NATIONAL DE CERCETARE-DEZVOLTARE PENTRU FIZICA LASERILOR, PLASMEI SI RADIATIEI (NATIONAL INSTITUTE FOR LASER, PLASMA AND RADIATION PHYSICS) (RO)
- 10 ISTITUTE PER LE RICERCHE DI TECNOLOGIA MECCANICA E PER L'AUTOMAZIONE S.P.A. (IT)
- 11 ASOCIACIÓN INDUSTRIAL DE OPTICA, COLOR E IMAGEN (ES)



# INNORUBBER

## Intelligent and Multifunctional Rubber Compounds/Adhesives for the Shoe Industry

Surface treatments used at footwear factories usually involve mechanical roughing and/or the use of solvent and chemical treatments which can be harmful for the workers, mainly when working with rubber, which is one of the main polymeric materials used in soling material. Being a critical stage to producing adequate bonding parameters, this treatment is generally done by hand at shoe factories repetitively, prolonging production times and adding costs to the final product. This results in a reduction in competitiveness as a result of countries with low labour costs.

In order to reduce labour costs and improve competitiveness of European footwear factories, this proposal suggests an alternative in order to avoid the problems related to the sole in upper bonding process in footwear. The main objective is the development of modified rubber compounds for outsoles and adhesives, with similar properties to the conventional materials currently used, in order to avoid the surface preparation of soling material prior to bonding, or at least to reduce as much as possible the need for it, and simplify the overall bonding process.

The advantages of the elimination of the surface treatment are obvious as there is an important reduction in production times and production costs, which implies a reduction in labour costs and thus the improvement of the European footwear companies' competitiveness.

The foreseen tasks to be developed in order to accomplish the objectives are the following.

1. State of the art and technical limitations, characterisation of commercial materials in order to determine the most suitable characteristics to be required from new materials and to obtain a correlation between rubber properties and adhesion properties.
2. Development of intelligent materials (rubber and adhesives). Modifications of polymeric materials (rubber and adhesives) in order to pre-

activate sites: formulation, functionalisation, polymer blending and synthesis of base polymer.

3. Industrial validation of the new rubbers and adhesives developed. In this task all partners will participate.
4. Dissemination and exploitation of results and commercial promotion. In this task all partners will participate.
5. Management of the project. All partners will participate, and the responsible person will be the project co-ordinator.

- 1 ASOCIACIÓN DE INVESTIGACIÓN PARA LA INDUSTRIA DEL CALZADO Y CONEXAS - INESCOPE (ES)
- 2 JOAQUIN GALLARDO E HIJOS S.L. (ES)
- 3 ANALCO AUXILIAR CALZADO S.A. (ES)
- 4 CAUCHOS RUIZ ALEJOS S.A. (ES)
- 5 ENECOL ADHESIVOS S.L. (ES)
- 6 P. AYSANDRATOS & SIA OE (GR)
- 7 GEORGIOS TIGAS & SIA SP (GR)
- 8 C. F. S.R.L. (IT)
- 9 DIAP S.R.L. (IT)
- 10 UNIVERSIDAD POLITÉCNICA DE VALENCIA (ES)
- 11 ELKEDE TECHNOLOGY AND DESIGN CENTER S.A. (GR)
- 12 UNIVERSITÀ DEGLI STUDI DI PERUGIA (IT)

**Contract: 508157**  
**Call: FP6-2002-SME-1**  
**Starting Date: 01/04/2004**  
**Duration (months): 24**  
**Total cost: € 922 588**  
**EC Contribution: € 536 204**

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# INNOVATION FOR BEECH

Innovative Solutions for Improved Processing of Beech (*Fagus sylvatica* L.) with Red Heartwood

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Co-operative research

This proposal aims at improving the international competitiveness of European hardwood industries which are mainly small to medium-sized enterprises (SMEs) and related sectors by an integrated, translational research approach. It shall enable SMEs to increase their added value in processing beech timber, being one of the most valuable European hardwood resources. For the European beech wood resource, the inhomogeneous discoloration red heartwood (red core) is very common.

Red heartwood significantly restricts the log quality of beech stems and end products and leads therefore to severe economic losses. The overall scientific and technical objectives of the submitted project are to optimise the processing of beech logs containing red heartwood, to develop grading devices for red heartwood timber and to develop high-value products of red heartwood.

The project work will start with an international survey on existing technologies, processing methods and products relevant for the project in Work Package 1 (WP1). Based on this, the partners will agree on the fine-tuning of the industrial trials, done by the SMEs with support of the research and technological development (RTD) performers, and on the additional measurements in the laboratories.

The strategy is on the one hand to increase the yield of the valuable light beech wood by optimising the sawing of roundwood containing red heartwood and by automated grading, using a prototype optoelectronic system (WP2). On the other hand, methods for increasing the added value for red heartwood products shall be developed; for example by homogenising the appearance by adapted and optimised steaming and drying schedules, as well as by UV-treatment (WP3). By doing so, innovative products of red heartwood will be developed focusing on "Thermal Wood".

Glue-lam beams and furniture and their market potential will be assessed (WP4). By combining the results of WPs 2 to 4, an integrated concept

to process Beech logs containing red heartwood with special regard to feasibility, risks, costs, profit and energy input will be developed (WP5) and will be disseminated to SMEs and interested bodies in Europe (WP6).

- 1 ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG - INSTITUTE OF WOOD SCIENCE (DE)
- 2 VAIMWOOD S.L. (ES)
- 3 KERKA MENTI FURÉSZ KFT (HU)
- 4 HEMA ELEKTRONIK GMBH FERTIGUNGS- UND VERTRIEBS GMBH (DE)
- 5 UNIVERSITÄT FUER BODENKULTUR (AT)
- 6 ASOCIACION DE INVESTIGACION Y DESARROLLO EN LA INDUSTRIA DEL MUEBLE Y AFINES (ES)
- 7 UNIVERSITY OF WEST HUNGARY (HU)
- 8 FEDERICO GINER S.A. (ES)
- 9 BURGBACHER HOLZTECHNOLOGIE GMBH (DE)
- 10 MITTERAMSKOGLER GMBH (AT)



FP6 Project Catalogue

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Duration (months): 30  
Total cost: € 1 032 772  
EC Contribution: € 695 656

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For the constructions of yachts and small ships the application of aluminium/steel-transition joints approaches significant relevance because of design criteria in order to reduce weight in the upper regions of the vessel. In these application fields, materials with a thickness of 5 mm are of relevant interest. At present, material combinations like aluminium and steel can only be joined by an explosively bonded steel/aluminium transition profile. To realise a direct bonding of the dissimilar materials, no commercial technology is available for the corresponding material thickness. By using an adapted laser joining technology, this problem could be overcome. For joining thin sheet material combinations e.g. steel/aluminium alloy, a laser process with potential for industrial application is already available. By the localised energy input of the laser beam and a controlled heat distribution a minimised interaction of the joined materials is realised, thus avoiding embrittlement of the joint.

The topic of this project is the up-scaling of the material thickness up to 5 mm focussing on the material combination steel/aluminium. Joint geometries like butt- and T-joints will be evaluated, targeting on the potential of assemblies made of dissimilar material combinations. As the implementation of expensive laser welding equipment will not be economically affordable for small ship yards, suppliers specialised in laser welding will have to enable them by transfer of know how. The goal of this project is the strengthening of the competitiveness of small European ship yards and their suppliers by the implementation of advanced laser joining technology for dissimilar material combinations.

- 1 BREMER INSTITUT FUER ANGEWANDTE STRAHLTECHNIK GMBH - BIAS (DE)
- 2 NEUBELT UND KRÜGER YACHT PROJEKT GMBH (DE)
- 3 DEMAR LASER B.V. (NL)
- 4 WEKA INTERNATIONAL B.V. (NL)
- 5 SMST DESIGNER AND CONSTRUCTORS B.V. (NL)
- 6 BLS LASERTECHNOLOGY GMBH (DE)
- 7 JJ WELDING VOF (NL)
- 10 ALLUSHIP TECHNOLOGY SP. Z.O.O (PL)
- 11 INFERT INNOVATIVE FERTIGUNG GMBH (DE)
- 12 STEALCOM TECHNOLOGY B.V. (NL)
- 13 UNIVERSITY OF TWENTE (NL)

**Contract:** 508091  
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**EC Contribution:** € 541 818

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With the issue of the WEEE (Waste from Electrical and Electronic Equipment) and RoHS (Reduction of Hazardous Substances) guidelines by the EU, the use of lead solders will be restricted, starting from July 2006. This ban of lead enforces developments of new joining techniques in the entire electronic and micro system technology. First attempts of lead free soldering still show many shortcomings due to their higher temperature. Here, laser spot welding (LSW) becomes a promising complement to the conventional soldering process. Being lead free and high durability, with high thermal and mechanical stability, minimum heat diffusion during the process and transferability towards three-dimensional printed circuit boards (PCB) are the key advantages of this process.

JOITEC aims to establish the LSW as the future joining technology in the electronics industry. In the LSW process, a new laser with an adapted wavelength will be employed, leading to a dramatically increased coupling efficiency and to an improved process control. An in-process quality management will also be developed, which will evaluate the correlation between the welding-specific process emissions and the weld quality. A complete system design combining research technology with industrial standards will result in a LSW prototype. An additional key feature of JOITEC is a specialised design of PCBs, included in order to take full advantage of this new technology.

Not only will this environmentally friendly technology be directly implemented into the production lines of the participating small to medium-sized enterprise (SME) end-users, the technology will also allow the SME participants to meet the EU guidelines right on time. With the available system technology and its sub-components' laser source and monitoring system, the requirements of a huge subsection of the electronic mass production can be satisfied, having the potential to reinforce the European position in the sector of manufacturing systems for the electronics industry, which is currently dominated by Asian industry.

- 1 LASER ZENTRUM HANNOVER E.V. (DE)
- 2 UNIVERSITY OF KENT (UK)
- 3 BYTICS AG (CH)
- 4 EPH ELECTRONIC-PRINT-HANDELS AG (CH)
- 5 INDUSTRIE UND LEITERPLATTENFERTIGUNG ALLER ART GMBH (DE)
- 6 ELS ELEKTRONIK LASER SYSTEM GMBH (DE)
- 7 MICROLEX SYSTEMS AS (DK)
- 8 MULTISECTOR - CONSULTORES EM TECNOLOGIA E GESTÃO INDUSTRIAL LDA (PT)

# LASERIS

## Development of an Innovative Laser-Printing System Based on Serigraphic Thermo-chromic Inks

The industrial sector of industrial printing is waiting for a radical innovation: in fact, since the latest 1980s, the worldwide market has been more and more oriented to customised printing products, which has caused a high fragmentation of the production. The direct consequence has been the reduction of batch size, and for this reason the industrial printing companies have turned their attention to digital printers, which offer more flexibility than the serigraphic ones (but lower quality of the printed product and lower productivity rates).

The LASERIS system should match the high quality offered by the traditional serigraphic printing process, while providing the flexibility as for the digital printers. To achieve this important result, a breakthrough technology will be developed in this project: a laser beam will interact with irreversible thermo-chromic inks (i.e. lacquers including pigments sensible to the temperature changes) spread over a substrate. The special ink layer will remain transparent before the laser treatment but will change its colouration permanently when activated by the laser beam, which follows the desired pattern to generate the coloured image.

The consortium will develop specific modules (to be housed in the existing serigraphic printers) for feeding the printing process with the support chosen (paper, plastic foils, etc.), spreading thermo-chromic ink over them, and activating the thermochromic pigments by means of a laser beam. Software will drive the laser scanning head, which enables the laser beam to focus on each printing dot (for activating the ink), in order to obtain the desired image.

- 1 LABOR S.R.L. (IT)
- 2 AM ENGINEERING S.R.L. (IT)
- 5 ARGES GESELLSCHAFT FÜR INDUSTRIEPLANUNG UND LASERTECHNIK MBH (DE)
- 6 GRAFOS S.R.L. (IT)
- 7 MONOCROM SL (ES)
- 8 ALOJZ SALIGA (CZ)
- 9 CHROMAGEN CORPORATION (KR)
- 10 KIAN S.P.A. (IT)
- 11 UNIVERSITY OF LEEDS (UK)
- 12 CENTRO DE AUTOMATIZACIÓN, ROBÓTICA Y TECNOLOGÍAS DE LA INFORMACIÓN Y DE LA FABRICACIÓN (ES)
- 13 INSTITUTO AGILUS DE INOVAÇÃO EM TECNOLOGIAS DE INFORMAÇÃO LDA (PT)

**Contract: 18030**  
**Call: FP6-2003-SME-1**  
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**Total cost: € 1 667 570**  
**EC Contribution: € 993 480**

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# LASER-MEM

## Manufacturing Customised Polymer Membranes with Defined Characteristics Using Laser Technology

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Co-operative research

Flexible membranes are used today in many industries to remove solids such as activated sludge from fluids. The sheet membranes available are based on polymer sheets and ceramics and are all manufactured outside Europe.

The methods used for manufacture rely on continuous flow processes, but are not suitable for true bulk manufacture and do not produce the material in large quantities. The techniques used result in material that has a fixed structure and it is not possible to introduce flexibility by changing its characteristics or modifying the material to meet the individual needs of any application. The uses of these membranes are therefore limited and do not enable the material to be exploited to its full potential. Where they are used, system designers are not able to optimise their designs, and have to modify their specifications to use the material in the form in which it is available.

The LASER-MEM project will use a different method of manufacture to overcome all the disadvantages inherent in existing products. Laser technology will be developed to enable membranes to be created from low-cost raw material, using a process that can be implemented by small to medium-sized enterprises (SMEs). This new technique will enable the characteristics of the membranes to be controlled and provide the capability to manufacture sheets to suit the requirements of individual applications. It will remove the dependence on the global suppliers of membranes and will provide significant opportunities for SMEs to identify and develop new applications for the use of membranes.

Initial application will be in water treatment but the potential for use in many other areas such as health, chemical, petro-chemical, and food processing industries is unlimited.

- 1 PERA INNOVATION LTD (UK)
- 2 MEGATEC MESSNER GEORG ANLAGENTECHNIK GMBH (DE)
- 3 TAMFLOW OY (FI)
- 4 HAFI-INDUSTRIES KFT (HU)
- 5 ASCO POMPE SRL (IT)
- 6 AQUACONSULT ANLAGENBAU GMBH (AT)
- 7 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 8 LASER OPTICAL ENGINEERING LTD (UK)



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**Total cost:** € 1 252 038  
**EC Contribution:** € 646 742

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# LASERPOM

## Low-Cost Laser Power Meter with Ultra-Fast Response for Continuous "Online" Monitoring of Laser Beam Power and Polarisation

Over the years, lasers have become common tools for various fields of industry and medicine, as well as for basic and applied research. For many applications, it is necessary to precisely determine the output power of the laser in order to achieve optimum results. However, no commercial power meter exists, which allows laser power to be monitored "online" without the need for additional diffractive optical systems, designed for such applications. Moreover, traditional power meters make use of thermoelectric or pyroelectric sensors, which are expensive (especially when used to measure high power lasers), and suffer from long response times.

In this project, an innovative laser power meter will be developed. The proposed power meter prototype is based on the scattering of light by nanoparticles, either deposited, or embedded, in a transparent substrate. Most of the incident laser light is transmitted by the nanoparticle-containing substrate, but a small fraction of the laser light is scattered by the nanoparticles. The intensity of the scattered light and its angle-dependent distribution can be measured to determine the power of the transmitted laser radiation.

This design allows laser power to be monitored during laser operations, such as surgery, welding, drilling or cutting. This feature enables tighter control of processes, more precise operation (through feedback systems), and an improvement in working conditions, through safer operation. Furthermore, the scattered light also yields information on the polarisation of the laser beam. Like laser power, polarisation is a critical parameter, which influences the quality of the work being carried out in many routine laser operations. Hitherto, no commercial power meter provides information on the polarisation of the laser beam.

Other important features of the proposed design, with respect to traditional detectors, are improved performance (fast response, wide dynamic range, safety during operation, no requirement for refrigeration systems) and low cost. An initial technical feasibility

check of the proposed technology has been carried out by the University of Barcelona, with such promising results that all partners have envisaged a huge exploitation potential. The power meter developed in the project will compete favourably with traditional detectors. Furthermore, its unique capability for monitoring beam power and polarisation make it ideal for implementation into surgical devices, medical lasers, welding and cutting systems, analytical instruments, etc. It is expected that new market opportunities will also arise from active-safety systems, which will contribute to an overall improvement in terms of safety in the laser world.

The potential impact for small to medium-sized enterprises (SMEs) will be huge. On the one hand, for end-users of the proposed technology, it will provide them with a much safer and efficient use of lasers in multiple applications and will certainly help in pushing laser technologies among them. On the other hand, for SME suppliers of the system, it will introduce them to nanotechnology industrial applications and provide them with attainable resources.

- 1 CENTRE DE RECERCA I INVESTIGACIO DE CATALUNYA S.A. (ES)
- 2 LASER COMPONENTS GESELLSCHAFT FÜR DEN VERTRIEB UND DIE FERTIGUNG VON LASERN UND OPTOELEKTRONISCHEN KOMPONENTEN MBH
- 3 LASERPOINT SRL (IT)
- 4 TEMSA - DIAMOND DIE DIVISION (ES)
- 5 JESUS CARCELLE SUAREZ (ES)
- 6 VÁRADI & TÁRSA LTD (HU)
- 7 CERAMOPEC GMBH (DE)
- 8 SPECTRUM TECHNOLOGIES PLC (UK)
- 9 JCB ELECTROMECHANICA S.L. (ES)
- 10 UNIVERSITAT DE BARCELONA (ES)
- 11 FELTALÁLOI ÉS KUTATÓ KÖZPONT SZOLGÁLTATÓ KFT (HU)
- 12 BAY ZOLTÁN FOUNDATION FOR APPLIED RESEARCH (HU)

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# LIQUIDSOLE

Development of a Cost-Effective Adjustable Damping Sole Based on Magneto-Rheological Fluids to Provide Diabetics With a Customisable Product-Service Which Reduces Foot Stress and Diseases, While Supporting Competitiveness of the European Footwear Sector

Foot diseases are indeed recognized as a wide societal problem and the majority of people affected are women. This problem is particularly relevant if we consider that 25 % of the diabetic population suffer from foot diseases and alterations. Our project aims at developing a novel ergonomic, comfortable, shock-absorbing and highly recyclable sole able to real-time auto-shape itself based on magneto-rheological (MR) fluids.

Our idea is to instantaneously and cost-effectively vary the stiffness and shape according to the different pressure produced while walking or running onto the different areas of the sole, through the application of a low-power micro-controller powered by embedded piezoelectric foils. However several barriers need to be overcome and innovations introduced to exploit this concept through the achievements of the following scientific and technical objectives:

- development of an innovative MR fluid formulation suitable for application in the small chambers and thin channels built in the sole;
- development of a constitutive model for the MR fluid able to simulate and predict the non-linear effects which affect the peculiar working principles of the intended sole;
- design and development of the optimal circuit configuration based on bio-mechanical requirements using CFD, FEA and BEM models;
- development of a cost-effective manufacturing process able to integrate the system components into an environmentally friendly sole;
- optimisation and integration of the low powered electronics and control system able to develop a self-power system able to real-time control the sole behaviour.

Our economic objective is to cost-effectively produce a sole with innovative properties and features compared to an orthopaedic insole in order to generate an initial market worth EUR 28 million for diabetics' shoes and a secondary market worth of EUR 60 million for functional and outdoor shoes.

As a result of the initial market penetration of our system, we expect that the following realistic societal objectives will be achieved:

- reduction of the foot diseases in diabetics by 5 %, improving health for 750 000 European citizens;
- supporting the prevention of foot ulceration and amputation, thus saving EUR 140 million every year in Europe;
- preserving current employment level in the footwear sector, generating opportunities for 190 new jobs in the medium term after product commercialisation.

- 1 D'APPOLONIA S.P.A. (IT)
- 2 LIQUIDS RESEARCH LTD (UK)
- 3 EVENT S.R.L. (IT)
- 4 ARTESANO 2003 S.L. (ES)
- 5 HASWELL MOULDING TECHNOLOGIES LTD (UK)
- 6 GOUDSMIT MAGNETICS LTD (UK)
- 7 ANALCO AUXILIAR CALZADO S.A. (ES)
- 8 ALPINA, TOVARNA OBUVJE D.D. ZIRI (SI)
- 9 ZAC SAS DI FOLLO ADOLFO & CO. (IT)
- 10 PERA INNOVATION LTD (UK)
- 11 ASOCIACIÓN INSTITUTO DE BIOMECÁNICA DE VALENCIA (ES)

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Co-operative research

www.dappolonia-research.com/saferdrill



FP6 Project Catalogue

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EC Contribution: € 740 055

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# LOOSEandTIGHT

Development of a Superelastic Material that Enables its Cost-Effective Application in Highly Compliant Compression Hosiery for the Over 18 Million European Citizens Suffering from Chronic Venous Insufficiency

Since the invention of compression hosiery in 1947, no major innovations have been introduced. Different products exist on the market, suitable for therapy and prevention. Compression hosiery is usually worn by elderly and sick people. When applying and removing compression hosiery, they encounter many problems: they lack strength in their arms and hands, they can't bend properly or they suffer from pain in their arms, hands or feet. One of the characteristics of compression hosiery is that the highest pressure in the stocking is found at the ankle. This is also the narrowest part of the stocking.

The trouble is that it is this narrowest part that has to be pulled over the widest part of the foot (the tarsal circumference). At this point, the stocking exerts a very high degree of pressure, which is considerably higher than the therapeutic pressure value that is desired at the ankle.

The stocking is also pulled over the leg in a double layer (i.e. fabric over fabric), both when it is being put on and when it is taken off. The resistance in this process is extremely high. Many people stop wearing their hosiery as a result of these problems (or wear them less frequently). This decrease in compliance means an aggravation of the disease status, with an increased risk of complications and a corresponding increase in costs. A number of patients receive help from family members or through domiciliary care.

Our objective is to develop a novel hybrid fabric based on superelastic fibres to manufacture a new concept of compression hosiery that overcomes current limitations. This will support the small to medium-sized enterprise (SME) proposers and the SME-led European hosiery sector in profiting from sales worth at least EUR 370 each year in Europe, only considering the 1.2 % of the adult population suffering from leg ulcers, among the 15 % with varicose veins and requiring compression therapy.

- 1 D'APPOLONIA S.P.A. (IT)
- 2 TWISTA, SPOL SRO (SK)
- 3 DIAMETER LTD (UK)
- 4 TEA S.N.C (IT)
- 5 DR KAREL VOLENEC - ELLA - CS (CZ)
- 6 E.A.A. - ELETTRONICA APPLICATA ALL'AUTOMAZIONE S.P.A. (IT)
- 7 JE BE INTERNATIONAL TEXTILES B.V.B.A (BE)
- 8 GRADO ZERO ESPACE S.R.L (IT)
- 9 ACADEMY OF SCIENCES OF THE CZECH REPUBLIC - INSTITUTE OF PHYSICS (CZ)

**Contract: 16868**  
**Call: FP6-2003-SME-1**  
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**EC Contribution: € 789 688**

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# LOSTIR

## Development of a Low-Cost Processing Unit for Friction Stir Welding

400

Co-operative research

Friction stir welding (FSW) is a revolutionary non-fusion technique for joining sheet and plate material. The basic form of the process uses a cylindrical (non-consumable) tool, consisting of a flat circular shoulder, with a smaller probe protruding from its centre. The tool is rotated and plunged into the joint line, between two rigidly clamped plates, so that the shoulder sits on the plate surface and the probe is buried in the work piece. There are significant advantages of FSW over more established arc welding processes. For example, welds are made below the melting point in the solid phase and as such permit welding of materials that cannot be welded by conventional fusion welding, excellent mechanical properties and low distortion are achieved and an extremely low porous good quality joint is produced. As such, the impact of the process in many industries has been significant and FSW is likely to become the welding process of choice in many existing and new applications.

However, take up of FSW has been limited to a few industry sectors that have had sufficient capital to invest in the high facility and technology costs. Purpose-built FSW machines can be very expensive, of the order of EUR 300 000, making it difficult for many product manufacturers to justify implementation of the technology. An alternative approach is to adapt milling machines, which have been known to produce promising results in the past, and allow a low-cost introductory level to FSW. However, there is uncertainty regarding the quality of the joint produced as there is little scientific correlation between the milling machine parameters (torque, downward force, feed rates etc) and the quality of the joint (defects, heat affected zone, residual stresses, distortions etc). LOSTIR will develop a low-cost FSW system, using advanced modelling techniques that will be used in conjunction with milling machines, to create high quality friction stir welded joints.

- 1 TWI LTD (UK)
- 2 INSTYTUT SPAWALNICTWA (PL)
- 3 VYZKUMNY A ZKUSEBNI LETECKY USTAV A.S. (CZ)
- 4 SAPA AB (SE)
- 5 BAE SYSTEMS (OPERATIONS) LTD (UK)
- 6 SIGMAPI SYSTEMS LTD (UK)
- 7 BERMAQ (ES)
- 8 SUFFOLK PRECISION AEROSPACE LTD (UK)
- 9 APPLIED MEASUREMENTS LTD (UK)



FP6 Project Catalogue

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**EC Contribution:** € 572 649

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# LOTPIM

Low-Cost, Predictive Maintenance System for Industrial Machinery, Based on Induction Motor Current Analysis, Wireless Network and Self-Power Technologies

With the growing adoption of electronics in today's industrial systems, increasing reliability is often hampered by the failings of mechanical components.

Reliability is a major issue in today's highly competitive marketplace, the costs associated with unexpected machine failure having potentially drastic effects on a company. Predictive maintenance systems and services are very often unaffordable for small to medium-sized enterprises (SMEs). Therefore, there is a need for a low-cost means for a non-subjective, online, pre-vibration condition monitoring system for detecting malfunctions in gearboxes, rotating shafts, bearings and similar systems.

Currently, only the largest, most critical motors are monitored. Leveraging new, inexpensive RF components and integration techniques, along with advances in microprocessor technology, it is possible to provide an economic solution for the wireless monitoring of motor operating parameters — such as temperature, vibration, current, etc. — for all classes of motors, thus creating enormous potential for energy and cost savings.

The proposed LOTPIM technology will surpass the state of the art by utilising the novel combination of stator current analysis, along with the current flow from the inverter to the motor and machinery for continuous pre-vibration monitoring. LOTPIM will combine self-powered innovative technology, artificial intelligence and a wireless communication network that will render the device both intelligent and autonomous, allowing continuous centralised monitoring of the plant at a fraction of the cost of current alternatives. The generic technology will find applications in areas where motors, pumps, gearboxes or drive chains need to be monitored on a continuous basis, such as fluids processes in chemical industries, motor generator systems, serial trunk conveyor systems, and general line-production in manufacturing industries.

- 1 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)
- 2 JCB ELECTROMECHANICA S.L. (ES)
- 3 SCHMIDT, KRANZ & CO. GMBH (DE)
- 4 ADVANCED DIGITAL DESIGN S.A. (ES)
- 5 ANGEWANDTE SYSTEM TECHNIK GMBH (DE)
- 6 FABRYKA WENTYLATOROW S.A. (PL)
- 7 FLEXACHEM MANUFACTURING LTD (IE)
- 8 DELEGADA TECNICA S.L. (ES)
- 9 ELECTRONIC SYSTEMS DESIGN LTD (MT)
- 10 UNIVERSITAT POLITÈCNICA DE CATALUNYA (ES)
- 11 INNOWACJA POLSKA SP. Z. O. O. (PL)
- 12 FELTÁLLÓI ÉS KUTATÓ KÖZPONT SZOLGÁLTATÓ KFT (HU)

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**Call:** FP6-2003-SME-1  
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**Total cost:** € 1 529 576  
**EC Contribution:** € 792 287

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Materials & Processes

The concrete manufacturing industry has adopted some very wasteful and antiquated practices. The use of steam curing in precast concrete plants, for example, is a health and safety hazard, produces poor working conditions and makes inefficient use of energy produced by non-renewable fossil fuels.

Similarly deficient practices are used on construction sites in winter, e.g. open-flame gas or oil heaters are used to prevent freezing of concrete in the formwork. In cold regions, construction activity is often avoided in the winter, which is very uneconomical. Insulated formwork can also be used, which provides poor control of curing temperature. Eventual disposal of formwork requires the removal of the chemical insulative coatings with solvents or by burning, which causes an environmental hazard.

The project aims to transform these inefficient, uneconomical and unsafe practices by developing a novel thermal curing system for concrete, based on the recently developed core technology of a unique conductive polymer coating material which has many potential applications. The conductive polymer coating, applied to a flexible fabric, produces a low-resistance material which provides uniform heat distribution without localised hot spots. Typically, the elements operate at 24 V to provide highly controlled temperature profiles up to 120 °C, using very low power input compared with traditional systems which typically operate at 240 V. A small to medium-sized enterprise (SME) proposer has been engaged in the development of this core technology.

The objectives of the project are to:

1. develop the novel technology for accelerated curing of concrete under normal and low ambient temperatures;
2. establish performance characteristics;

3. develop energy-efficient accelerated curing systems for precast concrete, thermal formwork for cold-weather concreting and thermal covers to prevent frost attack in winter concreting;
4. determine interactions due to the thermal input of the curing systems and heat of hydration of concrete, and derive optimum operating conditions; and
5. design, manufacture and test prototypes of thermal moulds, formwork and covers. The proposed hi-tech thermal curing systems promise a clear market leadership for the SME proposers.

- 1 SHEFFIELD HALLAM UNIVERSITY (UK)
- 2 ERBA HOLLAND B.V. (NL)
- 3 ANGIO S.A. (ES)
- 4 CONSTRUCCIONES BIKANI S.L. (ES)
- 5 KALAB-STAVEBNI FIRMA S.R.O. (CZ)
- 6 PREFAB IP A.S. (CZ)
- 7 WYTWORNI PODKLADOW STRUNOBETONOWYCH S.A. (PL)
- 8 PRZEDSIĘBIORSTWO PRZEMYSŁU BETONOWYCH "PREFABET-KOLBUSZOWA" S.A. (PL)
- 9 TARMAC PRECAST CONCRETE LTD (UK)
- 10 INDITHERM PLC (UK)
- 11 AKADEMIA GORNICZO-HUTNICZA (PL)
- 12 FUNDACIÓN LABEIN (ES)
- 13 RIBM S.R.O. (CZ)



# MAGNET

## Magnetic Moulding: Innovative Technology to Improve the Competitiveness and Working Conditions of the European Foundries

The development of a new foundry process is proposed that will increase the competitiveness of sand casting, lost wax and lost foam foundries in Europe. The new technology proposed, Magnetic Moulding, is an innovative process in which an expendable model is used that is surrounded by metallic particles bonded together by the action of an induced magnetic field. Once the cast metal has solidified, the magnetic field is interrupted so that the mould collapses by itself, the part is recovered and the particles can be reused in the subsequent castings. The innovative process combines the advantages of the lost foam process and the permanent mould processes; it is environmentally friendly, cost competitive and suitable to produce high quality parts with very complex shapes with a large range of sizes and materials. The components produced do not need any parting lines and the metallurgical and mechanical properties obtained are better than those obtained in lost wax, lost foam and sand casting techniques due to the fine grain structure obtained through the fast solidification phase derived from the use of the metallic particles that form the mould.

The concept on which the magnetic moulding is based was born in Europe together with the lost foam process. The maturity of the lost foam process and the results from the investigations in the main parameters of magnetic moulding of the last years finally makes it possible now to approach the proposed project to develop the new foundry process up to the industrialisation stage. The two research and technological development (RTD) performers in the group have previous experience in the lost foam process and one of them has already had the first positive experiences in the magnetic mould concept at lab scale.

The foundry sector in the European Union is composed of a large amount of small to medium-sized enterprise (SME) companies that employ around 300 000 workers. This sector is particularly concerned with environmental regulations and a large international concurrence coming from the Asian and American foundries. Therefore, it must look

for new cost competitive materials and processes that increase the quality, competitiveness and the added value of their products. The proposed project approaches all these objectives and represents a real breakthrough concept that will sustain the technological advantageous level of the European foundry sector. The magnetic moulding process will enable the European foundries to approach a large niche market on the production of complex shape castings for markets such as the automotive, aeronautics, biomedical, electronics, valves, etc.

403

Co-operative research

- 1 FUNDACION INASMET (ES)
- 2 GSL GUSSTAHL LIENEN GMBH & CO. KG (DE)
- 3 KROLMET CO. (PL)
- 4 HIRST MAGNETIC INSTRUMENTS (UK)
- 5 WH ROWE AND SON (UK)
- 6 RODABELL AS PONTES (ES)
- 7 TECHCAST FOUNDRIES LTD (UK)
- 8 KNAUF CREAFORM (FR)
- 9 FUNDICIONES DEL ESTANDA (ES)
- 10 INSTYTUT ODLEWNICTWA (POLISH FOUNDRY RESEARCH INSTITUTE) (PL)

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**Call:** FP6-2002-SME-1  
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# MATINA

## Innovative PVD Nano-Coatings on Tools for Machining Titanium and Nickel Alloys

404

Co-operative research

The aim of this project is the substantial improvement of cutting tools for the machining of nickel and titanium alloys. These alloys present several problems during machining operations, and as a result today there are important restrictions regarding tool performance that limit the economy and quality of the final parts. The most important fact when machining nickel and titanium alloys is the tendency for the work to harden, due to the localised overheating, and to stick or adhere to the cutting tool surface. Therefore, tools are required that have sharp edges to avoid deforming the material before cutting it, and that also have a very good surface finish and low chemical affinity, as any surface defect may cause the material to adhere to the tool.

The application of selected PVD nano-structured coatings with a thickness of less than 1  $\mu\text{m}$  can improve the life of nickel and titanium cutting tools without degrading the tool sharpness. It will make it possible for nickel and titanium machining to benefit from a technology that has already been successfully applied (micro-coatings) to machining other materials, i.e. steel alloys, but has shown little if any improvement with nickel and titanium.

A good selection of PVD nano-structured coatings can decrease friction, which will result in a reduction of the overheating risk, allowing higher machining speeds or even avoiding the use of lubricant. Furthermore, a hard nano-structured coating with a nano-thickness ( $<1\mu\text{m}$ ) can be applied to the tool, maintaining its surface finishing and sharpness, thus delaying the presence of local wear defects; this will reduce the material's sticking and increase tool life.

The objectives of the project will thus focus on:

1. longer cutting tool life,
2. quicker machining processes, and
3. a reduction or elimination of the use of environmentally costly lubricants and coolants.

- 1 FUNDACIÓN INASMET (ES)
- 2 TESSCENTER S.L. (ES)
- 3 CEMECON AG-COATINGS TECHNOLOGY & PROCESS (DE)
- 4 BROEDRENE JOHNSEN A/S (NO)
- 5 DESARROLLOS MECANICOS DE PRECISIÓN S.L. (ES)
- 6 MORFOMICCHANIKI LTD (CY)
- 7 ARISTOTELIO PANEPISTIMIO THESSALONIKIS - ARISTOTLE UNIVERSITY OF THESSALONIKI (GR)



Powder filled injection moulding feedstocks are processed for a wide range of applications. Mostly the filler is added to influence and improve the properties of a matrix polymer. In Powder Injection Moulding, PIM, a technology used to produce complicated ceramic and metal parts, the polymer is needed as an intermediate medium to allow forming of the metal again via injection moulding. In all cases but especially so for PIM, the distribution of the filler in the moulded component has a major influence on the properties of the final parts. On the other hand, there often is a major difference in density between polymer and filler and some separation of the two phases occurs during moulding.

Many problems still exist in characterising such feedstocks with respect to their homogeneity and flow and separation behaviour and also in simulating the mould filling taking into account slight changes in feedstock quality. Thus, this project aims at a better understanding and new and easy instruments for analysing the feedstocks in order to make every day quality control easier, to develop new material laws to describe the two phase flow behaviour of the feedstocks and thus possibly to drastically improve the instruments for simulating the mould filling process. This will lead to reduced tooling cost and improved part quality and thus allow further growth of the small to medium-sized enterprise (SME) partners.

Improved quality and reduced tolerances of the PIM parts with the resulting increased acceptance of this young technology in industry will open up new and large markets and allow much increased growth of PIM.

- 1 FRAUNHOFER-INSTITUT FUER FERTIGUNGSTECHNIK UND ANGEWANDTE MATERIALFORSCHUNG (DE)
- 2 MONTANUNIVERSITÄT LEOBEN, INSTITUTE FOR PLASTICS PROCESSING (AT)
- 3 MIMECRI S.A. (ES)
- 4 PARMACO METAL INJECTION MOLDING AG (CH)
- 6 ITB PRECISIETECHNIEK HOLDING B.V. (NL)
- 7 ALLIANCE S.A. (FR)
- 8 INMATEC TECHNOLOGIES GMBH (DE)
- 9 MIMITALIA S.R.L. (IT)
- 10 BATTENFELD KUNSTSTOFFMASCHINEN GMBH (AT)
- 11 IMETA GMBH (DE)
- 12 SIGMA ENGINEERING GMBH (DE)

**Contract: 33006**  
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**Total cost: € 1 205 500**  
**EC Contribution: € 624 250**

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# MEDI-VOICE

## A Low-Cost, Environmentally Friendly Smart Pharmaceutical Packaging Technology to Differentiate European SME Suppliers to Service the Needs of the Blind, Illiterate and Europe's Ageing Population

406

Co-operative research

Printed instructions are meaningless to around 20 % of the European population, due to illiteracy. This figure, combined with the 8 million registered blind and the ever increasing ageing population, are contributing to the 194 500 deaths a year in the EU due to misuse and non-compliance of prescribed medication. Non-compliance is estimated to cost the European Union EUR 125 billion annually, of which EUR 2.25 billion is lost annually by Europe's struggling small to medium-sized enterprise (SME) pharmacist community.

This project targets the European community of independent pharmacists, consisting of more than 154 438 SME companies. This sector represents around 4 % of the EU's entire retail sector and supports over 700 000 jobs. A typical pharmacist, on average, provides free advice 2 500 times per month at a cost to themselves of EUR 3.5 billion annually. It is estimated that up to 64 % of these consultations are unnecessary, simply due to medication non-compliance and misuse, or that they have an excessively long duration, owing to extended explanations to those not able to read the instructions. Such economic pressures have led to nearly 90 % of the former SME pharmacies in the UK and the Netherlands being owned by large networks over the last five years, with this pattern spreading across the whole of the European Union. SME pharmacies are faced today with lower prices and superior cash resources from competitors such as US retailers.

The global demand for pharmaceutical packaging is set to increase at a rate of 4.3 % per year, to an estimated EUR 22 billion by 2010. The European community of SME packaging manufacturers (82 000 SMEs) currently supply most of the European demand, but pharmaceutical and medical packaging production is set to grow massively in China and India as the countries expand and upgrade their drug producing and specialised packaging capabilities, which will also be used to serve export markets.

Product differentiators will be required to retain a competitive edge in the market as the leverage of quality, cost and delivery (QCD) will soon be eroded, as margins are already very low.

We have identified a product differentiator that moves us from QCD, which is the growing market for "Smart Packaging". It is reported that by 2013, over 60 % of healthcare packaging will have some smart feature.

This will create a market for smart healthcare packaging in excess of EUR 24 billion in the healthcare sector alone. Whilst the competitive threats we face are on a global level, so are the market opportunities. Internationalisation is a crucial success factor in a wider sense for SMEs, since national markets, in particular in small economies, are often too small for a sophisticated niche product like Smart "Speech" Packaging. Our project aims to develop a novel product that can be manufactured and distributed globally through a network of European SMEs, creating EUR 120 million each year from new sales and exports for the European smart pharmaceutical packaging sector, and safeguarding 1 200 jobs.

The partnership between the SMEs, research and development (R&D) partners, large companies and an end-user interest group, will be used to develop further commercial and technological relationships, which will enable a broader exploitation of the project results, stimulate new joint innovations and facilitate the development of further enabling technologies across the EU.

Our idea is to take current state-of-the-art compliance monitoring, enhance it, and combine it with our speech technology, incorporating these into pharmaceutical blister packaging through novel manufacturing techniques such as in-mould labelling, over-moulding and encapsulation.



These technologies will overcome the problems associated with non-compliance and misuse, specifically through the incorporation of spoken instructions. Furthermore, the primary objective of the project is to develop an eco-friendly power generation system that will harness “free” solar energy through the incorporation of thin-film flexible photovoltaic laminates.

The innovation specifically lies in the amalgamation of the photovoltaic and the polymer packaging through in-mould labelling techniques. The speech system and compliance electronics will be developed onto a flexible PCB which will be over-moulded, enabling incorporation into the packaging, ensuring that the instructions are never lost from the medication. The spoken instructions will be heard through a piezo-electric sounder that will be encapsulated into the polymer packaging during the injection moulding process. Dosage assurance will be achieved through the printing of conductive ink electrodes onto the blister sealing film that will input to the compliance circuitry. The technical risks are high but justified by the huge economic, social and environmental benefits, and are addressed through a methodical and structured programme of work.

- 1 AUDIO INTERNATIONAL LTD (UK)
- 2 FAROMED H. GMBH (AT)
- 3 IT MOBILE OY (FI)
- 4 MTC HOLDINGS (AU)
- 5 UNIA FARMACEUTÓW - WŁAŚCICIELI APTEK (PL)
- 6 NOVARTIS PHARMA AG (CH)
- 7 PERA INNOVATION LTD (UK)
- 8 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)
- 9 ROYAL NATIONAL INSTITUTE OF THE BLIND (UK)
- 10 AK INDUSTRIES (UK)

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**EC Contribution:** € 686 562

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# MEMS-PIE

## Integration of Piezoelectric Thin Films in Micro-Electromechanical Systems

408

Co-operative research

The MEMS-Pie project will develop reliable technology and qualified procedures for integration of piezoelectric thin films into micro-electromechanical systems (MEMS) on an industrial scale.

The results will increase the competitiveness of European small to medium-sized enterprises (SMEs) engaged in the MEMS market. Many small companies have innovative ideas for new types of sensors and actuators based on silicon technology with integrated piezoelectric functional elements. Examples of such devices are: ultrasonic imaging transducers, pressure and flow sensors, accelerometers, micromotors and micropumps. Reliable technology for integration of piezoelectric thin films is a key tool to realising these new products.

However, current knowledge in the field is mostly limited to the conditions and scale of academic laboratories, and knowledge on reliability and reproducibility of the films and methods at industrial level is scarce. Therefore, this project will develop validated procedures and technology demonstrators for integration of piezoelectric thin films in MEMS. The thin films will be deposited using three different techniques: magnetron sputtering, sol-gel deposition and pulsed laser deposition.

This approach will reduce the risk of the project considerably. Qualified production routes will form the basis for a new foundry service that one of the research and technological development (RTD) partners plans to offer within 12 months after completion of the project. This service will be an open and low-cost alternative for production, particularly suitable for a large group of SMEs that do not have resources to build their own production line.

The first commercial products produced by the new service are likely to be available on the market within two years after completion of the project. The project will also contribute to industrial standards in the field. The development of such standards is a particularly important tool for strengthening the competitiveness of SMEs. The project involves five

non-competing SME partners with a diverse market and technology base, and three complementary RTD partners.

[www.sintef.no/mems-pie](http://www.sintef.no/mems-pie)

- 1 SINTEF - STIFTELSEN FOR INDUSTRIELL OG TEKNISK FORSKNING VED NOREGS TEKNISKE HØGSKOLE AS (NO)
- 2 ECOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE (CH)
- 3 UNIVERSITEIT TWENTE (NL)
- 4 AIXACCT SYSTEMS GMBH (DE)
- 6 NOLIAC A/S (DK)
- 7 PRECISION ACOUSTICS LTD (UK)
- 8 SONITOR TECHNOLOGIES AS (NO)
- 9 HÖK INSTRUMENT AB (SE)



FP6 Project Catalogue

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**EC Contribution:** € 1 258 310

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# MEPOS

## Optical Measurement of Position and Size of Wood Panels for Intelligent Automation of Sanding Machines

The project tackles problems for automation of wood-sanding machine, in 24 months through the development of a robotic agency based on 3 interacting agents:

1. an optical sensing system to detect wood panel shape and position;
2. an intelligent control system;
3. driving an improved array of pneumatic actuators.

In order to control the sanding process and to optimise panel surface finish, it is necessary that panel dimensions, shape and position are measured online, while the panel is moving on the transport belt and entering the machine and that actuators are controlled in force in order to apply the required force distribution on the panel surface, so that each part of the panel is machined at the desired pressure level.

This Cooperative research project is designed on the needs of a cluster of complementary small to medium-sized enterprises (SMEs), which operate in different business areas:

1. VIET SpA — Manufacturer of wood-working machines (IT);
2. Sibois — Supplier for furniture industry, expertise in wood-working machinery (FR);
3. MEL Mikroelectronic GmbH — Manufacturer of optical sensors (DE).

Research and technological development (RTD) performers:

1. Università Politecnica delle Marche-UNIVPM— Research and development on structured illumination systems and advanced sensing for mechanics—Project COORDINATOR (IT);
2. Politecnico di Milano—Research and development on intelligent control systems

fuzzy logic and on image acquisition and processing (IT);

3. Advanced Computer Vision GmbH—Research and development of image processing (AT).

Other enterprises:

1. COSMOB Consorzio del Mobile—Service center for furniture industry (IT);
2. Fluid Automation Systems s.a.-FAS—Manufacturer of pneumatic valves and actuators for automation (CH).

The project has 7 work packages (WPs); the first 4 WPs output at month 12 an innovative optical sensing system, an intelligent control and a new pneumatic actuator. System integration on a machine is in WP5; WP6 will test performance of the prototype sanding machine; and WP7 will manage and coordinate activities, throughout the project.

- 1 UNIVERSITA POLITECNICA DELLE MARCHE - DIPARTIMENTO DI MECCANICA (IT)
- 2 POLITECNICO DI MILANO (IT)
- 3 ADVANCED COMPUTER VISION GMBH - ACV (AT)
- 4 COSMOB, CONSORZIO DEL MOBILE S.P.A. (IT)
- 5 MEL MIKRO-ELEKTRONIK GMBH (DE)
- 6 SIBOIS S.A. (FR)
- 7 FLUID AUTOMATION SYSTEM S.A. (CH)
- 8 VIET S.P.A (IT)

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**Call: FP6-2002-SME-1**  
**Starting Date: 23/08/2004**  
**Duration (months): 24**  
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**EC Contribution: € 1 154 620**

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# Merc-sorb

## Low-Cost Sorbent for Reducing Mercury Emissions

410

Co-operative research

We have identified a cost-effective way to reduce mercury emissions from crematoria, power stations and incinerators below current levels, reducing European societal and health costs by over EUR 485 million, while delivering EUR 80 million each year in end-user savings. This market opportunity is worth over EUR 50 million each year in the EC alone, with a global opportunity worth over EUR 100 million each year, and it is growing.

Every year over 2 000 t of mercury are released through air emissions into the environment globally, 342 t of this being from Europe. Mercury released into the environment occurring through biological processes is converted into methyl mercury (MeHg), a bio-accumulative neurotoxin, a neurotoxin that even at low levels can cause serious learning difficulties in young people. Recent research has also linked it with possible harmful effects on the cardiovascular, immune and reproductive systems.

Elemental mercury is insoluble in water and cannot be captured effectively by wet scrubbers, so it must be captured with solid sorbents. Sulphur-impregnated activated carbon is the best mercury sorbent currently available; however, it is very expensive (EUR 7-00/kg to EUR 12-00/kg) and so most organisations use cheaper but less effective non-impregnated activated carbon (EUR 3-00/kg to EUR 6-50/kg). This project will develop a method of producing high-quality sulphur-impregnated activated carbon (S-AC) at a lower cost than non-impregnated activated carbon, by one-step microwave activation of waste tyres. The proposed production route will deliver economic benefits to both consortium members and end-users, while providing the twin environmental benefits of recycling scrap tyres and reducing mercury emissions.

<http://mercsorb.pera.com>

- 1 PERA INNOVATION LTD (UK)
- 2 EPLER & LORENZ (EE)
- 3 SPIRIT – INFORMATION SYSTEMS (SK)
- 4 DESOTEC ACTIVATED CARBON (BE)
- 5 IES-PCA LTD (UK)
- 6 CGS (IT)
- 7 KEY ENVIRONMENTAL SERVICES (UK)
- 8 TYREGENICS LTD (UK)
- 9 ALTER S.R.L (ES)



FP6 Project Catalogue

**Contract:** 32245  
**Call:** FP6-2004-SME-COOP  
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**EC Contribution:** € 818 162

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# METAL-Print

## The Development of a New Flexible Manufacturing Technique for Highly Detailed, Custom-Made Metallic Products by Metal Inkjet Printing

In order to increase the competitiveness and internationalisation of small to medium-sized enterprises (SMEs) in the highly competitive manufacturing industry of jewellery and electronics, a new flexible manufacturing (FM) technique for highly detailed, custom-made metallic products by metal inkjet printing is being developed.

This technique will contribute to the effective improvement of the development of new products, which is an iterative process involving design and visualisation, building prototypes, testing and evaluation. New flexible manufacturing techniques are even more indispensable and urgent when the need for more complexity in one product at lower cost, increased functions and manufacturing flexibility pushes the requirements far beyond the capability of traditional manufacturing methods.

There is a strong need worldwide for a FM technique for high-end metallic products, which have the technical specifications (integrity, accuracy and shape), appearance (material, texture) and feel of the desired product. In addition, there is a strong need for manufacturing of (complex) one-offs, e.g. jewellery and small-series technical parts (electronic PCBs, thermal safety devices). FM by metal inkjet printing is based on additive free-form fabrication technologies for the automated production of complex end products. It is defined as the direct production of finished goods using additive processes from digital data.

This implies that the technical specifications (integrity, accuracy), function (e.g. conductivity) and appearance (structure, texture) and feel of the desired product are met by the metal inkjet printing technology. A key advantage is that it eliminates the need for tooling, that can make the introduction of new products prohibitively expensive, both in terms of time and money.

The ability to make multi-layer structures will also be incorporated. This can be realised by having two separate inkjet heads: one for the metal and

the other one for the isolating polymer. At this moment, TNO has such a system in operation for temperatures of up to 300 °C. The new system to be developed can also be mounted on this stage to see how it performs.

SME partners identify the need for a production method for a highly automated metal-part production process, capable of making very small dimensions, in very short run lengths, still economically viable, having a reduced impact on the environment. This technology must be non-contact, flexible, digital data driven and low cost, through the appropriate design of the product. Metal inkjet printing meets these requirements.

This project addresses the industrial development of metal printing technology and its implementation in two industrial sectors with a strong innovative approach of bringing together a pan-European partnership of expertise along the entire technological chain of materials, hardware and software integration, and case studies, underpinned by a strong applied research programme.

The partnership uses results from research already being conducted by research and technological development (RTD) performers in the metal printing area. Knowledge and hands-on experience is available on the understanding of metal printing technology from fluid composition, fluid jet ejection, surface treatment and subsequent fluid-substrate interaction to control metal print quality characteristics.

As compared to other manufacturing techniques for metal parts, 3-D metal printing is clearly the only one with the potential to evolve into a widely applicable flexible manufacturing technique for many sectors within a short time.

The overall objective of the project is the (further) development and implementation of the metal printing technique into the new flexible manufacturing technique for fine metal parts via new mechanical, material and software methods in order



to resolve the mechanical strength, reproducibility and accuracy drawbacks of current manufacturing methods. It will result in functional end parts with proven quality, represented by two case studies, which “prove” the applicability of the developed metal printing manufacturing technique in specific product applications and demonstrators. The metal printing technique will be demonstrated in the jewellery and electronics industry, and will increase productivity by at least 50 %, at 50 % manufacturing costs’ reduction.

- 1 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH (NL)
- 2 INDUTHERM ERWAERMUNGSANLAGEN GMBH (DE)
- 3 REISCHAUER GMBH (DE)
- 4 ATELIER LE MARQUIS V.O.F. (NL)
- 5 MORENO / ATELIER DE BRUJN (NL)
- 6 VELLEMAN SWITCH (BE)
- 7 ARDEJE SARL (FR)
- 8 PERA INNOVATION LTD (UK)
- 9 FORSCHUNGSINSTITUT FÜR EDELMETALLE UND METALLCHIMIE (DE)



**Contract:** 18070  
**Call:** FP6-2003-SME-1  
**Starting Date:** 15/09/2005  
**Duration (months):** 30  
**Total cost:** € 1 069 854  
**EC Contribution:** € 553 962

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# MICROCHEM

## A Multipurpose Industrial Chemical Reactor Using Tuneable Frequency Microwaves

The chemical industry is a major contributor to employment, technology and wealth creation in Europe and directly employs 520 000 people. More than 95 % of the chemical companies are small to medium-sized enterprises (SMEs) employing about 30 % of the workforce. To maintain this position, the chemical industry is constantly seeking to increase yields and reduce production times.

Microwaves operating with a frequency of 2.45 GHz are able to drastically reduce chemical reactions under conventional heating from hours to just minutes, and in addition to produce the more controlled reactions required to create eco-friendly green chemistry. Currently, only a laboratory system exists for the production of a few cubic centimetres of chemicals. The project aims to develop a multi-purpose prototype chemical reactor using microwave chemistry, for the continuous production of bulk chemicals at commercial production rates (kilograms per hour). This will be achieved by combining, for the first time, both centrifugal technology and microwave sources having tuneable frequencies within the range of 2 GHz to 26 GHz. The availability of a tuneable frequency will allow the microwave process to be optimised at all stages of its reaction to generate maximum product yield whilst reducing the time-consuming chemical extraction procedures. In addition, sensors for measuring temperature, power and dielectric properties within the chemical reactor will permit computer control of the process.

It is proposed to use the new system to investigate the production of four important pharmaceuticals having a high commercial added value. Such experiments will create a wealth of new information, from which it may be possible to elucidate the mechanism of how microwave energy is able to substantially speed up these polar chemical reactions. By creating a microwave chemical reactor, both the microwave and chemical sectors of industry will benefit by the consolidation of existing employment in the EC, and create new jobs by gaining a technology lead over the competitors in the US, Canada and Japan.

- 1 LIVERPOOL JOHN MOORES UNIVERSITY (UK)
- 2 SURFACE TRANSFORMS (UK)
- 3 COMBILIFT LTD (IE)
- 4 FELDEC (UK)
- 5 PROTENSIVE (UK)
- 6 ASPEN ELECTRONICS (UK)
- 7 MERCACHEM (NL)
- 8 ORGANON (FR)
- 9 UNIVERSITÉ DE RENNES 1 (FR)

**Contract:** 17658  
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# MICROCON

## New Economical and Ecological Solutions to Reduce Raw Material Costs of Cement-Based Products by Utilising Micro Technology

414

Co-operative research

The project aims to develop an economical and ecological reduction of the raw material costs of cementitious products through the development of a waste-based micro filler composite for the concrete industry; at the same time the project will provide economical and ecological improvements in the technical properties of cementitious products.

Raw material and production costs of cementitious products have increased and are increasing all the time. Simultaneously, as structures of tomorrow become larger and more complex, the construction materials will be required to meet more demanding standards of performance than those in force today. High-performance concrete should have properties such as high workability, dimensional stability and strength, and long durability in service. This trend has led to the use of higher cement contents and more admixtures in cementitious products. This especially concerns self-compacting concrete (SCC) and dry product pre-mixes.

The microstructure of concrete and mortar has a great impact on the properties of fresh and hardened concrete. The project seeks to improve these properties through the development of waste-based filler composites, which can help to optimise the microstructure of cementitious products and reduce the need for high cement and admixture amounts.

The optimised micro-composite is a potential commercial product for the manufacture of high-performance mortars and concretes (ready-mixed concretes, precast concrete products including SCC and dry pre-mix products), and has the potential of improving the competitiveness of companies by reducing their raw material costs and of increasing their turnover, either as end-users or as producers of micro filler composites, or both.

- 1 CT HEIKKINEN OY (FI)
- 2 MILLAB CONSULT A/S (NO)
- 3 TECNOCHEM ITALIANA SPA (IT)
- 4 JOUTSENON ELEMENTTI OY (FI)
- 5 STU-K A.S. (CZ)
- 7 VALTION TEKNILLINEN TUTKIMUSKESKUS (VTT) (FI)
- 8 BUNDESANSTALT FÜR MATERIALFORSCHUNG UND -PRÜFUNG (DE)
- 9 ITC-CNR "ISTITUTO PER LE TECNOLOGIE DELLA COSTRUZIONE" (IT)



**Contract:** 17620  
**Call:** FP6-2003-SME-1  
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**EC Contribution:** € 891 384

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# MONARCH

## Ultra-Bright Nanoscale SEM-on-a-Chip

The technological objective of the MONARCH project is to produce the world's first scanning electron microscope (SEM) on-a-chip. Such an instrument would represent a step-change in electron beam (e-beam) technology comparable with the introduction of the silicon chip to electronics. This device will be orders of magnitude smaller than existing technology, would operate at lower voltages and have an order of magnitude higher resolution for a fraction of the cost of a current state-of-the-art SEM. It would provide the first instrument capable of rapidly scanning a surface layer and producing an image with elemental identification at atomic resolution. This disruptive technology has dramatic implications for many sectors other than electron microscopy, including e-beam lithography, genetic sequencing, ultra-high density data storage and focussed ion beam milling. In particular, it is expected to be a key enabling tool for the booming sectors of nanotechnology and MNEMS (micro-nano-electromechanical systems). Crucially it could also allow lithography on a scale suitable for true nano-electronics.

The physics behind the MONARCH project are beautifully simple: by scaling the device dimensions down to the nano-scale, the voltages, beam energies and aberrations are scaled down proportionally. The system becomes diffraction-limited, rather than aberration-limited, and the lenses can be electrostatic rather than magnetic. These principles have been known for decades, but the realisation of such devices has only been made possible through very recent parallel advances in several nano-machining technologies: improved FIB techniques, the evolution of MEMS technology and scanning probe microscopy (e.g. very short focal length electrostatic lenses). In short, these techniques have transformed a thought-experiment into a realistic possibility: ultra-low energy, ultra-high power, ultra-pure e-beams.

MONARCH will deliver a prototype operational integrated SEM-on-a-chip system.

- 1 VIVID COMPONENTS LTD (UK)
- 2 NANOFABORY INSTRUMENTS AB (SE)
- 3 NFAB LTD (UK)
- 4 CONCEPT TO VOLUME B.V. (NL)
- 5 OMICRON NANO TECHNOLOGY GMBH (DE)
- 6 NANOBEAM LTD (UK)
- 7 GATAN UK LTD (UK)
- 8 UNIVERSITY OF SALFORD (UK)
- 9 UNIVERSITEIT TWENTE (NL)
- 10 CHALMERS TEKNISKA HÖGSKOLA AB (SE)

**Contract:** 32732  
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# MULTISENS

## Cameras as Multifunctional Sensors for Automated Processes

416

Co-operative research

The goal of the project is the development of a "smart" camera for process control and fault detection in automation. The camera should take the role of several sensors and thus reduce the setup time for machines substantially. Two prototypes will be developed that are targeted at low-speed (40ms) as well as high-speed (1ms) applications.

In most automatic assembly machines a large number of (sometimes expensive) sensors are used to check whether the machine is still operating correctly or to avoid collisions. A typical situation is that a sensor has to make sure that a gripper is retracted, before the handled object moves on to the next station. The setup of these sensors and programming of the right timing in a PLC (programmable logic controller) program is a very time consuming process. Within the project a camera system will be developed that will help the 135 000 small to medium-sized enterprises (SMEs) in the European mechanical engineering industry in building their machines. The proposed device is essentially a camera which is combined with a processing unit and will be able to visually interpret image sequences of automated processes, report malfunctions and deviations in the process and assist the task of programming the right sequence of events.

www.multisens.org

- 1 ANALOGIC COMPUTER LTD (HU)
- 3 HAGE SONDERMASCHINENBAU GMBH & CO.KG (AT)
- 4 MASCHINENBAU HEINRICH HAJEK GMBH & CO.KG (AT)
- 5 HOCHRAINER GMBH (DE)
- 6 PROFACOR PRODUKTIONSFORSCHUNGS GMBH (AT)
- 7 FOUNDATION FOR RESEARCH AND TECHNOLOGY - HELLAS (GR)
- 8 COMPUTER AND AUTOMATION RESEARCH INSTITUTE, HUNGARIAN ACADEMY OF SCIENCES (HU)



FP6 Project Catalogue

**Contract:** 512668  
**Call:** FP6-2002-SME-1  
**Starting Date:** 01/11/2004  
**Duration (months):** 24  
**Total cost:** € 1 406 703  
**EC Contribution:** € 839 392

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# MULTIWEAVE

## Weaving Machine for Producing Multiaxial Fabric

Technical textiles is a new sector of the textile industry that has experienced a rapid growth in recent years, thanks to the new materials that have been developed for each specific application.

The structural market conditions of technical textiles are completely different from the traditional sectors (clothing, home textiles), where nearly everything is ready to use and the market is well defined.

In the technical textiles market, the client defines the objectives and specifications by a set of technical parameters. The production development can occur over a long period of time, sometimes years, using expensive materials and performing a very high number of tests on the products and their respective applications. Positive results, in this sector, are only possible by a permanent dialogue between the fibre supplier, manufacturer and final client. In order to achieve the main objectives, a strong financial position is required, as well as high skills in terms of textile engineering and product design.

Major considerations that should be taken into account when starting a research and development activity in this field can be summarised as follows:

- developments in this field need larger amounts of time and resources than those on traditional textiles;
- even when the technical success is considered very good, profits could be low if mass production is not achieved;
- demand for more challenging product specifications is increasing, so the machinery should be more sophisticated and quality control more restrictive;
- research and development is always hard for small companies, so research centres where know-how is gathered, reducing or eliminating financial and technical risks, should undertake it;

- scientific and technical knowledge in other fields beyond textiles and clothing is required.

The main objective of the MULTIWEAVE project is to develop new manufacturing processes that can take advantage of the possibilities of new woven structures. One of the most important characteristics of technical textiles is the possibility of providing a specified strength in multiple directions. In order to achieve this objective, the research team is determined to develop a new concept that could produce a multiaxial fabric. This kind of fabric is designed to boost the reinforcement in bias directions, by the insertion of interlaced yarns between the weft and warp in a woven structure.

- 1 P. & MAIA LDA (PT)
- 2 SAMDAL ENGINEERING (NO)
- 3 SPOLSIN SPOL S.R.O. (CZ)
- 4 MAGEBA TEXTILMASCHINEN GMBH CO. OHG (DE)
- 5 UNIVERSIDADE DO MINHO (PT)
- 6 RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN (DE)
- 7 LABOR SRL (IT)
- 8 INSTITUTO AGILUS DE INOVAÇÃO EM TECNOLOGIAS DE INFORMAÇÃO LDA (PT)

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**EC Contribution: € 444 115**

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# NAGINELS

## Non Aggressive Internal Engraving Laser System

418

Co-operative research

Laser marking is a key manufacturing technique required for product identification, traceability and anti-counterfeiting. For transparent materials, current laser technologies (YAG – Yttrium Aluminium Grenat) do not meet the industrial requirements. Recently, a laboratory laser technology (Ti:Sa – Titanium – Sapphire crystals) has shown promising results when engraving materials with femtosecond (in the range of 10-15 second) pulses, but has still major problems for its industrialisation (speed, reliability, price, etc.).

This is why a consortium of four small to medium-sized enterprises (SMEs) active in the decorative, anti-counterfeiting and normative marking sectors - COSTET, SOLOS, TBS, KST - have asked two SMEs (LASEA and AMPLITUDE) acting as research and technological development (RTD) performers, together with two research centres which are experts at non linear light/matter interactions (CSL) and femtosecond micromachining (PALA), to validate a new internal engraving process for transparent materials using a new type of Femto laser (using Ytterbium crystal).

The project objective is to develop and to validate an engraving system using a new type of high repetition rate femtosecond laser, cheap and reliable enough to be integrated in an industrial system.

Reaching the industrial quality of YAG lasers and the potentiality of Femto lasers (high quality processing, without thermally induced damages), within a cost effective system goes beyond the state of the art. It will enable end-users to generate:

1. complex decorative designs which make copying very difficult;
2. high resolution invisible codes linked with anti-counterfeiting signatures;
3. indelible normative marking. The project results can be applied to all transparent pieces in a wide range of industries (automotive, pharmaceutical, beverage, luxury goods).

The project is led by a multidisciplinary team with the complementary resources and competences to achieve the project goals. It impacts the competitiveness of both the industrial partners and the RTD providers: the industrial partners will be given access to a very innovative laser technology by one of the few European players in the field. The research partners will be the first consortium of SME companies in Europe to validate and exploit an industrial Femto laser engraving system responding to a growing market demand and offering competitive processing costs.

www.naginel.com

- 1 KST - KS TECHNIQUES S.A. (BE)
- 2 TBS - TOTAL BRAND SECURITY LTD (UK)
- 3 COSTET S.A. (FR)
- 4 SOLOS - SOLOS IDENTIFICAZIONE E PROTEZIONE S.R.L. (IT)
- 5 AMPLITUDE SYSTÈMES S.A. (FR)
- 6 LASEA - LASER ENGINEERING APPLICATIONS (BE)
- 7 UNIVERSITÉ BORDEAUX I - PALA (BE)
- 8 UNIVERSITÉ DE LIÈGE - CENTRE SPATIAL DE LIÈGE (BE)



FP6 Project Catalogue

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# NaMaCo

Nano-Structured, Thermally Sprayed, Magnetic Coatings for Microwave Absorption Applications

The specific objective of the proposed project is to develop a new system for absorbing reflected high-frequency radiation. The approach will be to thermally spray nano-structured ferrite powders onto components such as waveguides or housings, under controlled conditions, to deposit coatings with both low porosities and very small grain sizes — this combination is critical for optimum performance. The work will involve innovative developments in powder manufacture and thermal spraying technology.

The developed process is intended to replace the current approach which is to use conventional pressed and fired ferrite plates (bulk material) that are then glued on waveguide walls, for example, resulting in problems with air gaps and the presence of adhesive, as well as being expensive in labour and materials. Research will focus on high velocity oxy fuel (HVOF) spraying which is now known to be capable of being controlled so as to avoid degradation of powders during spraying, thereby retaining the original material structure and chemistry in the coatings.

It is anticipated that a further benefit from this work will be that the sprayed coatings will find applications over a wider frequency range than is currently possible. Whilst the deliverables from the proposed work are products with electronics applications, the research will also establish the underpinning methodology for thermally spraying nanostructured coatings for functional applications.

This proposal conforms to the objectives of the specific programme on strengthening the ERA and the 'Horizontal research activities involving small to medium-sized enterprises' (SMEs') work programme, in that it will create a transnational group of small enterprises and researchers undertaking research aimed at enhancing the competitiveness of European SMEs in the electronic components manufacturing sector. It will also address social objectives relating to the role of women in science, working conditions and health and safety issues.

- 1 UNIVERSITY OF NOTTINGHAM (UK)
- 2 ADVANCED FERRITE TECHNOLOGY GMBH (DE)
- 3 RYBAK & HOSCHELE GMBH (DE)
- 4 RASCEUR INDUSTRIAL INNOVATIONS B.V. (NL)
- 5 OSEIR LTD (FI)
- 6 PHOENIX SCIENTIFIC INDUSTRIES LTD (UK)
- 7 PYROGENESIS S.A. (GR)
- 8 METALLISATION LTD (UK)
- 9 AACHEN UNIVERSITY, SURFACE ENGINEERING INSTITUTE (DE)
- 10 POWDER METALLURGY INSTITUTE, NATIONAL ACADEMY OF SCIENCES OF BELARUS (BY)

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**EC Contribution: € 782 750**

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Materials & Processes

# NANOCERAM

Cutting Tools and Miniaturised Parts with Complex Geometry Based on Nano Powders

420

Co-operative research

The aim of the project is to develop the technology of processing of nanosized ceramic powders including the adoptions of shaping method for prototypes as well as for small and large series. The project is focused on applications of Y-stabilized ZrO<sub>2</sub> and Si<sub>3</sub>N<sub>4</sub> for wood cutting tools as well as for parts of medicine technique and micro systems, micro reactors and sensors.

The plasma chemical technology for powder manufacturing and new technologies of surface modifications of the powders will be a breakthrough for the use of ceramic nanopowders in connection with the shaping methods gel casting, injection moulding and pressing. The sintering methods must become developed for nanopowders to get dense materials with nanosized microstructure. Wear-resistant cutting tools and instruments, gears and bearings with low friction coefficient will become key components for new products.

The involvement of small to medium-sized enterprises (SMEs) guarantees the flexibility to enter into the aimed market. Other applications will follow.

www.ikts.fraunhofer.de

- 1 DICERAM COMPONENTS GMBH & CO.KG (DE)
- 2 PLASMA & CERAMIC TECHNOLOGIES LTD (LV)
- 3 GOCERAM AB (SE)
- 4 FCT INGENIEURKERAMIK GMBH (DE)
- 5 FORMATEC TECHNICAL CERAMICS B.V. (NL)
- 6 JOHANN EBERHARD GMBH (AT)
- 7 ANTON PEITZ ZERSPANNUNGSTECHNIK (DE)
- 8 FORMAO (FR)
- 9 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 10 SVENSKA KERAMINSTITUTET AB (SE)
- 11 INSTITUTE OF INORGANIC CHEMISTRY OF THE RIGA TECHNICAL UNIVERSITY (LV)



FP6 Project Catalogue

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# NANOREFLEX

## New Water-Based Industrial Coating Technology for Environmental-Friendly High-Reflective Metallic Coatings Based on Nano-Coated Sub-Micron Aluminium Pigments

A new water-based coating system for industrial high reflective metallic coatings will be developed in this project. To achieve this high metallic reflectivity — matching those of a recently developed Japanese organic solvent based spray coating technology — in an environmental-friendly water-based coating system, several fundamental physical and chemical obstacles have to be overcome by suitable research. This will be achieved by:

- the development of new specially adopted sub-micron aluminium pigments with even, high reflective and organic substance-free surfaces;
- the development of a specialised nano coating process to protect, stabilise and functionalise these pigments for the use in an aqueous system;
- the development of a tailored binder matrix with specific, well-defined chemical and physical properties towards the pigments, the substrates and external influences;
- the formulation of an aqueous coating system combining pigments and binder matrix with suitable additives to achieve the desired functionality and processing properties;
- the evaluation of the desired fundamental physical and chemical properties of the new aqueous coating, in accordance with the requirements of different industrial applications;
- the proof of the fundamental technical feasibility of the new coating technology in industrial application processes.

Successful realisation of the project will not only dramatically improve the competitiveness of the involved small to medium-sized enterprise (SME) partners. It will also decrease the dependency of European industry from Japanese technology and support the implementation of the EC Integrated

Product Policy (IPP) and the EC VOC Directive 1999/13/EG. The results of the research project will be protected and exploited by the SME partners after the project by development of suitable industrial products and services. Awareness for the new coating technology in European industry will be generated by suitable dissemination actions.

421

Co-operative research

- 1 FRANKEN-COATINGS GMBH & CO. KG - SECTION PAINTS AND COATINGS (DE)
- 2 HELLA KG HUECK & CO. (DE)
- 3 ILF FORSCHUNGS- UND ENTWICKLUNGSGESELLSCHAFT LACKE UND FARBEN MBH (DE)
- 4 QCR COATINGS LTD (UK)
- 5 BENDA-LUTZ WERKE GMBH (AT)
- 6 ORNELA A.S. (CZ)
- 7 MODUS CESKY VYROBCE SVITIDEL SPOL. SR. O. (CZ)
- 8 VIENNA UNIVERSITY OF TECHNOLOGY, INSTITUTE OF MATERIALS CHEMISTRY (AT)

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Materials & Processes

# NANORUB

## Customised Nanocomposites Based on Rubber Matrices for High-Demand Applications

422

Co-operative research

The complexity of including new factors in an already very complex system of rubber matrix-carbon black filler-mixing and vulcanisation conditions has brought about recent revolutionary innovations in the plastics industry, such as the use of nano-particles to improve stiffness, strength, abrasion resistance, barrier effect and fire behaviour: these have not yet been applied in the rubber industry.

With this in mind, the project NANORUB intends to develop an industrial technology for the production of nanoclay-based (montmorillonite) rubber composites, with the following steps:

- development of a production-exfoliation process for montmorillonite, based on organoammonium or phosphonium salts, with the organic moiety being as compatible as possible with the rubber matrix;
- surface treatment of the nanoparticles to impede clustering and to promote adhesion with the rubber matrix, using to that purpose peroxydic macroradicals, functionalised liquid rubber and organosilanes;
- optimisation of the formulation, processing and vulcanisation conditions, in order to obtain a nanoclay-rubber composite material with at least three times better abrasion resistance, 50 % improved stiffness, 30 % improved strength and 20 % delayed ignition with respect to the equivalent reference non-nanoclay reinforced product. Price should not exceed the reference by more than 40 %;
- use of the developed materials in the production of prototypes of improved moulded parts, rubber bearings, rubber cords and conveyor belts.

From six countries, the consortium brings together eight small to medium-sized enterprises (SMEs) and one industry, namely a nanoparticle producer, a specialty chemicals manufacturer, a mixer-

compounder, a machinery constructor, and four end-users producing moulded parts, rubber cords, conveyor belts and rubber bearings. They are supported by four research organisations in the fields of rubber and plastic processing, including nanocomposites, machinery design, rubber materials formulation-testing and interfacial modification in organic-inorganic systems.

<http://eu-nanorub.com>

- 1 L'UREDERRA, FUNDACIÓN PARA EL DESARROLLO TECNOLÓGICO Y SOCIAL (ES)
- 2 POLYCOMP B.V. (NL)
- 3 PLAZMA, KERAMIKA, TEHNOLOGIJA SIA (LV)
- 4 HERDIT S.L. (ES)
- 5 CAUCHO METAL PRODUCTOS II, S.L. (ES)
- 6 POLYMER LABORATORIES LTD (UK)
- 7 WARSZAWSKIE ZAKŁADY PRZEMYSŁU NIEORGANICZNEGO STOICHEM (PL)
- 8 ZAKŁADY PRZEMYSŁU GUMOWEGO "SANTOCHEMIA" SPÓŁDZIELNIA PRACY (PL)
- 9 SILVERTOWN UK LTD (UK)
- 10 SMITHERS RAPRA TECHNOLOGY LTD (UK)
- 11 PIASTOWIE INSTYTUT PRZEMYSŁU GUMOWEGO STOMIL (PL)
- 12 UNIVERSITÀ DEGLI STUDI DI MESSINA (IT)
- 13 LAVIOSA CHIMICA MINERARIA S.P.A. (IT)



FP6 Project Catalogue

Contract: 18003  
Call: FP6-2003-SME-1  
Starting Date: 01/09/2005  
Duration (months): 24  
Total cost: € 1 306 089  
EC Contribution: € 732 349

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# NANOTUBE

## Development of Carbon Nanotube-Based Protective Coatings for Anodes in Electron Tube Devices

Electron tubes (magnetrons, travelling wave tubes, triodes, etc.) are vacuum operating devices that are widely used as radiofrequency oscillators and amplifiers. They have a huge number of applications in industrial systems, such as microwave ovens or driers, and telecommunications (radars, etc). The performance of electron tubes depends on several design aspects. One fundamental limitation of high-power electron tubes is the fact that the anode of these devices must withstand enormous electron densities, which result in the production of secondary electrons inside the tube, and consequences related to outgassing, instability, efficiency losses and reduction of device lifetime.

The present project aims at developing a thin film coating technology, based on carbon nanotubes (CNTs), able to produce protective coatings for the electron tube anodes. From the electrical point of view, these carbon-based structures have extremely interesting properties that make them ideal for use as protective coatings in electron tube anodes: extremely high conductivity, capacity to sink huge current densities without being degraded, and capability to capture secondary electrons, due to the electric field generated at their tip. Throughout the project, vacuum reactor for producing CNTs will be built up. CNTs will be grown under different conditions, and the material characterised by different spectroscopic techniques, atomic force microscopy and electron microscopy, in order to establish the relationship between the growth conditions and the physical properties of the coatings. Real devices will be produced which will include CNT-coated anodes, and their performance will be tested and compared with standard devices.

- 1 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)
- 2 COVIMAG S.A. (FR)
- 3 TEER COATINGS LTD (UK)
- 4 SAIREM S.A. (FR)
- 5 FRICKE UND MALLAH MICROWAVE TECHNOLOGY GMBH (DE)
- 6 S.P.R.I.N.T. SRL (IT)
- 7 TTI NORTE S.L. (ES)
- 8 UNIVERSITY OF BARCELONA, PHYSICS AND ENGINEERING OF AMORPHOUS MATERIALS AND NANOSTRUCTURES GROUP (ES)
- 9 UNIVERSITY OF BARCELONA, PHYSICS AND ENGINEERING OF AMORPHOUS MATERIALS AND NANOSTRUCTURES GROUP (ES)
- 10 FELTALÁLOI ES KUTATÓ KÖZPONT FKT (HU)
- 11 INNOVACJA POLSKA SP Z.O.O. (PL)

**Contract:** 32713  
**Call:** FP6-2004-SME-COOP  
**Starting Date:** 01/10/2006  
**Duration (months):** 24  
**Total cost:** € 1 390 295  
**EC Contribution:** € 866 193

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Materials & Processes

# NEEDLES

## Knowledge-Based Process Control System to Optimise Needle Performances for High Added Value Needle-Punched Nonwovens

424

Co-operative research

The process technology for the needling of the fibre webs is characterised by needle design, needle density per working width, stroke frequency, feeding and delivery speed. Fineness, design (amount and location of barbs) and strokes of the needles determine the degree of consolidation of the felt.

The performance and quality of the felt heavily depend on the number of fibres which are reoriented at each penetration of the needles without damage, and how many penetrations per unit area are made. The ageing of needles strongly affects final performance and quality as the barbs wearing causes a much decreased reorientation of the fibres. This issue becomes even more important when processed reclaimed fibres or recycled material are used for different products in the automotive or other industries. The stress of the needles is then highly increased by the heterogeneity of the delivered fibre web of recycled material. Impurities and thickenings immediately lead to massive needle breaks and production must be stopped.

The innovative idea of this project is to investigate simple measurable variables in connection with the needle performance. These measurable variables together with the application of the mathematical model will quantify the occurring of needle ageing and needle breakage, in order to be able to predict and prevent needle breakage. A high-speed multi-sensor approach will be taken into consideration, for developing an automatic online control system for needle-punching machines, able to control in real time the performances of the needles, and to monitor and predict their ageing.

[www.dappolonia-research.com/needles](http://www.dappolonia-research.com/needles)

- 1 CIM-MES PROJEKT SP.Z.O.O (PL)
- 2 GEO TEXTIL WESTSACHSEN GMBH (DE)
- 3 KONUS-KONEX D.O.O. (SI)
- 4 TECHNOPLANTS S.R.L. (IT)
- 5 DIDI & GORI S.P.A. (IT)
- 6 D'APPOLONIA S.P.A. (IT)
- 7 SKA POLSKA SP. Z.O.O (PL)
- 8 SAECHSISCHES TEXTILFORSCHUNGSINSTITUT E. V. (DE)



FP6 Project Catalogue

**Contract:** 18221  
**Call:** FP6-2003-SME-1  
**Starting Date:** 15/09/2005  
**Duration (months):** 26  
**Total cost:** € 1 518 622  
**EC Contribution:** € 910 261

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# NEWTRESI

## New Treatments for Surgical Implants

The objectives of this project are to set-up two innovative vacuum thin film treatments to be deposited on the surface of surgical implants. We will study two categories of implants: The first category is represented by electronic prosthesis for Intracocular implants; in this case the treatments must replace the ceramic case now used, too thick, and must have a very high level of barrier against water (body fluids) and to be dielectric (to guarantee the wireless communication with external parts) and to be biocompatible.

The second category is represented by Dental and Orthopaedic Titanium prosthesis; the purposes of this coating are: to protect the prosthesis itself by the erosion of body fluids, to guarantee a faster Osseo integration (not less than 50 % reduction of ossification time), to be biocompatible and to avoid rejection by softening of the interface between bone and implant (more than 20 years of lifetime).

To obtain these performances we planned to use two innovative deposition technologies.

- Ion Plating Plasma Assisted (IPPA) (mainly in the configuration Reactive Low Voltage Ion Plating Plasma Assisted (RLVIPPA).
- High Density Plasma Enhanced Chemical Vapour Deposition Plasma Assisted (HDPECVD). Using this deposition process we aspire to obtain very dense, compact, adherent and very hard layers. To realise the dielectric barrier treatment for electronic prosthesis we planned to use a multilayer of alternate inorganic and semi-organic layers, deposited by IPPA and/or HDPECVD (such as SiC, Al<sub>2</sub>O<sub>3</sub> and SiO<sub>x</sub>C<sub>y</sub>, etc.). We planned to use for dental and orthopaedic implants coatings of TiC<sub>x</sub>O<sub>y</sub> Titanium-Oxycarbide that, deposited by laser ablation showed the desired properties. The use of the proposed deposition techniques is necessary because Laser Ablation is not suitable for an industrial production.

The expected results will contribute to the social objectives of European community by improving the quality of life and sustaining employment increasing the EU competitiveness with respect to the US, Japan and Far East.

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Co-operative research

- 1 ASSING S.P.A. (IT)
- 2 IONBOND LTD (UK)
- 3 UPPSALA UNIVERSITET (SE)
- 4 BIOPHY RESEARCH S.A. (FR)
- 5 ROMANA FILM SOTTILI SRL (IT)
- 6 UNIVERSITAET INNSBRUCK (AT)
- 7 HIPOT-HYB PROIZVODNJA HIBRIDNIH VEZIJ D.O.O. (SI)
- 8 OR-VIT - VITERIA ORTOPEDICA S.R.L (IT)
- 9 COATING PLASMA INDUSTRIE SAS (FR)
- 10 CAMPUS MICRO TECHNOLOGIES GMBH (DE)
- 11 MED-EL ELEKTRO-MEDIZINISCHE GERATE GMBH (AT)

**Contract:** 508344  
**Call:** FP6-2002-SME-1  
**Starting Date:** 01/12/2004  
**Duration (months):** 30  
**Total cost:** € 1 874 000  
**EC Contribution:** € 962 000

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# NODESZELOSS

## Novel Device to Study Pulp Suspensions Behaviour in Order to Move Towards Zero Energy Losses in Papermaking

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Co-operative research

Pulp suspensions are different from other solid-liquid systems because of the unique interactions between the different components of the fibre furnish: fibres, fines, fillers, additives, DCM, etc. Fibre-fibre interactions, fibre-water, fibre-fines, fibre-additives, fines-additives, etc., are very important in these heterogeneous samples giving rise to complex shear mechanisms that are different from classical slurry systems.

The flow properties of the pulp suspensions are important for the optimal functionality of most unit operations in pulp and papermaking. The aim of this project is to develop a novel device to study pulp suspensions behaviour and to explore two potential uses for the new device: the improvement of equipment design and wet end chemistry optimisation. The identified benefits are: pumping energy cost saving of 19 %; maintenance cost reduction by 2 %; performance improvement in pulp processing, which also improves product quality; and potential cost reduction by means of wet end optimisation.

The paper value chain has a strong influence on the European economy. Only in the EU countries (not including the eastern countries) the total annual turnover represents EUR 73 billion, with an average growth of 3 %. There are 895 companies with 1 257 mills, the capital investment is EUR 5 billion a year, the sector employs 251 000 people directly and 3.5 million people indirectly and the total paper production is 91 million tonnes, representing one third of the world production. Small to medium-sized enterprises (SMEs) represent a substantial part of this sector being one of the industrial sectors where consolidation takes place at a slow pace compared with other important European industrial sectors, and it is expected that at the end of the consolidation process 500 SMEs will still continue in market niches based on a recent study carried out in 2003 by Price Waterhouse consultancy services. This demonstrates that any action to reduce cost in papermaking will have a significant direct impact on the SMEs.

This project addresses the specific problem of cost saving of a group of SMEs paper mills, specially related to energy and maintenance costs and chemical programme evaluation, to optimise the wet end of the paper machine. A multinational consortium formed by eight SMEs and three research and technological development (RTD) performers from five European countries has been established in the proposal.

Furthermore, it is anticipated that the technical information generated during the project could be used for a code on best practice at European level for pump design and it may set a new standard for pump design in Europe for the pulp and paper industry.

[www.ucm.es/nodeszeloss](http://www.ucm.es/nodeszeloss)

- 1 UNIVERSIDAD COMPLUTENSE DE MADRID (ES)
- 2 PAPELERA DEL PRINCIPADO S.A. (ES)
- 3 PAPELERA DEL JARAMA S.A. (ES)
- 4 MILLVISION B.V. (NL)
- 5 PAKA GLASHUETTER PAPPEN- UND KARTONAGENFABRIK GMBH (DE)
- 6 GRUENPERGA PAPIER GMBH (DE)
- 7 AQUA+TECH SPECIALTIES S.A. (CH)
- 8 GOPACA - FÁBRICA DE PAPEL E CARTÃO S.A. (PT)
- 9 JUAN ROMANÍ ESTEVE S.A. (ES)
- 10 TECHNISCHE UNIVERSITÄT DRESDEN (DE)
- 11 FACULDADE DE CIÊNCIAS E TECNOLOGIA - UNIVERSIDADE DE COIMBRA (PT)



FP6 Project Catalogue

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EC Contribution: € 660 100

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Ceramic wall tiles (the subject of this proposal) are normally porous so as to favour their adhesion to walls, and are glazed to provide the required characteristics, such as water and detergent resistance, ease of cleaning, permanent aesthetic characteristics, etc.

The manufacture of ceramic wall tiles has undergone considerable and continuous change over the past years. Ceramic wall tiles can be manufactured in two different ways

- Double firing process: In this process, the pressed body is fired to form a biscuit and subsequently a glaze is applied on top of this and the body is once again fired to obtain the final finish.
- Single firing process: In the single firing process, the glaze is applied directly on to the pressed and raw body; both are fired simultaneously to obtain the final finish.

For many years there has been a controversy with regard to which of the two methods is better. Advances in body and glaze in formulation, associated with a strict control of manufacturing stages, has allowed production of acceptable wall tiles using the once-firing approach (Monoporosa). Wall tiles produced by once firing are also termed Monoporosa. Besides reducing energy and production time, the single firing process is very easy to automate, which in turn results in cost reductions. Therefore the general trend for wall tiles production is to be manufactured by once firing process.

The drawback of once firing is that only limited decoration ranges and techniques are allowed. Decoration represents a key stage in order to embellish tiles to meet customer aesthetic demands. Sometimes, several layers of glazes of different compositions producing a variety of different effects are applied to produce sophisticated design.

Sometimes, a third fire is used to produce specific effects, or for example when precious metals are used in decoration. Once firing constrains the opportunities for product differentiation, so some companies, mainly small to medium-sized enterprises (SMEs), are still using the twice firing process.

Twice fired tiles represent the high end market of the tile production. The process allows a somewhat wider decorative choice that can demand a higher price and also provides differentiation that can not be achieved by monoporosa technology.

However, twice-fired wall tile manufacturers are implicitly and in some cases explicitly forced to change their production to once-firing technology in order to reduce energy consumption, increase process efficiency and remain competitive. Another pressure towards the monoporosa production is a widely spread speculation in the industry that the main glaze suppliers are contemplating terminating the supply of glaze for twice firing, due to decreasing demand and more complicated production.

Twice-firing wall tiles producers therefore have the dilemma of choosing one of the following two options:

- transferring to Monoporosa production: however, this will compromise flexibility and the ability to fulfil high-margin low-quantity orders and significantly limit the product range; or
- finding alternative coating materials to replace glaze. However, these novel coating materials have to retain important key features (technical, hygienic, esthetical, economical, etc.) required for wall tiles.

This proposal aims to deliver a novel, durable, low-energy coating that opens up a host of new decoration possibilities for tiles and other ceramics, glasses.



The low coating temperature will open several new opportunities to utilise waste in the tile body and therefore will promote development of sustainable manufacturing processes. This should stimulate a growth in niche products that SMEs are best placed to exploit.

The consortium contains three SME tile producers from three different European countries, and one tile manufacturer belonging to a large Italian manufacturing group. This selection of end-users will help to diffuse the developed coating concept throughout Europe. The inclusion of an Italian equipment supplier will further ensure Spain and Italy (the two countries with more than 85 % of current European wall and floor tile production) are alerted to the project. The supply chain is completed through an SME coating supplier. The research and technological development (RTD) performers cover ceramics and nano-coating expertise, as well as (via Helsinki Art and Design University) the ability to marry science knowledge to the artistic “desires” of end customers.

- 1 CERAM RESEARCH LTD (UK)
- 2 ENGINEERED NANOPRODUCTS GERMANY GMBH (DE)
- 3 BRITISH CERAMIC TILES LTD (UK)
- 4 KERAMIKA BIELA HORA S.R.O. (SK)
- 5 FREEFORM ARTS TRUST LTD (UK)
- 6 INGEGNERIA CERAMICA S.R.L. (IT)
- 7 PUKKILA OY AB (FI)
- 8 LEIBNIZ-INSTITUT FUER NEUE MATERIALIEN GMBH (DE)
- 9 TAIDEOTEOLLINEN KORKEAKOULU (FI)
- 10 KONINKLIJKE MOSA B.V. (NL)



**Contract:** 5799  
**Call:** FP6-2002-SME-1  
**Starting Date:** 01/04/2005  
**Duration (months):** 24  
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**EC Contribution:** € 469 880

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# NOVIGLAS

InNOVative hIGH power LASer system based on polycrystalline Nd:YAG for marking, engraving, cutting and micro-drilling metal surfaces

Laser machineries have become more and more efficient and precise in the last years and the field of applications is very wide today. Nevertheless, on the market there are no laser machineries with high operational flexibility for marking, cutting, engraving and micro-drilling metals. The objective of NOVIGLAS is to realise an innovative laser system that will allow overcoming this limitation.

The main innovation of the project regards the diode-pumped solid-state (DPSS) source, based on polycrystalline Nd:YAG ceramics. With respect to mono-crystalline Nd:YAG: this material can not only be doped with a higher amount of Nd (5 times more) but can reach better optical and thermal levels and is easier and less expensive to produce. The particular pumping geometry adopted for the DPSS laser source (edge pumped geometry) allows the reduction of the thermal stress on the Nd:YAG material. This obtains an output laser beam matching high power (200 W TEM00) with high beam quality ( $M2 < 5$ ).

- 1 INNOVA S.P.A. (IT)
- 2 GRAFOS S.R.L. (IT)
- 3 RETINAE S.R.L. (IT)
- 4 MONOCROM S.L. (ES)
- 5 GESELLSCHAFT FÜR FERTIGUNGSPROZESSPLANUNG, FORSCHUNG UND ENTWICKLUNG (DE)
- 6 EMIL BRÖLL GMBH & CO. (AT)
- 7 NATIONAL RESEARCH COUNCIL (IT)
- 8 OPTICLAB S.R.L. (IT)
- 12 FUNDACIÓN CARTIF (ES)
- 13 VILNIUS UNIVERSITY (LT)
- 14 AM ENGINEERING S.R.L. (IT)

**Contract:** 512318  
**Call:** FP6-2002-SME-1  
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**Duration (months):** 30  
**Total cost:** € 1 257 000  
**EC Contribution:** € 754 600

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## Highly Efficient and Low-Cost Ozone Compact Electrochemical Generator for Environmentally Friendly Disinfecting

Ozone is the second most powerful oxidant after fluorine. It is widely used to supplement or replace chlorine in a variety of processes including water treatment, the treatment and improvement of the quality of indoor air, plant growth, the preservation of fruits and vegetables, the etching and cleaning of semiconductors, textiles, paper, etc. In addition, ozone leaves no residue after disinfection, as opposed to chlorine which leaves toxic residue and substances which are harmful to both humans and the environmental.

Current commercial methods of obtaining ozone are based for the most part on the generation of a plasma corona through which air is driven, yielding small ozone concentrations in the region of 3 %wt in the resulting gas stream. Other methods for producing ozone are UV bombarding of oxygen — yielding around 0.1 %wt of ozone — and electrochemical ozone generators — producing higher concentrations, but with the penalty of enormous power consumption related to the evolution of by-product hydrogen in the electrolysis of water.

The proposed system is based on an electrochemical cell, which produces a mixture of oxygen and ozone in an adjustable ratio, and a hydrogen peroxide stream. The final device should meet the following operational targets:

- development of a noiseless electrochemical ozone generator using purified water and electrical energy to produce an adjustable ozone/oxygen stream (with up to 18 %wt of ozone) and an ozone production rate of up to 20 g/h;
- maximisation of energy efficiency, with an electrical power requirement of less than 2 kW, by depolarising the cell with oxygen at the cathode and thus producing hydrogen peroxide;
- costs of manufacture to enable a market price of between EUR 8 000 and EUR 10 000.

The resulting device must be compact, versatile, and easy to maintain so as to facilitate its use in the many applications where ozone and hydrogen peroxide are required.

The social impact of this proposed project will lie in the integration of a group of European small to medium-sized enterprises (SMEs) into a consortium, whose aim will be to work towards the development of novel technologies such as advanced polymer engineering, nanoparticle deposition, multiphase reactions, etc. All the partners will be actively involved by providing expertise, hardware, test installations, as well as a market to which this innovation can be distributed.

- 1 CENTRE DE RECERCA I INVESTIGACIO DE CATALUNYA S.A. (ES)
- 2 PIAS.A. ENGINEERING AND TRADING S.A. (ES)
- 3 SN-ELECTRONICS OY (FI)
- 4 AQUABIO TECH LTD (MT)
- 5 EILENBURGER ELEKTROLYSE-UND UMWELTECHNIK GMBH (DE)
- 6 BINIFALDO S.A. (ES)
- 7 VATIS (BE)
- 8 AQUALINE POOL KERESKEDELMI ES SZOLGALTATO KORLATOLT FELELOESSEGUE TARSASAG (HU)
- 9 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 10 FELTALALOI ES KUTATO KOZPONT SZOLGALTATO KFT (HU)



# Odour Control

Smart Odour-Control System to Increase Product Quality, Occupational Safety, and Safeguard the Location and Jobs, Based on Forward-Looking Tools of SMEs Entering the European Paper Market

A European survey within the framework of COST E-17 presented in 2004, shows the need for a reliable odour-control system for the paper industry.

Offering that system to paper mills, small to medium-sized enterprises (SMEs) will improve their competitiveness by widening their product portfolios to enter a new market segment in the papermaking and related sectors. This new application area will substantially raise their business volume. Establishing sustainable cooperation with European paper mills and an internationally acting paper institute will accelerate the penetration of this future market. Based on distinguished SME products, a unique, fast and sensitive odour-control system will be developed to overcome odour problems in papermaking.

Biological odour formation is a complex and challenging process whose full description and control requires a critical mass of disciplines. Therefore Odour Control combines biotechnological, physical, chemical and process engineering tools. This multidisciplinary approach will cover all subjects relevant, for successful integral solutions.

The ambitious goal will be achieved by developing rapid monitoring products for detecting odour-forming microorganisms and odorous compounds:

- FISH: Fluorescence *In Situ* Hybridisation - VIT-kit (biotechnological);
- AOS: Artificial Olfactory Systems (physico-chemical) triggering tailor-made countermeasures for odour control;
- mill treatment system – biokidney concept (biological/engineering);
- mill treatment system – environmentally sound additives (chemical) to be combined into a Odour Control System.

SME product lines will be expanded, focusing on paper product quality and occupational safety and safeguarding the location and jobs by sound

environmental performance. As a result, Odour Control supports Council Directives 98/8, 96/61/EC, 94/62, 93/43/EEC, the REACH system and OECD policy, whilst bridging the biotechnological and nanotechnological gap between Europe, the US and Japan.

- 1 PAPIERTECHNISCHE STIFTUNG (DE)
- 2 INGEGNERIA DEI SISTEMI ELETTRONICI S.R.L. (IT)
- 3 SOATEC S.R.L. (IT)
- 4 ANOXKALDNES AB (SE)
- 5 VERMICON AG (DE)
- 6 DR. W. KOLB AG (CH)
- 7 F. LLI BARTOLI S.P.A. (IT)
- 8 SCA HYGIENE PRODUCTS AB (SE)
- 9 ALCE S.P.A. (IT)
- 10 LUCCA CENTRO SERVIZI PER L'ECONOMIA SCPA (IT)
- 11 SVERIGES LANTBRUKSUNIVERSITET (DEPARTMENT OF MICROBIOLOGY) (SE)
- 12 UNIVERSIDAD COMPLUTENSE DE MADRID (DPTO. INGENIERIA QUIMICA. F. QUIMICAS) (ES)
- 13 UNIVERSITÀ DEGLI STUDI DI PARMA (DEPARTMENT OF ORGANIC AND INDUSTRIAL CHEMISTRY) (IT)

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**Call: FP6-2003-SME-1**  
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# OLIWAM

## Development and Validation of Online Monitoring and NDT Inspection of Laser-Welded Thin-Sheet Automotive Components

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Co-operative research

The automotive industry sector is a vital part of the European economy. The EU is the largest automotive production region in the world, with 34 % of global manufacture, and the industry comprises 7.5 % of all manufacturing sectors within the Union. The increasing demand for improved fuel efficiency and reduced emissions at lower, competitive costs, have prompted the automotive industry to seek ways of reducing weight by using new lightweight materials, new joining processes and new manufacturing concepts. Due to pioneering work in the industry, the use of lasers for production welding of tailor-welded blanks (TWBs) and body-in-white (BIW) structures is now common practice. Current weld quality monitoring and inspection techniques for these applications are often difficult in their application, performed offline, and are therefore time consuming and expensive. Moreover, current non-destructive testing (NDT) inspection and tear-down, in which a fully assembled car is put through a controlled crash, is only a sampling test, as not all parts can be inspected individually. Because of the implications on the human and economic costs of the currently applied procedures, major vehicle manufacturers would prefer to have an NDT record for each weld. It is also the intention to perform this testing online, as a comprehensive inspection using current offline procedures is economically not viable.

This pre-competitive project will develop a new, fast, monitoring and NDT inspection system, the OLIWAM system, to be used online, providing a 100 % inspection rate for thin-sheet laser-welded automotive components. The system's software will allow for online evaluation of the results, with remedial actions, if any, taken immediately, significantly reducing repair costs and scrap rates. Generic concepts for up to four further NDT inspection systems will also be developed to further facilitate fast, reliable online detection of weld imperfections.

- 1 TWI LTD (UK)
- 2 ADVANCED TECHNOLOGY GROUP S.R.O. (CZ)
- 3 COMPUTERISED INFORMATION TECHNOLOGY LTD (UK)
- 4 MICROTEST S.A. (ES)
- 5 NOE ENTERPRISE SP. Z.O.O. (PL)
- 6 PRECITEC OPTRONIK GMBH (DE)
- 7 SOCOMATE INTERNATIONAL S.A. (FR)
- 8 TECNITEST INGENIEROS SL (ES)
- 9 SOLBLANK S.A. (ES)
- 10 VOLKSWAGEN AG (DE)
- 11 ASOCIACION DE INVESTIGACION METALURGICA DEL NOROESTE (ES)
- 12 NDT CONSULTANTS LTD (UK)
- 13 ZENON S.A. - ROBOTICS AND INFORMATICS (GR)

[www.oliwam.com/home/index.jsp](http://www.oliwam.com/home/index.jsp)



FP6 Project Catalogue

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EC Contribution: € 1 032 688

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# OP3MET

## Optical 3-D Metrology , Automated In-Line Metrology for Quality Assurance in the Manufacturing Industry

In industrial metrology, there is growing demand for measurements with higher accuracy and speed. Although optical 3-D metrology fulfils the speed requirement in most cases; this is often at the expense of accuracy and traceability of the measurements. The proposed project focuses on the development of innovative equipment for automated in-line 3-D metrology. A main objective is to develop an integrated 3-D laser scanner and software solution for the verification of dimensional and geometrical tolerances, including free-form surfaces, on metallic and plastic parts with dimensions up to 200 x 200 x 200 mm.

The system, besides ensuring the automatic reconstruction of complete surface models, will be designed to guarantee user-friendliness (one-button operation), versatility, reliability and speed. The new system's price will be one-third of that of comparable existing equipment. A second objective is to develop innovative laser and optics for the new system, optimised with respect to measurements on 'difficult' materials such as reflective metal and translucent plastics. Another objective is to develop a mega-pixel USB Machine Vision Camera for use as the main component in the system. A fourth objective is to develop procedures and artefacts for good industrial practice in connection with achieving traceability of optical systems. The goal is to reach with optical systems the accuracy levels of mechanical coordinate measuring machines (CMMs) at up to double their measuring speed. The proposed project is a unique opportunity to create competitive high-tech products for global distribution in the field of optical 3-D metrology, as a European response to the strong competition in this field by North American and Asian firms.

Substantial increase in competitiveness of the three participating small to medium-sized enterprises (SMEs) (with potential new markets estimated at over EUR 90 million yearly) as well as substantial savings for the three end-users are expected outcomes.

- 1 3SHAPE AS (DK)
- 2 CAMBRIDGE OPTICAL SCIENCES (UK)
- 3 DEVITECH APS (DK)
- 4 JOÃO DE DEUS & FILHOS (PT)
- 5 ASKOLL HOLDING (IT)
- 6 SC SINTERON S.A. (RO)
- 7 NPL MANAGEMENT LTD (UK)
- 8 UNIVERSITÀ DEGLI STUDI DI PADOVA - DIPARTIMENTO DI INNOVAZIONE MECCANICA GESTIONALE (IT)
- 9 INSTITUTE FOR PRODUCT DEVELOPMENT (DK)
- 10 TECHNICAL UNIVERSITY OF CLUJ-NAPOCA (RO)

**Contract:** 32721  
**Call:** FP6-2004-SME-COOP  
**Starting Date:** 10/11/2006  
**Duration (months):** 24  
**Total cost:** € 1 782 780  
**EC Contribution:** € 1 047 940

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# PEMTOOL

## Development of Novel, Efficient and Validated Software-Based Tools for PEM Fuel Cell Component and Stack Designers

434

Co-operative research

Reductions in cost and improvements in both performance and reliability are the key factors on the road to the mass commercialisation of proton exchange membrane (PEM) fuel cells in Europe. These depend principally on the design and properties of cell components and stacks that are developed by small to medium-sized enterprises (SMEs). In order to be able to design and construct as cheap, efficient and reliable a PEM fuel cell as possible, it is necessary to be able to understand qualitatively and predict quantitatively how it functions. To do this, and to do it in a more time- and cost-effective manner, SMEs' experimental methods must be complemented by modelling. This project aims to provide SMEs with novel, efficient and validated modelling tools, in the form of computer software, which will enable them to develop better-performing fuel cell-related products more efficiently. In so doing, this will accelerate the long-awaited wide-scale acceptance of PEM fuel cells as a whole, and will in turn boost the core business of the SMEs themselves.

The steps to the overall objective of the project will be:

1. to establish a focused SME priority list of key problems, associated with cell performance, stability and degradation, that they wish to see addressed;
2. to address those problems by modelling;
3. to programme the derived models into user-friendly software;
4. to carry out extensive parameter studies using the software for key operating conditions;
5. to perform experiments in order to validate the models;
6. to demonstrate the optimisation, by experiment and modelling, of an industrial PEM fuel cell stack.

As compared to the state of the art, the innovations will be modelling tools that will:

1. lead to savings in time for PEM fuel cell product development of 50 % to 60 %;
2. lead to savings in cost for PEM fuel cell product development of 50 % to 60 %;
3. lead to 30 % to 50 % improvements in PEM fuel cell performance;
4. be able to predict how to optimise the operation of an industrial-use PEM fuel cell stack;
5. be as practically useful as, yet 90 % to 95 % more time-efficient than, existing modelling tools for PEM fuel cells.

- 1 CELLKRAFT (SE)
- 2 COMSOL AB (SE)
- 3 ENVIRONMENT PARK S.P.A. (IT)
- 4 HYSYTECH S.R.L. (IT)
- 5 VOLVO TECHNOLOGY AB (SE)
- 6 KUNGLIGA TEKNISKA HOEGSKOLAN (SE)
- 7 FUNDACIÓN INASMET (ES)



# PIPESCAN

Development of Systems for the Inspection of Metal Pipelines Buried Underground, in Concrete, in Water or Covered with Coatings

Over 10 million kilometres of pipelines in Europe carry hazardous fluids. These include oil, oil products, chemicals such as solvents, caustics, acids, corrosives and combustibles and gases, often at high pressure and temperature. These pipelines are subjected to corrosion by the environment and by the contents. Other defects in pipes are caused by mechanical fatigue. The inspection of a great majority of pipes is mandatory to ascertain their structural integrity, as failure to inspect can result in leakage of hazardous material into the environment and even explosion. Up to 90 % of these pipelines are inaccessible for inspection by current inspection methods because they are:

- buried under concrete
- buried underground
- underwater
- covered with coatings such as paint and insulation.

Corrosion and defects in inaccessible areas of pipelines can remain undetected until a leak occurs due to pipeline failure. Pipeline spills of hazardous fluids into the environment outnumber all other sources (e.g. tanker spills in oceans etc.) combined. In Europe up to 20 million litres of oil leak into the environment per year. The consortium of small to medium-sized enterprises (SMEs) propose to develop a set of mechanised inspection techniques, sensors and systems for finding defects and corrosion in inaccessible pipe (i.e. pipes buried underground, in concrete, in water or covered with insulation) without the need to "dig up" or remove coatings. By developing this technology, the SME consortium will access the EUR 250 million each year, pipeline and pipework inspection budget of world oil and gas, chemical and electricity plant operator companies, four years after project completion.

- 1 COAXIAL POWER SYSTEMS LTD (UK)
- 2 TECNITEST INGENIEROS SL (ES)
- 3 INNOSPEXION APS (DK)
- 4 TECHNICAL SOFTWARE CONSULTANTS LTD (UK)
- 5 ZENON S.A. ROBOTICS AND INFORMATICS (GR)
- 6 SPREE ENGINEERING LTD (UK)
- 7 TOTAL E&P UK LTD (UK)
- 8 ST SERVICES LTD (UK)
- 9 HEALTH AND SAFETY EXECUTIVE (UK)
- 10 TWI LTD (UK)
- 11 KINGSTON COMPUTER CONSULTANCY LTD (UK)
- 12 MILTECH HELLAS S.A. (GR)

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**Call: FP6-2002-SME-1**  
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**EC Contribution: € 1 035 722**

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# PLASTER+

## Innovative Production of High-Quality Indoor Earth Plaster by Adding Cattail Fibre

436

Co-operative research

The demand for “healthy life and habitation” and innovative natural building materials has increased substantially over the last 10 years. Architects promote green building designs and sustainable architecture, and people ask for materials that are not damaging to health. Following the EU White Paper on the Strategy for a future Chemicals Policy (2001), many of the currently toxic building materials, including common plaster material with toxic additives, will no longer be acceptable.

The use of unhealthy cement, lime or gypsum-based plasters can be substituted through earth plasters reinforced with cattail fibres, exceeding all technical performances of conventional plasters. True earth plaster has very positive effects on indoor climate, health and the positive charisma of a building, and is produced in a completely sustainable manner. It regulates air-moisture and temperature, absorbs pollutants, prevents mould, is renewable, recyclable, energy efficient and durable.

Despite the high market potential and the unbeatable positive effects of earth plaster, most earth plaster producers nowadays are not able to profitably serve a national or international market. The main reasons are: (1) a lack of professional technology able to produce great quantities of high-quality earth plaster in an efficient way, which is competitive with conventional plasters, and (2) the unsatisfying quality of existing earth plasters: large cracks may appear during the drying process, fungus growth may occur due to incorrectly processed additives, it makes for relatively rough wall surfaces.

The aims of the proposed project are:

- to develop, test and optimise a high-quality innovative and cost-effective healthy indoor earth plaster reinforced with cattail fibre;
- to develop and test a highly technical automated prototype plant requiring minimum maintenance, which will dramatically improve the production process of common earth plasters;

- to improve the competitiveness of earth plaster products on the national and international plaster market.

- 1 NATUR & LEHM LEHMBAUSTOFFE GMBH (AT)
- 2 CLAY PROCESSING SERVICES OU (EE)
- 3 SEECON INTERNATIONAL GMBH (CH)
- 4 BIOAZUL S.L. (ES)
- 5 LAMMIN PAJA KY (FI)
- 6 BAUUNTERNEHMEN WEIXBAUM GMBH (AT)
- 7 UNIVERSITÄT KASSEL (DE)
- 8 TAMPERE UNIVERSITY OF TECHNOLOGY (FI)
- 9 VEREIN ZUR FÖRDERUNG DES TECHNOLOGIETRANSFERS AN DER HOCHSCHULE BREMERHAVEN E.V. (DE)
- 10 NATIONAL INSTITUTE OF PUBLIC HEALTH - STATNI ZDRAVOTNI USTAV (CZ)



# PLASWELD

## Development of a New Laser Welding Technique for Joining Different Types of Polymers

The use of lasers in materials welding has increased in recent years due to the speed, accuracy and flexibility of this advanced technique. But when applied to plastics in joining applications, lasers have several limitations due to the inherent properties of these materials and it is still not sufficiently applied by plastic goods manufacturers.

There are many methods established for joining plastics, each with its own advantages and disadvantages, but the most important disadvantage of the application of laser welding techniques is that the materials to be welded should be compatible in order to give a stable seam when cold.

On the other hand, laser welding is the fastest welding method known but the dispensing and assembling activities are an important part of the welding process in terms of time consumption. Therefore, to take advantage of the laser welding speed, it is necessary to optimise the dispensing and assembling operations. The technical objective of this project is to develop a completely new, innovative and automated dispensing-assembling-laser welding process to make possible the joining of chemically incompatible plastic materials, using a new concept of polymeric absorbing inter-layer applied with a high tech dispensing system.

In order to achieve this objective it will be necessary to develop the following.

- New polymeric near-infrared-absorbing materials to join chemically incompatible plastics. These materials have to create a strong bond which is stable and clean after solidification (optically clear joints with no particulate or visible colour).
- The control and optimisation of the welding parameters in order to ensure the homogeneity of the joint and to avoid degradation of the polymer and emission of toxic fumes.

- A totally automated dispensing-assembling-laser welding system able to improve the quality of final products and, at the same time, to increase productivity by replacing a labour intensive process with precise and rapid dispensing-assembling-welding technology.

- 1 CRIF-WALLONIE (BE)
- 2 PROCON (ES)
- 3 SERVIPLAST ASBL (BE)
- 4 PROCOPLAST (BE)
- 5 SIVEL LTD (BG)
- 6 FUJIFILM IMAGING COLORANTS LTD (UK)
- 7 SCHNEIDER-ELECTRIC S.A. (BE)
- 8 GALLOPLAST (ES)
- 9 ASOCIACIÓN DE INVESTIGACIÓN DE MATERIALES PLÁSTICOS (ES)
- 10 VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK (BE)

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**EC Contribution: € 716 157**

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# PlugIn

## Plug Materials Influence on Final Part Quality in Thermoforming Process

438

Co-operative research

This project will bring together two small to medium-sized enterprise (SME) processors/thermoformers (Holfeld, Jacob), two SME material suppliers (CGP, CIFRA), one SME software developer (Accuform) and two research and technological development (RTD) institutes (USTUTT, QUB) who have the common goal of needing to understand the influence of plug design in the final part quality in the thermoforming process.

The thermoforming process is something of a "black art"; when a new product is being developed, the process parameters and plug properties are determined through a mixture of trial and error and experience. These methods are highly inefficient, stifle innovation and reduce the overall competitiveness of thermoforming companies. The aim of the project will be to use a more scientific approach which will enable products to be manufactured with a faster time to market, optimal properties and with reduced material and energy costs.

The project work will gather the current knowledge base, use experimentation to understand the physical phenomena that govern the effects of the plug and observe the actual plug behaviour and verify these results through extensive thermoforming trials.

Unique test rigs will be built at the RTD institutes to quantify the effects of friction and heat transfer. Data generated from these rigs will be used to develop numerical models for friction and heat transfer that will be subsequently implemented into the simulation software supplied by the SME software vendor. This software will be validated by initially carrying out experiments using instrumented lab-scale thermoforming equipment at each RTD institute and by carrying out trials on industrial-scale equipment at each of the SME thermoformers. A web-based expert system will be constructed using the validated simulation software along with the practical knowledge and data accumulated over the duration of the project.

The web-based expert system will be the major deliverable of the project. This will consist of a suite of databases and a "plug advisor". It is intended to be a valuable tool for all of the SMEs within the consortium. The processors will use the system to enhance their production facility, the material suppliers will have access to knowledge that will enable them improve the composition of their plug and sheet products, whilst the software developer will enhance the capabilities of their software.

www.plugin-thermoforming.eu

- 1 MANFRED JACOB KUNSTSTOFFTECHNIK GMBH & CO. KG (DE)
- 2 KAREL KOUBA - ACCUFORM (CZ)
- 3 CONSORTIUM GÉNÉRAL DES PLASTIQUES (FR)
- 4 CALANDRAGE INDUSTRIEL FRANÇAIS (FR)
- 5 HOLFELD PLASTICS LTD (IE)
- 6 WILSANCO PLASTICS LTD (UK)
- 7 UNIVERSITÄT STUTTGART (DE)
- 8 QUEEN'S UNIVERSITY OF BELFAST (UK)



FP6 Project Catalogue

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**EC Contribution: € 753 983**

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# POLYDRY

## The Development of an In-Line Energy-Efficient Polymer Microwave-Based Moisture Measurement and Drying System

The plastics industry is one of the most energy-intensive in Europe, to such an extent that in the UK the government has placed an energy levy on this sector to try to force it to find new and innovative ways of reducing its consumption. The prototype development of the microwave-based moisture measurement and drying system and the associated control system will improve the competitiveness of the small to medium-sized enterprises (SMEs) represented in the following ways: (1) through the reduced energy requirement of the drying phase of polymer processing by 50 %; (2) an increased productivity of 5 % through savings in drying time; and (3) reduced waste by eliminating faults related to residual moisture as a consequence of inadequate drying.

This will provide the plastic processing sector with the necessary momentum to increase our competitiveness against non-EU competition by contributing towards our efforts to offset the labour cost advantages of our Asian competitors, typically around 20 % of the moulding selling price, through energy and productivity savings of around 12 % of the selling price. The result of this innovation will be a more competitively priced service and supply of plastic products from EU plastic processors competing in a global market.

This project proposes to develop a new low-cost, rapid, energy-efficient microwave-based moisture measurement and drying system. This will enable in-line, accurate, real-time microwave moisture measurements to control the drying process, integrated with a low-cost microwave-based drying system that can dry a diverse range of polymer types. These will be joined together by an intelligent control module to enable closed loop control of the continuous measure-dry process and integration with the downstream process.

- 1 WITTMANN SCANDINAVIEN APS (DK)
- 3 MUEGGE ELECTRONIC GMBH (DE)
- 4 GISIP AB (SE)
- 5 ITS-PLASTICS LTD (UK)
- 6 SONDERBORG PLAST AS (DK)
- 7 PERA INNOVATION LTD (UK)
- 8 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

**Contract: 513205**  
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**Duration (months): 27**  
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**EC Contribution: € 603 538**

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# POLYTEC-SYSTEMS

## The Development and Validation of Non-destructive Testing Techniques for Electrofusion Joints in Polyethylene Pipes

440

Co-operative research

Polyethylene (PE) pipe offers significant advantages over other materials, such as cast iron, steel and concrete, for the distribution of fluids such as natural gas, water and corrosive liquids. It has a longer predicted service life, leading to less frequent replacement; it is less expensive to install due to its light weight; it doesn't fracture in the event of an earthquake or other earth movements due to its flexibility; and it has significantly lower leakage rates. However, its more widespread use is being restricted by the lack of a reliable non-destructive testing (NDT) method for the welded joints.

Pipeline leakage does not only cause high repair costs but can also result in disastrous environmental consequences and even in loss of life. The development of a reliable NDT method for welded joints in PE pipes will result in both lower leakage rates in these systems and also in lower overall pipe leakage rates, due to an increase in the usage of PE over other materials for pipelines.

This project will develop phased array ultrasonic and thermographic NDT techniques and systems for the assessment of electrofusion (EF) welds in PE pipes in the field. The development will be made using manufactured EF joints containing known flaws. The NDT data will be analysed to determine the limits of flaw detection for each technique. In parallel, the significance of flaw size and quantity will be established in relation to service requirements. This will be achieved by the short-term and long-term mechanical testing of EF joints containing known flaws, and comparison with results for welds containing no flaws. Prototype phased array ultrasonic and thermography equipment will be designed and built, specifically for the inspection of EF joints. This equipment will be tested under both laboratory and field conditions.

- 1 NDT CONSULTANTS LTD (UK)
- 2 VERMON S.A. (FR)
- 3 ISOTEST ENGINEERING S.R.L. (IT)
- 4 HORTON LEVI LTD (UK)
- 5 EGEPLAST WERNER STRUMANN GMBH & CO. (DE)
- 6 SIMPLAST S.P.A. (IT)
- 7 SOUTH WEST WATER LTD (UK)
- 8 NORTHUMBRIAN WATER LTD (UK)
- 9 SOCIETÀ ITALIANA PER IL GAS (ITALGAS) (IT)
- 10 TWI LTD (UK)
- 11 HESSEL INGENIEURTECHNIK GMBH (DE)
- 12 CONSORZIO CATANIA RICERCHE (IT)



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**Starting Date:** 01/05/2004  
**Duration (months):** 26  
**Total cost:** € 1 815 000  
**EC Contribution:** € 939 500

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# PRO2CONTROL

Online Control of Drawing and Blanking Processes and of Quality of the Product by Fusion of Sensors and Artificial Vision Techniques

Forming processes and sheet metal punching and deep drawing in particular are inherently quite unstable manufacturing processes. On the one hand, a slight change in the production parameters or in the material quality are usually enough for the process to lose its condition of stability and to produce bad parts. On the other hand, when a tooling breakage or excessive wear occurs, the resulting parts are also bad. This situation is especially difficult to detect when producing small size parts, often manufactured in large quantities using high speed and production rate equipment. As a result, production of bad parts goes on until a statistical control is able to detect this and to stop the machine.

The main objective of this project is to develop a complete control system to be fitted on the ensemble press-tooling in order to assure a zero-defect rate in forming industries manufacturing small-sized work parts. The aim is to get a complete diagnosis and control over the quality of the production and the state of the production goods. Therefore, the control system has to be able to integrate the capabilities of state-of-the-art control systems for forming processes and to fulfil the new objective of complete control of the quality of the part.

Two complementary methods are considered: use of acoustic emission (AE) and load measurement technologies, which include a sensor set mounted on the press and the tooling, the electronics needed for the conditioning and a monitoring system installed on a PC, and an artificial vision (AV) system, which is composed of a set of cameras and a flexible image-processing system for the detection of defects in real time. The information of both systems is analysed by a software-based control system, installed on the same PC, which determines the changes in the press state, the tooling condition or the process parameters needed to avoid defects occurring.

- 1 MONDRAGON GOI ESKOLA POLITEKNIKOA JMA S.COOP. (ES)
- 2 UNIVERSITÄT STUTTGART (DE)
- 3 BRANKAMP SYSTEM PROZESSAUTOMATION GMBH (DE)
- 4 DELTA TECHNOLOGIES SUD OUEST (FR)
- 5 OFFICINE SANGIACOMO S.R.L. (IT)
- 6 TROQUELES Y DERIVADOS S.A. (ES)
- 7 INDUSTRIAS ALUZARÁN, S.L. (ES)
- 8 INDUSTRIAS GARITA S.L. (ES)

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**EC Contribution: € 823 840**

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Materials & Processes

# PROBELL

## Maintenance and Protection of Bells

442

Co-operative research

Church bells are both musical instruments strongly connected to the European culture and technical structures exposed to severe loading conditions during ringing. Many famous bells in service for centuries are damaged by cracks and wear, leading to a severe loss of valuable cultural heritage, and require high efforts and costs to repair.

The system bell-clapper-belfry, being in service under different ringing conditions from region to region, has been developed over the centuries, mainly based on intuition and tradition. The technological mechanisms and reasons for damage are widely unknown. For the nine small to medium-sized enterprises (SMEs) involved as bell and/or clapper manufacturers, the elaboration of field procedures and respective data to reduce damages is most decisive:

1. a new professional service on historical and new bells shall open a new and strong business branch to the European bell foundries, reducing costly damages and the risk to personnel and people from damaged bells or clappers;
2. reliable methodologies and data shall allow the specialists to set the ringing conditions in the smoothest way, achieving a better musical quality at the same time;
3. product reliability arguments on damages of new or repaired bells shall be defined more clearly and prevent the foundries from pretensions to damages that exceed their responsibilities;
4. the results of the project aim for a new standard for the installation of bells, similar to the newly defined DIN4178 for church towers.

Well-experienced research and technological development (RTD) performers will carry out the experiments and simulations on the latest state of art. An end-user will evaluate the research programme and its results in view of field experience.

The project strongly supports:

1. the protection of European cultural heritage, by maintaining the life of a large number of bells, through optimisation of ringing conditions, professional services and professional evaluation of necessary repair measures;
2. reduction of risk due to bells or clapper damage;
3. maintaining a higher musical quality.

- 1 UNIVERSITY OF APPLIED SCIENCES KEMPTEN (DE)
- 2 BACHERT GLOCKENGIESSEREI KARLSRUHE GMBH (DE)
- 3 FONDERIE CORNILLE HAVARD SAS (FR)
- 4 JOHANN GRASSMAYR GMBH & CO.KG (AT)
- 5 JOHN TAYLOR BELLFOUNDERS LTD (UK)
- 6 CAMPANAS QUINTANA S.A. (ES)
- 7 RINCKER GLOCKEN- UND KUNSTGIESSEREI GMBH & CO.KG (DE)
- 8 GLOCKEN UND KUNSTGIESSEREI H. RUEETSCHI AG (CH)
- 9 ROSSWAG GMBH (DE)
- 10 GLOCKENINSPEKTION ERZBISTUM FREIBURG (DE)
- 11 TUEV INDUSTRIE SERVICE GMBH, TUEV SUED GRUPPE NIEDERLASSUNG MANNHEIM (DE)
- 12 UNIVERZA V LJUBLJANI (SI)
- 13 UNIVERSITÀ DEGLI STUDI DI PADOVA (IT)

www.Probell.net

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EC Contribution: € 1 168 249

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# PRO-HEAD

## Hybrid Thermoplastic Composite for Recyclable and High-Performance Head Protection System

The public feeling towards the need for effective safety or protection systems is progressively increasing in several sectors. Regulations have made mandatory the use of helmets for motorcyclists and for workers operating in dangerous environments (e.g. building construction site), while new regulations are likely to be introduced to make mandatory the helmet in other fields (e.g. cycling, skiing, skating, etc.). Statistics proved that the helmet significantly reduces the risk of death in accidents related to head injuries but the number of victims in all fields is still impressive. The European producers of helmets are mainly small to medium-sized enterprises (SMEs) that have to face strong competition from low labour cost countries. There is therefore the strong need to introduce into the market innovative products characterised by higher performances at a competitive price. The aim of the project is to develop a novel fully recyclable hybrid thermoplastic composite material for head protection devices, based on novel all-thermoplastic composites with embedded super-elastic fabrics. The introduction of the new materials and the related manufacturing techniques and tools, together with the results of the demonstration activities, will have a direct impact on the product innovation and will give new impulse to the introduction of new concepts and standards for safety, recyclability and product regeneration in sectors which are very important for the safety of the citizens.

The main innovation of the project is the novel recyclable thermoplastic hybrid composite material for head protection systems. To achieve this objective the following innovations must be pursued:

- a novel all-thermoplastic commingled fabric for rapid moulding and easy recycling;
- a novel single stage compression moulding process;
- a novel superelastic fabric architecture;
- a novel thermoplastic hybrid composite.

The project builds up on the experience of the Engineering Team and the consortium has been enlarged to take into account the different skills and expertise needed to reach an exploitable product for a head protection system all over Europe and the world.

- 1 ENGINEERING TEAM S.R.L. (IT)
- 2 EPSIRA OY (FI)
- 3 SAVIPLAST SNC (IT)
- 4 PRENDAS DEPORTIVAS NZI S.L. (ES)
- 5 SOCIEDAD ANONIMA GROBER (ES)
- 6 FOAM TECHNIQUES LTD (UK)
- 7 AEROVAC SYSTEMS LTD (UK)
- 8 TMBK PARTNERS (PL)
- 9 D'APPOLONIA S.P.A. (IT)
- 10 PERA INNOVATION LTD (UK)

443

Co-operative research

[www.dappolonia-research.com/prohead/](http://www.dappolonia-research.com/prohead/)

**Contract: 508179**  
**Call: FP6-2002-SME-1**  
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**Duration (months): 28**  
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**EC Contribution: € 670 392**

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Materials & Processes

# ProTECC

## Powder-Protected Cardan Chain in Industrial Floor Conveyors

444

Co-operative research

Powder-coating lines have been developed for use only with chain overhead conveyors (COC) and floor skid conveyors (FSC) transporting the parts to be coated. For a large part of industry which applies coating in their production, COC and FSC systems are not applicable, owing, for example, to the heavy weight of the parts (COC systems are too expensive because of the necessary steel constructions) or abrasion (e.g. from overhead chains, bearings) which may fall on the painted parts. FSC systems are used only for transporting large and heavy parts (e.g. car bodies) as they are expensive and space demanding. BKM, a well-known manufacturer of cardan chains and trader of conveying systems, estimates that some 60 % to 70 % of these companies using chain floor conveyor (CFC) systems would like to change from liquid coatings to powder application, but cannot use powder due to the disadvantages of the conveying system. These companies therefore have to adhere to traditional technologies (liquid coating).

The aim of this project is to develop a novel chain floor conveyor system for powder application. CFC systems consist of a chain track with an integrated cardan chain running through the track. The chain, in some cases, is also equipped with pusher dogs into which the anchor of the carrier is hooked. The chain transports the loaded carrier throughout the entire production line.

The PROTECC system to be developed will be totally new and will have a special track, which will be designed as follows:

- double-skinned track to implement a wind curtain protection;
- application of an electrical load to the track to stop powder sticking to the track;
- outer skin of the double-skinned track made of a non-metallic material to avoid powder sticking to the track.

The prime industrial and economic objectives of the PROTECC project are:

- development of a novel technique that will enable the replacement of traditional liquid painting technology by a more environmentally friendly one;
- up to 95 % recovery of the overspray powder for reuse;
- increased productivity due to reduction of costs inherent to the replacement of liquid coating technology (i.e. less waste-disposal cost);
- rapid (less than 15 min) change of colours possible;
- design of a flexible system affordable for small to medium-sized enterprises (SMEs) especially.

www.protecc.eu

- 1 BREMER KETTENMONTAGE (DE)
- 2 UNIVERSAL FINISHING SYSTEMS LTD (UK)
- 3 MMS, MONTSERWIS (PL)
- 4 NW OBERFLÄCHENSCHUTZ GMBH (DE)
- 5 JCB ELECTROMECÁNICA S.L. (ES)
- 6 CENTIV GMBH (DE)
- 7 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA S.A. (ES)



FP6 Project Catalogue

Contract: 31253  
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Total cost: € 621 184  
EC Contribution: € 318 654

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# RAMA3DP

## Rapid Manufacturing by Improved 3-D Printing

The development of new products is an iterative process involving design and visualisation, building prototypes, testing and evaluation. This is usually quite expensive and time consuming, especially if unconventional or complex geometries are required. Worldwide there is a strong need for a Rapid Prototyping (RP) technique, which is able to produce prototypes, which have the technical specifications (integrity, accuracy and shape), appearance (colour, texture) and feel of the desired product. In addition, there is a strong need for Rapid Manufacturing (RM) of (complex) one-offs, e.g. teeth, and implants and small series, e.g. mock-ups for surgical practising, high-end tooling and technical parts.

The consortium aims to develop a Three Dimensional Printing (3DP) technique for making very precise engineering parts. Current rapid prototyping machines produce models of which the varying dimensions, warpage and ovality are unacceptably bad: only 4 out of 20 parts are assessed to have identical quality. As compared to other RP techniques, 3DP is clearly the only RP technique with the potential to evolve into a widely-applicable rapid manufacturing technique. The overall objective of the project is to develop a 3DP technique via new mechanical, material and software methods in order to resolve the mechanical strength, reproducibility, accuracy and colour drawbacks of current RP methods, resulting in acceptable functional end parts and to 'prove' the applicability of the developed 3 DP prototyping/manufacturing technique by developing specific product applications/demonstrators.

The goal is to introduce the newly developed 3DP prototyping/manufacturing technique in the medical modelling and industrial design industry, to increase the productivity compared to present state-of-the-art RP/RM technique by at least 50 %, to decrease the rapid prototyping/ manufacturing costs by 50 %.

- 1 PTS SOFTWARE B.V. (NL)
- 2 CP - CENTRUM FÜR PROTOTYPENBAU GMBH (DE)
- 3 INTELLIGENT LASER APPLICATIONS GMBH (DE)
- 3 MARTELLO LTD (UK)
- 4 HUNTSMAN ADVANCED MATERIALS LTD (UK)
- 5 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 6 UNIVERSITY OF MANCHESTER INSTITUTE OF SCIENCE AND TECHNOLOGY (UK)

**Contract:** 508432  
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**Duration (months):** 24  
**Total cost:** € 854 700  
**EC Contribution:** € 441 850

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# RECFINMIX

## Primary Recycling of Polyolefin-Mixed Films for High-Added Value Applications in the Blow Moulding Industry

446

Co-operative research

Western Europe consumes 34 million t per year of plastic, with only 1.5 million t being currently recycled, primary from industry sources (69 %) and specially processing scrap (52 %).

Regarding post consumer waste, 20 % of all bottles are being currently recycled, therefore post-consumer plastic films remain as the major area of concern.

Polyolefin films (LDPE, HDPE and PP) account for 95 % of the total plastic waste film collected and while their separation from contaminants including other plastics is very easy by flotation or hydrocycloning, further separation of LDPE, HDPE and PP is extremely difficult since their respective densities are very similar. Around 3 million tonnes of post-consumer polyolefin mixed films are available from municipal facilities in Europe, with an average composition of 71.4 % LDPE, 17.5 % HDPE and 11.1 % PP.

While mixtures of LDPE, HDPE and PP do have a degree of compatibility allowing them to be used in low-added value applications, they cannot be used for high demand applications such as blown film production since it is impossible to form a consistent film bubble due to the material's inhomogeneity. Market price for a polyolefin film mixture is EUR 180 / tonne and is in very low demand.

The price for separated blown film grade material is EUR 481/tonne, half that of virgin material, and the market demands much more than the amount currently available.

Post-consumer film mixtures of LDPE, HDPE and PP can be separated due to their different crystallinities (50 % for LDPE and above 90 % for HDPE and PP) since during film production only the amorphous regions of the plastic are stretched.

When this stretched plastic film is exposed to heat, it shrinks in a very similar way to stretched rubber. Since LDPE has a greater amorphous area (and hence higher degree of freedom), it shrinks at lower temperatures than both HDPE and PP. Thus, when

exposed to temperatures slightly higher than 100 °C, shredded LDPE film pieces will shrink forming sphere-like bodies, whereas pieces of HDPE and PP will remain flat up to temperatures of approximately 120 °C. This characteristic change in shape will allow a further efficient separation of the LDPE by centrifugation, sieving, vibrating inclined planes or other methods, thus offering a highly marketable purified material.

Based on this effect, the project intends to develop a method for separation of mixed post-consumer polyolefin films into a high added-value LDPE streamsuitable for production of blown film and with less than 5 % HDPE and PP impurities, and a low value HDPE-PP stream with less than 20 % LDPE impurities, only suitable for injection moulding, therefore recovering effectively more than 90 % of the original LDPE for high added-value applications.

A suitable semi-industrial separator for mixed polyolefin films with a production capacity of 100-200 kg/hour and fulfilling the purity targets set will be constructed, and the method demonstrated by producing 50-250 micron blown film using the purified LDPE material obtained.

The consortium brings together six small to medium-sized enterprises (SMEs) and three research organisations from five different EU countries, and covers all the steps regarding separation and recycling to obtain LDPE suitable for production of blown film from waste polyolefin film mixtures and the development of equipment for such purpose.

The SME core group comprises companies in the field of production of lines for plastic recycling (Rondol Technology), manufacture of efficient industrial heat systems (Zaber), production of recycling equipment to be integrated as a secondary stage including centrifuges, vibrational sieves and other devices (GTV), plastic recycling (PHB), plastic compounding (Perplastic) and production of blown LDPE film, also including some recycled grades (Rinaplas).

www.rcfinmix.com



The SME core group will be supported by three research organisations highly skilled in the fields of recycling and design of separation systems (Lurederra), plastic properties, processing and testing (Rapra) and engineering design (University of Zielona Gora).

- 1 FUNDACIÓN L'UREDERRA (ES)
- 2 RONDOL TECHNOLOGY LTD (UK)
- 3 RIOJANA NAVARRA DE PLÁSTICOS SL (ES)
- 4 PLASTIC HERVERWERKING BRABANT (NL)
- 5 PERPLASTIC 2 SL (ES)
- 6 DR ZABER SP Z.O.O. (PL)
- 7 GTV (LT)
- 8 SMITHERS RAPRA TECHNOLOGY LTD (UK)
- 9 UNIVERSITY OF ZIELONA GORA (PL)
- 10 VILNIAUS VINGIO MECHANIKA UAB (LT)
- 11 MACHINEFABRIEK OTTO SCHOUTEN B.V. (NL)

[www.recfinmix.com](http://www.recfinmix.com)

**Contract:** 32766  
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**EC Contribution:** € 635 400

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# RENEWITT

## Development of New and Novel Automated Inspection Technology for Glass-Reinforced Plastic Wind-Turbine Blades

448

Co-operative research

The monitored and predicted growth of wind turbines in Europe indicates that the output from these sources has been increasing at approximately 30 % each year between 1993 and 1999 and that the trend is set to continue between 2002 and 2010. This expansion could be supported by accessing the offshore market that is capable of generating large energy volumes at a reduced degree of societal impact through the use of larger turbines elsewhere.

Additional output is achieved through the use of larger diameter wind turbines, as the amount of energy that a turbine can generate is given by the equation,  $\text{rated power} = 0.1215d^3$ . Blades in excess of 100m in length are being considered to service the required outputs. Blades this size must be manufactured in a cost effective manner using cheap, strong and lightweight materials. Glass reinforced plastics (GRP) are used increasingly in place of metal, because they are lightweight and corrosion resistant. One major issue that has arisen through the desirable expansion in the use of this material is the lack of testing techniques suitable for the rapid and accurate inspection of large areas. The development of suitable non-destructive Testing (NDT) techniques is essential to allow European wind blade (WTB) manufacturers to successfully employ the most desirable materials to achieve lightweight designs that can maximise the efficiency of the components and provide a competitive advantage over non-European competitors.

The consortium proposes to develop new and novel automated NDT techniques for the inspection of GRP components as used in the construction of WTBs. This pre-competitive project represents a step change to the current state of the art by advancing technology and improving the competitive advantage of European small to medium-sized enterprises (SMEs) and large enterprises. The systems will be applied using novel automated crawler system and will minimise the use of manual inspections that are unrepeatable and do not ensure complete area coverage. The techniques developed, including film-less digital radiography, will provide a full suite of inspection solutions for all

types of WTBs currently in service as well as those predicted for the future. The inspection solutions will detect and size all of the defect types for each of the blades, given the restrictions of component access, location and environmental surroundings (particularly offshore). Similarly all of the maintenance and manufacturing sectors have been targeted. Hence, the ReNEWIT project is designed to deliver total solutions to the total inspection requirements of the total WTB industry.

www.renewit.eu.com

- 1 INNOSPEXION APS (DK)
- 2 LASER OPTICAL ENGINEERING LTD (UK)
- 3 LOT ORIEL (UK)
- 4 NTD SOLUTIONS LTD (UK)
- 5 ZENON S.A. ROBOTICS AND INFORMATICS (GR)
- 6 FAIRWIND (ORKNEY) LTD (UK)
- 7 HEXCEL (UK)
- 8 VESTAS WIND SYSTEMS AS (DK)
- 9 TWI LTD (UK)
- 10 TECHNICAL UNIVERSITY OF SOFIA (BG)
- 11 IDEASIS LTD (GR)
- 12 MILTECH HELLAS S.A. (GR)



FP6 Project Catalogue

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**EC Contribution: € 1 057 766**

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# RESTOOL

## Nano-Composite Machining Tools with Wear and Thermal Resistance

Protective coatings are deemed vital for endurance, performance and wear protection of modern tools. It is needless to say that an enormous number of costly replacements are performed every year in Europe to fix failing tools.

The importance of wear protection for machining applications, such as drilling, turning, milling etc. is illustrated by the fact that today 40 % of all the European-made cutting tools are coated. It is also important to mention that the market for coated tools is rapidly growing worldwide.

Unfortunately, the cost of protective coating is relatively high; this cost is passed on to the consumer via the retail price, but the coated tools are still lacking the desired quality and fail to satisfy modern requirements such as fast speed of machining and cutting. (It should be noted that besides wear, such parameters as toughness, oxidation resistance, chemical stability, low friction against the material to be machined, adherence to the substrate, thermal conductivity and compatibility with the substrates, etc. define the quality of coatings.)

Manufacturers express concern and try to respond to the consumer's complaints about insufficient quality of machining tools that significantly limits their applications. There is an acute need for a low-cost innovative technological concept that satisfies essential marketing conditions regarding cost yet is characterised by high performance, wear resistance, reliability and endurance characteristics.

One of the major problems is the use of coolants. About 40 % of the machining cost represents the cost of coolants. In Germany, the cost of coolants in 1999 amounted to EUR 1 billion while in Italy it has recently reached EUR 560 million. Europe-wide, the cost of coolants has exceeded EUR 7 billion in 1999. While the machining workshops throughout Europe are predominantly small to medium-sized enterprises (SMEs), the increasing demands on productivity force them to use the tools beyond their capability.

These conflicting conditions call for a new technology and new products to be more benign to modern machining operations.

The core SME proposers represent a complimentary team of tool manufacturers and distributors who will be united to explore the potential of novel protective coating technology that possesses very high performance characteristics. The novel coating materials will largely mitigate the current problems the manufacturers of machining tools are facing.

The technology that will be developed in the course of the project would largely improve the quality, compatibility, endurance and reliability of materials used in machining tools and will reduce the use of unnecessary interventions to fix degrading products. Besides that, it will decrease the use of expensive (and sometimes very toxic) substances-coolants that contaminate the environment when they are discarded in large quantities. Compared to conventional protective coatings currently used, the new coatings will be characterised by greater hardness and toughness, better friction properties, better thermal and chemical stability and much greater wear and oxidation resistance.

The results will enable the European machining industry to increase and speed up the production combined with saving of resources and should benefit health and environment.

The main goal of this project is to develop new coating materials that may significantly help the SMEs to increase their competitiveness. It is known that diamond has high hardness, however attempts to use it as a tool material usually fail because of its poor chemical resistance with regard to Fe, Co and Ni, especially at elevated temperatures. Thus, it is not a surprise that the tests show that the diamond coated tools are not considered as an ideal option.

PCBN-based tools made of solid polycrystalline cBN fabricated by HTHP technology show much



better performance as far as chemical stability is concerned. However, due to their very high cost of manufacture and limited shape variations, they appear to be of very limited practical value for SMEs. In spite of recent enormous research efforts and resources that have been spent to develop coated by c-BN films tools, it can be predicted that these tools will not be marketable (at least for quite a long time) due to the limits the high internal stress imposes on coating thickness.

Therefore, the synthesis of compounds which possess the mechanical properties of diamond and chemical resistance of c-BN can be very promising. The project will be aimed at the development of coatings based on a combination of high hardness and chemical inertness complementing those of diamond and c-BN.

- 1 MTM (IT)
- 2 KERMET DIAMOND TOOLS (RU)
- 3 INNOVATIVE MATERIALS PROCESSING TECHNOLOGIES (UK)
- 4 TECHNISCHE UNIVERSITÄT MÜNCHEN (DE)
- 5 THE UNIVERSITY OF NOTTINGHAM (UK)



**Contract:** 507839  
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**EC Contribution:** € 460 484

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The safe operation of the 450 nuclear power plants around the world and 210 in Europe depends on the regular in-service inspection of the reactor pressure vessels, which contain the nuclear fuel. Reactor Pressure Vessels (RPVs) which house the fuel of a nuclear power plant are made of thick steel sections welded together. This steel becomes brittle with age and is therefore more susceptible to the rapid growth of cracks. These RPVs contain water under high pressure and are particularly susceptible to a process known as 'stress-corrosion cracking'. Current methods of inspection have major drawbacks owing to their following reasons.

1. They require large and heavy robots costing millions of euros. In most cases these robots require the use of a central mast manipulator and insertion of this mast is a difficult and time-consuming operation, requiring the use of the plant's polar crane and causing disruption to other activities during the plant outage thus increasing time of inspection.
2. These require several large inspection sensors placed in complex 'probe pans' to inspect large areas. The probe pans have to be changed several times thus increasing time of inspection.
3. They can sometimes miss defects or wrongfully size them.
4. All the above current drawbacks mean that large amounts of time consuming manual intervention is required during inspection thus requiring operators to work in radiation hazardous areas. This also increases inspection time, which carries a huge economic cost. To overcome the above drawbacks this project satisfies an urgent need to develop new and novel inspection methods, which can speed up inspection times, improve defect detectability and reduce operator exposure to dangerous radiation whilst working inside the reactor containment.

- 1 TWI LTD (UK)
- 2 VERMON S.A. (FR)
- 4 TRUEFLAW LTD (FI)
- 5 ADVANCED TECHNOLOGY GROUP S.R.O. (CZ)
- 6 TECNITEST INGENIEROS SL (ES)
- 7 DOOSAN BABCOCK ENERGY LTD (UK)
- 8 NATIONAL NUCLEAR CORPORATION LTD (UK)
- 9 IGNALINA NUCLEAR POWER PLANT (LT)
- 10 TEOLLISUUJEN VOIMA OY LTD (FI)
- 11 LONDON SOUTH BANK UNIVERSITY (UK)
- 12 PEAK NDT LTD (UK)
- 13 ZENON S.A. - ROBOTICS & INFORMATION (GR)
- 14 REAKTORTEST S.R.O (SI)
- 15 CEZ A.S. (CZ)

**Contract: 512984**  
**Call: FP6-2002-SME-1**  
**Starting Date: 15/01/2005**  
**Duration (months): 30**  
**Total cost: € 1 995 500**  
**EC Contribution: € 1 067 900**

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# RISERTEST

Development of a Guided Long-Range Ultrasonic Inspection System for the Examination of Offshore Subsea Risers, Steel Catenary Risers (SCRs) and Flowlines

452

Co-operative research

In the ever-increasing search by oil majors for new fields and with the advent of advanced drilling and extraction technologies, very deep-water offshore fields are now being developed in the Gulf of Mexico, offshore Brazil and offshore West Africa. There have been significant engineering difficulties to overcome to make the development of deep-water offshore fields possible. However, there are still non-destructive testing (NDT) and inspection problems to solve. One such significant concern is the in-service NDT and inspection of the subsea risers, steel catenary risers (SCRs) and subsea flowlines.

Once installed in their subsea environment, it will be impossible to apply conventional NDT techniques to these components. Although the pipes comprising these components are manufactured and welded to the highest standards, they nevertheless need to be able to operate for 20 years or more without failure. Fatigue analysis shows that the "start of life" defect size to ensure that failure will not occur is small (in the region of a millimetre or so through thickness dimension). It is inevitable that some welding defects of that size will go undetected at the manufactured weld NDT and inspection stage. Some parts of the SCR (particularly in the least accessible seabed region) will be subject to fatigue loading that could ultimately cause premature failure and significant environmental pollution.

In this project, guided wave ultrasonic testing developments are proposed that will overcome the limitations of the current technology and greatly increase the applicability and productivity of the technology.

These developments will lead to increased business for EU inspection and maintenance small to medium-sized enterprises (SMEs). Recent business trends have seen oil companies outsource their entire inspection and maintenance requirements to specialist service SMEs. This will significantly increase business opportunities for these SMEs.

- 1 TWI LTD (UK)
- 2 COAXIAL POWER SYSTEMS LTD (UK)
- 3 2H OFFSHORE ENGINEERING LTD (UK)
- 4 ATLANTIS NDE INGENIERÍA DE INSPECCIÓN NO DESTRUCTIVA SL (ES)
- 5 PRZEDSIĘBIORSTWO BADAWCZO-PRODUKCYJNE OPTEL SP. Z O.O. (PL)
- 6 I&T NARDONI INSTITUTE (IT)
- 7 DACON AS (NO)
- 8 BP EXPLORATION OPERATING COMPANY LTD (UK)
- 9 PETROLEO BRASILEIRO S.A. (BR)
- 10 DET NORSKE VERITAS AS (NO)
- 11 ZENON S.A. ROBOTICS AND INFORMATICS (GR)

[www.risertest.eu.com/home/index.jsp](http://www.risertest.eu.com/home/index.jsp)

**Contract:** 18267  
**Call:** FP6-2003-SME-1  
**Starting Date:** 15/10/2005  
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**Total cost:** € 2 000 000  
**EC Contribution:** € 1 036 224

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# SAFE&COOL

## Development of a Cost-Effective Moisture and Thermal Barrier Layer for Protective Clothes Based on an Innovative Combination of Warp-Knitted Textiles and Hydrogel Polymer Coatings

Development of a cost-effective moisture and thermal barrier layer for protective clothes based on an innovative combination of warp-knitted textiles and hydrogel polymer coatings, introducing new standards which will prevent low quality imports and increase competition of 20 000 European small to medium-sized enterprises (SMEs).

To minimise accidents among workers operating in harsh environments, the EU launched Directives 89/656/EEC and 89/686/EEC, which oblige employers to make available protective clothes to their employees. Since then, the market of protective clothing has therefore been boosted. Ninety-eight percent of the 20 000 European companies involved in the protective clothing value chain are SMEs which are suffering competition from India, China, Japan and Taiwan. As a result, non-EU imports in the last 5 years have increased by 34 % resulting in a reduction of employment in Europe by 14 %. This is a highly relevant problem for the SME proposers and more so in general for the entire European sector.

Wearing state-of-the art protective clothing for indoor work in non-ventilated areas, in hot temperatures or performing physically demanding work hinder a worker's ability to remain cool. Workers' inability to shed excess heat results each year in 1 500 heat strokes in Europe. Less serious consequences of heat stress are more common, affecting 50 000 workers per year all over Europe.

Our objective is to develop a thermal and moisture management layer based on a 3-D weft-knitted flameproof fabric coated with a hydrogel polymer, fully compliant with EU Directive 89/656/EEC and 89/686/EEC and standards UNI EN 470-1.

This structure, which will replace the thermal layer and moisture barrier in typical three layered protective clothing fabric, mimics physical mechanisms for human body thermoregulation. This concept has been validated through a feasibility study performed by the partners.

However, barriers need to be overcome through the achievement of the following scientific and technical objectives:

1. development of a knowledge-based design tool able to predict the peculiar mass and heat transfer flows through the proposed system;
2. design and modelling of the 3-D textile structure with the proper selection of hydrophilic and hydrophobic fibres;
3. development of an enabling process to allow the cost-effective deposition of the hydrogel layer.

Wider societal and policy objectives are addressed, contributing to structuring the European Research Area. The project facilitates transnational co-operation as the consortium has been set up in order to form a complete supply chain with seven SMEs spanning all over Europe and Candidate countries as well as three complementary research and technological development (RTD) performers from Italy and Poland.

- 1 GAETANO ROSSINI HOLDING S.P.A. (IT)
- 2 M.T.S. MANIFATTURA TOSCANA SPALMATI S.P.A (IT)
- 3 JE BE INTERNATIONAL TEXTILES B.V.B.A (BE)
- 4 SPECJALISTYCZNY ZAKŁAD TAPICERSTWA KOMUNIKACYJNEGO TAPS - MACIEJ KOWALSKI (PL)
- 5 TACCONI S.P.A. (IT)
- 6 GRAPIL GRAŻYNA SOBIERAJ SPÓŁKA JAWNA (PL)
- 7 TIRSO S.R.L. (IT)
- 8 D'APPOLONIA S.P.A. (IT)
- 9 GRADO ZERO ESPACE S.R.L. (IT)
- 10 CENTRALNY INSTYTUT OCHRONY PRACY - PAŃSTWOWY INSTYTUT BADAWCZY (PL)

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# SAFEFILL

Safe, Aseptic, Flexible, Efficient FILLing of Liquids

454

Co-operative research

Despite being an integral part of the EUR 669 billion European food and beverage industry, food packers and fillers are a largely forgotten sector. They do not have their own trade association and are under significant commercial pressures from retailers, food processors and specialist packaging suppliers.

These combined forces are severely affecting small to medium-sized enterprises (SMEs) in the independent packing sector. There are approximately 12 500 contract food packers in Europe, 70 % of which are SMEs.

The safest, longest life liquid products are packaged aseptically. However, existing aseptic filling systems are expensive to buy and operate, difficult to maintain and have very expensive, specific packaging materials. The market is dominated by large multinational firms, who also supply all the packaging materials. There is a clear need for a low-cost packaging system that frees SME packers from their dependence on multinational firms. Therefore, to address this market opportunity, we will develop a fast, low-cost truly aseptic bulk liquid packing system. It will use a continuous in-line manufacturing process that creates completely sterile bags, and fills and seals them in one production line. We will simplify current aseptic bags to reduce material content and cost. The simplified bag design will also enable us to pack lumpy liquid food. In order to achieve this aim, we will need to overcome a number of technical barriers, such as fast inline sterilisation, accurate film cutting and precision film welding.

SAFEFILL has the potential to reduce packaging materials costs for bag-in-box filling by 60 % compared to existing aseptic systems and increase filling speeds by 80 %. This will save an average packer EUR 0.10 per litre packed or around EUR 200 000 each year per line. SAFEFILL will potentially impact 23 000 SME companies, employing 1.57 million people and producing products valued at EUR 223 billion each year. In total, we aim to capture market revenue of EUR 147 million by the end of year 5, including the revenue generated by licensees.

- 1 DAYLA LIQUID PACKAGING LTD (UK)
- 2 FLEXIFILL LTD (UK)
- 3 EPLEBLOMSTEN AS (NO)
- 4 MUEGGE ELECTRONIC GMBH (DE)
- 5 PLAST MODRA LTD (CZ)
- 6 POLTSAMMAA FELIX (EE)
- 7 VINAGREIAS RIOJANAS (ES)
- 8 PERA INNOVATION LTD (UK)
- 9 UNIVERSITAT SUTTGART (DE)
- 10 MATFORSK AS - NORWEGIAN FOOD RESEARCH INSTITUTE (NO)



FP6 Project Catalogue

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# SAFE-RAY

## Development of Digital Radiography Techniques, Sensors and Systems to Replace Film Radiography for Defect Detection in Safety-Critical Welds and Castings

Within the European Community there are over 110 refineries, 400 chemical plants and an estimated 10 million kilometres of interconnecting and transmission pipelines and pipe-work. An estimated 40 % to 50 % of the pipelines/pipe-work are directly accessible for Non Destructive Testing (NDT) and inspection. The majority of the pipe-work and vessels carry toxic and/or flammable fluids, often at high temperature and pressure where breach of component containment can have considerable safety, environmental and economic implications. There is an estimated 200 manned and unmanned offshore oil and gas production installations operating within European waters with thousands of kilometres of critical topside accessible pipe-work. Digital radiography will allow safer, faster and more economical *in situ* radiography to be undertaken on pipe work welds and parent material thus helping meet European safety, environmental and social objectives.

The aerospace and automotive industries throughout Europe produce millions of steel and alloy precision castings each year, many of which are used in safety critical applications. In the main, the current practice is to examine using film radiography 'off-line' of the casting production process. Digital direct radiography will significantly reduce the inspection cycle time by allowing the radiography to take place 'in-line' at the foundry.

The consortium of small to medium-sized enterprises (SMEs) propose to develop digital radiographic systems to meet the stringent defect detectability requirements of the oil and gas, petrochemical, aerospace and automotive industries. A step change in the use of 'in-line' and site radiography is intended, such that the safety, environmental and economics benefits to industry are compelling. By developing this technology, the consortium SMEs will access the EUR 500 million each year, in-service inspection market for pipeline/pipe-work in the oil and gas and petrochemical industries as well as the precision casting inspection market place for the aerospace and automotive industry.

- 1 TWI LTD (UK)
- 2 BALTEAU NDT S.A. (BE)
- 3 OY AJAT LTD (FI)
- 4 COMPUTERISED INFORMATION TECHNOLOGY LTD (UK)
- 5 TECNITEST INGENIEROS SL (ES)
- 6 ADVANCED TECHNOLOGY GROUP S.R.O. (CZ)
- 7 AIRBUS UK LTD (UK)
- 9 ZF LEMFORDER UK LTD (UK)
- 11 RBG LTD (UK)
- 12 ADVANTICA LTD (UK)
- 13 TRUEFLAW LTD (FI)
- 14 FORSCHUNGSZENTRUM JUELICH GMBH (DE)
- 15 NDT CONSULTANTS LTD (UK)

**Contract: 512986**  
**Call: FP6-2002-SME-1**  
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# SAFERDRILL

A Remotely Controlled Autonomous Walking and Climbing Robot for Faster and Safer Landslide Monitoring, Slope Stability Analysis and Consolidation

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Co-operative research

www.dapponia-research.com/saferdrill

Landslides are one of the major types of natural hazards, killing or injuring a large number of individuals and creating very high costs every year. They are caused mainly by penetration of groundwater into slippery layers or by instability of soil. Geological surveys, soil drainage and deep drilling are common practices to prevent them, but today all these operations are unsafe, highly expensive, time consuming and labour intense: specialised operators climb with ropes on the unstable slope to perform the drilling without any proper protection, or in order to reach the working area, large scaffolds are fixed to the wall, but this solution is dangerous and not cost effective. Use of vehicles carrying articulated arms with the drilling unit is applicable only in the few cases when wide approaching areas are available.

The industrial objective is to provide a cost-effective system to remotely and automatically perform deep-drilling and slope-stability analysis, thus reducing operating costs and working time, while avoiding the human presence in unsafe and harsh environment.

The project builds on feasibility studies previously performed, demonstrating that a climbing robotic structure carrying an automatic drilling unit is a viable solution to perform deep drilling on rocky slopes. The project's scientific objectives are the development of:

- a robust climbing mechanical structure able to put itself in working condition without requiring cranes, and be completely controlled remotely;
- a drilling unit capable of automatically drilling holes more than 20 m deep and on any slope conditions;
- a navigation sensorial system able to provide the operator with real-time information on slope morphology and obstacles;
- an innovative mechanism for rope tensioning, able to move the system on vertical slopes;

- a geophysical knowledge-based system, integrating the drilling values and properties of ground samples in real-time, providing information on slope stability.

- 1 I.CO.P S.P.A. (IT)
- 2 SPACE APPLICATIONS SERVICES NV (BE)
- 3 IMC ZLIN AS (CZ)
- 4 COMACCHIO S.R.L (IT)
- 5 ROBERTO ZANNINI CONSOLIDAMENTO PARETI ROCCIOSE (IT)
- 6 MACLYSA MATERIALES CLINICOS Y SANITARIOS SC (ES)
- 7 D'APPOLONIA S.P.A. (IT)
- 8 DIPARTIMENTO DI MECCANICA E COSTRUZIONE DELLE MACCHINE - UNIVERSITÀ DEGLI STUDI DI GENOVA (IT)
- 9 CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS (ES)





# SCOOP

## Sheet Cutting and Process Optimisation for Furniture Enterprises

The SCOOP project aims at making a research contribution to the solution of complex problems arising in the management and control of manufacturing processes and systems adopted by European small to medium-sized enterprises (SMEs) operating in the furniture sector. The research is also intended to provide indications for practical advanced solutions aiming at improving SMEs' efficiency and competitiveness. In a scenario characterised by new competitors and decreasing labour costs, to maintain plants and expertise in Europe the SMEs considered have a need to minimize the costs deriving from raw materials and set-up costs.

The project is focused on furniture industries operating on semi-finished components by computer controlled wood-cutting machines and automated material handling systems to produce finished good types. These companies have already made a relevant investment in automation, but still have serious optimisation problems connected with the logistics of the whole production cycle. The most relevant problem, and starting point for this research, consists of cutting stock sheets into smaller pieces according to specified requirements: basically, parts of given sizes must be cut from stock items of given sizes demanded by customers so that the total trim loss is minimized (cutting stock problem). Once an operative solution is found, pre-computed cutting patterns are repeatedly applied in order to minimize set-up costs. However, the efficiency of the production process also depends on the organisation of the pattern sequence: in fact, a part type is generally produced by several cutting patterns, and lots of parts of the same type are put out by the system only when all the patterns producing that part type have been activated.

A direct consequence of a good pattern sequencing is a sensible reduction of work-in-process and intermediate inventory, as well as an improvement of shop floor organisation. Another major process improvement can derive, when appropriate, from an optimal selection of standard stock sizes, limiting the assortment of large sizes to a relatively small set so

as to trade off between warehouse maintenance and cutting efficiency (in fact, the larger the set of distinct stock sizes, the more complicated the magazine operation, but the smaller the trim loss).

A further type of problem typically arising in such a production environment is two- and three-dimensional pallet loading. This is the basic problem of efficiently fitting different (normally, rectangular) parts into one larger rectangle. An optimal solution to this problem has not only a positive effect on trim loss (as it plays the role of producing a single efficient cutting pattern in the cutting stock problem), but also can have an impact on external logistics (as it gives a way of efficiently filling outbound containers with given sets of packages).

The efficiency of a supply chain involving cutting operations can greatly benefit from optimal solutions to the problems above; but such problems are very complex, and small and medium enterprises cannot generally solve them efficiently. An important SCOOP output will be a prototype of decision support software able to integrate state-of-the-art optimisation features for cutting stock, pattern sequencing and scheduling, assortment and pallet loading problems in automated manufacturing systems.

- 1 UNIVERSITÀ POLITECNICA DELLE MARCHE (IT)
- 2 UNIVERSITÀ DEGLI STUDI DI L'AQUILA (IT)
- 3 UNIVERSIDADE DO MINHO (PT)
- 4 SOFTEL S.R.L. (IT)
- 5 MOBILPREF S.P.A. (IT)
- 6 COSMOB - CONSORZIO DEL MOBILE S.P.A. (IT)
- 7 AIDIMA - ASOCIACIÓN DE INVESTIGACIÓN Y DESARROLLO DE LA INDUSTRIA DEL MUEBLE Y AFINES (ES)
- 8 BENICARLÒ BM2000 (ES)

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**Materials & Processes**

# SEFUCO

## High-Performance Self-Lubricated Multifunctional Coating for Demanding Industrial Applications

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Co-operative research

The reliability of large industrial sectors such as energy plants, process industry and transport are dependent on the proper functioning of the critical components. Especially safety-critical components in heavy engineering, such as bearings, seals, shafts, barrels, rolls, etc. are suffering, because of the sticking of the counterpart material. Often conventional lubrication oils cannot be used, due to process environment, temperature or impurities. In order to ensure reliable function of the critical components, self-lubricating wear-resistance coatings are proposed. Thermal spray methods have been well established in producing wear-resistant coatings for such components. However, tailored coatings including solid lubricants are not commercially available.

This project's research and development work is divided into three technology areas:

1. powder production,
2. thermal spraying, and
3. tribology.

Manufacturing techniques for powder production will be optimised to achieve the optimal powder structure for thermal spraying. Possible manufacturing techniques for coating powders are self-propagating high-temperature synthesis (SHS) and agglomeration techniques. Novel powder processing opens possibilities for new powder compositions.

Thermal spray coating processes will be optimised for spraying powders containing solid lubricant materials for different application environments. Tribological tests will be done to determine tribological, wear and corrosion properties of the coatings containing solid lubricants. Controlling the whole manufacturing route from powder to coating enables tailoring the composition of coating according to application.

A combination of novel powder manufacturing and HVOF coating technology will be achieved, with cooperation of different European small to medium-

sized enterprises (SMEs). The project provides an opportunity to combine these two different technologies. The technological and economical chain is formed by powder manufacturers TL Beteiligungs (Austria), Millidyne (Finland), HVOF coating manufacturers Kuopion Konepaja (Finland) and Brodrene Johnsen (Norway), and the industrial end-users, JS Oy Pietarsaari (Finland) and Eaton-Hydrowa (the Netherlands).

<http://sefuco.vtt.fi>

- 1 VTT - VALTION TEKNILLINEN TUTKIMUSKESKUS (FI)
- 2 BRODR JOHNSEN AS (NO)
- 3 TL BETEILIGUNGS GMBH (AT)
- 4 JS OY PIETARSAARI (FI)
- 5 MILLIDYNE OY (FI)
- 6 HYDROWA B.V. (NL)
- 7 KUOPION KONEPAJA OY (FI)
- 8 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH (NL)



FP6 Project Catalogue

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# SHAKER

## A Smart Homogenisation Approach improving process Knowledge and papermaking competitiveness

This project will be beneficial for the paper industry in the following ways.

- Small to medium-sized enterprise (SME) paper mills will benefit directly because this project addresses an important problem they are suffering nowadays: the process instabilities and its consequences. A more stable process will allow them to increase their productivity and their product quality. This will favour their competitiveness, and therefore their situation with respect to large companies that benefit from the scale economy. This problem is more important for SMEs because small paper machines do not usually have a fully optimised control process.
- The improvement of paper quality will have a positive effect on the end-users of the paper chain, such as the corrugated board industry, copiers, printing, etc., many of whom are SMEs.
- The improvement of EU sustainable paper-making and competitiveness compared to Japan, the US and Asia with approximately EUR 10/t. Considering that around 10 million t of paper were produced by SMEs during 2003, this means a repercussion for European SMEs of more than EUR 100 million.

For SME suppliers, the project will achieve the following:

- transnational cooperation of individual complementary SMEs for delivery of a “total solution” instead of separate products, leading to a EU-wide market penetration instead of regional market penetration;
- development and validation of a “homogenisation concept” for the pulp, paper and board industry;
- an estimated realistic market of about EUR 3 million/year.

For research and technological development (RTD), the project will promote and deliver the following:

- development of new knowledge, which will contribute to the papermaking process;
- transnational cooperation in research and development, and an exchange of available knowledge and experience throughout Europe;
- transfer of gained knowledge to academic students;
- transfer of knowledge via seminars as further education for papermakers.

459

Co-operative research

- 1 MILLVISION B.V. (NL)
- 2 INVEN TECHNOLOGY BENELUX B.V. (NL)
- 3 INVENT UMWELT- UND VERFAHRENSTECHNIK GMBH & CO. KG (DE)
- 4 JUAN ROMANI ESTEVE S.A. (ES)
- 5 J. TONNESMANN & VOGEL GMBH & CO. KG (DE)
- 6 PAPELERA DEL PRINCIPADO S.A. (ES)
- 7 GORICANE PAPER MILL, JOINT STOCK COMPANY (SI)
- 8 OUDEGEM PAPIER N.V. (BE)
- 9 PAPIERTECHNISCHE STIFTUNG (DE)
- 10 UNIVERSIDAD COMPLUTENSE DE MADRID (ES)

www.milvisionweb.eu

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Materials & Processes

# SilkBone

Development and Evaluation of Mineralised, Silk-Based Composites for Orthopaedic Applications

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Co-operative research

The consortium seeks to develop a highly novel bone-substitute material (BSM) from mineralised silk composites, for use in medical procedures requiring bone tissue replacement. Oxford Biomaterials have developed Spidrex(R), a novel silk-silk composite based on a fibre and matrix generated from spider silk analogues.

Spidrex is biocompatible, bio-absorbable, can be made porous and has excellent mechanical properties and cell adhesiveness. Pilot studies at UNIVBRIS have shown it is rapidly and heavily mineralised by hydroxyapatite, the mineral of natural bone. Mineralised Spidrex will be developed into a BSM by incorporating osteoinductive factors in the silk matrix and biochemical tailoring both fibre and matrix. Progentix will develop non-foetal stem-cell technology with which to seed the BSM. 3H and U Kon InPuT will test human cell reactions to BSM *in vitro*. This will reduce the need for animal trials, in line with Directive 86/609/EEC, and will allow material modification early in the design process. Soton will optimise bone formation in the BSM *in vitro*. A cellularised, load-bearing, resorbable BSM is unprecedented and will provide entry to a market estimated at EUR 2.5 billion. It will be particularly advantageous for the treatment of fractures resulting from osteoporosis and bone lesions in cancer patients.

The consortium comprises three highly innovative, research-based small to medium-sized enterprises (SMEs) from three member states, whose competitiveness will be enhanced by access to this market and by collaboration with the consortium's five leading research and technological development (RTD) performers. Individually, each SME does not have the capability to pursue a project of the above magnitude. Tissue engineering, adult stem-cell research and implantable biomaterials have been flagged as future growth markets, keenly pursued in the US and Asia. Developing know-how in these areas and the subsequent dissemination of results in Europe will increase EU competitiveness in these burgeoning sectors.

www.silkbone.org

- 1 OXFORD BIOMATERIALS LTD (UK)
- 2 PROGENTIX BV I.O. (NL)
- 3 UNIVERSITÄT KONSTANZ (DE)
- 4 3H BIOMEDICAL AB (SE)
- 5 THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD (UK)
- 6 UNIVERSITY OF BRISTOL (UK)
- 7 UNIVERSITY OF SOUTHAMPTON (UK)
- 8 SVERIGES LANTBRUKSUNIVERSITET (SE)



FP6 Project Catalogue

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# SilverCross

## Mass Production of Silver Halide Recording Material for Full-Colour Holographic Applications

Currently there are no suitable materials on the market that may be used for recording high quality full-colour holograms or holographic optical elements (HOEs). This lack of commercially available material is crippling holographic-based industries, and consequently this remarkable technology is restricted to laboratories and research centres.

Full colour holography is unquestionably the most perfect imaging technology known to science: the images it produces are almost indistinguishable from the original image. Developments in other technology areas have created many applications for full-colour holograms and HOEs but these new market areas are unexploited due to this lack of a suitable recording material.

This project aims to solve this problem by developing a new nanoparticle (5-10 nm), a high-sensitivity (<2 mJ cm<sup>-2</sup>) low light-scattering, panchromatic silver halide emulsion which may be used for high-quality imaging recording techniques, including full-colour holograms and HOEs.

A commercial product would allow the evolution of a whole new industry, which has a potential market size of several billion euros and could create up to 10 000 European jobs. The spheres of impact include security (through an imaging technology which is virtually impossible to copy), 2-D display systems (including LCD displays and head-up displays for aircraft and road vehicles), cultural heritage (perfect copies of exhibits from galleries and museums could be displayed at any location), art and portraiture, advertising, and in the future, 3-D holographic dynamic imaging systems (i.e. 3-D TV).

This project will:

- develop and verify nanoparticle (5-10 nm) panchromatic, isochromatic silver halide emulsions with high sensitivity (<2 mJ cm<sup>-2</sup>);
- identify a process of coating these emulsions onto glass plates;

- verify the performance and storage characteristics of this recording material;
- develop a prototype manufacturing apparatus and process for this recording material.

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Co-operative research

[www.silvercrossproject.org](http://www.silvercrossproject.org)

- 1 VIVID COMPONENTS LTD (UK)
- 2 GEOLA UAB (LT)
- 3 PROF. CHRISTO G. STOJANOFF (PERSON PHYSIQUE) (DE)
- 4 THE HOLOGRAPHIC IMAGE STUDIO LTD (UK)
- 5 BULGARIAN ACADEMY OF SCIENCES (BG)
- 6 UNIVERSITÉ DE LIÈGE (BE)
- 7 NORTH EAST WALES INSTITUTE OF HIGHER EDUCATION (UK)

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Materials & Processes

# SIM-TWB

Accurate Simulation of Tailor-Welded Blanks to Reduce Process Design Time for the Sheet Pressing Industry

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Co-operative research

The main objective of the SIM-TWB project is to improve the design and manufacture of tailor-welded blank (TWB) components by using accurate numerical simulation and concurrent engineering methodologies. The sheet pressing operations of tailor-welded blanks will be predicted and optimised via simulation so that a viable product and process design is obtained before costly physical prototyping begins. However, in order to successfully use these methodologies, it is key to carry out an accurate modelling of the weld seam including the effects of different sheet alignment, type of welding, heat affected zone and the sheet materials. User-friendliness of the new functionality will be an important consideration in an effort to reduce engineer time in defining simulations.

This will optimise components as well as the manufacturing process, thus enabling tailor-blanks of higher quality to be produced using curved weld lines, new welding techniques, different sheet alignments and high-performance materials not previously considered. Companies benefit since this significantly reduces costs and improves time-to-market and competitiveness. Users benefit since this reduces vehicle weight and fuel consumption while improving safety and environmental concerns.

Both experimental and computer modelling will be carried out on new technologies to utilise tailor-welded blanks in the automotive industry that is looking at novel ways of reducing vehicle weight. The work will study recently-developed welding techniques such as diode laser and friction stir welding to enable the use of high-performance steels and aluminium for tailor-blanks, and will look at novel ways of enhancing pressing techniques in order to provide the sector with new technology in this competitive field.

[www.cimne.com/simtwb](http://www.cimne.com/simtwb)

- 1 QUANTECH ATZ S.A. (ES)
- 2 COM.STAMP SRL (IT)
- 3 PROGETTAZIONE STAMPI INGEGNERIZZAZIONI TRASFERIMENTO TECNOLOGIE SRL (IT)
- 4 FORMPOL- VAB TYCHY (PL)
- 5 LASINDUSTRIA (PT)
- 6 EUROPEAN FEDERATION FOR WELDING, JOINING AND CUTTING (BE)
- 7 CENTRE INTERNACIONAL DE MÈTODES NUMÈRICS EN ENGINYERIA (ES)
- 8 INSTITUTE OF FUNDAMENTAL TECHNOLOGICAL RESEARCH POLISH ACADEMY OF SCIENCES (PL)
- 9 SILESIAN UNIVERSITY OF TECHNOLOGY (PL)
- 10 INSTITUTO SUPERIOR TÉCNICO (PT)



FP6 Project Catalogue

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# SMARTSTRAND

## A Novel Built-in Remote Stress Sensing Element for Increased Safety and Efficiency in Manufacturing, Mooring and Craneage Applications

Many industries, from food and pharmaceutical production through tyre manufacture to stone cutting and mining, use conveyors and cables that contain structural or strengthening wire elements under tension. The tension, stress and strain of operation in these installations leads to frequent failures, particularly when they are not set up perfectly to the optimum level of load, tension or straightness, or when they wear or go out of adjustment during use. Our idea is to develop a stress measurement method that generates signals from the wire material itself in response to an applied external signal, coupled with a novel Induced Voltage Fluctuation Spectrum (IVFS) analysis that has been proven to be highly correlated to applied stress. To magnify the effect for industrial use and to provide information on torque effects at small radius bends, a new wire element is to be developed, based on nitinol, an alloy that has a super-elastic deformation mode exhibiting very high reversible electrical property changes. This will give us a novel, cost effective direct sensing method that will give condition monitoring at all points on the belt/cable and a reliable measure of the "high point" sources of stress and strain over the entire layout.

The technological objectives of the project are to develop:

- a wire element to be incorporated into a wire rope as the core wire, capable of sustaining sufficient signal spectrum to be induced and detected to monitor stress readings;
- a forming process to turn the individual wires into belt element, cutting wire;
- a signal inducer and reader system capable of precisely reading to within 5mm to give new information about localised strain peaks and tight bends;
- proof of concept for applying developed smartstrand technology to timing belt;
- integrated case study prototypes of a wire rope and a high speed cutting wire.

By helping leverage the limited research and technological development (RTD) resource of the small to medium-sized enterprise (SME) proposers, this project will allow us to afford to produce a truly innovative product and disseminate it to develop a new application market

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Co-operative research

- 1 WIREBELT COMPANY LTD (UK)
- 2 ASTECH ELECTRONICS LTD (UK)
- 3 WEBSTER & HORSFALL LTD (UK)
- 4 NUOVA FAUDI S.R.L. (IT)
- 5 TIMM AS (NO)
- 6 PERA INNOVATION LTD (UK)
- 7 D'APPOLONIA S.P.A. (IT)
- 8 SI AUTOMASJON AS (NO)

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**EC Contribution: € 644 743**

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Materials & Processes

# SOLARPLAS

Development of Plasma-Chemical Equipment for Cost-Effective Manufacturing in Photovoltaics

464

Co-operative research

The project is aimed at the development of cost-saving manufacturing technologies and innovative equipment to achieve a step change in production of solar power photovoltaic cells. Solar power production is suffering from a cost structure which at mid-term would retard penetration into a decreasingly deregulated market for power production.

The strategic objective for the EC is to bridge the gap between renewable and conventional energy production costs, and as a result, to significantly increase the market share of renewable energy use. The strategic goal for the project is to develop a platform for a new generation of production technologies for crystalline silicon photovoltaic cells, based on a through-going in-line manufacturing concept.

The target is to reduce the specific production cost for photovoltaic cells by introducing highly innovative surface technologies into the production chain, which fulfils both the criteria of in-line compatibility and reduced costs. Medium-sized enterprises are currently dominating the PV market in Europe. By integration of innovative technologies being developed by highly experienced research and technological development (RTD) performers into the portfolio of small to medium-sized enterprises (SMEs) their competitiveness will be significantly improved. An additional objective of the consortium is to develop a multi-purpose technology. This project will significantly widen out the technological basis of the SMEs involved.

- 1 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 2 CENTROTHERM PHOTOVOLTAICS GMBH & CO. KG (DE)
- 3 REGATRON AG, ELEKTRONIK (CH)
- 4 Q-CELLS AKTIENGESELLSCHAFT (DE)
- 5 CVD TECHNOLOGIES LTD (UK)
- 6 SOLARTEC S.R.O. (CZ)
- 7 UNIVERSITY OF SALFORD (UK)



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**EC Contribution:** € 838 560

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# SPILLREC

## Enhanced Design and Manufacturing of Waterborne Spills Recovery Systems

The SPILLREC project aims at enhancing the competitiveness of European small to medium-sized enterprises (SMEs) and research and technological development (RTD) organisations in the area of waterborne spill response, by innovating in the areas of the design, computer analysis, materials, and manufacture of spill recovery structures and systems.

The project will design, produce and test a new spill-response structural system, the SPILLREC System, and an open-source code for multi-physical modelling and simulation of fluid-structure interaction in spill recovery systems, the SPILLREC Application.

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Co-operative research

- 1 CENTRE INTERNACIONAL DE MÈTODES NUMÈRICS EN ENGINYERIA (ES)
- 2 UNIVERSITY OF APPLIED SCIENCE MUNICH (DE)
- 3 UNIVERSITAT DE BARCELONA (ES)
- 4 AZTI FUNDAZIOA (ES)
- 5 OIL POLLUTION ENVIRONMENTAL CONTROL LTD (UK)
- 6 OPTIMAL KUNSTSOFFPLANEN GMBH (DE)
- 7 BUILDAIR INGENIERÍA Y ARQUITECTURA (ES)
- 8 LINDSTRAND BALLOONS LTD (UK)
- 9 GERÈNCIA URBANÍSTICA PORT 2000 - AUTORIDAD PORTUÀRIA DE BARCELONA (ES)

[www.cimne.com/spillrec](http://www.cimne.com/spillrec)

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Materials & Processes

# S-SCIL

## Development and Testing of New Standards for Sorption Measurement and Characterisation of Ionic Liquids

466

Co-operative research

The aim of S-SCIL is the development and testing of new standards to measure the selective sorption for multigas application. This technology, which is not yet available, brings huge advantages for various kinds of chemical, pharmaceutical, environmental, food and energy processing. These new standards can be used to characterise the substances which are used to perform the process (porous solids, (nano-)particles, polymers, liquids) concerning their selective behaviour in gas-mixtures as well as to investigate the process itself in terms of temperature, pressure and composition. In addition, the main single gas sorption measuring standards, including the multi gas ones developed by this project, will be investigated and adapted for the characterisation and investigation of pure and multigas processing based on ionic liquids.

Targets are: investigation of several methods for gas analysis concerning their potential for combined sorption measurements in a wide range of temperature and pressure; development of a simple and economic sensor combination for a wide range of temperature and pressure; combination of gas analysis modules with two high end sorption measuring apparatus, one combined gravimetric / volumetric for measurements in static atmospheres and one gravimetric for measurements in a forced flow through; design and manufacture of a prototype of a commercial instrument based on the development previously done; adaptation and testing of sorption measuring standards, including the new ones to characterise ionic liquids and investigate chemical processing realised by using ionic liquids.

www.s-scil.eu

- 1 RUBOTHERM PRAEZISIONSMESSTECHNIK GMBH (DE)
- 2 COSTECH INTERNATIONAL S.P.A (IT)
- 3 APOLLO INSTRUMENTS (FR)
- 4 STEC INSTRUMENTS LDA. (PT)
- 5 COSTECH MICROANALYTICAL OUE (EE)
- 6 JVS ENGINEERING (DE)
- 7 RUHR-UNIVERSITÄT BOCHUM (DE)
- 8 POLITECNICO DI MILANO (IT)
- 9 INSTITUT FÜR NICHTKLASSISCHE CHEMIE E.V. AN DER UNIVERSITÄT LEIPZIG (DE)



FP6 Project Catalogue

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# STANLUB

## Development of New Bio-Lubricants and Coatings Using Stand Oils from Linseed, Castor and Tung Oils

Today, more than 90 % of lubricant and coating production is based on use of raw materials and processes developed by the petro-chemical industry. The high environmental burden caused by the use of non-renewable petrochemical based feed stocks for the chemical and polymer industries has led to the search for vegetable oil-based alternatives. Bio-lubricants and “green” solvents for coatings answer to these preoccupations and represent an emerging market in which small and medium-sized enterprises (SMEs) are strongly active. To develop market shares, SMEs need to enhance the performances and the properties of vegetable oil-based products through selection of the best vegetable oil sources and the development of cost-effective and efficient processes to transform vegetable oils into raw materials for bio-lubricants and solvents for coatings.

The objectives of the project are to develop “green” raw materials and related production processes from renewable sources: stand oils from linseed oil, castor oil and tung oil for two applications which are bio-lubricants and solvent for coatings.

The main interests of the project are:

- the implementation of a low-cost process with few reaction steps that could be used easily at SME scale (four steps instead six steps for traditional processes);
- to provide SMEs with cost-effective raw materials with high quality standards, good mechanical and physical properties (at least 20 % cheaper than traditional raw materials);
- to valorise all the stand oils derivatives from linseed, castor and tung oil. The main one (dimer) will be used for bio-lubricant production and the reaction by-product (monomer) for the coating industry.

- 1 INSTITUT DES CORPS GRAS (FR)
- 2 MOTUL (FR)
- 3 BARALDI LUBRIFICANTI S.R.L. (IT)
- 4 ZEROWASTE (FR)
- 5 VANDEPUTTE OLEOCHEMICALS S.A. (BE)
- 6 PEWAS S.R.O. (SK)
- 7 TOYAL EUROPE S.A. (FR)
- 8 BFB OIL RESEARCH S.A. (BE)
- 9 SOCIETE DES COLORANTS DU SUD OUEST (FR)

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EC Contribution: € 335 573



# STEMACEL

## Development of an Innovative Iron-Based Cellular Material — New Manufacturing Routes for Porous Structures

468

Co-operative research

The STEMACEL project is dedicated to the development of iron- and steel-based cellular materials. While the development of cellular aluminium structures ("aluminium foams") has seen significant progress during recent years, there is much less experience available for the manufacturing of steel and iron-based foams. However, many technological issues already known from aluminium foam processes can be adapted to iron-based structures.

In the STEMACEL project, the two most promising technologies for the manufacturing of iron foams will be further developed: the powder-metallurgical route and the melt-foaming route. These technologies will be further developed according to the requirements for energy-absorbing structures (crash test barriers), and noise damping and heat shielding applications in the metal working industry.

The project starts with the definition of the requirements of the potential steel or iron foam products. Demonstrators will be defined to ensure that the project results are relevant to industrial production. In the second work package, the two technologies (the powder-metallurgical route and the melt-foaming route) will be optimised and adapted. Samples will be manufactured in order to show whether the defined targets can be achieved in terms of mechanical and structural properties, as well as technological production feasibility. Finally, demonstrators will be manufactured in order to show the feasibility of an industrial production.

The STEMACEL consortium is well balanced and provides key know-how of the production technology through three research and technological development (RTD) performers. Three potential suppliers of iron and steel foam products will evaluate the possibility of establishing the related technologies in their companies. Two potential end-users bring in their expertise in defining requirements for innovative products made from cellular iron and steel-based materials.

- 1 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 2 ACIERIE ET FONDERIE DE LA HAUTE-SAMBRE (FR)
- 3 INDUSTRIAS LAGUN ARTEA S.L. (ES)
- 4 FUNDICIONES URBINA S.A. (ES)
- 5 CELLBOND COMPOSITES LTD (UK)
- 6 EISENGIESSEREI BAUMGARTE GMBH (DE)
- 7 FUNDACIÓN INASMET (ES)
- 8 CENTRE TECHNIQUE DES INDUSTRIES DE LA FONDERIE (FR)



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**EC Contribution:** € 452 045

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The consortium small to medium-sized enterprise (SME) partners propose to develop a set of mechanised non-destructive evaluation (NDE) techniques, sensors and systems that determine the quality assurance and structural integrity of production and 'in-service' glass fibre reinforced plastic (GRP) pipes and pipe joints.

The scientific and technical objectives are as follows.

1. To significantly develop and improve NDT techniques, in a step change to their current capability, in order that GRP pipe and joint defects such as 'kissing bonds' (KB) are detected early in the production process. This will expedite feedback to the fabrication process and reduce the level of rework.
2. To conduct inspections faster and hence reduce maintenance down time by automating NDT techniques.
3. To deliver NDT techniques, validated in their individual areas of intended use.
4. By eliminating operator subjectivity, to increase accuracy, increase safety and reduce instances of failure.

The economic objectives are as follows.

1. Improved highly reliable NDT inspection technology that will eliminate costly GRP joint failures and eliminate the need for expensive joint "over-wrapping" to be applied as a secondary containment backup. This equates to an annual worldwide saving of EUR 100 million in the offshore industry alone.
2. Improved confidence in the integrity of the corrosion-resistant GRP pipe and pipe joints, that will enable the material to be used in other pipeline applications as a substitute to steel, which is prone to corrosion and eventually leaking, with the loss of toxic products. The potential capital cost saving here is 75 %,

with further savings due to lower operating expenditure.

3. Elimination of collateral damage and repair costs following rupture during hydrostatic testing. The combined cost of this type of failure has been in excess of EUR 5 million.
4. A reduction in the pipe joint inspection time and thus a reduction in the site installation cost.
5. Profits from sales of the inspection systems and inspection service with the system, of approximately EUR 7 million over four years.

The social objectives are as follows.

1. Elimination of hazard due to possible exposure of workers to asbestos used for older pipe insulation.
2. Elimination of labour-intensive and monotonous inspection tasks, through the use of multi-task robotic manipulators.
3. Reduction of the radiation dose to radiographers, through the use of digital radiography that will reduce the required exposure times.
4. Elimination of the necessity to manually lift heavy inspection components through automation. This will extend the opportunities available to female and ageing operators in this historically young-male-dominated engineering sector.

The environmental objectives are:

1. elimination/reduction in hydrocarbon leaks from steel pipelines and pipe-work, with the substitution of corrosion-resistant, demonstrably high-integrity GRP pipes;
2. the elimination of the need to use and subsequently dispose of film processing chemical, by the introduction, where suitable,



of digital radiography for the volumetric examination of GRP pipe joints.

Over 10 million km of pipelines in Europe transport hazardous fluids, of which over half are carrying hydrocarbons (i.e. oil, oil derivatives and gas). Only a very small number of these pipelines are made from corrosion-resistant GRP materials, with the vast majority of pipelines being fabricated from steel pipes joined together by butt welds. Steel pipelines are prone to corrosion over a period of time and are therefore likely to leak hydrocarbon products into the environment.

For use in ambient temperatures and relatively low-pressure applications, GRP would offer an attractive alternative to steel were it not for the fact that the integrity of the interconnecting pipe joints cannot be inspected with a high level of confidence. The inadequacy of conventional NDT techniques seriously limits the current applications of GRP pipelines, and furthermore, the joint needs to be "over wrapped" to provide a secondary containment in the event that the primary joint is defective. If suitable NDT methods can be developed, GRP pipes would be used in additional applications, such as pipelines that cannot be currently considered as viable.

The consortium SME partners propose to develop new and novel non-destructive evaluation (NDE) techniques, sensors and systems that are capable of assessing the quality assurance and structural integrity of "production" and "in-service" GRP pipes and pipe joints. Hence, this key enabling technology will facilitate the use of GRP materials without the need for cost-prohibitive over-engineering processes such as secondary containment "over-wrap". The highly reliable and sensitive NDT methods developed under this proposal will also extend the use of GRP pipes into other applications that have traditionally been the domain of corrosion-prone metals, that have resulted in a series of catastrophes.

www.sure2grip.com

- 1 TWI LTD (UK)
- 2 LASER OPTICAL ENGINEERING (UK)
- 3 NDT SOLUTIONS LTD (UK)
- 4 MIKRON LTD (GR)
- 5 LOT ORIEL LTD (DE)
- 6 ADVANCED TECHNOLOGY GROUP S.R.O. (CZ)
- 7 OY AJAT LTD (FI)
- 8 PETROLEO BRASILEIRO S.A. (BR)
- 9 AMERON B.V. (NL)
- 10 RWE NPOWER PLC (UK)
- 11 UNIVERSITY POLITECHNICA OF BUCHAREST (RO)
- 12 ZENON S.A. - ROBOTICS INFORMATION (GR)
- 13 TECHNICAL UNIVERSITY OF SOFIA (BG)



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# SureGait

A Portable, Multi-Channelled, Inexpensive, Non-Invasive, Three-Dimensional Gait Analysis System Developed for Community Use that is Easy to Use and Provides Rapid and Accurate GAIT Reports

Our idea is develop an efficient, reliable, cost-effective gait analysis system. Current systems are usually expensive, complex, large, non-portable, and can be difficult to use. Specialised gait analysis laboratories are extremely hi-tech and accurate in their diagnosis of human disorders or diseases. However, they are very expensive, difficult to set up and use, and require significant expertise. Furthermore, they are normally centred around large cities, medical schools and in private clinics.

Our technical objectives for SUREGAIT are to develop a portable, inexpensive, non-invasive, three-dimensional gait analysis system that can be used in the community. Being simple-to use, it can be set up by a nurse at a GP surgery, community centre, village/church hall, or even at a nursing home, and be easily calibrated prior to use. A gait analysis report suitable for clinical use will be available in less than one minute after a measurement has been made.

Due to its ease of use, it is envisaged that up to 20 patients could easily be analysed in a four-hour session. All the data from the various sensors and the matching video clips will be sent for diagnosis to a doctor, or any other clinician anywhere in the EU with expertise in gait analysis, via e-mail, the Internet or mobile phone technology. In addition, the relatively low cost of the SUREGAIT technology will allow gait analysis to be available to anybody who requires it in all European Union countries.

Each skin-mounted EMG sensor will allow force measurement and positional analysis of the patient. Sensors will be highly innovative in that they are truly wireless, connected by low power radio, negating the need for the patient to carry heavy battery packs or trailing cables.

To achieve this we need to develop:

- a) an appropriate digital communication network between all the radio sensors in the system;

- b) a triangulation protocol and process to give a sensor's location and orientation;
- c) sensors that are flexible and miniaturised.

Regarding the strategic objectives addressed, the project will:

- a) provide a highly portable, inexpensive, non-invasive three-dimensional gait analysis system for community use. The equipment will be easy to set up and use while maintaining efficiency and accuracy;
- b) answer the social need for quicker medical treatment;
- c) facilitate the long-term monitoring of patients (i.e. Parkinson's disease, Spina Bifida, Cerebral Palsy, arthritis etc..) and will be used to identify appropriate drug therapy patients;
- d) through innovative technology increase the competitiveness of the small to medium-sized enterprise (SME) community through the development of global export and licensing;
- e) provide opportunities outside Europe.

- 1 KINE EHF (IS)
- 2 BELLMAN B.V. (NL)
- 3 A&G LTD (EE)
- 4 PLASTOD S.P.A. (IT)
- 5 ZEPLAS SL (ES)
- 6 RIAM (ES)
- 7 PERA INNOVATION LTD (UK)
- 8 LÖNTÆKNISTOFNUN ÍSLANDS (IS)
- 9 UNIVERSITY OF HEIDELBERG (DE)

**Contract: 32808**  
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# Swirl-jet study

Research to Evaluate the Technological Application of Swirling Jets in the Fields of Seabed Excavation, Vessel Propulsion and Underwater Cleaning

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Co-operative research

Participants in this research project share a common interest in swirling fluid jets, either from the standpoint of commercial exploitation, or fundamental scientific curiosity, or both.

Swirling fluid jets can be created and studied in various ways, in nature and technology. There are three project-focus applications, namely: (1) seabed excavation, (2) vessel propulsion, and (3) underwater cleaning-use jets formed by ducted propellers and static swirl-generator nozzles. Swirling jets are known to exhibit unusual behaviour: thus, at a particular swirl-to-axial velocity ratio, a columnar jet can suddenly splay out into a plane-wall cone, with the primary flow of energy being concentrated in the form of a thin conical sheet.

Conical fan-jets, as they are known, have demonstrable utility for seabed excavation, and significant potential for the other two applications. However, they only exist over a limited range of flow parameters, and are susceptible to disturbances, which can cause dramatic and often undesirable changes in jet topology.

Through preliminary research and development (R&D) in the area of seabed excavation, means have been found to better control the formation and stability of conical jets. Provisional patents (held by one of the small to medium-sized enterprises (SMEs)) cover basic design for the three application areas, and act as a catalyst for the project. However, to fully realise the inventions' cutting-edge potential, and enable the SMEs to jointly exploit the technology, detailed research into swirling jet dynamics and kinematics is required.

Research and technological development (RTD) performers have been purposely chosen with these research goals in mind, and to create an integrated, highly focused project team. Apart from the anticipated commercial-cum-scientific advancement for participants, potential EC benefits stemming from this research include:

1. a more sustainable and environmentally-appropriate method of maintenance dredging;
2. a more energy-efficient method of propelling and manoeuvring vessels at slow speed; and
3. a less hazardous means of underwater cleaning.

- 1 KORT PROPULSION COMPANY LTD (UK)
- 2 SILT LTD (UK)
- 3 HTS HIGH-PRESSURE TECHNICAL SYSTEMS GMBH (DE)
- 4 HOLYHEAD TOWING COMPANY LTD (UK)
- 5 IMAR SURVEY LTD (IE)
- 6 ISTITUTO NAZIONALE PER STUDI ED ESPERIENZE DI ARCHITETTURA NAVALE (IT)
- 7 UNIVERSITY OF NEWCASTLE UPON TYNE (UK)
- 8 UNIVERSIDAD DE MÁLAGA (ES)
- 9 UNIVERSITY OF LEEDS (UK)
- 10 ABP MARINE ENVIRONMENTAL RESEARCH LTD (UK)
- 11 INTERNATIONAL PAINT LTD (UK)
- 12 BUREAU VERITAS (FR)
- 13 UNIVERSIDAD DE SEVILLA (ES)



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European small to medium-sized enterprises (SMEs), which produce high precision parts (i.e. bearing and hydraulic components) are facing a steady loss of competitiveness in their growing markets, since existing manufacturing technologies do not fulfil increasing demands on part quality and variety. At the same time the competition has worsened due to low wages in countries outside Europe and an increasing cost pressure. As a result, a new technology must be provided to sustainably ensure the competitiveness and survival of the SMEs.

Therefore, the main objective of the project is to develop a combined process of high-precision hard turning and superfinishing in an integrated machining centre to permit a flexible production of high-precision parts made of hardened steel. The combined hard turning and superfinishing process (TAF) will substitute the current process chain of grinding and superfinishing, leading to a drastic reduction of non-productive times and thus to a significant increase of the productivity of the end-users of the technology.

The achievement of the objectives will require the development of an innovative technology, which will encompass the following:

- development and integration of a compact superfinishing device into a high-precision lathe;
- combination of the kinematics of a high-precision lathe equipped high-frequency direct motor drives with the kinematics of the compact superfinishing device;
- machining technology development and optimisation;
- optimisation of superfinishing tools;
- lifetime tests on real parts.

Besides contributing to an improvement of the bonds between Member States and Candidate Countries

and to a considerable increase in the competitiveness of the participating SMEs, the project will encompass scientific, technical and societal objectives, which can be summarised as follows.

- A better scientific and technical knowledge of superfinishing.
- An expansion of the use of superfinishing to other engineering applications and, consequently, enhancement of the life time and reliability of components, machines and other mechanical systems.
- A significant reduction in the use of emulsions in the machining process by using only one machine instead of many.
- the risk of inhaling hazardous oil mist produced in grinding operations increases if the worker spends a long time trying to align the parts after re-clamping. By producing parts by means of turning and superfinishing on only one machine, this risk will be considerably reduced and thus there will be an improvement in the health condition of European workers.

- 1 B.V. GEREEDSCHAPSWERKTUIGENINDUSTRIE HEMBRUG (NL)
- 2 UNIVERSITY OF MISKOLC (HU)
- 3 DIASFIN S.A. (RO)
- 4 GERVASONI S.P.A. (IT)
- 5 CEROBEAR GMBH (DE)
- 6 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

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# TAILORLIQUID

Tailor-Made High Performing Liquids — Enabling Competitive and Sustainable Growth

474

Co-operative research

The objective of this project is to promote an easy development of chemical liquids formulations (such as cleaning solutions, automotive care products, paint, pharmaceutical and food formulations, etc.), mainly for formulation industries in order to secure competitive and sustainable growth for small to medium-sized enterprises (SMEs). This requires an expansion of the fundamental knowledge within the field. With systematically varying process and product variables by combining the two concepts, high throughput screening (HTS) devices and the concept of surfactant affinity difference (SAD) using multivariate data analysis, a number of commercial and industrial benefits will be targeted, such as:

1. Rapid time to market for new novel products and processes, enabling custom-made solutions. Rapid transition between discovery, development and implementation.
2. Minimizing manufacturing costs by an optimum choice of ingredients in the formulation, also involving alternative raw material feed stocks (environmentally acceptable), additive packages.

The strategy is to build an easily accessible knowledge base of properties and functions enabling for example an easy implementation of renewable components for use in chemical formulations, which can be used by SMEs.

Positive results produced within this project will definitely allow substantial changes within the targeted industrial fields. The HTS and SAD concepts themselves are not the main goal, but combined they will constitute a toolbox for dramatic enhancements. TAILORLIQUID will make it possible to change the product easily on demand. TAILORLIQUID will provide a toolbox of knowledge for a sustainable development as well as the quality of life.

The SMEs have to meet increased demands for high quality products, continuous innovation and technological adaptations, as well as an intensification

of competition on the European market. More importantly, they need to be able to make custom made solutions for small production series.

The intended transformation of industry towards knowledge-based organisations, with better conformity to sustainability, etc. will also be accelerated by a strong academic, institute and industrial network associated to the selected TAILORLIQUID partners.

- 1 DR O.K. WACK CHEMIE GMBH (DE)
- 3 CAMURUS AB (SE)
- 4 SWEDISH OAT FIBRE AB (SE)
- 5 YKI - YTKEMISKA INSTITUTET AB  
(INSTITUTE FOR SURFACE CHEMISTRY) (SE)
- 6 PROCESSKONTROLL I STENUNGSUND AB (SE)
- 7 CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS (ES)



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# TANK-INSPECT

## Condition Monitoring of Large Oil and Chemical Storage Tanks Using Ultrasonic-Guided Wave Tomography without the Need to Empty and Clean the Tanks

Large above ground storage tanks filled with hazardous liquids such as oil, oil derived products, chemicals and food processing liquids are widely used in Europe and indeed throughout the world.

Leakage from corroded storage tanks, especially their floors, is a major environmental, economic and safety hazard. External inspection of these storage tanks is inadequate because current methods can only inspect up to 1m into the tank. Thus the current methods for tank inspection have the following major limitations:

1. require the tank to be emptied and cleaned before internal inspection can take place, a process, which takes up 80 % of the costs of the inspection itself;
2. the hazardous liquids have to be transported and stored in alternative tanks. This takes up expensive additional storage facilities, so causing weeks of lost production;
3. exposure of workers to chemicals and dangerous fumes during inspection and cleaning tasks. Also the process of emptying and cleaning releases large volumes of dangerous vapour and contaminated water into the surrounding atmosphere and ground water;
4. the large expense involved in tank inspection and the older age of the storage tanks in Eastern European countries is causing huge leakages into the environment.

To overcome the above drawbacks of current inspection practices, the consortium proposes to develop new and novel ultrasonic guided wave (UGW) techniques, sensors and systems for finding defects and corrosion in internal tank floor plates, without the need to empty and clean the tank.

By placing the UGW sensors outside the tank; the proposed method will be able to detect corrosion and other defects on tank floors without the need to empty and clean the tank and without the need for operator entry inside the tank.

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Co-operative research

- 1 SPREE ENGINEERING LTD (UK)
- 2 TECNITEST INGENIEROS SL (ES)
- 3 ISOTEST ENGINEERING S.R.L. (IT)
- 4 COAXIAL POWER SYSTEMS LTD (UK)
- 5 ROYAL VOPAK (NL)
- 6 KANEB TERMINALS LTD (UK)
- 7 TOTAL FRANCE (FR)
- 8 TWI LTD (UK)
- 9 KAUNAS UNIVERSITY OF TECHNOLOGY (LT)
- 10 KINGSTON COMPUTER CONSULTANCY LTD (UK)

**Contract: 508486**  
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**EC Contribution: € 1 082 155**

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# TARE-IT

A Novel Tare Identification, Crack and Corrosive Detection System to Improve Filling Accuracy, Productivity and Safety for SME LPG, Butane and Propane Gas Vendors

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Co-operative research

This project targets the European NDT sensors and instruments industry, consisting of more than 30 000 companies, mainly small to medium-sized enterprises (SMEs). The sector employs more than 250 000 people in Germany alone and is responsible for a turnover of more than EUR 28 billion. The highly competitive nature of the market has forced prices downward, which is hindering revenue growth. Competition is fierce in the world NDT sensor market and SMEs active in this sector are coming under increasing competitive pressure from large US-based and -owned multinational companies, as well as cheap imports from Asia Pacific and other non-EU countries that have access to a low-cost labour force.

Whilst the competitive threats we face are on a global level, so are the market opportunities. Internationalisation is a crucial success factor in a wider sense for SMEs, since national markets, in particular in small economies, are often too small for a sophisticated niche product like an NDT test system.

Our project aims to develop a novel product that can be manufactured and distributed globally through a network of European SMEs, creating EUR 66 million each year of new sales and exports for the European NDT sector and safeguarding 550 jobs.

- 1 NØRGAARD TEKNIK AS (DK)
- 2 ARROW TECHNICAL SERVICES LTD (UK)
- 3 QUANTEL SA (FR)
- 4 PBP OPTEL SP. Z O.O. (PL)
- 5 CYLINDRIC DENMARK AS (DK)
- 6 KOSAN CRISPLANT AS (DK)
- 7 DANISH INNOVATION AND TECHNOLOGY INSTITUTE AS (DK)
- 8 TWI LTD (UK)



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**Call:** FP6-2003-SME-1  
**Starting Date:** 01/07/2005  
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**Total cost:** € 1 251 537  
**EC Contribution:** € 648 178

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# TERMOGLAZE

## Production of Thermochromic Glazings for Energy-Saving Applications

Glazed surfaces are increasingly being adopted in buildings, but are responsible for the highest part of the energy needs of building (about 25 % to 30 %), which constitute 40 % of the total energy consumption in Europe.

In a moderate climate, typical of European countries, buildings are subjected in some seasons to overheating, while high solar gains are required to support space heating during other seasons. An optimal glazing should then have high solar transmittance in winter to enhance passive solar energy utilisation, and low transmission in the solar infrared region in summer to avoid overheating or high cooling loads.

The aim of TERMOGLAZE is to realise a thermochromic switchable glazing, that adapts itself to the external climatic condition in order to optimise its behaviour: (1) it functions like a clear surface below the transition temperature, with a high shading coefficient (i.e. high heat gain due to solar radiation) and high visible transmittance; and (2) it functions like a spectrally selective surface above transition temperature, with a low shading coefficient (i.e. low heat gain) and high visible transmittance, without losing too much visibility of the outside.

The aim of the TERMOGLAZE project is to develop such an innovative product, and an affordable and low-cost production process, based on Atmospheric Pressure CVD. The targets of TERMOGLAZE are:

1. limited change in the visible spectrum but very significant changes in the IR portion above transition temperature: visible transmittance of 50 % to 60 %, shading coefficient of 40 %;
2. virtually no change in the visual aspect: colour, visibility;
3. transition temperatures optimised for different climatic conditions in the range 20-35 °C;
4. very narrow width of hysteresis around the transition temperature;
5. good mechanical and physical durability of the TC layer, to be realised as a solid state very thin layer (less than 250 nm);
6. low-cost investment for installation of equipment; and
7. a production cost of the TC layer of up to 20 % of the cost of the underlying window.

- 1 LABOR S.R.L. (IT)
- 2 THERMOGRAPHIC MEASUREMENTS LTD (UK)
- 3 ENERCOME S.L. (ES)
- 4 CVD TECHNOLOGIES LTD (UK)
- 5 A.G.T. S.R.L. (IT)
- 6 ESTRUTURAS METALICAS FLORPOVOA LDA (PT)
- 7 SIVIS S.P.A. (IT)
- 9 UNIVERSITY COLLEGE LONDON (UK)
- 10 INSTITUTO AGILUS DE INOVAÇÃO EM TECNOLOGIAS DE INFORMAÇÃO LDA (PT)
- 11 UNIVERSIDADE DO MINHO (PT)

**Contract: 17761**  
**Call: FP6-2003-SME-1**  
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**EC Contribution: € 830 892**

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# THERMOFIT

## The Development of a Thermal Imaging-Based Part Inspection Tool

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Co-operative research

The principle objective of this project is to develop a new low-cost thermal imaging-based part inspection system that allows injection-moulders to rapidly identify parts that are likely to develop failures, as a consequence of cooling or future expensive reprocessing. The prototype development of the thermal imaging-based part inspection system will improve the competitiveness of the large community of 25 000 small to medium-sized enterprises (SMEs) in the EU injection moulding sector.

The economic objective of our work is to penetrate at least 5 % of the European plastic processing market, generating combined sales of EUR 47 million, productivity improvements worth EUR 100 million and additional cost savings of EUR 37.5 million. The work programme to deliver the technological objectives consists of work packages to enhance scientific understanding of the influence of part geometry and material on the temperature profile on polymer components as they are removed from the mould. It will also enhance the scientific understanding of the relationship between variations in component surface-temperature profile during a production run, and the part quality, both when it has cooled and when it is reheated during post-mould processing.

A new fault inspection module will be developed: it will be one that uses the knowledge of thermal tolerances and image registration algorithms to compare the thermal profile of a de-moulded part with a reference thermal profile of the same part with boundary thermal tolerances, and which has the ability to continuously adapt thermal tolerances based on feedback from production. Also, a second-order prediction tool, which uses advanced gradient, flow and fault prediction algorithms to detect part defects in parts that are within temperature tolerances but has an abnormal temperature profile, will be developed. These two innovations will be integrated into a prototype THERMOFIT part inspection system.

The project results will be formulated into a protectable form and patent application; this will be applied for before the 18th month of the project.

The knowledge from the research and technological development (RTD) performers will be transferred to the SME participants, and the benefits of the developed technology and knowledge will be broadcast beyond the consortium to potential industrial user communities.

- 1 MICOTRON AS (DK)
- 2 DALE I.D. AS (EE)
- 3 CONTURA MTC GMBH (DE)
- 4 AUTOMATION TECHNOLOGY GMBH (DE)
- 5 SCITEQ HAMMEL AS (DK)
- 6 ENGEL AUSTRIA GMBH (AT)
- 7 PERA INNOVATION LTD (UK)
- 8 FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)



FP6 Project Catalogue

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**Call:** FP6-2002-SME-1  
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**Total cost:** € 1 252 399  
**EC Contribution:** € 648 907

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# TRUESOUND

## A Challenge for Materials Science: Bringing True Baroque and Medieval Sound Back to Life in Historic and New Pipe Organs

True Baroque and Medieval organ music can only come back to life in the 21st century by developing Cu-based alloys and implementing them in organ pipes. By providing the technology to rebuild and create instruments with tailored sound qualities, small to medium-sized enterprise (SME) organ builders in EU will be increasing competitive in the world market for new instruments, and uniquely qualified to secure contracts for the restoration of the 10 000 historically valuable organs within Europe.

Achieving true Baroque or Medieval sound requires overcoming significant materials science challenges. An organ contains flue and reed pipes constructed of lead-tin alloys. There are no moving parts within a flue pipe. Reed pipes contain an additional vibrating part, the copper-alloy tongue that crucially influences its sound. Historically accurate lead-tin alloys characterised and reproduced by a previous Swedish project beautifully recreate the historic flue pipe sound. The reed pipes, however, are still acoustically inaccurate, since only conventional copper alloys were available to replace damaged reed pipe tongues.

This project aims to completely reproduce the beautiful warmth and blazing fanfare of Baroque and Medieval music by developing reed pipe tongues with appropriate acoustic properties. Historic pipe organs have regional sound qualities since they were constructed from locally available materials; however, local restoration efforts would be redundant and expensive. This project will be effectively and efficiently carried out with SME organ builders from across Europe, in conjunction with top quality research institutions, as the required technology development is far beyond the SMEs' capabilities. The final project deliverables include:

1. identifying historically accurate alloy compositions,
2. developing the processes necessary to reproduce historically accurate material properties, and

3. manufacturing tongues as replacement parts for historic reed pipes and as new reed pipe components with historic sound.

- 1 MAX-PLANCK-GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V. REPRESENTED BY MAX-PLANCK-INSTITUT FUER METALLFORSCHUNG (DE)
- 2 GÖTEBORG UNIVERSITY, GÖTEBORG ORGAN ART CENTER (SE)
- 3 CHALMERS UNIVERSITY OF TECHNOLOGY (SE)
- 4 UNIVERSITÀ POLITECNICA DELLE MARCHE, SEZIONE DI SCIENZE FISICHE (IT)
- 5 HENK VAN EEKEN ORGELMAKER (NL)
- 6 MATS ARVIDSSON ORGEL & CEMBALOBYGGARE AB (SE)
- 7 SOCIETÀ MARCO FRATTI S.A.S. DI FRATTI & CO. (IT)
- 8 UAB VILNIAUS VARGONU DIRBTUVĖ (LT)
- 9 UGALE ORGANBUILDING WORKSHOP (LV)

**Contract: 5876**  
**Call: FP6-2002-SME-1**  
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**Total cost: € 1 225 000**  
**EC Contribution: € 700 000**

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**Materials & Processes**

# TURBOWASH

## Construction and Demolition Waste-Washing System with Increased Mobility through Rapid Coagulation of Turbid Water

480

Co-operative research

The recovery of construction and demolition waste (C&DW) is a major trend in Europe, driven by the need to reduce landfill and aggregate extraction costs whilst providing resalable commodities in the form of top soils, metals and aggregates. At present, over 3 000 European small to medium-sized enterprises (SMEs) have established crush-screening recycling facilities and the sector is growing at a rate of 20 % each year.

A growing trend adopted by one in ten of these companies is secondary processing with washing equipment capable of tripling the value, quality and potential uses of the recovered materials. However, the washing techniques currently available are largely adapted from aggregate extraction methodologies and have significant limitations.

- A typical system rated at 100 t processing capacity per hour will use in excess of 75 000 l to 1 000 000 l of water to achieve products compliant with recycling standards. As a result, these systems tend to be centralised within a waste collection community of only a 30 km radius.
- The complex consistency of the feed stream (relative to aggregate extraction sites) results in a high carry-over of floating contaminants in the recovered phases (especially wood and plastics).
- The addition of flocking agents to chemically reduce turbidity results in a clay fraction that can only be put to landfill and contaminates the water with chemical residues.

This project proposes to develop an innovative mobile washing system of 15 000 l capacity, with the following novel features:

- an agitated pulse screen washing and grading methodology that reduces water usage from 1 500 l/min to 800 l/min (based on 100 T/h capability).

- a novel hydro-vortex separator for the removal of floating contaminants;
- secondary washing of sand to remove any residual clay;
- pre-treatment of the water with an electro-magnetic girdle;
- water treatment using an optimised continuous discharge centrifuge for rapid removal of 95 % to 98 % of the fine silt and clay deposits as thick slurry, returning 85 % of the semi-cleaned water for the bulk of washing requirements;
- secondary processing of 15 % of the water through an innovative combined lamella/electrocoagulation chamber capable of contaminant removal down to 99.5-99.7 %, suitable for all finish washing applications;
- concentration of the sludge into cake by a hydraulic membrane filter pressing process, thereby removing all requirements for coagulation chemicals and binders in the clay;
- the delivery of a flexible and integrated system capable of receiving and processing variable waste streams, including soil extraction deposits, crushed buildings and roadway rubble.

- 1 KMC ENGINEERING LTD (UK)
- 2 REDHILLS ENGRAVING LTD (IE)
- 3 POWERSCREEN CR S.R.O. (CZ)
- 4 FILTRECLAIR S.P.R.L. (BE)
- 5 AKSEL BENZIN A.S. (DK)
- 6 KIRTON ENGINEERING LTD (UK)
- 7 OLEN BETONG A.S. (NO)
- 8 POWERSCREEN INTERNATIONAL DISTRIBUTION LTD (UK)
- 9 PERA INNOVATION LTD (UK)
- 10 STIFTELSEN TEKNOLOGISK INSTITUTT (NO)



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# WAVESHIFT

## The Development of a Novel Integrated Super High Frequency (SHF) Non-Contact Detector Unit for Mobility Detection and Speed Measurement

False burglar alarms waste EUR 3.3 billion each year and are normally activated by motion detection. These include the direct costs to police and 3 200 small to medium-sized enterprise (SME) crime prevention companies, with additional costs and distress to property owners (domestic and commercial); the 5 million European SME retailers are one of the groups most vulnerable to these false alarms.

There is therefore an urgent need to improve the performance of these alarms to reduce this failure level. With price a main buying driver, performance improvement at the same cost is critical. This will directly increase crime prevention efficiency, impacting on over 2 million burglaries in Europe each year. To improve performance quality, there is a need for improved, more reliable and cost-effective sensors. Using 24 GHz instead of traditional 10 GHz frequency for sensors will increase performance reliability and result in less sensitivity to installation location error, through its more appropriate attenuation and propagation characteristics. However, current 24 GHz sensors are too large and costly for this use.

The EU wants to harmonise frequencies for short-range sensors and security systems to 24 GHz band, releasing lower frequencies for longer range applications. Therefore, there is a need to develop a high-performance low-cost microwave motion detector operating at 24 GHz.

There is a current and growing European market for 60 million multi-sensor alarms. This involves over 7 500 producing and distributing SMEs. There are also a further 27 500 SMEs involved in the installation and maintenance of crime prevention systems: this will help them to increase their sales.

The proposed research and technological development (RTD) project is in response to the urgent industrial need to develop a solution for a universal microwave detector unit, meeting the need for frequency harmonisation while helping to decrease the number of false alarms affecting crime prevention services (police and commercial services) and the victims of crime.

- 1 MICROWAVE SOLUTIONS LTD (UK)
- 2 CUBE CZ S.R.O. (CZ)
- 3 SCHAAL OBERFLACHEN & SYSTEME GMBH & CO. KG (DE)
- 4 LINWAVE TECHNOLOGY LTD (UK)
- 5 RCD RADIOKOMUNIKACE SPOL. S.R.O. (CZ)
- 6 SYSTEM MONITOROWANIA ALARMOW SP. Z.O.O. (PL)
- 7 BESAM PRODUCTION AB (SE)
- 8 INNOWACJA POLSKA SP. Z.O.O. (PL)
- 9 SIRRIS (BE)

**Contract: 16927**  
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**EC Contribution: € 579 445**

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# WOODSTONE

Intelligent System for Optimising the Online Finish Process for Stone Slabs and Wood Panels

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Co-operative research

The system that intends to be designed, developed and tested within the project will be made up of a 3-D laser scanner device equipped with a digital camera or video-camera. The system will be used for acquiring necessary information (on slabs and wood panels) collected and elaborated by a specific SW system which will interact with the machinery for final manufacturing operations supplying expected answers on final products quality.

The innovative system aims at obtaining two different results.

- Supply reference parameters to the final semi-processed material manufacturing phases. This aspect regards marble slabs, mostly the final working phase of polishing (potential wood applications are also regarding specific reference to wood panels). This operative phase is carried out in order to give desired exterior features to the final product by removing material with grindstones. The running depth is obviously the crucial parameter of this phase. The 3-D scanner is able to detect all existing defects on the marble slab that needs to be polished. Scanning will take about 10 seconds (considering marble slabs with maximum size: 2.5 m x 3.0 m) acquiring the marble slab shape and the various types of defects will be located. A vision system will also operate and will assess the strictly exterior aspects of the scanned material. The dedicated SW will then proceed, for each defect, to calculate the most significant geometrical parameters such as, for example, defect perimeter and depth. The SW system will also calculate the running depth of the polishing phase. The deeper the running depth, the higher number of defects will be eliminated. At the same time, the deeper the running depth, the greater the working costs and time employed.
- Supply objective data to the finished product classification phase divided according to various quality levels. Finished product quality

may depend on colour considerations (the use of a digital camera is crucial) and also on number and type of still existing defects on the finished product. The prototypal system must work effectively, precisely and quickly. In view of this, the technical objectives to be reached include precision degree: the precision level involves the 3-D acquisition and SW elaboration phases; precision will be not lower than 0.1 mm.

- 1 COGEMAR SRL (IT)
- 2 CELVER ELETTRONICA SRL (IT)
- 3 AUTOMATICA Y CONTROL NUMERICO S.L. (ES)
- 4 PROYECCION EUROPLAN XXI S.L. (ES)
- 5 GMG GRAMMATOPOULOS AND ASSOCIATES LTD (GR)
- 6 IRIS MARBLE S.A. (GR)
- 7 SODEX OOD (BG)
- 8 CGS DI COLUCCIA MICHELE & C. SAS (IT)
- 9 UNIVERSITÀ DI ROMA "LA SAPIENZA" - DIPARTIMENTO DI INGEGNERIA CHIMICA DI MATERIALI, MATERIE PRIME ET METALLURGIA (IT)
- 10 CONSORZIO ERICA - EVOLUZIONE DELLA RICERCA INDUSTRIALE NEL COMPRESORIO APUANO (IT)
- 11 UNIVERSITAS MIGUEL HERNÁNDEZ (ES)
- 12 ELKEDE TECHNOLOGY AND DESIGN CENTRE S.A. (GR)



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# ADOPTIC

## Additive Optimisation for Improved Ceramics

Ceramics manufacturing is a major industrial sector in Europe, recording total sales of around EUR 25.6 billion and employing 240 000 people. While the EU single market has stimulated further concentration in the industry, small and medium-sized companies tend to predominate in this sector: of the European ceramics companies, 90 % are small to medium-sized enterprises (SMEs) and the majority of them actually employ less than 25 people.

However, it is especially important to contribute to maintain the competitiveness of European ceramic industries against emerging countries by improving yields, demonstrating greater flexibility and reducing costs. To reach these objectives, additives have a valuable role to play. Even if they are typically added at low levels (0.1-2 wt %), organic additives play a vital role in attaining high yields and improved end-product properties in ceramic manufacturing.

However, given the large range of organic additives available and also due to the lack of communication between additive suppliers and ceramic manufacturers, SME companies are in danger of falling behind in their knowledge on additives. Currently, the use of these additives is often performed on a trial-and-error basis. That is why there is a strong need to research and promote awareness of what the best additives are and the optimum dosage level to add.

To respond to these needs, this project proposes:

- to understand the relationship between additive and ceramic product properties;
- to investigate the performance of different additives on both traditional and emerging processes and materials;
- to develop a web-based platform in order to help industrials involved in ceramic manufacturing to identify and select appropriate speciality additives.

This project will be useful to different subsectors of ceramic industry, such as sanitaryware, tableware, ceramic tiles, heavy clay, refractories, and advanced ceramics.

- 1 CERAM RESEARCH LTD (UK)
- 2 FEDERCERAMICA - FEDERAZIONE NAZIONALE DELL'INDUSTRIA CHIMICA (IT)
- 3 BRITISH CERAMICS CONFEDERATION (UK)
- 4 APICER - ASSOCIAÇÃO PORTUGUESA DA INDUSTRIA CERÂMICA (PT)
- 5 ASSOCIACAO INDUSTRIAL DO DISTRITO DE AVEIRO (PT)
- 6 FEDERAZIONE NAZIONALE DELL'INDUSTRIA CHIMICA - CERAMICOLOR (IT)
- 7 INCO INDUSTRIA COLORI SRL (IT)
- 8 NOEMI CERAMICHE SRL (IT)
- 9 EUROCOATING S.P.A. (IT)
- 10 CER.INVEST S.R.L. (IT)
- 11 PASTCERAM - PASTAS CERÂMICAS S.A. (PT)
- 12 AGORAMAT - PRODUÇÃO DE MATERIAIS CERÂMICOS LDA (PT)
- 13 DOMINO INDUSTRIAS CERAMICAS S.A. (PT)
- 14 FABRYKA NACZYŃ KAMIONKOWYCH MANUFATURA (PL)
- 15 ZAKLAD CERAMIKI SANITARNEJ STANISLAW HYBNER (PL)
- 16 STAR-DUST (PL)
- 17 VULCAN REFRACTORIES LTD (UK)
- 18 PARKINSON-SPENCER REFRACTORIES LTD (UK)
- 19 TENMAT (UK)
- 20 NATIONAL RESEARCH COUNCIL (IT)
- 21 UNIVERSIDADE DE AVEIRO (PT)
- 22 AKADEMIA GORNICZO-HUTNICZA IM. STANISLAWA W KRAKOWIE, UNIVERSITY OF SCIENCE AND TECHNOLOGY (PL)
- 23 UNIVERSITÀ DI MODENA E REGGIO EMILIA (IT)
- 24 GRAF S.P.A (IT)

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EC Contribution: € 1 325 513

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# DIOFUR

## Dioxins in Cupolas, Rotary and Electric Arc Furnaces — Emissions-Free Melting Practices in Foundries

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Collective research

Dioxins and furans can be formed in melting processes of ferrous foundries. The BREF document recently edited by EIPPCB (Seville) emphasized the emission problem in cupolas, rotary furnaces and electric arc furnaces. The BREF report defines the need for a better understanding of dioxins formation, and the need for more research towards the adaptation of existing measures in other processes. Reduction in dioxins emissions of melting furnaces beneath an acceptable level of 0.1 ngTEQ/Nm<sup>3</sup> will be achieved in two steps: first by optimising process parameters (in cupolas, rotary furnaces and electric arc furnaces), and secondly by using adapted end-of-pipe techniques (carbon activated and with sorbent injection). A good-practice book will be edited with the necessary guidelines for the foundries.

A high number of foundries in Europe are small to medium-sized enterprises (SMEs) (approximately 80 %) and the total number of furnaces looking at this problem could be from 600 to 800 units. The consortium has developed resource planning for industrial associations or groupings (IAGs), SMEs core group and research and technological development (RTD) performers, according to research and development (R&D), training and dissemination, and management activities. Participants come from six countries, and an EU IAG (CAEF) with 20 associations from different European countries as members, will cooperate too. The multidisciplinary of the partners is guaranteed in the consortium with:

- iron and steel foundries SMEs with different melting furnaces,
- foundry and environmental equipment manufacturers,
- foundry IAGs,
- RTD experts in foundry and environmental techniques.

In total, DIOFUR is applying for EUR 2 878 937, and the duration is estimated to be 30 months.

- 1 FUNDACIÓN INASMET (ES)
- 2 ASOCIACIÓN DE FUNDIDORES DEL PAÍS VASCO Y NAVARRA (ES)
- 3 ODLEWNICZA IZBA GOSPODARCA (THE FOUNDRY CHAMBER OF COMMERCE) (PL)
- 4 DEUTSCHER GIESSEREIVERBAND (DE)
- 5 CENTRE TECHNIQUE DES INDUSTRIES DE LA FONDERIE (FR)
- 6 INSTYTUT ODLEWNICTWA (FOUNDRY RESEARCH INSTITUTE) (PL)
- 7 VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK (BE)
- 8 EUROPÉENE SEA (FR)
- 9 FIDAY GESTION (FR)
- 10 ZAKLADY METALURGICZNE "POMET" SA (PL)
- 11 GUIVISA SL (ES)
- 12 FUNDICIONES INFUESTA S.A. (ES)
- 13 FUNDICIONES FUMBARRI SCI (ES)
- 14 SIDER PROGETTI SNC (IT)
- 15 NV TYPHOON (BE)
- 16 NV DESOTEC ACTIVATED CARBON (BE)



## Development of Innovative Particleboard (Chipboard) Panels for a Better Mechanical Performance and a Lower Environmental Impact

In contrast to the particleboard industry, the European furniture industry mainly consists of small to medium-sized enterprises (SMEs). In modern furniture industry, the use of particleboard (chipboard panels) is continuously growing. They are basically composite materials, traditionally made of wood chips, and a binder (either adhesive or resin).

During the last decade, especially in countries where forestry resources are scarce, there has been a deterioration of the mechanical performance of chipboard panels; the main reason is the increasing use of recycled materials obtained from old pieces of furniture, made themselves of chipboards, for the preparation of new chipboard panels, instead of natural wood chips.

Contingent on the quality of the recycling and cleaning process, this downgrading of performance is causing often serious problems to the furniture manufacturing firms, typically SMEs, across Europe, and provides the motivation for this Collective Research project proposal.

The project aim is to reinforce the technological basis of chipboard manufacturing, and to develop innovative lightweight chipboards, which meet mechanical performance requirements and have a reduced environmental impact. This will allow furniture manufacturers to rely on panels of adequate reliability that are environmentally friendly, panels being a key element across the value chain of furniture production.

The SMEs involved in this project are from the following sectors — most of them are furniture and furniture component manufacturers, and are therefore at the end of the furniture industry value chain:

1. SMEs manufacturers of furniture,
2. SMEs manufacturers of semi-finished panels for the furniture sector,
3. SME manufacturers of particleboards,

4. SME manufacturers of process equipment and of process instrumentation.

Recycling in the particleboard and fibreboard industry has an increased relevance, because of the environmental impact.

The demand from furniture manufacturers is clearly oriented towards innovative particleboards, employing new materials; panels developed in this project should exhibit the following characteristics:

1. improved mechanical performance of particleboards in terms of:
  - a) reduced density,
  - b) increased stiffness,
  - c) improved workability;
2. lower environmental impact.

Innovation will concern the following aspects of particleboard composition and manufacturing:

- a) innovative binder materials;
- b) recycling waste materials as particles for particleboard production, from agriculture (wood and annual plants), industry (e.g. sawmills), home (e.g. used furniture), etc.;
- c) improved adhesion between particles and binder;
- d) innovative instrumentation for panel-production process control and quality checks.



- 1 COSMOB - CONSORZIO DEL MOBILE S.P.A (IT)
- 2 UNIVERSITÀ POLITECNICA DELLE MARCHE (IT)
- 3 AIDIMA - ASOCIACIÓN DE INVESTIGACIÓN Y DESARROLLO EN LA INDUSTRIA DEL MUEBLE Y AFINES (ES)
- 4 CNR - ISTITUTO DI CHIMICA E TECNOLOGIA DEI POLIMERI (IT)
- 6 FALCO S.P.A. - INDUSTRIA PANNELLI TRUCIOLARI (IT)
- 7 CAMPEC SCRL - CONSORZIO SULLE APPLICAZIONE DELLE MATERIE PLASTICHE E PROBLEMI DI DIFESA DALLA CORROSIONE (IT)
- 8 MOBILPREF S.P.A. (IT)
- 9 CIDEMCO-CENTRO DE INVESTIGACIÓN TECNÓLOGICA (ES)
- 10 BIESSE S.P.A. (IT)
- 11 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 12 IMS HELLAS S.A. (GR)
- 13 IMS NAPREDAK S.A. (BG)
- 14 CENTRE TECHNIQUE DU BOIS ET DE L'AMEUBLEMENT (FR)
- 15 ASSINDUSTRIA PESARO-URBINO (IT)
- 16 UPPER S.P.A. (IT)
- 17 INTERNATIONALER VEREIN FÜR TECHNISCHE HOLZFRAGEN E.V. (DE)
- 19 FABRICACION Y DISTRIBUCION DEL MUEBLE S.L. (ES)
- 20 MEDIFA S.A.R.L. (FR)
- 21 B. MAIER ZERKLEINERUNGSTECHNIK GMBH (DE)
- 22 THERMOSENSORIK GMBH (DE)
- 23 ZEUTEK OPTO-ELEKTRONIK GMBH (DE)
- 24 INNOVAWOOD LTD (IE)
- 25 PRIEUR S.A. (FR)
- 26 TRENNSO - TECHNIK GMBH (DE)
- 27 AGROSYS GMBH & CO. KG (DE)
- 28 ELKA-HOLZWERKE LUD. KUNTZ GMBH (DE)



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 Total cost: € 2 850 750  
 EC Contribution: € 1 782 375

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# DYNAMIC

## The Closed-Loop, Active Control of Reaction Dynamics, through Dielectric Monitoring, Enabling Greater Competitiveness of the European SME Plastics Processing Community

The technology that we will develop will directly impact on the thermoplastic processing sector, and more specifically the thermoplastic reaction injection moulding (RIM) sector, estimated to be worth EUR 700 million each year in Europe by 2008. The work will focus on nylon and CBT (a thermoplastic polyester material). This technology will impact on the 1 100 moulders in Europe.

Our project will develop a core process technology to significantly add to the competitiveness of the small to medium-sized enterprise (SME) community by providing them with increased knowledge, enabling them to supply competitively on a global basis. The technology we seek to develop will use innovative dielectric sensors to monitor and control the reaction kinetics of the polymerisation process to reduce the in-mould cure cycle from 3 to 4 min to 45 s.

This will be achieved by the development of innovative and novel control systems, through increased scientific understanding, enabling the controlled advancement of the polymerisation process and hence the viscosity of the polymer within the extruder/mixer, such that once injected, a mould residence time of only 45 s is required to complete the polymerisation process and de-mould the finished part.

This technology will enable:

- significant reductions in cycle time through mould residence times of 45 seconds instead of 3 minutes;
- threefold greater machine output;
- the control and reduction of polymer viscosity (over traditional manufacturing methods), enabling 50 % lower machine-clamp pressures through the reduced forces involved;
- significantly lower capital investment (40 %) through the use of smaller machines;

- the manufacture of 50 % larger parts for the same machine size;
- reduced energy usage, in compliance with the proposed directive on energy, end-use efficiency and energy services (COM (2003) 739 final of 10 December 2003, equivalent to 4 million t of energy each year;
- the placement of preforms within the mould tool, due to the low pressure of injection, which can be accurately tailored to achieve the desired engineering properties, with a saving on material scrap of 8 %.

The market size for RIM is estimated to be EUR 700 million each year in Europe in 2008. The remainder, worldwide, is estimated to be EUR 1300 million, making a total world market of EUR 2 billion.

- 1 THE COMPOSITES PROCESSING ASSOCIATION LTD (UK)
- 2 THE EUROPEAN ASSOCIATION OF INNOVATING SMES (UK)
- 3 MAGYAR VEGYIPARI SZOEVETSEG (HU)
- 4 INTEGRATED AEROSPACE SCIENCES CORPORATION O.E. (GR)
- 5 ISOJET EQUIPEMENTS S.A.R.L. (FR)
- 6 ASTROMAL SP Z.O.O. (PL)
- 7 TECHNIKA PLASTIKA S.A. (GR)
- 8 FIBREFORCE COMPOSITES LTD (UK)
- 9 PERA INNOVATION LTD (UK)
- 10 UNIVERSITE CLAUDE BERNARD LYON 1 (FR)
- 11 NATIONAL TECHNICAL UNIVERSITY OF ATHENS (GR)

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**EC Contribution: € 1 382 255**

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# ECONWELD

## Economically Welding in a Healthy Way

488

Collective research

The metal-mechanic sector (with a turnover of EUR 970 billion a year) represents 8 % of EU business as a whole. Welding is the most important joining technique in this sector; there are about 730 000 full time and 5.5 million welding-related jobs in Europe. These jobs are threatened by welding moving to low-wage Asian countries, leading to a decrease in European welding and welding-related jobs of 3 % each year (meaning 165 000 employees' jobs).

Another drawback is that welding has a great impact on health, for it is extremely demanding physically, leading to a high percentage of sick leave (about 160 working hours per welder yearly). These high sick-leave costs are extremely threatening to the financial position of small to medium-sized enterprises (SMEs), endangering their competitiveness.

ECONWELD will put a stop to this current downward spiral for welding, using the following means.

1. Reduction of welding costs by 15 % to 20 % and improvement of production by 10 % to 15 % The project will find solutions and guidelines for a (flexible) mechanisation of welding, including modular fixture and clamping design. The benefits and possibilities of alternative high speed and/or high deposition welding processes will be demonstrated.
2. Reduction of sick leave of welders of 50 % and improvement of production by 10 % to 15 %. This will be achieved by an improvement of the organisation at welding. Reducing sick leave will pay off 80 hours, meaning 10 working days per welder per year. An improved productivity by 10 % to 15 % will be possible, with the development of new solutions to improve work conditions (ergonomics and work flow).
3. Reduction of exposure to welding fumes of 30 % for gas metal arc welding (GMAW) and 20 % for other processes.

This will improve health and safety at work for welders. ECONWELD will come up with solutions to reduce welding fumes at the source, a smart exhaust arm moving to the exact welding spot, and a helmet with sensors indicating when the fume concentrations exceed safety limits as well as prototypes of welding torches with better ergonomics and fume extraction capabilities. This will lead to a decrease of the MAC value on a European scale from 5,5 mg/m<sup>3</sup> to 3,5 mg/m<sup>3</sup>.

The results obtained in ECONWELD will give SMEs in Europe better competitiveness as well as welding a better image of the profession; both combined will keep welding activities and consequently welding jobs in Europe, in the long run.

- 1 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 2 ISTITUTO ITALIANO DELLA SALDATURA - ENTE MORALE (IT)
- 3 MS DI MAURO SALA & C. SNC (IT)
- 4 LASINDUSTRIA - TECHNOLOGIA LASER (PT)
- 5 ASPIRMIG SRL (IT)
- 6 JESVA S.R.O. (CZ)
- 7 ALMOR LTD (UK)
- 8 INSTYTUT SPAWALNICTWA (PL)
- 9 CFD ENGINEERING S.R.L. (IT)
- 10 ELEKTROTECHNICK PRODUKTY S.R.O. (SK)
- 11 INOVAMAIS - SERVICOS DE CONSULTADORIA EM INOVACAO TECNOLOGICA S.A. (PT)
- 12 VALK WELDING B.V. (NL)
- 13 REGIONALNA IZBA PRZEMYSLOWO-HANDLOWA W GLIWICACH (PL)
- 14 HUNGARIAN ASSOCIATION OF WELDING TECHNOLOGY AND MATERIAL TESTING (HU)
- 15 NEDERLANDS INSTITUUT VOOR LASTECHNIEK (DUTCH INSTITUTE OF WELDING TECHNOLOGY) (NL)
- 16 EUROPEAN FEDERATION FOR WELDING, JOINING AND CUTTING (PT)
- 17 UNIVERSITA DEGLI STUDI DI GENOVA (IT)
- 18 PLASMA TEAM DI LORETO VILVANA & C.S NC (IT)
- 19 INSTITUTO SUPERIOR TECNICO (PT)

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EC Contribution: € 1 713 448

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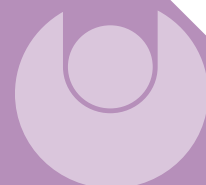
Within three years, all windows have to be provided with a CE mark. This means that the performance profile of windows throughout the EU will be uniformly determined. However, the introduction of CE-marking for windows will have an enormous impact on all local window-manufacturers (mainly small to medium-sized enterprises (SMEs)) all over Europe: it requires the determination of the CE-performance profiles by physical testing for each window type. Because local SMEs in particular manufacture unique window types in small series, extra costs for extensive testing will raise the cost price of a window unit enormously. They will face strong competition from huge international industrial companies.

This will result in the loss of employment mainly in rural areas, where more than 85 % of the window manufacturers are located. In total, about 300 000 SMEs manufacture about 85 million window units in Europe each year, with a value of EUR 16 billion (source: IC Interconnection Consulting Group, München, 2005).

Furthermore, the main goal of EU policy, increasing the tradability of building products and competitiveness of SMEs in the EU, will not easily be achieved by introducing the CE mark for windows, because of the different building legislations, building processes and building traditions in different countries (source for SME policy: CEC (2003b) *Thinking Small in an Enlarging Europe*, Brussels, 2003).

The technological objectives of this research proposal are as follows.

- To develop a CE assessment model that calculates most of the CE performance characteristics whereby physical testing will be minimised. With this model, new innovative and individual window designs with CE-marking will become possible for SMEs (design and manufacture) by increasing competitiveness.
- To develop a European window interface model that assesses the applicability of a CE-marked window in a specific building project in the EU. With this model, locally produced windows can be designed to be built into façades in most of the EU Countries. To achieve the objectives, highly sophisticated models have to be developed, in which all relevant window components, and also the different building processes, building traditions and building façade legislations in the EU are incorporated. The models will be developed on the condition that the assessment tool developed can be handled very easily by SMEs by designing windows, and a more complex version can be used for CE assessment by notified bodies. With the CE-assessment model, locally produced windows can be optimised and new innovations in window design with a CE mark can become affordable even for small SMEs. The European window interface system for windows will stimulate all to share innovations in window-design across the borders. As a result of the optimisation of local windows and of the European window interface model, the innovativeness and the competitiveness of local SMEs will be strengthened. Not only free tradability but also the applicability of windows within the EU will actually be ensured.



- 1 FACHVERBAND DES TISCHLERHANDWERKS NRW (DE)
- 2 ORSZÁGOS ASZTALOS ÉS FAIPARI SZÖVETSÉG (HU)
- 3 EUROPEAN BUILDERS CONFEDERATION (BE)
- 4 LATVIJAS LOGU U UNDRUJIJU RAŽOTĀJU ASOCIĀCIJA (LV)
- 5 CONFEDERATIE BOUW - VLAAMSE SCHRIJNWERKERS (BE)
- 6 BRITISH WOODWORKING FEDERATION (UK)
- 7 NORMAPME A.I.S.B.L. (BE)
- 8 CONFÉDÉRATION DE L'ARTISANAT ET DES PETITES ENTREPRISES DU BÂTIMENT (FR)
- 9 CONFEDERATION OF FINNISH CONSTRUCTION INDUSTRIES (FI)
- 10 FEDERAZIONE ITALIANA DELLE INDUSTRIE DEL LEGNO, DEL SUGHERO, DEL MOBILE E DELL'ARREDAMENTO (IT)
- 11 THEO THESING GMBH (DE)
- 12 HELMUT DAMWERTH GMBH & CO. KG (DE)
- 13 ANTON WIGGER GMBH & CO. KG (DE)
- 14 KOLB GMBH (DE)
- 15 HOLZ TEAM KFT (HU)
- 16 SZÉPLAKI FAIPARI KFT (HU)
- 17 SIA FLORA (LV)
- 18 SIA MONTAZNIEKS D (LV)
- 19 LAMIKON B.V. (NL)
- 20 VERWEIJ HOUTTECHNIEK B.V. (NL)
- 21 BOYLAND JOINERY LTD (UK)
- 22 SMITH & CHOYCE LTD (UK)
- 23 EURL DESMEDT (FR)
- 24 CRIAUD (FR)
- 25 SKAALA IKKUNAT JA OVET OY (FI)
- 26 DOMUS-YHTIÖT OY (FI)
- 27 TNO BUILDING AND CONSTRUCTION RESEARCH (NL)
- 28 UNIVERSITY OF WEST HUNGARY (HU)
- 29 VTT TECHNICAL RESEARCH CENTRE OF FINLAND (FI)
- 30 TECHNICAL UNIVERSITY DELFT (NL)
- 31 CONSIGLIO NAZIONALE DI RICERCA (IT)



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# EMOLD

## Total Life-Cycle Approach for Efficient and Networking Plastic Injection Moulding Processes

The European plastics processing industry includes 39 000 companies, 85 % of them small to medium-sized enterprises (SMEs), with an annual turnover of EUR 140 billion. Behind the US, Europe ranks second in worldwide production, and employs more than one million workers, which means 4.5 % of the labour force and 4 % of the value added European manufacturing.

It can be stated that nowadays the main technological challenges of this sector are to maintain the technological leadership for high technological-content plastic products and to face the economic disadvantages associated with higher costs of both human labour and tools.

Admitting that the battle associated with mould-making costs and labour costs of plastic injection processing are virtually lost, a group of industrial associations or groupings (IAGs) have made a strategic reflection. They have agreed that the only way for the European plastic converting industry to maintain its competitive and leadership position is to offer high technological-content plastic products and an enhanced service content by means of efficient and added-value injection moulding processes.

With the aim of tackling these general needs and technological challenges detected in the European plastic injection moulding sector, the project EMOLD intends to completely redefine the plastic injection process. Thus, this project proposes a new concept of plastic injection processes, in which moulds will pass from being passive elements to becoming networked active elements with embedded knowledge. This will allow, on the one hand, improvement of the efficiency of the whole life cycle of plastic parts production, from mould-making to the production process itself, as all process parameters will be able to be monitored and corrected in real time. On the other hand, the knowledge embedded in these "intelligent" moulds will allow retention of the know-how gained by their technicians, but also exploitation of that knowledge more efficiently, so that moulds will become increasingly intelligent.

- 1 FUNDACIÓ ASCAMM (ES)
- 2 EUROPEAN PLASTICS CONVERTERS (BE)
- 3 FEDERACIÓN ESPAÑOLA DE ASOCIACIONES EMPRESARIALES DE MOLDES Y MATRICES (ES)
- 4 TECOS SLOVENIAN TOOL AND DIE DEVELOPMENT CENTRE (SI)
- 5 GAUGE & TOOLMAKERS ASSOCIATION (UK)
- 6 VLAAMS KUNSTSTOFCENTRUM - VKC (BE)
- 7 ELEDA CUMSA S.A. (ES)
- 8 PLASTIASITE S.A. (ES)
- 9 MDE B.V. (NL)
- 10 HAIDLMAIR GMBH (AT)
- 11 SPRINT TOOL AND DIE LTD (UK)
- 12 TEHNOS (SI)
- 13 ELASTOPOLI (FI)
- 14 FOS MESSTECHNIK GMBH (DE)
- 15 FUNDACIÓ FATRONIK (ES)
- 16 NETHERLANDS ORGANIZATION FOR APPLIED SCIENTIFIC RESEARCH - TNO (NL)
- 17 SMITHERS RAPRA TECHNOLOGY LTD (UK)

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Materials & Processes

# FILTER

## A Total Metalworking Fluid (MWF) Disposal Technology

492

Collective research

The European engineering sector is an essential pillar of the EU, worth EUR 300 billion with 375 000 companies, 90 % of which are small to medium-sized enterprises (SMEs) providing 20 million jobs. Of these companies, 253 000 are SMEs involved in metal machining. The sector is under intense pressure from cheap imports from the Far East, where labour costs are much less.

Further pressures have arisen from ever-tightening but essential environmental legislation in the EU, resulting in increased disposal costs and tightening of pollution discharges. Consequently, the number of engineering workshops has been reduced by 20 % in the last 5 years. This key SME sector must respond if it is to survive. These engineering companies use water-mix metalworking fluids (MWFs) in their machining processes for lubrication and cooling.

It is these MWFs that present a significant environmental problem since they have finite lifetimes, typically one year, and current waste treatment technologies are ineffective due to the complex make-up of spent MWFs which result in toxic fluids being discharged to sewers.

As industrial associations or groupings (IAGs), we represent the needs of our large SME membership base of 6 400 companies. We aim to develop a total MWF disposal technology consisting of enhanced separation membranes and a new ceramic photocatalytic oxidation process to reduce the 4 billion litres of spent MWF by 50 % through new recycling opportunities. Assuming a modest penetration market penetration of 2 %, this will equate to savings in the region of EUR 32 million in MWF disposal costs each year across the EU.

To provide the critical mass required to develop and make a significant positive impact upon our sector, we need the research and technological development (RTD) providers to develop the science knowledge and technical capability and core SMEs to ultimately manufacture the FILTER product. As IAGs, we have the means to disseminate, train and promote the

technology to the engineering sector. For this reason, the Collective Instrument is the best mechanism to deliver a solution to the large SME community we represent.

- 1 ENGINEERS EMPLOYERS FEDERATION (UK)
- 3 FEDERATION OF ESTONIAN ENGINEERING INDUSTRY (EE)
- 4 BERGHOF GRUPPE (DE)
- 5 LENNTECH WATER TREATMENT & AIR PURIFICATION HOLDING B.V. (NL)
- 6 SCIENTIFIC-LAB.GLASS AB (SE)
- 7 BAYER-WOOD TECHNOLOGIES LTD (UK)
- 8 ACEITES LUBRICANTES SASH SL (ES)
- 9 JOHNSON AND ALLEN LTD (UK)
- 10 NOTECH AS (NO)
- 11 TALLERES RUIZ SOCIEDAD ANÓNIMA (ES)
- 12 ADREM PÄRNU AS (EE)
- 13 PERA INNOVATION LTD (UK)
- 14 TEKNOLOGIST INSTITUTT AS (NO)



FP6 Project Catalogue

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Total cost: € 2 038 153  
EC Contribution: € 1 153 651

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# FLEXFORM

## Development of a Flexible Manufacturing Process for the Low-Series Production of Metal Parts for Custom and Special Vehicles

The production of special vehicles or products in volumes lower than 2 000 units per year presents specific technical and economical problems with respect to achieving efficiency, reliability and profitability while remaining environmentally friendly. The current trend is seeing an increase of these specific needs which are becoming increasingly unsatisfied mainly due to excessively high production costs. The special vehicle sector, in which roughly 2 500 small to medium-sized enterprises (SMEs) are involved in Europe, for a business volume of EUR 4 000 million, must respond to escalating customer expectations, fluctuating demand and complex supply chain processes, and has now reached a critical point in its development where new solutions are needed in order to stay competitive. The present state of the art is a practically entirely craft or hand-made production.

We aim to modify the sector, from the current rigid manual manufacture to an innovative, flexible, automated and high added value production, achieving a considerable shift from resource-dependent to knowledge-based manufacturing. The main technological aspect to be developed in order to achieve the project objective is the manufacturing methodology related to the sheet metal components of the vehicle. For this, it is planned to use as a starting point, an emerging manufacturing technology for sheet metal components, "incremental sheet forming", which is based on incremental deformation and rapid manufacturing technologies. Time reductions of up to 60 % in product development and 50 % in manufacture, as well as a 50 % increase in capacity are expected.

- 1 ASOCIACIÓN ESPAÑOLA DE RAPID MANUFACTURING (ES)
- 2 ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE EQUIPOS Y COMPONENTES PARA AUTOMOCIÓN (ES)
- 3 GAUGE & TOOLMAKERS ASSOCIATION (UK)
- 4 FORSCHUNGSVEREINIGUNG STAHLANWENDUNG E.V. (DE)
- 5 SLOVENIAN TOOL AND DIE DEVELOPMENT CENTRE (SI)
- 6 ASOCIACIÓN DE INVESTIGACIÓN DE LA INDUSTRIA METALMECÁNICA, AFINES Y CONEXAS (ES)
- 7 CENTRE TECHNIQUE DES INDUSTRIES MÉCANIQUES (FR)
- 8 PLANCHISTERIA BERGADANA S.L. (ES)
- 9 ECOROLL AG WERKZEUGTECHNIK (DE)
- 10 SOCIÉTÉ DE RECHERCHE ET REALISATIONS AUTOMOBILES (FR)
- 11 EDAETECH - ENGENHARIA E TECNOLOGIA S.A. (PT)
- 12 QUANTECH ATZ (ES)
- 13 FORMTECH GMBH (DE)
- 14 INDUSTRIAS PUIGJANER S.A. (ES)
- 15 DRESCHER GMBH (DE)
- 16 FUNDACIÓN ASCAMM (ES)
- 17 INSTITUT FÜR BILDSAME FORMGEBUNG, RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN (DE)
- 18 CENTRE INTERNACIONAL DE MÉTODES NUMÉRICS EN ENGINYERIA (ES)
- 19 GIP INSTITUT SUPÉRIEUR D'INGÉNIERIE DE LA CONCEPTION (FR)

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# FLEXICOAT

## Flexible Automated Processes for PVD Coatings in New Applications

494

Collective research

Around 18 000 European small to medium-sized enterprises (SMEs) from the surface engineering sector (electroplating, anodising, galvanising, etc.) have several environmental and worker safety problems (hazardous chemicals, liquid and solid wastes, etc.) which conflict with the IPPC Directive 96/61/EC on integrated pollution prevention and control.

PVD is a sophisticated advanced technology for applying coatings in a high vacuum, opening up the possibility for applying coatings of improved performance over those employed at present. It generates no waste water and makes optimum use of the materials, so it is environmentally friendly.

For all these reasons, it is an optimum candidate for substituting the current problematic surface treatment technologies mentioned before, that additionally do not offer such a potential for improvement and innovation of the coatings as the market requires. The objective of the project is the development of the technologies necessary to reduce the cost of the PVD treatment so as to make it affordable to the SMEs. Those new technologies include:

- the development of a combination of PVD with other pre-treatments, that allows the application of PVD coating onto different kinds of materials (steel, brass, zamak, zinc or aluminium alloy components);
- a low-cost, flexible and fast PVD coating process and machine with optimum throughput and reliability (to reduce the required time in order to reduce the cost of coating it by PVD), which is also able to coat a broad range of pieces with different coatings.

In order to develop these new PVD processes, 11 industrial associations or groupings (IAGs), SMEs and research and technological development (RTD) performers from 5 European countries have come together, representing 50 % of the surface treatment sector in Europe.

The project will have a very positive impact on sector competitiveness, reducing consumption of raw materials, energy and water, avoiding waste production and improving worker safety. Additionally, the project will support European SMEs in competing in international markets, and in leading surface treatment processes worldwide.

www.flexicoat.org

- 1 FUNDACIÓN TEKNIKER (ES)
- 2 HERRAMEX - ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE HERRAMIENTAS DE MANO (ES)
- 3 KENNISPLATFORM OPPERVLAKTE TECHNOLOGIE (NL)
- 4 ECOMETAL (IT)
- 5 SYNDICAT GÉNÉRAL DES INDUSTRIES DE MATÉRIELS ET PROCÉDÉS POUR LES TRAITEMENTS DE SURFACES (FR)
- 6 DEKRACOAT (NL)
- 7 EMBEGA S. COOP (ES)
- 8 GRIP-ON TOOLS S.A (ES)
- 9 TNO - THE NETHERLANDS ORGANISATION OF APPLIED SCIENTIFIC RESEARCH (NL)
- 10 LONDON SOUTH BANK UNIVERSITY (UK)



FP6 Project Catalogue

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**EC Contribution: € 1 382 270**

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# FREEFLOW

## The Development of a High-Output Processing Method for the Extrusion of Solid Thermoplastic Sheet and Profile

Extrusion and co-extrusion of sheet and profile are important industrial processes within the EU. There are approximately 1 100 distinct extruder operations in western Europe, extruding some 10 million t of thermoplastic. However, due to the inherently viscous nature of polymers, output rates are limited at normal processing temperatures. If the processing temperature is increased, degradation of material can occur, resulting in loss of mechanical properties, flow instabilities and discolouration.

These issues have environmental and cost issues that have resulted in the loss of production capacity to lower-wage economies outside of the EU.

A technology developed by two of the of the consortium partners has shown that plastics extrusion equipment can be modified to allow for compressed CO<sub>2</sub> to be used as a processing aid for the production of solid extrudate with reduced melt viscosities, thus allowing processing at faster output rates, reduced temperatures or reduced energy. The project aims to develop the necessary technologies to allow for industrial-scale, commercially viable extrusion and co-extrusion of solid sheet and profile, either by retro-fitting the equipment to current machinery or by fitting to new extruders.

The main objectives of the project are to:

1. develop a prototype extruder that will allow full industrial and commercial development of the process;
2. develop the process on an industrial scale for small to medium-sized enterprises (SMEs) with different production requirements;
3. demonstrate the technical and commercial viability of the process on full industrial scale;
4. carry out dissemination and training activities that allow for maximum exploitation of the technology.

If these objectives are achieved, then the SME grouping and industrial association or grouping (IAG) members will obtain a technological edge leading to increased competitiveness. In line with the objectives of the EU and of the Sixth Framework Programme (FP6), the product and process developed will contribute towards sustainable manufacturing.

- 1 SMITHERS RAPRA TECHNOLOGY LTD (UK)
- 3 EUROPEAN PLASTICS CONVERTERS (BE)
- 4 PLASTICS MACHINES PROMOTION (IT)
- 5 ASOCIACION VALENCIANA DE EMPRESARIOS DE PLASTICOS (ES)
- 6 TURKISH PLASTICS INDUSTRY PROMOTION (TR)
- 8 PLASTIRE S.A. (ES)
- 9 REBOCA S.L. (ES)
- 10 YELKENCILER MAKINA SAN VE TIC LTD STI (TR)
- 11 AGOR GMBH & CO.KG (DE)
- 12 CENTRO EUROPEO SVILUPPO E APPLICAZIONI PLASTICHE (IT)
- 13 PRESEARCH (UK)
- 14 BRITISH PLASTICS FEDERATION (UK)
- 15 ASOCIACION DE INVESTIGACION DE MATERIALES PLASTICOS Y CONEXAS (ES)
- 16 QUEEN'S UNIVERSITY BELFAST (UK)

495

Collective research

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Materials & Processes

# HIPERMOULDING

## Extreme Cycle-Time Reduction of Injection Moulding Processes by Using High Performance Injection Moulds and Moulding Processes

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Collective research

The last years, per year approximately 5 % of the injection moulding and mould making turnover was lost to the EU community to the Far East. Continuity of the EU moulding and mould making sectors is therefore at stake.

The EU injection moulding sector currently realises a turnover of EUR 22.5 billion and comprises a workforce of 225 000 people. The preceding, and therefore heavily dependent, mould making sector realises a turnover of EUR 12.0 billion and comprises a workforce of 120 000 people. Competition can be beat with shorter part delivery times and constant high quality, preferably with lower part costs. Therefore, the development and dissemination of conformal heating/cooling configurations in high performance injection moulds and moulding processes is proposed. Due to the positioning of the heating/cooling channels in an optimal way near the surface (so called "conformal") of the injection moulds, a far better and more efficient thermal management is possible. The objectives when using the proposed technology and methodology are:

- reducing the cycle time of injection moulding processes by at least 35 %;
- reducing the energy consumption of injection moulding moulds by at least 30 %;
- improving the durability of injection moulding moulds by around 50 %.

These objectives together result in a part cost reduction of around 20 % together with improved and controllable part quality.

The project will be supported and validated by hands-on experience with the industrial associations or groupings (IAGs) and core small to medium-sized enterprise (SME) partners involved, and will result in a technology and methodology which:

- will increase the knowledge base of the sectors involved;

- can easily be transferred by the IAGs to all their members;
- will improve EU competitiveness of the injection moulding and mould making sectors.

At least the continuity of both sectors will be secured but an increase in turnover directly and indirectly is expected, directly due to more injection moulding and mould manufacturing orders. Indirectly due to sale of software and hardware as both will be deliverables which will be disseminated and exploited during and after the project.

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- 2 CENTRE DE RECHERCHES SCIENTIFIQUES ET TECHNIQUES DE L'INDUSTRIE DES FABRICATIONS METALLIQUES (C.R.I.F.) (BE)
- 3 MOLD SYSTEMS S.A. (UK)
- 4 DELCAM PLC (UK)
- 5 CEFAMOL - ASSOCIAÇÃO NACIONAL DA INDUSTRIA DE MOLDES (PT)
- 6 PERA INNOVATION LTD (UK)
- 7 CENTRO TECNOLÓGICO DA INDUSTRIA DE MOLDES E FERRAMENTAS ESPECIAIS (CENTIMFE) (PT)
- 8 POLITECHNIKA WROCLAWSKA (PL)
- 9 PROMOLDING B.V. (NL)
- 10 FUNDACION ASCAMM (ES)
- 11 PRODUCTENTEN VERENIGING THERMOPLASTEN (BE)
- 12 SPÓLDZIELNIA INWALIDÓW "SPAMEL" (PL)
- 13 AGORIA - THE MULTISECTOR FEDERATION FOR THE TECHNOLOGY INDUSTRY (BE)
- 14 WADIM PLAST SP. J. WANDA NAROJEK, ZENON NAROJEK (PL)
- 15 SOFIPLAST S.A. (ES)
- 16 MOLDES ROYAS S.A. (ES)
- 17 INTERMOLDE - MOLDES VIDREIROS INTERNACIONAIS LDA (PT)
- 18 LN-MOLDES LDA (PT)
- 19 OPTIM TEST CENTER S.A. (BE)
- 20 L.SACCOL (BE)
- 21 TECHNISCHE INDUSTRIE W.J. VAN DER SAR B.V. (NL)
- 22 STOWARZYSZENIE TECHNICZNE - TWORZYWA SZTUCZNE STTS (PL)
- 23 GAUGE AND TOOLMAKERS' ASSOCIATION (UK)
- 24 FEDERACION ESPANOLA DE ASOCIACIONES EMPRESARIALES DE MOLDISTAS Y MATRICEROS (ES)





# IBIOLAB

## Improvement of Biolubricant Manufacturing and Development Thanks to the Obtaining of EcoLABels in a Wide Range of Industrial Sectors

In Europe, the inland consumption of lubricants has been estimated at 5 million t in 2001. More than 95 % of the market is dominated by the mineral-oils-based lubricants, which are contaminating the environment but have a very low price and high availability. As 30 % of lubricant used in the industry ends up in the ecosystem, it is very easy to understand why some countries are more and more attracted by the bio-lubricant alternative. Vegetable oils have a number of inherent qualities that give them advantages over petroleum oils as the feedstock for lubricants, but up to now there has been little experience in their use and some limitations have to be overcome.

The proposed project addresses a problem common to the small to medium-sized enterprises (SMEs) of the bio-lubricant sector, who represent 80 % of the actors, namely the difficulty for marketing and integration of the bio-products.

Therefore, the IBIOLAB project intends to address several needs to enhance the market share of the bio-lubricants, thus reinforcing the competitiveness of SMEs:

- the need to improve and better understand the manufacturing processes (immature technologies) in order to decrease the overall cost and improve the properties of bio-lubricants;
- the need to help SMEs awarding of their products with eco-labels;
- the need to provide SMEs with knowledge on best practices in lubricant bases, bio-additives and formulation issues;
- the need for an efficient and widely spread campaign of communication, gathering all the actors and potential end-users.

Finally, tailored training sessions will be organised by the industrial associations or groupings (IAGs) and the research and technological development

(RTD) performers to expand the knowledge base of the SMEs dealing with bio-lubricants. The IBIOLAB project gathers 4 Associations, 12 SMEs and 6 RTD performers, coming from 7 European Countries.

- 1 INSTITUT DES CORPS GRAS (FR)
- 2 THE EU OIL AND PROTEINMEAL INDUSTRY (BE)
- 3 VALORISATION DE LA BIOMASSE ASBL (BE)
- 5 ORGANISATION NATIONALE INTERPROFESSIONNELLE DES OLÉAGINEUX (FR)
- 7 ETS ALBERT MAURAN ET FILS S.A. (FR)
- 8 LUBRIX S.A. (BE)
- 9 BARALDI LUBRIFICANTI (IT)
- 10 DOIMAK S.A. (ES)
- 11 ZERO WASTE (FR)
- 12 VANDEPUTTE OLEOCHEMICALS S.A (BE)
- 13 BRUGAROLAS S.A. (ES)
- 14 SOGELLUB (BE)
- 15 NATOIL (CH)
- 16 RS CLARE (UK)
- 17 ABAMOTOR ENERGÍA SL (ES)
- 18 PANOLIN A.G. (CH)
- 19 BFB OIL RESEARCH S.A. (BE)
- 20 UNIVERSITY OF GEMBLOUX – CHIMIE BIOLOGIE INDUSTRIELLE (BE)
- 22 INSTITUT NATIONAL POLYTECHNIQUE DE TOULOUSE – LABORATOIRE DE CHIMIE AGRO-INDUSTRIELLE – UMR 1010 INRA/INP/ENSIACET (FR)
- 23 BAM (DE)
- 24 FUNDACIÓN TEKNIKER (ES)
- 25 AGRAGEX (ES)

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# INNOTEX

A Tool Box to Catalyse Continuous Process INNOvation within the TEXTile Manufacturing Lines in Europe

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Collective research

EURATEX — the European Federation of Textile Associations — and 6 textile professional associations from Belgium, Portugal, Italy, Spain, Hungary, and Poland have joined with 10 core small to medium-sized enterprises (SMEs) to develop and disseminate a productivity enhancement toolbox for the textile industry. It aims at supporting process improvement primarily in ISO-certified European textile SMEs, where continuous process innovation will lead to both productivity gains and quality increase of the final textile products.

Textile research centres coordinated by CENTEXBEL will add their expertise to the core SMEs to model performance indicators of four key textile processes that are known to be non-linear: polymer extrusion or yarn manufacturing, dyeing, finishing, and technical fabrics manufacturing. The prototype software tool will be developed by DATATEX, a specialist of enterprise resource planning (ERP) solutions in the textile sector, and MIRIAD, a specialist of stochastic modelling of manufacturing processes. DATATEX and MIRIAD will make this tool interoperable with other available ERP solutions, thus responding to legacy issues for ERP systems already in place in textile SMEs.

Manufacturing operators will be trained at gathering process data, and at using the above self-learning software techniques to perform automatic offline optimisation of manufacturing control parameters (lowering manufacturing variability, reducing labour costs), offline product quality diagnosis (speeding up the identification of root causes for quality defects), online diagnosis of manufacturing quality risks (anticipating process misbehaviours in real time).

This training will primarily help implement the software tool: it will be developed and tested for 1 year with the 10 core SMEs, and then tested with 30 more SMEs to further validate tool acceptance, prior to dissemination of the project outputs.

EURATEX will coordinate dissemination plans at a European scale to reach about 1 600 SMEs during the first 6 years of industrial use.

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- 2 TECHNIFI S.A. (FR)
- 3 MIRIAD TECHNOLOGIES SA (FR)
- 4 DATATEX S.R.L. (IT)
- 5 INSTYTUT WŁÓKIENNICZYCH (PL)
- 6 ASSOCIAÇÃO UNIVERSIDADE-EMPRESA PARA O DESENVOLVIMENTO (PT)
- 7 INNOVATEX TEXTILE ENGINEERING AND TESTING INSTITUTE CO. (HU)
- 8 CENTRO TESSILE COTONIERO E ABBIGLIAMENTO S.P.A. (IT)
- 9 LABORATORIO DE ENSAYOS E INVESTIGACIONES TEXTILES DEL ACONDICIONAMIENTO TARRASENSE (ES)
- 10 FEDERATIE VAN DE BELGISCHE TEXTIELBEDRIJVEN (BE)
- 11 ASSOCIAÇÃO TÊXTIL E VESTUÁRIO DE PORTUGAL (PT)
- 12 POLSKA IZBA ODZIEŻOWO-TEKSTYLNA (PL)
- 13 TEXTILIPARI MŰSZAKI ES TUDOMÁNYOS EGYESÜLET (HU)
- 14 ASSOCIAZIONE NAZIONALE PER L'UNIFICAZIONE NEL SETTORE TESSILE - FEDERATA ALL'UNI (IT)
- 15 FEDERACIÓN NACIONAL DE ACABADORES Y TINTOREROS (ES)
- 16 EUROPEAN APPAREL AND TEXTILE ORGANISATION (BE)
- 17 VERSTRAETE-HAHN (BE)
- 18 DYVERTEX S.P.R.L. (BE)
- 19 ETEVIMOL - EMPRESA TÊXTIL DE VILAR DO MONTE (PT)
- 20 A.T.B. ACABAMENTOS TÊXTEIS DE BARCELLOS LDA (PT)
- 21 EUROHOD TEXTIL LTD (HU)
- 22 AR-POL (PL)
- 23 LARIOFIL SRL (IT)
- 24 ANTONIO ASPESI S.R.L. (IT)
- 25 TEJIDOS ESTAMBRIIL S.A (ES)
- 26 INDUSTRIAL NEOTEX S.A (ES)
- 27 ECOLE NORMALE SUPÉRIEURE DE CACHAN (FR)

www.innotex-cr.org

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The scientific and technical objectives are to develop new and novel long-range ultrasonic condition-monitoring (LRUCM) technological tools – sensors and systems for finding defects and corrosion in a wide range of engineering assets.

The economic objectives are to improve the competitiveness of a large group of European small to medium-sized enterprises (SMEs) by disseminating this technology to the 16 000 companies involved in the EUR 225 billion inspection and maintenance sector.

The social objectives are to reduce, for SME employees, the hazards created by work at heights, leaks, asbestos and lead-based paint removal, etc., and also to increase opportunities for female employees by reducing equipment weight and increasing dependence on IT skills.

The environmental objectives are to reduce the numbers of failures leading to spillage of pollutants, etc. The EU policy objectives are to aid the achievement of the goals of Community strategy on health and safety at work, and to support economic and environmental policy, as stated above.

The project will develop new techniques for inspecting Europe's engineering assets (pipelines, rails, offshore platforms, cable stayed/suspension bridges and sheet-piled coastal defences, etc.), which are degrading, thus posing risk of equipment failure. Europe's maintenance/inspection budget for these assets is approximately EUR 225 billion each year. Even so, failures result in the following catastrophes.

1. Oil/gas pipelines: spillages from pipelines involved a total of 1 000 fatalities and serious injuries.
2. Rails: more than 2 500 rail fractures occur annually, causing delays and derailments.
3. Bridges: most of the cable stayed and

suspension bridges worldwide are in danger due to corrosion of their cables.

4. Sea and river defences: sheet piling is corroding, endangering their integrity and risking high value real estate.
5. Heat exchanger tubing: used in process and petrochemical plants around the world, current inspection methods are slow and laborious. A rapid scanning technique is required, that requires minimal tube cleaning before application. Conventional inspection methods have the following drawbacks:
  - a) Their maximum range is tens of millimetres. Thus many man months are needed to inspect a large structure,
  - b) They need direct access to the structure. Access costs may be 5 to 10 times those of inspection. The overall cost is prohibitive.

The technical solution proposed involves recent developments made largely by core group SMEs, who have used guided ultrasound with ranges of 10 m or more (long-range ultrasonic testing (LRUT)). LRUT can solve the otherwise intractable problem of inspecting engineering assets.

It has the advantage of full-volume coverage and the ability to test long lengths of structure from one point. Inaccessible regions can also be inspected from an accessible location. Potentially defective areas are located accurately in terms of distance from the inspection tool.

The development of LRUT technology will help the approximately 16 000 EU inspection and maintenance SMEs, whose total activity represents a EUR 225 billion business sector. Recent business trends have seen asset owners (oil companies, electricity utilities, railways, bridge authorities, etc.) outsource their entire inspection and maintenance requirements to specialist service SMEs.



- 1 TWI LTD (UK)
- 2 DEUTSCHE GESELLSCHAFT FÜR ZERSTÖRUNGSFREIE PRÜFUNG E.V. (DE)
- 3 EUROPEAN FEDERATION OF NON DESTRUCTIVE TESTING (BE)
- 4 ASOCIACIÓN ESPAÑOLA DE ENSAYOS NO DESTRUCTIVOS (ES)
- 6 ASSOCIAÇÃO PORTUGUESA DE MANUTENÇÃO INDUSTRIAL (PT)
- 7 ASSOCIAZIONE ITALIANA PROVE NON DISTRUTTIVE MONITORAGGIO DIAGNOSTICA (IT)
- 8 BALGARSKI SAIUZ PO ZAVARIIVANE (BG)
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- 11 COAXIAL POWER SYSTEMS LTD (UK)
- 12 I&T NARDONI INSTITUTE (IT)
- 13 SONATEST LTD (UK)
- 14 ISOTEST ENGINEERING S.R.L (IT)
- 16 RARI - CONSTRUÇÕES METÁLICAS ENGENHARIA PROJECTOS E SOLUÇÕES INDUSTRIAIS LDA (PT)
- 17 A CASA INTELIGENTE LDA (PT)
- 18 ATLANTIS NDE INGENIERÍA DE INSPECCIÓN NO DESTRUCTIVA SL (ES)
- 19 NDT CONSULTANTS LTD (UK)
- 20 ADVANCED TECHNOLOGY GROUP S.R.O. (CZ)
- 21 INSTITUTO DE SOLDADURA E QUALIDADE ASSOCIAÇÃO (PT)
- 22 KINGSTON COMPUTER CONSULTANCY LTD (UK)
- 23 ZENON S.A. ROBOTICS AND INFORMATICS (GR)
- 25 KAUNO TECHNOLOGIJOS UNIVERSITETAS (LT)
- 26 NEXUS ENGINEERING LTD (BG)



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# KnowEDM

## Automated Knowledge-Based EDM Technology for Integrated Tool Making and High-Precision Components

The overall objectives of KnowEDM are to improve the competitiveness of the mould- and precision-component manufacturing sector and preserve jobs for future employment through a 50 % lead-time reduction and a 30 % cost reduction for the tool making and precision engineering sector. A third overall objective is to improve attractiveness for young people through changing from labour-intensive to knowledge-intensive work.

The making of mould tools and precision engineering components is a very labour-intensive, craftsmanship-based activity. For one of the most important machining processes in this activity, electrode discharge machining (EDM), reliable machining time-calculation is not possible, which makes it impossible to optimise the total manufacturing process, reduce cost and to shorten lead time.

The unpopular image of this sector makes it very difficult to find young skilled technicians for NC programming and operating advanced CAD/CAM systems.

This sector in Europe, having a EUR 12 billion turnover (of which about 75 %, EUR 9 billion, is attributable to small to medium-sized enterprises (SMEs)), is now under sustained competitive pressure and is steadily losing market shares to the Far East. Now there is an urgent need for innovation, cost saving, and reducing delivery times.

The objectives will be achieved by development of integrated knowledge-based EDM technology for design and manufacture of moulds and precision components in order to streamline production. The technical objectives of the project will be met by knowledge-based systems and will achieve:

- automated calculation of EDM time (WP1)
- automated design and manufacturing of EDM-electrodes (WPs 2 and 3)
- integrated knowledge-based design review of mould tools (WP4).

There will be an integrated manufacturing of mould tools and precision components and established rules for deciding which features to EDM and what to high speed mill (HSM) for optimised machining of parts of particular geometry (WP5).

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- 2 METAALUNIE (NL)
- 3 STOWARZYSZENIE INŻYNIERÓW I TECHNIKÓW MECHANIKÓW POLSKICH - TOWARZYSTWO PRZETWÓRCÓW TWORZYW WIELKOCZĄSTECZKOWYCH (PL)
- 4 FEDERACIÓN ESPAÑOLA DE ASOCIACIONES EMPRESARIALES DE MOLDES Y MATRICES (ES)
- 5 GAUGE & TOOLMAKERS ASSOCIATION (UK)
- 6 NC-GESELLSCHAFT E.V. (DE)
- 7 GEREEDSCHAPMAKERIJ WINTERS B.V.B.A. (BE)
- 8 MATERIALISE N.V. (BE)
- 9 ZWICKER SYSTEMS GMBH (DE)
- 10 GEREEDSCHAPMAKERIJ VAN WIJENEN (NL)
- 11 SMS STAMP TOOL TECHNOLOGIES B.V. (NL)
- 12 CCIIM. COMPETENCE CENTER FOR INNOVATIVE MANUFACTURING (NL)
- 13 PROCESOS TÉCNICOS DEL MOLDE S.L. (ES)
- 14 CONSTRUCCIONES MECANICAS SOLE S.A. (ES)
- 15 ZEEKO LTD (UK)
- 16 PP INJECTION MOULDS AND MOULDINGS LTD (UK)
- 17 MISSLER SOFTWARE (FR)
- 18 BUCKINGHAMSHIRE CHILTERN'S UNIVERSITY COLLEGE (UK)
- 19 KATHOLIEKE UNIVERSITEIT LEUVEN (BE)
- 20 IDEKO S. COOP. (ES)

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# MagForge

## Magnesium-Forged Components for Structural Lightweight Transport Applications

502

Collective research

The European forging industry — as an industry with about 1 000 small to medium-sized enterprises (SMEs) and 135 000 direct work places — experiences fierce cost-price competition in the global market. For the forging companies, there is thus a distinct need to stay ahead by developing into a “super specialist” and/or co-maker, rather than to be rendered into a jobber. Being governed mainly by the automotive industry, their market is further characterised by the continuous need for weight saving in order to meet commitments and legislation on fuel economy and emission reduction. Since the prevailing material for forging is still steel, there is a clear opportunity to specialise in the processing of light metals. The project addresses the issue of weight reduction of structural components by using magnesium (being 75 % lighter than steel and 35 % lighter than aluminium).

The overall goal of the project is to provide tailored and cost-effective technologies for the industrial manufacturing of magnesium-forged components. Current constraints are to be resolved in order to prepare the European forging industry for this innovation. Hence, the technological basis for the design and manufacture of magnesium forgings needs to be reinforced, and dissemination and training needs to be undertaken.

The scientific and technological objectives are new feedstock materials with improved performance, forging process design and modelling tools with a satisfying level of predictability, machining technology for finishing of magnesium forgings, and typical magnesium demonstrator components. Research and technological development activities will thus focus on material, process and component development. The targeted advancements are to enable high-volume applications (with a cost-price reduction of 50 %) of lightweight magnesium forgings (with a weight saving of 15 % to 25 % over the current best-in-class aluminium versions). The stakeholders are the forging industry (associations and their SMEs), but also the material producers and end-users, as well as suppliers of auxiliaries and engineering services.

www.magforge.eu

- 1 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK (NL)
- 2 ASSOCIATION FRANÇAISE DE FORGE (FR)
- 3 DEUTSCHE GESELLSCHAFT FÜR MATERIALKUNDE E.V. (DE)
- 4 CONFEDERATION OF BRITISH METALFORMING (UK)
- 5 SVAZ KOVAREN ČESKE REPUBLIKY (CZ)
- 6 SOCIETATEA DE FORJA DIN ROMANIA (RO)
- 7 RAZVOJNI CENTER ORODJARSTVA SLOVENIJE (SI)
- 8 ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE EQUIPOS Y COMPONENTES PARA AUTOMOCIÓN (ES)
- 9 GOSPODARSKO INTERESNO ZDRUŽENJA ACS, SLOVENSKI AVTOMOBILSKI GROZD (SI)
- 10 NONFERRO METAALNIJVERHEID N.V. (BE)
- 11 FORGIALLUMINIO 3 S.R.L. (IT)
- 12 LEIBER POLAND SP. Z O.O (PL)
- 13 SC BIMETAL S.A. BUCHAREST (RO)
- 14 KOVINAR D.O.O (SI)
- 15 PRESSMETALL AB (SE)
- 16 DUROC TOOLING I ROBERTSFORS AB (SE)
- 17 MAT PLASMATEC GMBH (DE)
- 18 SORALUCE SOCIEDAD COOPERATIVA (ES)
- 19 GKSS FORSCHUNGSZENTRUM GEESTHACHT GMBH (DE)
- 20 UNIVERZA V LJUBLJANI (SI)
- 21 IDEKO SOCIEDAD COOPERATIVA (ES)
- 22 UNIVERSITATEA POLITEHNICA DIN BUCUREȘTI (RO)
- 23 SVENSK VERKTYGSTEKNIK AB (SE)



FP6 Project Catalogue

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# META-MODAS

Total Metalworking Fluid (MWF) Monitoring, Optimisation and Disposal Advisory System

The European engineering sector is worth EUR 3 000 billion, with 375 000 companies, 90 % of which are small to medium-sized enterprises (SMEs), providing over 20 million jobs. The sector has been under intense pressure from the Far East, with stifling economic competitiveness through low labour costs. Consequently, the number of SME engineering firms has been reduced by 20 % in the last 5 years. Further pressures have arisen from tightening environmental legislation in the EU. This sector must respond if it is to survive.

Over 75 % of workshops use water miscible metalworking fluids (MWFs) as an integral part of metal machining. It is has been calculated that about 16 % of metal manufacturing costs are attributed to MWFs. About 3 200 million l of spent MWF are disposed of each year, and if the MWFs are not properly handled, they create health concerns for operators (dermatitis and asthma, for example). Currently the engineering sector has a very limited understanding of MWF management, including lifespan and disposal. As industrial associations or groupings (IAGs) we represent and understand the needs of our large SME membership base.

We aim to develop a total MWF monitoring, optimisation and disposal advisory system to at least double fluid life. It will involve the development of innovative MWF concentration and bio-activity sensors, plus a sophisticated software algorithm defining the inter-relationships between pH, concentration and bio-activity. The technology will help reduce production costs through reduced fluid purchase and disposal costs. It will also contribute to improved machining, environmental and health and safety performances, compliance with EU environmental legislation and general “upskilling” of the large SME engineering family.

- 1 ENGINEERING EMPLOYER'S FEDERATION (UK)
- 2 TEKNOLOGIBEDRIFFTENES LANDSFORENING (NO)
- 3 NACZELNA ORGANIZACJA TECHNICZNA (POLISH FEDERATION OF ENGINEERING ASSOCIATIONS) NOT (PL)
- 4 ZAKLAD MECHANICZNY MESTIL SPÓLKA Z ORGAICZONA ODPOWIEDZIALNOSCIA (PL)
- 5 CONVEX ELECTRICAL LTD (IE)
- 6 TALLERES RUIZ SOCIEDAD ANONIMA (ES)
- 7 BAYER-WOOD TECHNOLOGIES LTD (UK)
- 8 DELTA OHM SRL (IT)
- 9 HYDRAMOTION LTD (UK)
- 10 K. LUND AS (NO)
- 11 PERA INNOVATION LTD (UK)
- 12 ICARE SAS (FR)
- 13 TEKNOLOGIST INSTITUTT AS (NO)

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Collective research

www.metamodas.com

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Materials & Processes

# MICRO-MELT

The Development of Advanced Retro-Fit Processing Technologies for Rotational Moulding to Reduce Product Cost and Processing Time and Increase Surface Quality

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Collective research

The principle objective of this proposal is to develop an enabling process technology to improve the competitiveness of the small to medium-sized enterprise (SME) rotational moulding sector in Europe. Through an increased scientific understanding and technological development of the processing stage, the whole sector — not just a small group of SMEs — will benefit.

Therefore we have chosen the Collective Research scheme to improve the competitiveness of a large community of SMEs with the European rotational moulding sector, where research and technological development (RTD) performers undertake research on behalf of the industrial associations or groupings (IAGs) who retain ownership of the results for the benefit of their members. With the aid of our partnership, we now have a coherent route map to achieve an innovative process change and reduced product cost, both of which offer competitive and environmental benefits.

Our idea will develop a new method for melting the polymer and a high-tech internal water-cooling system, which we will integrate with existing rotational moulding machinery. We estimate that the development of microwave heating enables a 70 % reduction in energy consumption. The advances in internal water cooling will support a 50 % reduction in cycle time. Because few materials can withstand the long cycle times and high temperatures associated with the rotational moulding process, reducing the cycle time makes a wider range of engineering polymers available for product applications.

The internal water cooling will also allow the process to become a low-pressure system, enabling the objective for improved surface finish (which currently limits rotational moulding to low-cost non-aesthetic applications) to be met.

The economic objectives to improve SME competitiveness are for the SME partners to provide a large community of predominantly SME end-users with a system that ensures competitive advantage

for quality, cost, delivery, performance, flexibility and functionality. The estimated 50 % reduction in unit manufactured cost will provide the cost-benefit differentiation for our customers to compete against the rising market of imported low-cost Far East plastic products into the EU.

We, the three IAG proposers, BPF, IRMA and ARMCE, do not have the resources necessary to develop the Micromelt technology ourselves, so we have combined our capabilities with a core group of SME partners to form a technology development supply chain, and have recruited three RTD performers with complementary expertise to carry out the research and testing which we cannot execute ourselves.

<http://micromelt.pera.com>

- 1 THE BRITISH PLASTICS FEDERATION (UK)
- 2 ASSOCIATION OF ROTOMOULDERS IRELAND LTD (IE)
- 3 ASSOCIATION OF ROTATIONAL MOULDING (CENTRAL EUROPE) (DE)
- 4 GISIP AB (SE)
- 5 STURDY PRODUCTS LTD (IE)
- 6 TECNI-FORM LTD (UK)
- 7 FRIGEL FIRENZE S.R.L. (IT)
- 8 ERNST REINHARDT GMBH (DE)
- 9 SPI PLAY (EUROPE) LTD (UK)
- 10 BALMORAL GROUP LTD (UK)
- 11 MAUS & ESSLINGER GMBH (DE)
- 12 THE QUEENS UNIVERSITY BELFAST (UK)
- 13 PERA INNOVATION LTD (UK)
- 14 FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)



FP6 Project Catalogue

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# MIGRESIVES

## Research Programme on Migration from Adhesives in Food Packaging Materials in Support of European Legislation and Standardisation

Most food packages and food contact materials (FCMs) are manufactured using adhesives. The EU regulates FCMs, as their constituents may contaminate food and endanger consumer health. In contrast to plastics, which are regulated by positive lists of authorised ingredients, adhesives do not yet have a specific regulation. Also, when using this approach for adhesives, hundreds of raw materials would be out of scope, as they lack the standard information required by the risk assessment agencies.

This would pose high cost burdens for toxicity tests to the adhesives industry, which is dominated by small to medium-sized enterprises (SMEs), and to all SMEs from the added value chain.

The project wants to elaborate a scientific global risk-assessment approach to meet current general EU regulatory requirements, to serve as a basis for future specific EU legislation, and to provide SME industry with a tool to ensure that adhesives do not endanger consumer health. The idea is to demonstrate that consumer exposure to chemicals released by adhesives is in many cases below levels of concern.

Technical and scientific knowledge from industry and research and technological development (RTD) performers will be merged into a collective research endeavour, gathering together all stakeholders.

The major milestones are:

- a) classification of adhesives according to chemistry and uses;
- b) test strategies based on physico-chemical behaviour of adhesives,
- c) modelling migration/exposure from adhesives;
- d) providing guidelines to integrate the risk assessment approach into the daily life of companies;
- e) the application of a toxicological approach from the EU BIOSAFEPAPER programme (ending 2006); and
- f) extensive training and education for SMEs and large dissemination for the general adoption of the concept in Europe.

The project involves experts contributing to the EU regulation for FCMs, which favours dialogue with authorities. Overall, the competitiveness of adhesives SMEs will be strengthened, and confidence in food packaging safety and thus in the food (packaging) industry will be increased, and consumer health better protected.

- 1 FRAUNHOFERINSTITUT FÜR VERFAHRENSTECHNIK UND VERPACKUNG (DE)
- 2 FEICA - ASSOCIATION OF EUROPEAN ADHESIVES MANUFACTURES (BE)
- 3 INDUSTRIEVERBAND KLEBSTOFFE E.V. (DE)
- 4 ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE COLAS Y ADHESIVOS (ES)
- 5 ASSOCIATION CLUB "MATERIAUX POUR CONTACT ALIMENTAIRE ET SANTÉ" FILIERE PAPIER/CARTON (FR)
- 6 IK INDUSTRIEVEREINIGUNG KUNSTSTOFFVERPACKUNGEN (DE)
- 7 CODILÈGE - GROUPEMENT POUR LA CODIFICATION DES MESURES DES BOUCHONS DE LIÈGE (FR)
- 8 ASSOCIATION FRANÇAISE DES INDUSTRIES DE COLLES, ADHESIFS ET MASTICS (FR)
- 9 INRA - INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE (FR)
- 10 FABES FORSCHUNGS-GMBH FÜR ANALYTIK UND BEWERTUNG VON STOFFÜBERGÄNGEN (DE)
- 11 UNIVERSIDAD DE ZARAGOZA - INSTITUTO DE INVESTIGACIÓN EN INGENIERIA DE ARAGÓN (I 3A) (ES)
- 12 CTCPA - CENTRE TECHNIQUE DE LA CONSERVATION DES PRODUITS AGRICOLES (FR)
- 13 ITECH - INSTITUT TEXTILE ET CHIMIQUE DE LYON (FR)
- 14 UNIVERSITÉ DE BOURGOGNE-ENSBAVA "ERT SÉCURITÉ ALIMENTAIRE- EMBALLAGES" (FR)
- 15 EUKALIN SPEZIAL KLEBSTOFF FABRIK GMBH (DE)
- 16 GLUDAN A/S. (DK)
- 17 TÜRMELEIM GMBH (DE)
- 18 SAMTACK S.L. (ES)
- 19 MITOL (SL)
- 21 BELBO SUGHERI (IT)
- 22 PIETEC CORTICAS S.A. (PT)

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# MINIREF

## New Refrigeration Concept for the Reduction of Greenhouse Gas Emissions by Minimising Refrigerant Charge

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Collective research

MINIREF addresses the following strategic objectives:

- a) offers a solution for the problems faced by small to medium-sized enterprises (SMEs) and industrial associations or groupings (IAGs) in the refrigeration sector, related to the use of the HFC greenhouse gases and their natural alternatives;
- b) gives SMEs manufacturing and installing refrigeration equipment a leading position in a worldwide market, by expanding rapidly in the upcoming markets;
- c) contributes to the European objectives of substantial reduction of the use and emissions of the HFC greenhouse gas.

The European refrigeration sector (end-users, and manufacturers and installers, who are mainly SMEs) is confronted with the consequences of various international obligations such as the obligations of the EU to reduce the emissions of HFC greenhouse gases (Kyoto), and the safety aspects for the HFC alternatives: natural refrigerants like ammonia (EU directives 96/82/EC (SEVESO II) and 97/23/EC (PED)).

The refrigeration sector recognises minimisation of refrigerant charge as a major solution to the problems faced. However, due to fragmentation of the sector, the required technological innovations have not taken place. Therefore a collective approach on a European scale is a necessity.

MINIREF addresses the problems by minimising the refrigerant charge at an integral system level: this is in contrast to research currently being performed, which focuses on minimisation at component level. By removing refrigerant buffers, traditionally accounting for the stability of the system, and by increasing the frequency of refrigerant circulation, MINIREF can achieve an estimated decrease of 95 % in refrigerant charge.

MINIREF dissemination and training is carried out mainly by the IAGs. For a successful exploitation of the concept in a fragmented market, early IAG involvement in the sector, after but also during the research phase, is a prerequisite.

- 1 NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO (NL)
- 2 AIR CONDITIONING AND REFRIGERATION EUROPEAN ASSOCIATION (BE)
- 3 EUROPEAN COLD STORAGE AND LOGISTICS ASSOCIATION (BE)
- 4 KRAJOWE FORUM CHŁODNICTWA (NATIONAL REFRIGERATION FORUM) (PL)
- 5 NEDERLANDSE VERENIGING VAN ONDERNEMINGEN OP HET GEBIED VAN KOUDETECHNIEK EN LUCHTBEHANDELING (NL)
- 6 VERENIGING VAN NEDERLANDSE KOEL- EN VRIESHUIZEN (NL)
- 9 EST ENERJI SISTEM TEKNOLOJILERI SANAYI IC VE DIS TICARET LTD STI (TR)
- 10 APPARATENFABRIEK HELPMAN B.V. (NL)
- 11 LODAM ELECTRONICS A/S (DK)
- 13 INGENIEURS- EN HANDELSBURO WIJBENGA B.V. (NL)
- 14 TH. WITT KÄLTEMACHINENFABRIK GMBH (DE)
- 15 FORSCHUNGSZENTRUM FÜR KÄLTETECHNIK UND WÄRMEPUMPE GMBH (DE)
- 16 TÉCNICA EN INSTALACIONES DE FLUIDOS S.L. (ES)
- 17 ALU HEAT EXCHANGER A/S (DK)
- 18 BORT DE GRAAF B.V. (NL)
- 19 CTP PEROZZO IMPIANTI S.R.L. (IT)



# MODELPACK

## Advanced Quality-Prediction Tool for Knowledge-Driven Packaging Design and Manufacturing in European SMEs

This project aims at improving the international competitiveness of European corrugated board industries — which are mainly small to medium-sized enterprises (SMEs) — and of related sectors using an integrated, transnational research approach. Research will be carried out by research and technological development (RTD) performers, in order to expand the knowledge base and improve the overall competitiveness of participating SMEs. It shall enable SMEs to increase their added value in producing corrugated board (one of the most valuable packaging materials) from alternative resources with a high proportion of recycled fibres. For the European corrugated board industry the variability in raw materials (packaging grade papers) with increasing percentages of recycled fibres is a very common technical problem. This is due to the restrictions in availability of forest-based raw materials along with a favourable environmental policy (the EU Packaging Directives). The difficulty of predicting the properties of paper products produced from heterogeneous sources creates several limitations resulting in severe economic losses, and only a comprehensive characterisation will enable their better utilisation.

The project work will start with an international survey on existing definitions and grading of raw materials and end products relevant to the project. The overall scientific and technical objectives of the project are:

- to create a database of information on raw materials (grade papers and corrugated board) available for packaging companies throughout Europe;
- to classify packaging grade papers into well-defined categories according to their basic properties and production methodologies;
- to investigate and to identify the lower tolerance limits of the properties of grade papers that ensure high performance of selected semi-elaborates (corrugated boards) and final products (package boxes) according to their specific use;

- to filter and priorities, by the use of statistical analysis, the paper characteristics (crucial industrial relevant properties) that mostly affect corrugated boards and boxes properties, considering SMEs' practices (production, practical measurements, practical quality control);
- to develop appropriate quality prediction systems and explore new decision possibilities for both cost reduction and quality increase in packaging design and manufacturing;
- to train the staff of the group of participating SMEs and industrial associations or groupings (IAGs) and disseminate the results to interested packaging industrial SMEs by organising seminars, by publications in practical journals and brochures and by using the Internet.

The integrated results to predict the quality of packaging from alternative raw materials with special regard to feasibility, risks, costs, profit and energy input will be disseminated to a large number of SMEs and other interested bodies in Europe.

- 1 AIDIMA - ASOCIACIÓN INVESTIGACIÓN Y DESARROLLO EN LA INDUSTRIA DEL MUEBLE Y AFINES (ES)
- 2 FEFCO - EUROPEAN FEDERATION OF CORRUGATED BOARD MANUFACTURERS (BE)
- 3 INNOVAWOOD LTD (IE)
- 4 CARTONAJES SANTORROMÁN S.A. (ES)
- 5 ENVASES INDUSTRIALES DEL CARTÓN ONDULADO S.A. (ES)
- 6 ONDUPACK S.A. (ES)
- 7 HAITOGLOU-HARTEL S.A. (GR)
- 8 PAPELERA LOS OLIVOS S.A. (ES)
- 9 PAKA - GLASSHUETER PAPPEN-UND KARTONAGENFABRIK GMBH (DE)
- 10 HEPI - HELLENIC FOREIGN TRADE BOARD - HELLENIC PACKAGING INSTITUTE (GR)
- 11 ARISTOTLE UNIVERSITY OF THESSALONIKI (GR)
- 12 COBRO - POLISH PACKAGING RESEARCH AND DEVELOPMENT CENTRE (PL)
- 13 STFI - PACKFORSK INSTITUTET FÖR FÖRPACKNING OCH LOGISTIK AB (SE)
- 14 UNIVERSIDAD COMPLUTENSE DE MADRID (ES)

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Collective research

www.MODELPACK.org

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Materials & Processes

# NANOMED

## Development of a Carbon Nanotube Actuator for Use in Medical Technology

508

Collective research

Since their discovery in 1991, carbon nanotubes (CNTs) are the fastest growing domain in nanotechnology due to their exceptional physical and chemical properties. In 1999, R. H. Baughman et al. discovered the electromechanical properties of CNTs which enables them to act as "artificial muscles". Those actuators possess an enormous potential in technical and medical applications which, until now, are produced mostly on the basis of piezo crystals, memory shaped alloys or polymers. Compared to other actuator materials, the characteristics of CNTs, e.g. their large extensions (20 times of piezos) at an enormously low energy supply (1 Volt compared to kV in piezos) with a high efficiency (near 1) and a surprisingly low weight, show their unique capabilities as actuator material. Within this project, a high performance and low voltage actuator for wide fields of applications in medical device industry will be developed as a platform technology for the European industry.

To achieve this objective, an increased knowledge of CNT material properties has to be elaborated. The production parameters of the raw CNT-material must be optimised to generate well-defined reproducible batches. The manufacture of CNT-sheets will lead to the development of improved bucky paper and its composites with better mechanical properties for increased efficiency of the fibre matrix. Furthermore, an appropriate electrolyte has to be found integrated into the CNT matrix. This is the basis for stapling the matrix units to a strong high efficient low voltage actuator, which has to be integrated and housed in the end. This technology platform will then be demonstrated and disseminated into the European medical device industry via the consortium. New professional skills in the controlled production processes of CNT will be necessary, and also in the technology of developing the CNT film and composites with high purity CNT fibres to CNT actuators. Special skills need to be developed and trained for the integration of CNT fibres and electrolyte material. The wide field of possible medical applications will lead to dramatic changes in the healthcare system: active flexible endoscopy and stent, new prostheses will

reduce healthcare costs by reduced need of medical care of healthier amputees and reduced community nursing costs for more mobile and independent patients. Smarter endoscopes and instruments for minimal invasive surgery will widen the applications of these technologies that lead to reduced healthcare costs by early stage therapy and shorter recuperation times after operations.

- 1 BRITISH HEALTHCARE TRADES ASSOCIATION (UK)
- 2 BUNDESVERBAND MEDIZINTECHNOLOGIE E.V. (DE)
- 3 EUCOMED (BE)
- 4 NEUE MATERIALIEN WUERZBURG GMBH (DE)
- 5 NANOTRIN LTD (IE)
- 6 NANOCYL S.A. (BE)
- 7 TESTWORKS LTD (UK)
- 8 VISTAMED LTD (IE)
- 9 SGT - SPRITZGIESSTECHNIK GMBH (DE)
- 10 ORTOPEDIJOS TECHNIKA (LT)
- 11 AJL (ES)
- 12 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 13 PERA INNOVATION LTD (UK)

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# PEPT-Flow

Innovative Polymer Flow Visualisation for Optimised Machine Design, Improved Mixing and Material Properties, Process Efficiency and Energy Reductions

The plastics industry represents a major contributor to European wealth, generating sales in excess of EUR160 billion. Small to medium-sized enterprises (SMEs) represent a significant proportion of the sector, employing over 1 million people (70 % of the total) in more than 36 000 companies (98 % of the total). Plastic extrusion is undoubtedly the most important processing technology, representing 36 % of all plastics consumed. In particular, twin-screw extrusion is recognised as a key knowledge-based technology due to its process design flexibility and high mixing efficiency. There exists, however, a fundamental lack of quantitative and qualitative knowledge with regards to the relationships between machine design, total process operation, polymer flow and mixing behaviour. This knowledge gap has been identified as a major barrier to the advancement of twin-screw extrusion for knowledge-based processes.

Using an innovative flow visualisation technique, the PEPT-Flow project will significantly strengthen the knowledge-base available to the SME industries, thus addressing the identified industrial barrier. Furthermore, the project will develop new knowledge-based machine design criteria and simulation software, thus contributing to the continued sustainability and competitiveness of the industry sectors.

The core project strategic objectives are as follows:

- **knowledge:** to undertake detailed quantitative and qualitative investigation of twin-screw extrusion, with regards to the influence of machine design, total process operation and specific polymer/additive systems;
- **design criteria:** to define knowledge-based twin-screw extruder design criteria and guidance;
- **simulation software:** to develop and validate accurate flow simulation software for twin-screw extrusion;

- **demonstration:** to demonstrate the new design criteria, simulation software and processing know-how within five commercial twin-screw processes;
- **transfer:** to achieve effective technology and knowledge transfer throughout communities of European SMEs.

- 1 SMITHERS RAPRA TECHNOLOGY LTD (UK)
- 2 FRAUNHOFER - GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 3 THE UNIVERSITY OF BIRMINGHAM (UK)
- 4 EINDHOVEN UNIVERSITY OF TECHNOLOGY (NL)
- 5 CAMERA DI COMMERCIO, INDUSTRIA, ARTIGIANATO E AGRICOLTURA DI MILANO (IT)
- 6 BRITISH PLASTICS FEDERATION (UK)
- 7 ASSOCOMAPLAST (IT)
- 8 GESAMTVBAND KUNSTSTOFFVERARBEITENDE INDUSTRIE E.V. (DE)
- 9 POLYMER MACHINERY MANUFACTURERS AND DISTRIBUTORS ASSOCIATION (UK)
- 10 TURKISH PLASTICS INDUSTRY ASSOCIATION (TR)
- 11 RONDOL TECHNOLOGY LTD (UK)
- 12 TREFFERT S.A.S (FR)
- 13 VAMP TECHNOLOGIES S.P.A. (IT)
- 14 EXTRICOM GMBH (DE)
- 15 DEVICES AND GLASS TECHNOLOGY S.A.S (FR)
- 16 ICMA SAN GIORGIO S.P.A. (IT)
- 17 CENTRO EUROPEO SVILUPPO E APPLICAZIONI PLASTICHE (IT)
- 18 IONPHASE OY (FI)
- 19 SCIENCE COMPUTERS CONSULTANTS (FR)
- 20 MAPEA SAS (FR)
- 21 RECYCLING AND COMPOUNDING TECHNOLOGY SRL (IT)

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# Pro4Plast

New Product Development Guidance System (PDGS) for Complex Injection-Moulded Plastic Parts by Enhanced Injection-Moulding Simulation and Material Data Measurement Applicable by SMEs

510

Collective research

The overall objective of Pro4Plast is to enable European plastic injection moulding and tooling small to medium-sized enterprises (SMEs) to produce complex, highly functional parts from special polymers at low cost, with short time to market, to sustain European SME competitiveness against challenges from countries with low-cost production outside Europe. This can only be achieved by a new technology-driven product development process, avoiding today's standard approach of trial and error. Therefore, 9 industrial associations or groupings (IAGs) have initiated this project with 28 partners, addressing the common threats of approximately 40 000 EU SMEs.

To achieve the strategic goals and to sustainably strengthen SME competitiveness, project partners will develop innovative technological systems, which consist of:

- a product development guidance system (PDGS) as a new software tool for development of complex plastic parts;
- development of enhanced injection moulding simulation software (multi component and insert-moulding) and development of an in-house viscosity measurement system, both applicable to SMEs;
- development of a new training model for European SMEs, including PDGS certification (like ISO 9000 for quality);

A top-class research and technological development (RTD) team from leading scientific institutes of the EU will safeguard the achievement of the ambitious project targets.

www.pro4plast.net

- 1 GESAMTVERBAND KUNSTSTOFFVERARBEITENDE INDUSTRIE E.V. (DE)
- 2 VEREINIGUNG ZUR FÖRDERUNG DES INSTITUTS FÜR KUNSTSTOFFVERARBEITUNG UND HANDWERK AN DER RWTH AACHEN E.V. (DE)
- 3 ITALIAN PLASTICS AND RUBBER PROCESSING MACHINERY AND MOULDS MANUFACTURERS ASSOCIATION (IT)
- 4 FOUNDATION AITIIP (ES)
- 5 SLOVENSKA ASOCIÁCIA SPRACOVATEĽOV PLASTOV A VÝROBCOV ŠPECIÁLNEHO NARADIA (SK)
- 6 ASSOCIATION OF THE HUNGARIAN PLASTICS INDUSTRY (HU)
- 7 GIZ GROZD PLASTTEHNIKA (SI)
- 8 POLISH PLASTIC CONVERTERS ASSOCIATION (PL)
- 9 OÖ TECHNOLOGIE- UND MARKETINGGESELLSCHAFT MBH, KUNSTSTOFF-CLUSTER (AT)
- 10 PKT PRÄZISIONSKUNSTSTOFFTECHNIK GMBH (AT)
- 11 DOLLWIN TOOLING B.V. (NL)
- 12 KUNSTSTOFF TECHNIK SCHMÖLLN GMBH (DE)
- 13 WEISSER + GRIESSHABER GMBH (DE)
- 14 AWENDER KUNSTSTOFFTECHNIK GMBH (AT)
- 15 CENTRO EUROPEO SVILUPPO E APPLICAZIONI PLASTICHE (IT)
- 16 INGENIERÍA COMPUTERIZADA DE MOLDE S.L. (ES)
- 17 POLYCOM PREDELAVA PLASTIČNIH MAS IN ORODJARSTVO D.O.O. (SI)
- 18 MIRKOPAK KFT (HU)
- 19 TERMOPLAST S.R.O. (CZ)
- 20 ESOX SPOL S.R.O (SK)
- 21 POLYCONCENT PLASTICS ENGINEERING AND DEVELOPMENT (AT)
- 22 SIMCON KUNSTSTOFFTECHNISCHE SOFTWARE GMBH (DE)
- 23 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH TNO (NL)
- 24 LEHRSTUHL FÜR KUNSTSTOFFVERARBEITUNG RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN (DE)
- 25 MONTANUNIVERSITÄT LEOBEN, INSTITUT FÜR KUNSTSTOFFVERARBEITUNG (AT)
- 26 UNIVERSIDAD DE ZARAGOZA (ES)
- 27 SLOVENIAN TOOL AND DIE DEVELOPMENT CENTER (SI)
- 28 ASK ALTMANN SYSTEMENGINEERING KUNSTSTOFFTECHNIK (DE)



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# PROLIMA

## Environmental Product Lifecycle Management for Building Competitive Machine Tools

Europe currently dominates the global machine-tools market by providing some 52 % of the worldwide value of machine tool production in 2002. However, globalisation of the machinery industry, 70 % of which are small to medium-sized enterprises (SMEs), has recently intensified.

The market environment is becoming more competitive, low labour costs in many parts of the world are attracting production away from Europe. Moreover, the economic recession that culminated in 2001 created an urgent need for the machine tool manufacturers to propose more cost effective and environmentally friendly products.

The overall objective of PROLIMA is hence to provide European machine tools manufacturing SMEs with the means to develop machines with minimum environmental impact and optimised global life-cycle costs. The project will have a strong focus on cutting-based machines tools, which includes grinding, milling and turning, but generic results could be further applied in other sectors.

The project targets to develop a knowledge system for supporting design decisions for machine tools integrating information on life cycle cost (LCC), on life cycle assessment (LCA), and on reliability, availability, maintainability and safety (RAMS) including a 'Best environmental practices manual'.

- 1 ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE MAQUINAS-HERRAMIENTA (ES)
- 2 THE MULTISECTORAL FEDERATION FOR THE TECHNOLOGY INDUSTRY - AGORIA VZW (BE)
- 3 TECHNOLOGY INDUSTRIES OF FINLAND (FI)
- 4 ASOCIACIÓN ESPAÑOLA PARA LA CALIDAD (ES)
- 5 VERENIGING VOOR PRODUKTIE-TECHNIEK (NL)
- 6 EUROPEAN COMMITTEE FOR CO-OPERATION OF THE MACHINE TOOL INDUSTRIES (BE)
- 7 STICHTING NEDERLANDS CORROSIE CENTRUM (NL)
- 8 SORALUCE S. COOP. (ES)
- 9 INDUSTRIEEL TOELEVERINGSBEDRIJF GODDEERIS NV (BE)
- 10 CIM GMBH INFORMATIONS UND PRODUKTIONS-MANAGEMENT (DE)
- 11 LEALDE S.COOP. (ES)
- 12 ESTARTA RECTIFICADORA S. COOP (ES)
- 14 LAU-NIK S.A. (ES)
- 15 ROLF WISSNER GMBH (DE)
- 17 INNOVATEC AG (DE)
- 18 URPEMAK S.L. (ES)
- 19 T-DRILL OY (FI)
- 20 IDEKO S.COOP. (ES)
- 21 VALTION TEKNIILLINEN TUTKIMUSKESKUS (VTT) (FI)
- 22 WETENSCHAPPELIJK EN TECHNISCH CENTRUM VAN DE METAALVERWERKENDE NIJVERHEID (BE)
- 23 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH (NL)
- 24 WZL - RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN (DE)
- 25 FUNDACIÓN TEKNIKER (ES)

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**Total cost: € 2 480 656**

**EC Contribution: € 1 495 485**

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# PRO-STONE

Eco-Efficient and High-Productive Stone Processing by Multifunctional Materials

512

Collective research

[www.dappolonia-research.com/prostonecm/doceboCms](http://www.dappolonia-research.com/prostonecm/doceboCms)

Figures on the worldwide stone trade show that the market share of EU countries has been decreasing over the last few years in favour of relatively new Far East and southern American countries. The main reasons for this is that the sector has not made any significant technological progress and operations are affected by low productivity and efficiency, fluctuation in the quality, huge quantities of waste, high energy consumption and critical safety for workers. The development of environmentally friendlier technologies is indeed an issue, considering that stone is a non-renewable resource. Furthermore, the European equipment manufacturers have been made more aware of safety and health (noise, dust, etc.) of the operators, through recent stringent regulations calling for alternative technologies.

To address these issues, scattered attempts have been registered in Europe to apply knowledge-based multifunctional materials in stone tools and equipment. The most promising are based on the application of shape memory alloys (SMA). Several concepts have been developed by our core group small to medium-sized enterprises (SMEs) based on this novel material. However, the available results show that macro-scale SMA elements have a lower level of reliability and performance reproducibility with respect to the micro-scale SMA devices so far applied in the medical sector. The project aims at creating new knowledge in the area of SMA technology, and integrating it in a knowledge-management infrastructure to facilitate and support design and validation of new tool concepts by the large and scattered European community of SMEs dealing in stone. It also aims at grouping a large number of European industrial associations or groupings (IAGs), led by the European Federation of Stone Industries with the major goal of solving specific needs, improving the technological status of the stone SMEs and transforming this rather traditional and regionalised sector into a modern, competitive and high added value industry.

- 1 D'APPOLONIA S.P.A. (IT)
- 2 EUROPEAN AND INTERNATIONAL FEDERATION OF NATURAL STONE INDUSTRIES (BE)
- 3 ZENTRALVERBAND DER DEUTSCHEN NATURSTEINWIRTSCHAFT (DE)
- 4 ASSOCIAZIONE INDUSTRIALE DI MASSA CARRARA (IT)
- 5 ASSOCIACAO PORTUGUESA DOS INDUSTRIAIS DE MARMORES E RAMOS AFINS (PT)
- 6 BULGARO-ITALIANA TARGOSKA, ZEMEDELSKA E INDUSTRIALNA KAMARA (BG)
- 7 ASSOCIATION OF MARBLE COMPANIES OF ATTICA (GR)
- 8 DITTA RIPAMONTI DR. GIANNI SAS (IT)
- 9 HERRAMIENTAS DE DIAMANTE S.A. (ES)
- 10 TESIMAG SRL (IT)
- 11 SODEX OOD (BG)
- 12 TECHMI - PAVEL MILEV (BG)
- 13 GRANITOS MACEIRA S.A. (PT)
- 14 MARMORES GALRAO - EDUARDO GALRAO JORGE & FILHOS S.A. (PT)
- 15 MASERC - MARMORES SERGIO COELHO LDA (PT)
- 16 SCHWIENEN STEIN COLOGNE GRANT- UND GRABSTEINWERKSTAETTEN (DE)
- 17 ZEIDLER & WIMMEL, STEINBRUCH - UND STEINMETZBETRIEBE GMBH & CO. (DE)
- 18 ABRA TOMASZ CZEKAJ (PL)
- 19 ECSEL S.P.A. (IT)
- 20 G. CHRISAFAKIS S.A. (GR)
- 21 LASKARIDIS MARBLE ABEE (GR)
- 22 SVILUPPO ITALIA TOSCANA SCPA (IT)
- 23 ISTITUTO SUPERIOR TECNICO (PT)
- 24 INSTITUTE OF PHYSICS, ACADEMY OF SCIENCES OF THE CZECH REPUBLIC (CZ)
- 25 NATIONAL TECHNICAL UNIVERSITY OF ATHENS (GR)

Contract: 516417  
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Total cost: € 3 006 717  
EC Contribution: € 1 930 326

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# SAFEWORKER

## Reduction of Occupational Asthma and Dermatitis in the Vehicle Repair Industry

SAFEWORKER will develop a styrene-free, vehicle body-repair filler that will be rapidly cured by UV lamps, resulting in faster turnaround of repairs at reduced cost. Reducing the process time will allow Europe's bodyshops to increase their throughput and therefore revenue generation potential whilst eliminating styrene and other volatile organic compounds (VOCs) from the filler.

Such a development, freely disseminated through the trade associations within our sector, will allow ALL of Europe's 172 000 small to medium-sized enterprises (SMEs) within our sector to comply with Council Directive 98/24/EC 'on the protection of the health and safety of workers from the risks related to chemical agents at work'. More than 98 % of firms in our sector are SMEs and 83 % of them employ less than 50 people.

The number of cars in Europe totals 184 426 000 and is growing at 2.3 % each year. The market for accident repair has never been so buoyant. However, our industry faces a resource and skills shortage that threatens the sector's ability to satisfy future market demand.

The increase in public awareness of environmental and occupational health hazards has caused worker reluctance to enter our sector, due to the perceived health risks and potential reduction of quality of life.

Occupational skin disease and respiratory disease effects over 100 000 workers in the European vehicle repair sector, costing the industry around EUR 100 million each year. These forms of skin disease and asthma are caused by exposure of our workers to specific chemicals, found in the polyester filler they use to fill dents in damaged vehicles.

Our industry generates approximately 300 000 t of styrene emission in Europe every year from our repair-shops. Styrene is classified as a possible human carcinogen by the Environmental Protection Agency (EPA) and by the International Agency for Research on Cancer (IARC). These styrene emissions pose a

heightened health risk to women wishing to join our sector's workforce. Our project will eliminate styrene monomer from vehicle body filler.

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Collective research

- 1 PERA INNOVATION LTD (UK)
- 2 AUTO BST & MILJO (DK)
- 3 RETAIL MOTOR INDUSTRY FEDERATION (UK)
- 4 CONFEDERACION ESPANOLA DE TALLERES DE RAPARACION DE AUTOMOVILES Y AFINES (ES)
- 5 UVASOL LTD (UK)
- 6 MOVAC GROUP LTD (UK)
- 7 PROXIMA NTR (PL)
- 8 COLAS ARTIACH S.L. (ES)
- 9 MOTORBRANSCHENS RIKSFORBUND (SE)
- 10 IMPACT REPAIR CENTRE IMPACT REPAIR CENTRE (UK) IMPACT REPAIR CENTRE (UK)
- 11 FRAUNHOFER-GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 12 INSTITUTO PEDRO NUNES - ASSOCIAÇÃO PARA INOVAÇÃO E DESENVOLVIMENTO EM CIÊNCIA E TECNOLOGIA (PT)
- 13 GLAS-CRAFT LTD (UK)

<http://safeworker.pera.com>

**Contract: 30305**  
**Call: FP6-2004-SME-COLL**  
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**Duration (months): 18**  
**Total cost: € 2 466 713**  
**EC Contribution: € 1 406 824**

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Materials & Processes

# SILICERAM

## Studies Aiming at Assisting Legislation and Encouraging Continual Improvement Strategies in the Field of Respirable Crystalline Silica

514

Collective research

The traditional ceramics industry is divided into several subsectors: tiles, tableware, sanitaryware, refractory, bricks and roofing tiles. In order to manufacture these products, the ceramic industry sometimes uses powdered crystalline silica. For many years it has been recognised that inhalation of respirable crystalline silica (RCS) can lead to silicosis, which ultimately leads to ill-health through breathing difficulties and may even result in death. Since the 1930s, sensible abatement practises have been developed to virtually eradicate the problem of silicosis. At present, different EU states have different limits for RCS. Within Europe, the Scientific Committee on Occupational Exposure limits are working towards identifying a common EU position on mg/m<sup>3</sup> levels. One of the difficulties associated with setting common exposure limits for workers is the fact that different forms of crystalline silica appear to pose different threats. A new input to the debate has been the decision by the International Agency on Research in Cancer (IARC) in 1997 to classify RCS as a category 1 carcinogen.

Whilst striving for lower and lower mg/m<sup>3</sup> limits is to be applauded, there is a potential danger that companies using RCS (especially small to medium-sized enterprises (SMEs)) will be faced with extortionate abatement capital equipment costs, in-house administration/testing costs, etc. to comply. This could drive some companies to ignore the legislation and so create a rise in the number of silicosis cases. Against the above background, the overall aim of this project is to provide legislators with useful data for defining RCS in air limits. Setting a single low limit to encourage continual improvement, but allowing concessions based on proven reduced risks associated with certain RCS forms is seen as a possible way forward.

The project will focus on different industries of the ceramic sector: tiles, tableware, sanitaryware, refractory, bricks and roofing tiles.

- 1 CERAM RESEARCH LTD (UK)
- 2 ISTITUTO DE TECNOLOGIA CERAMICA - AICE (ES)
- 3 CENTRO CERAMICO BOLOGNA, CENTRO DI RICERCA E SPERIMENTAZIONE PER L' INDUSTRIA CERAMICA (IT)
- 4 SOCIETE FRANCAISE DE CERAMIQUE (FR)
- 5 MIDDLESEX UNIVERSITY (UK)
- 6 BRITISH CERAMIC CONFEDERATION (UK)
- 7 FACULTE DE MEDECINE (FR)
- 8 RESEARCH, DESIGN AND EXPERIMENTAL PRODUCTION INSTITUTE FOR CONSTRUCTIONS AND CONSTRUCTION MATERIALS (RO)
- 9 COMMERCIAL CLAY (UK)
- 10 ROYAL STAFFORD (UK)
- 11 ANCON TECHNOLOGIES LTD (UK)
- 12 FRESHFIELD LANE BRICKWORKS LTD (UK)
- 13 SC SEVEN GROUP (RO)
- 14 CERAMUS S.A. (RO)
- 15 LOYAL-TRADE INVEST S.R.L (RO)
- 16 S.C PORCELAIN MANUFACTURERS S.R.L (RO)
- 17 SC AXA PORCELAINE S.R.L (RO)
- 18 REFRACTARIOS ALFRAN S.A. (ES)
- 19 ATOMIZADORA S.A. (ES)
- 20 TEJAS Y LADRILLOS DEL MEDITERRANEO S.A. (ES)
- 21 CERACASA S.A. (ES)
- 22 PORCELANAS DEL PRINCIPADO S.L. (ES)
- 23 PORVASAL S.A. (ES)
- 24 CERAMICHE SETTECENTO VALTRESINARO SPA (IT)
- 25 EUROFILTER SPA (IT)
- 26 MAREF SPA (IT)
- 27 ARPA (IT)
- 28 ANCAP SPA (IT)
- 29 PORCELAINES AVIGNON S.A. (FR)
- 30 FAUCHON BAUDOT SARL (FR)
- 31 BUNDESVERBAND DER DEUTSCHEN ZIEGELINDUSTRIE (DE)
- 32 ASSOCIACAO PORTUGUESA DA INDUSTRIA DE CERAMICA (PT)
- 33 ARBEITSGEMEINSCHAFT KERAMISCHE INDUSTRIE E. V. (DE)
- 34 CONFEDERATION DES INDUSTRIES CERAMIQUES DE FRANCE (FR)
- 35 ASOCIACION ESPANOLA DE FABRICANTES DE AZULEJOS Y PAVIMENTOS CERAMICOS (ES)
- 36 ASOCIACION ESPANOLA DE FABRICANTES DE LADRILLOS Y TEJAS DE ARCILLA COCIDA (ES)
- 37 ASSOCIAZIONE NAZIONALE DEI PRODUTTORI DI PIASTRELLE DI CERAMICA E DI MATERIALI REFRATTARI (IT)
- 38 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)

Contract: 500896  
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Duration (months): 36  
Total cost: € 2 213 305  
EC Contribution: € 1 468 836

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# SlipSTD

## Development of Slip-Resistance Standard Surfaces

The societal and economical impact of slip accidents are wide ranging. In 2001, the direct insurance cost of occupational fall accidents in the EU was more than EUR 7 billion.

The fall injuries occurring in private life is not as well registered, but is estimated to be even higher; with the percentage of the total population defined as “aged” set to rise over coming years, fall injuries are likely to become even more of an issue. Therefore, there is an urgent need to prevent slip accidents via the design, third-party testing and installation of safer flooring surfaces.

The production of safer flooring presents a large potential market for the ceramic floor-tile industry. Despite the existence of safety requirements for other products through the Construction Products Directive, neither univocal guidelines to help manufacturers in producing slip resistant ceramic tiles nor harmonised test methods for measurement of the slip resistance of tiles are currently available. For instance, the current standard (GEN-EN14411) defining the minimum requirements needed by ceramic tiles to be labelled with CE marking, does not include a common “European” requirement on slip resistance characteristics for ceramic tiles.

Hence, various national level standard methods are still used to assess the slip resistance. In the absence of agreed slip- resistance requirements and tests, there is a tendency for tile manufacturers to strive for innovative products via aesthetic routes rather than improved health and safety performance in use.

In SlipSTD project, a consortium comprising leading experts in this field will work together with industry representatives to design and manufacture standard surfaces with varying slip-resistant properties. The design of surfaces will be based on tribology models and biomechanical testing and modelling. The fundamental knowledge and scientifically specified and constructed surfaces generated by the SlipSTD project will provide:

- participating small to medium-sized enterprises (SMEs) and industrial associations or groupings (IAGs) with practical know-how and a suitable benchmark for designing and manufacturing slip resistant ceramic tiles;
- CEN committees with scientifically defined surfaces that can be used to validate different tests and therefore will form a decisive step towards a harmonised European slip-resistance test.

- 1 CERAM RESEARCH LTD (UK)
- 2 THE TILE ASSOCIATION (UK)
- 3 ASSOPIASTRELLE - ASSOCIAZIONE NAZIONALE DEI PRODUTTORI DI PIASTRELLE DI CERAMICA E DI MATERIALI REFRATTARI (IT)
- 4 ASCER - ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE AZULEJOS Y PAVIMENTOS CERÁMICOS (ES)
- 5 APICER - ASSOCIAÇÃO PORTUGUESA DA INDÚSTRIA DE CERÂMICA (PT)
- 6 TYÖTURVALLISUUSKESKUS RY (CENTRE FOR OCCUPATIONAL HEALTH) (FI)
- 7 HEALTH AND SAFETY EXECUTIVE (UK)
- 8 ROYAL INSTITUTE OF BRITISH ARCHITECTS (UK)
- 10 FORSCHUNGSINSTITUT FÜR ANORGANISCHE WERKSTOFFE - GLAS/ KERAMIK GMBH (DE)
- 11 FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 12 TYÖTERVEYSLAITOS (FINNISH INSTITUTE OF OCCUPATIONAL HEALTH) (FI)
- 13 CENTRO CERAMICO DI BOLOGNA, CENTRO DI RICERCA E SPERIMENTAZIONE PER L'INDUSTRIA CERAMICA - CONSORZIO UNIVERSITARIO (IT)
- 14 TOPCER - INDÚSTRIA DE CERÂMICA LDA (PT)
- 15 DENNIS RUABON SALES LTD (UK)
- 16 CEDIR - CERAMICHE DI ROMAGNA SPA (IT)
- 17 ALOIS KORZILIUS INTERBAU FABRIKATION FÜR MODERNE BAUKERAMIK GMBH & CO. KG (DE)
- 18 CERACASA S.A. (ES)

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**EC Contribution: € 1 318 284**

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# SMART FOUNDRY

Knowledge-Based Manufacturing Strategy and Methods for Foundries

516

Collective research

The European foundry business is a traditional less research and technological development (RTD)-intensive industry which is dominated by small to medium-sized enterprises (SMEs) and which forms a significant part of Europe's manufacturing industry. The efficient design and manufacturing of cast components and corresponding tooling will be a crucial success factor for the companies in the future. The project aims at collecting and processing of information and knowledge around the design, planning and manufacturing of cast components. This includes the knowledge on new materials, processes and equipment for the manufacture of castings.

In contrast to other manufacturing sectors, the foundry business has not yet implemented e-manufacturing technology on a large scale such as Decision support software, Computer Aided Process Planning and networking. The project intends to overcome this drawback through a systematic development of IT solutions based on the collected information and knowledge. Smart Foundry takes an integrated approach combining material sciences, production technologies and IT. Beside the software tools, an overall knowledge database will serve multiple companies in optimising their processes and will allow the sharing of equipment between companies when it comes to new processes and expensive machinery. The integrated approach is achieved through the quality of the partnership. Four RTD performers covering all aspects of materials, casting processes and information technology will develop solutions on behalf of Industrial associations from Spain, France, the UK and Germany. These associations represent the sectors of tool making and foundry business in the different EU Member States. The link to industry is given through a core group of ten SMEs from four different countries.

www.smartfoundry.org

- 1 NC GESELLSCHAFT E.V. (DE)
- 2 FEDERACIÓN ESPAÑOLA DE ASOCIACIONES DE FUNDIDORES (ES)
- 3 THE DIECASTING SOCIETY (MIDLAND BRANCH) (UK)
- 4 LES FONDEURS DE FRANCE (FR)
- 5 FUNDACIÓN ASCAMM (ES)
- 6 LEOTECH RAPID PROTOTYPING UND WERKZEUGBAU GMBH (DE)
- 7 ASHLEY ENGINEERING (LANCASHIRE) LTD (UK)
- 8 FASEG S.A. (ES)
- 9 HCM ENGINEERING LTD (UK)
- 10 NISAFORM S.R.O. (CZ)
- 11 KEMLOW'S DIECASTING PRODUCTS LTD (UK)
- 12 ACTECH GMBH ADVANCED CASTING TECHNOLOGIES  
GIESSEREITECHNOLOGIE (DE)
- 13 WALTER FRANK & SONS LTD (UK)
- 14 NORTON CAST PRODUCTS LTD (UK)
- 15 MARCAM ENGINEERING GMBH (DE)
- 16 VEREIN ZUR FÖRDERUNG DER WISSENSCHAFTLICHEN FORSCHUNG IN DER  
FREIEN HANSESTADT BREMEN E.V. (DE)
- 17 FUNDACIÒN INASMET (ES)
- 18 CASTINGS TECHNOLOGY INTERNATIONAL (UK)
- 19 CENTRE TECHNIQUE DES INDUSTRIES DE LA FONDERIE (FR)



FP6 Project Catalogue

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Duration (months): 30  
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EC Contribution: € 1 431 559

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# TECH-SPRING

## Improving Technical Performance of Springs through Scientific Understanding of Dynamic Stress Profiles Utilising Advances in Software Design and Measurement Technologies

This project will support the community of over 600 European small to medium-sized enterprise (SME) spring manufacturers with a toolkit for innovation, and will enable novel new spring designs.

The consortium truly believes that this programme will revolutionise the whole sector, and the design process. This will be achieved by providing the large community with the knowledge and know-how necessary to individualise their strategy and approach with products giving increased performance and durability. The project will also result in products which utilise up to 20 % less material, and drive approximately 7 % out of manufactured costs.

Breakthroughs in new applicable knowledge and technology provided by this project include:

- enhanced scientific knowledge of residual and applied stresses;
- “next-generation” software design tools, integral to CAD/FEA and MKS;
- new innovative software packages and prediction models for improving spring designs and ensuring optimum material selection;
- a prototype system making use of advanced camera and stroboscopic technologies to quantify dynamic deflections;
- a prototype-adapted X-ray machine for residual stress analysis;
- revised EU and new global standards.

The above will result in a standard, comprehensive, innovative and affordable “toolkit” which will be made available to the SMEs involved in spring manufacturing across Europe.

This will enable EU spring manufacturers to regain some of the EUR 91 million of revenue lost over the last decade, by minimising the price differential and

providing superior specification and performance springs that cannot be matched technically by non-European manufacturers. This capability will help in supporting the industry to increase market share by 5 % over five years, and ultimately achieve an additional EUR 114 million each year in revenue and sales. It will also generate an increase in employment in the sector, of an additional 960 jobs.

It will also enable high-technology manufacturers, such as those involved in the electrical and aerospace sectors in the EU, to design better and more cost-effective products. This research is vital if Europe is to retain a dynamic and innovative spring design and manufacturing sector, and it needs to be stated that springs are incorporated into almost all manufactured goods and are used by all manufacturing sectors.

- 1 INSTITUTE OF SPRING TECHNOLOGY (UK)
- 2 DUTCH SPRING ASSOCIATION (NL)
- 3 ASSOCIAZIONE PROFESSIONALE SENZA FINE DI LUCRO TRA I COSTRUTTORI ITALIANI DI COMPONENTI ELASTICI (IT)
- 4 TURTON SPRINGS LTD (UK)
- 5 MEVIS S.P.A. (IT)
- 6 METALPOL SP.J (PL)
- 7 LAKE IMAGE SYSTEM (UK)
- 8 PEEN SERVICES (IT)
- 9 INNOTECH FORSCHUNGS- UND ENTWICKLUNG (DE)
- 10 JOH.PENGG AG (AT)

**Contract: 29743**  
**Call: FP6-2004-SME-COLL**  
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**Total cost: € 2 735 393**  
**EC Contribution: € 1 513 549**

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# T-FORM

## Throughput-Time Reduction and First-Time-Right Production for the Thermoform Industry by Introducing a Predictive Mould Design and Manufacturing System

518

Collective research

The product design, mould design and production within the thermoforming process is currently based on craftsmanship and an iterative trial and error approach.

The European thermoform industry (with 275 000 employees, a turnover of EUR 27.5 billion, and 85 % of companies being small to medium-sized enterprises (SMEs)) is facing severe competition from Far Eastern countries. In order to fight this competition, a combination of throughput time reduction and first-time right production should be established.

The current craftsmanship should be integrated in a predictive approach from product design to manufacturing, with the emphasis on mould design to come to a first-time right production of less costly thermoformed parts in shorter timescales.

The T-ForM project will result in a technology which is able to supply the thermoform industry with:

1. design guidelines for thermoformed parts;
2. a complete proposal for an ideal thermoforming mould design, based on, and connected to, a dedicated production simulation software tool by developing a predictive mould design software tool for thermoforming;
3. Optimal thermoforming parameter settings, stemming from the developed predictive mould design software tool.

Through the developed technology, an "ideal-thermoforming-mould" will be described in a neutral, digital format which can be used immediately in commercial available CAD/CAM software for generating tool paths. In this way, the first-time right and correct manufacturing of the mould is also guaranteed.

The project will be supported and validated by the hands-on experience of authoritative industrial associations or groupings (IAGs) and SME partners

involved, and will result in a technology and methodology which:

1. will increase the knowledge base and cooperation of the sectors involved;
2. can easily be transferred by the IAGs to all their members;
3. will improve EU competitiveness of the thermoform industry in Europe, as almost all authoritative EU countries are represented in this project through the six IAGs.

During the project, the participating SMEs and members of the national groups of SMEs (approximately 100) will be trained. It is foreseen that on a European level, the project results will stop the drain of turnover to the Far East (EUR 1.8 billion a year) and stop the unemployment of 18 000 employees a year.

As the current trial-and-error approach becomes obsolete, a reduction of processing 1 300 000 t of plastic a year is foreseen. This results in an energy saving of 1 000 000 GJ per year.

www.t-form.eu



- 1 NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH (NL)
- 3 CLUSTERLAND OBEROESTERREICH GMBH, KUNSTSTOFF-CLUSTER (AT)
- 4 PRODUCENTENVERENIGING THERMOPLASTEN (NL)
- 5 FEDERACION ESPANOLA DE ASOCIACIONES EMPRESARIALES DE MOLDISTAS Y MATRICEROS (ES)
- 6 GESAMTVERBAND KUNSTSTOFFVERARBEITENDEN INDUSTRIE E.V. (DE)
- 7 GAUGE AND TOOLMAKERS ASSOCIATION (UK)
- 8 VERBAND DEUTSCHER WERKZEUG- UND FORMENBAUER (DE)
- 9 AGORIA PLASTIQUES (BE)
- 10 MANFRED JACOB KUNSTSTOFFTECHNIK GMBH (DE)
- 11 UNIPA KUNSTSTOFFTECHNIK GMBH (DE)
- 12 KAREL KOUBA - ACCUFORM (CZ)
- 13 BATELAAN KUNSTSTOFFEN B.V. (NL)
- 14 HAARLEMSE MODELMAKERIJ B.V. (NL)
- 15 LINECROSS LTD (UK)
- 16 OMNIFORM S.A. (BE)
- 17 SABERT EUROPE (BE)
- 18 MIDAS PATTERN COMPANY LTD (UK)
- 19 DECORCHAPA S.L. (ES)
- 20 PLASVINA S.L. (ES)
- 21 MISSLER SOFTWARE (FR)
- 22 PROFITLOGISTICS GMBH (AT)
- 23 CRIF-WALLONIE (BE)
- 24 UNIVERSITAET STUTTGART (DE)
- 25 FUNDACIO ASCAMM (ES)
- 26 SMITHERS RAPRA TECHNOLOGY LTD (UK)
- 27 ASOCIACION DE INVESTIGACION DE MATERIALES PLASTICOS Y CONEXAS (ES)
- 28 PERA INNOVATION LTD (UK)

Contract: 516374  
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 Starting Date: 01/09/2005  
 Duration (months): 36  
 Total cost: € 4 584 500  
 EC Contribution: € 2 846 150

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# TYRETEST

## Development of Low-Cost Non-Destructive Inspection Equipment to Improve the Assessment of Tyre-Casing Integrity

520

Collective research

Over 1 000 EU small to medium-sized enterprises (SMEs) are involved in tyre retreading and supply to this industry. Retreading is the process of recycling a used tyre via removal of the worn tread, and addition of new tread. During the process, each used tyre must be inspected to determine whether it is fit for retread or should be scrapped due to irreparable damage. The inspection process begins with a visual inspection and is generally complemented by further inspection using non-destructive test equipment. Currently available commercial equipment, such as X-ray, shearography and ultrasound, is too costly for SMEs; it is bulky, time consuming, and in many cases proprietary-developed by the major manufacturers for their exclusive use. EU tyre legislation means that dependency on the experience of qualified operators is no longer sufficient in assuring tyre quality, thus leaving retreading SMEs in a critical situation. A real need has been manifested by retread associations for a fast, easy-to-use, low-cost casing inspection machine to enable their SME retreaders to secure retread quality and avoid wasting resources on unsuitable casings.

This project will develop a tyre-casing inspection machine (Tyrestest) to complement the manual inspection of used truck casings in order to reduce operating costs, consistently deliver product quality and safety, as well as promote the recycling and reuse of tyres. The use of pulse-echo ultrasound will represent a real innovation, and Tyrestest will perform non-destructive inspection of the tyre sidewalls, shoulders and crown area in a total test time of 1.5 min. The inspection is designed to identify any internal tyre defects which could render the retreaded tyre unfit for use. Introducing a low-cost and easy-to-operate inspection technique would enable SMEs to become more competitive through better selection of used tyres for retreading, which would increase the quality of the end product, which would in turn increase the acceptance of retreaded tyres.

- 1 FELTALÁLOI ÉS KUTALÓ KÖZPONT KFT (FKK) (HU)
- 2 BUREAU INTERNATIONAL PERMANENT DES ASSOCIATIONS DE VENDEURS ET RECHAPERUS DE PNEUMATIQUES (NL)
- 3 ASOCIACIÓN ESPAÑOLA DE NEUMÁTICOS RECICLADOS (ES)
- 4 MAGYAR GUMIPARI SZÖVETSÉG (HU)
- 5 VERMON (FR)
- 6 ELECTRONIC SYSTEM DESIGN LTD (MT)
- 7 I+ S.R.L. (IT)
- 8 TECHNIC SYSTEMS (UK)
- 9 N. TIMENES & SON AS (NO)
- 10 AS SEPA REHV (EE)
- 11 CARLING SPOOL (CZ)
- 12 MEP-90 KULKERESKEDelmi ES SZOLGALTATO KFT (HU)
- 13 RENOVADOS MK (ES)
- 14 RECAUCHUTADOS MURALLA (ES)
- 15 J. ROLDÃO SEICA & TAVARES S.A. (PT)
- 16 TUN ABDUL RAZAK RESEARCH CENTRE (UK)
- 17 UNIVERSITAT POLITÈCNICA DE CATALUNYA (ES)
- 18 CENTRE DE RECERCA I INVESTIGACIÓ DE CATALUNYA (ES)
- 19 MALTA INDUSTRIAL INNOVATION FOR SMES LTD (MT)



FP6 Project Catalogue

Contract: 30274  
Call: FP6-2004-SME-COLL  
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Duration (months): 36  
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EC Contribution: € 1 838 958

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# X-Gear

## Development of Gear Drive-Trains Based on New Materials and Novel Gear Systems

The 135 000 European small to medium-sized enterprises (SMEs) of the mechanical transmission sector (specifically the producers of gears and gearing products) rely on traditional technologies and are characterised by a general conservatism. However, over the years, the end products in which the gears are used have become more complex and are pushing the state of the art in new technology. Thus the requirement for more sophisticated and reliable gears has become extremely important.

The gear industry has to implement major changes in gear design and gear fabrication techniques just to keep up with the changing needs of the end product. Moreover, the output of mechanical engineering equipment is growing much faster in China than in Europe or the US. China is thus becoming a serious competitor for the European SMEs of the sector.

In line with the strategic objectives of the associations of manufacturers of gears and mechanical transmission systems, the objective of X-Gear is the diffusion and the standardisation of novel technologies and new materials for a new generation of gears characterised by higher accuracy, resistance, reliability, and tribology properties.

In this context, X-GEAR plays a role in the competitiveness of European industry since it aims to comply with the ever-tighter requirements being imposed on the gear industry for lighter weight, higher torque transmissions and quieter, more efficient gear trains.

Research activities will be focused on an innovative combination of:

- new surface treatments based on flame spraying, PVD and laser shot peening;
- new materials based on nanopowders (namely ultra-dispersed fine diamonds) for the production of ultra-resistant gears;

- manufacturing and design tools, and knowledge-platform-implementing guidelines and best practices developed in the project, for a wider diffusion of the project results to the industrial associations or groupings (IAGs) and their members.

- 1 D'APPOLONIA S.P.A. (IT)
- 2 BRITISH GEAR ASSOCIATION (UK)
- 3 AGORIA (BE)
- 4 AIMMAP - ASSOCIAÇÃO INDUSTRIAIS METALÚRGICOS, METALOMECÂNICOS E AFINS DE PORTUGAL (PT)
- 5 SCIENTIFIC-TECHNICAL UNION OF MECHANICAL ENGINEERING (BG)
- 6 ASSOCIAZIONI INDUSTRIALI DI MASSA CARRARA (IT)
- 7 ASSOCIAZIONE NAZIONALE ENERGIA DEL VENTO (IT)
- 8 STOWARZYSZENIE INŻYNIERÓW I TECHNIKÓW MECHANIKÓW POLSKICH (PL)
- 9 HINDLE GEARS (UK)
- 10 DG - TECHNOLOGY SERVICE S.R.L. (IT)
- 11 CIM-MES PROJEKT SP. Z.O.O. (PL)
- 12 GALBIATI GROUP (IT)
- 13 BIERENS MACHINEFABRIEKEN B.V. (NL)
- 14 KOSS-REMO S.C. (PL)
- 15 DEFAWES '96, NV (BE)
- 16 TECHNOCONTACT INTERNATIONAL LTD (BG)
- 17 STAM S.R.L. (IT)
- 18 STRESSTECH OI (FI)
- 19 DENDRIT LTD (BG)
- 20 DESIGN UNIT, UNIVERSITY OF NEWCASTLE UPON TYNE (UK)
- 21 SPACE RESEARCH INSTITUTE OF BULGARIAN ACADEMY OF SCIENCES (BG)
- 22 INSTITUTE OF PRECISION MECHANICS (INSTYTUT MECHANIKI PRECYZYJNEJ) (PL)

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Call: FP6-2004-SME-COLL  
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EC Contribution: € 1 872 586

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# FP6 Project Catalogue

Transport

# CORPTUS

## Concrete Railtrack Panels for Tunnel Safety

524

Co-operative research

After the European fire catastrophes in the tunnels of Tauern and Mont Blanc in 1999 and in Gotthard in 2001, increasing endeavours were made to transfer the transport of dangerous goods from road to rail. From this aspect, new action plans are needed for a critical review of the safety of tunnels.

Similarly for rail passengers, it is high time to improve safety in case of emergencies in tunnels. The public still remembers the 1999 catastrophe near Salerno, when a train fire in a tunnel caused four deaths. In 2001, a derailment and the following fire of a freight train, which was transporting cars containing dangerous goods in the Howart Street Tunnel in Baltimore City, caused severe environmental damages. The impacts of such catastrophes become even more threatened, when they happen in urban areas, for instance in subway tunnels: in 1995 in the Baku Metro in Aserbadjan, and in 1999 in the Minsk Metro, tunnel fires caused 289 and 52 fatalities, respectively.

The CORPTUS project will focus on the development of a concrete rail-track panel system, useable for rail and subway tunnels, which, for the first time, enables trafficable access of conventional road vehicles in emergency cases. Additionally, this panel system will support the installation of cable systems for communication and safety and the integration of pressurised water pipelines for producing high-pressure water fog for fire brigades. As a further target side-effect, the system will reduce noise significantly.

The panel system will be designed for broad and easy application: it will be fully compatible with all national European and even international track gauges. It will be easy to install and will be made available as an upgrading element for existing tunnels — according to the White Paper “European transport policy for 2010: time to decide” — and can also hypovigilance be installed in new tunnels, e.g. on high-speed rails, as the system will allow speeds up to 250 km/h. Openings in the panel elements will facilitate maintenance works on the track fastenings. For tamping or cleaning of the track basis, an easy straightforward temporary removal of the plates

will also be possible. CORPTUS will improve the consortium's small to medium-sized enterprise (SME) competitiveness through the strength of its transnational cooperation and the European- and even world-wide applicability of the resulting product. CORPTUS supports the recent agreement of the Council, of 28 March 2003, for the implementation of the second railway package, including the regulation of safety and the reduction of impacts of accidents and incidents on the Community's railways.

- 1 RISK ASSESSMENT INTERNATIONAL (AT)
- 2 ARBEIDS FORSKNINGSinSTITUTTET AS - THE WORK RESEARCH INSTITUTE (NO)
- 3 WOPFINGER BAUSTOFFINDUSTRIE GMBH (AT)
- 4 TECHNISCHE UNIVERSITÄT WIEN - VIENNA UNIVERSITY OF TECHNOLOGY (AT)
- 5 VYSOKÉ UCENÍ TECHNICKÉ V BRNĚ - BRNO UNIVERSITY OF TECHNOLOGY (CZ)
- 6 SWIETELSKY BAUGESELLSCHAFT M.B.H (AT)
- 7 MABA PREFABRIK SPOL.S.R.O (CZ)
- 8 COMPANIA NATIONALA CAI FERATE CFR S.A. (RO)
- 9 ÖSTERREICHISCHE BUNDESBAHNEN (AT)
- 10 HARTL GMBH (AT)
- 11 KOLINGLEIS GLEISBAU GMBH & CO.KG (DE)
- 12 CHLADEK & TINTERA A.S. (CZ)



**Contract: 508674**  
**Call: FP6-2002-SME-1**  
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**EC Contribution: € 579 886**

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# DRIVESAFE

## Development of 3-D Eye Tracking Device for Safer Driving and More Efficient Web-Page Production

An eye tracking device (ETD) facilitates the comprehensive measurement of eye movements (horizontal, vertical and torsional): it provides the basis for many types of vestibulo-oculomotor and visual research works, and can be adapted to locate gaze positions (i.e. the position on a computer screen or the point through a vehicle windshield that the eyes are looking at).

A consortium of three small to medium-sized enterprises (SMEs) active in the field of data acquisition on board vehicles (ONE-TOO) and in the field of advertisement optimisation on web pages (MINDMATICS and MULTIMEDIA) together with end-users for car and airplane transportation applications (SIEMENS AUTOMOTIVE, AIRBUS) have joined to develop a new, portable 3-D ETD system which is able to perform eye and gaze tracking, at very high sampling rates and within difficult environments. They rely on a group of three SMEs (Kayser Tredde, MEDIASCOPE, EURISCO) and a research organisation (INRIA), in order to develop this prototype ETD with features and benefits much beyond what is currently available, in order to answer the kinds of questions below.

- How do the eyes behave when the hypovigilance state of a road vehicle driver is observed?
- How do the eyes behave when the hypovigilance state of an aircraft pilot is observed? How can the cockpit best be designed for optimised pilot operation?
- How do the eyes behave in front of complex web-page screens presenting myriads of data to Web surfers?

This research project improves the Space Station eye tracking solution initially developed by KAYSER-TREDDE, and will position the performances of the new 3-D ETD with respect to some of the latest know-how gained by MEDIASCOPE, INRIA and EURISCO for gaze measurement and man-machine interface

optimisation. This project is in support of improved innovation in service companies (in the car and aerospace industry where there is a need to develop an understanding of driver or pilot hypovigilance at European level, in the marketing and communication industry where there is already considerable activity in the impact measurement of web pages on consumption behaviour). This project also supports transnational cooperation, where a space-based technology solution is going to be adapted and used in the car, aerospace and communication sectors, using the background experience of specialists in cognitive processes.

- 1 ONE TOO S.A. (FR)
- 2 EURISCO INTERNATIONAL (FR)
- 3 MEDIASCOPE GESELLSCHAFT FÜR LEDIEN-UND KOMMUNIKATIONSFORSCHUNG MBH (DE)
- 4 KAYSER-THREDE GMBH (DE)
- 5 AIRBUS SAS (FR)
- 6 SIEMENS VDO AUTOMOTIVE SAS (FR)
- 7 MULTIMEDIA LTD (RO)
- 8 PLAN B MEDIA GMBH (DE)
- 9 INCORDIA AB (SE)
- 10 AREA 17 AB (SE)
- 11 INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE (FR)

**Contract: 508280**  
**Call: FP6-2002-SME-1**  
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**Duration (months): 24**  
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**EC Contribution: € 973 908**

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Transport

# EXOCAT

## Novel Catalyst Converter for Treatment of Engine Exhaust Gases

526

Co-operative research

Diesel engines are widely used for on-road (trucks, vans) and non-road applications (agricultural tractors, compressors, bulldozers, off-road trucks, forklift trucks, etc.). Despite a number of advantages, diesel engines have a detrimental environmental downside: relatively high mono-nitrogen oxides (NOx) and particulate matter (soot) emissions, which prompted stringent vehicle emissions regulation, in Europe as well as Japan and the US.

Driven by large volumes, current technologies are mainly developed for on-road applications. Indeed, for certain non-road applications they might be technically infeasible or very expensive to use, and novel technologies are required to ensure that this diesel non-road mobile machinery is able to comply with environmental legislation. Without exception, the catalyst converters currently available make use of precious (expensive) metals like platinum (Pt), palladium (Pd) and rhodium (Rh). The aim of the EXOCAT project is to develop a novel catalyst converter for diesel non-road mobile machinery, based on non-precious metals, by applying air spray coating technology.

Technical objectives include:

- reduction of nitric oxide (NO), and to oxidise carbon monoxide (CO) and HCx;
- optimisation of the mixture of oxides;
- improvement of converter performance to Euro III/IV level;
- reduction of the light-off temperature to 100°C.

The work includes:

- selection and testing of prospective cobalt oxides;
- design of catalyst precursors with alloyed hydroxides, which need to include a mix of

metals (cobalt (Co), nickel (Ni), copper (Cu), etc.);

- selection and optimisation of thermal spraying and its parameters;
- characterisation of the substrate material and coatings by ageing tests on small lab-scale samples;
- prototypes of the catalytic block, with a scaled geometry, will be designed, manufactured and tested;
- furthermore, vehicle roller bench validation of a full-scale converter with new catalytic block prototype will be executed on a forklift truck.

Plans will be drawn up to commercially exploit the catalyst technology developed, identifying possible markets, pricing and distribution.

www.exocat.europarama.lt

- 1 NORTA UAB (LT)
- 2 ZREMBUD (PL)
- 3 MOKSLINIŲ PASLAUGŲ FIRMA GTV (LT)
- 4 METALLISATION LTD (UK)
- 5 BERSY S.R.L. UNIPERSONALE (IT)
- 6 EUROPARAMA UAB (LT)
- 7 FINN KATALYT LTD (FI)
- 8 CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS (ES)
- 9 KAUNO TECHNOLOGIJOS UNIVERSITETAS (LT)
- 10 CENTRO RICERCHE FIAT SOCIETÀ CONSORTILE PER AZIONI (IT)



FP6 Project Catalogue

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**Duration (months):** 27  
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**EC Contribution:** € 864 303

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# INTELLICON

## Intelligent DC/DC Converter for Fuel-Cell Road Vehicle

Current hybrid electric vehicle power trains feature onboard energy generation, energy storage and traction drive, where the battery used for energy storage is heavy or expensive, or both, and requires regular maintenance. The best practice is to use super-capacitors with batteries, reducing the deep charge-discharge cycle and battery size (and hence the weight and cost).

The Intellicon power train replaces batteries with a novel DC/DC converter (which is the project deliverable), as an interface between the fuel cell and traction systems and super-capacitors. Super-capacitors are lightweight high-power energy storage devices which have an operational life typically equal to that of the vehicle.

The DC/DC converter will monitor fuel cell operational safety and reliability through intelligent control that will allow super-capacitor voltage to vary within acceptable limits as the traction system accelerates and decelerates, whilst maintaining a steady optimised power flow from the fuel cell without risk.

The simple replacement of batteries by super-capacitors alone would result in system instability because the super-capacitors need to take charge until their maximum rated terminal voltage is reached.

The DC/DC converter will be lightweight with a small dimensional profile, and its unit cost will allow the new power train to be competitive against its more conventional battery counterpart. The key objectives of Intellicon are to reduce overall unit power train weight, unit cost and maintenance.

To achieve a high-power density, a high operating frequency is used, of approximately 200 kHz. To ensure high efficiency, modern soft-switching techniques will be employed in the power topology, coupled with state-of-the-art high-frequency magnetics.

This represents a substantial research challenge since these techniques are not normally applied

at such power levels, especially in weight-, space- and cost-critical applications. The system thermal management may also have water or oil cooling options.

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Co-operative research

- 1 HILTECH DEVELOPMENTS LTD (UK)
- 2 SLOAN ELECTRONICS LTD (UK)
- 3 IRD FUEL CELL AS (DK)
- 4 TRANS-ELECTRIC B.V. (NL)
- 5 RANSOMES JACOBSEN LTD (UK)
- 6 MAXWELL TECHNOLOGY S.A. (CH)
- 7 VRIJE UNIVERSITEIT BRUSSELS (BE)
- 8 UNIVERSITY OF MANCHESTER (UK)

[www.intellicon.info](http://www.intellicon.info)

**Contract: 512271**  
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Transport

This proposal addresses the need for integrated security sub-modules (constituting the suspension and steering module) in the car manufacturing industry. The final objective is to give small to medium-sized enterprises (SMEs) an advantageous approach to the modularisation requirements demanded in the sector today.

The sub-modules are made up of a steel structure and anchorage elements (rubber-metal or plastic-metal), which undergo separate surface treatments to prevent corrosion. Afterwards, the elements are traditionally joined by means of adhesives and screws.

This process presupposes a great number of stages, low-quality union methods and generation of corrosion nucleuses that shorten its useful life. This proposal would change this work methodology. The first point in its implementation would be the construction of the metallic structure in high-strength low-alloy steel (HSLA), instead of the traditional one, in order to profit from its safety performance and lower weight at affordable cost. Once this is done, the improvement proposed is based on the use of laser welding as joint method, a high-quality way to reduce anchorage points and to increase the resistance of the sub-module. Thus, it would achieve a completely integrated, lighter and reliable security sub-module.

The further surface treatment of the integrated piece will provide an unaltered coating. Overcoming the current need of assembly processes, which usually cause serious damages on the protective surface, will presuppose an improvement in the response against corrosion of the pieces. In order to be applied to the sub-module, the traditional treatment would have to be modified so as to respect the different natures of its elements, i.e., steel, rubber and thermoplastics. With regards to this aspect, the development of a treatment with lower required temperatures (up to a maximum of 100°C) is proposed, drawing particular attention to the removal of pollutant elements, such as chromium (VI) (Cr (VI)), zinc (Zn) and nickel (Ni), involved in traditional methods. This process would provide SME automotive suppliers with an additional

added value and cost reduction, allowing them an increase in competitiveness in a sector undergoing the transition from the traditional supply chain to a strategic value chain.

<http://project.idetra.com/issea>

- 1 PLASTICOS DUREX S.A. (ES)
- 2 TEKNIJA DEJ (ES)
- 3 TECNI SATA INDUSTRIA METALOMECANICA LDA (PT)
- 4 AUTOFORESE, PROTECCAO ANTI-CORROSIVA, LDA (PT)
- 5 POETON INDUSTRIES LTD (UK)
- 6 MICROMETRIC TECHNIQUES LTD (UK)
- 7 FUNDACIÓN PARA LA INVESTIGACIÓN Y DESARROLLO EN AUTOMOCIÓN (ES)
- 8 LULEA TEKNISKA UNIVERSITET (SE)
- 9 CENTRO SVILUPPO MATERIALI S.P.A. (IT)
- 10 INSTITUTO SUPERIOR TECNICO (PT)



**Contract:** 508097  
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**Duration (months):** 18  
**Total cost:** € 1 493 189  
**EC Contribution:** € 746 494

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# MAFFIX

## Completely Flexible and Reconfigurable Fixturing of Complex-Shaped Workpieces with Magnetorheological Fluids

In the components manufacturing sectors, many consider that fixturing is the last obstacle to truly flexible manufacturing operations. In fact, fixturing frequently constitutes a costly and time-consuming barrier to meeting the challenge of the shorter runs necessitated by more demanding consumers. Variety in product choice is what consumers seek and what manufacturers have to provide. When processing small batches of parts, it is very common that a dedicated rigid fixture does not turn out to be economically feasible. In these cases, the most widely used flexible fixtures are adjustable fixtures and modular fixtures.

The European aerospace sector is characterised by a small number of very large firms and a very large number of small to medium-sized enterprises (SMEs). Most of these SMEs belong to the third tier and produce machined parts and prototypes. These SMEs have important limitations for the application of adjustable or modular fixture to manufacturing of workpieces with complex curved surfaces or with multiple ribs and walls which must be held during manufacturing operations. Therefore, they design and manufacture customised fixtures for each workpiece that obviously are technically very complex and labour intensive and/or too expensive. Another important problem occurs during the material removal process in compliant (such as non-rigid "skin" type) workpieces or in those whose structure weakens while machining progresses. In these cases, the workpiece or particular weak zones of it are liable to deform and even break out. In recent years, the problems associated with conventional technology have invited research into novel, universal workholding techniques. Ice clamps, fluidised beds and RFPE with melting materials are approaches used to achieve such universal fixturing objectives, but thermal deformations associated with temperature changes and lack of clamping force have also confined them to particular components, operations and/or materials, consolidating them as flexible and reconfigurable alternatives, but definitely not universal ones.

This reflection, and previous knowledge and experience with rheological materials, has led the MAFFIX project consortium to propose the development of a new type of universal fixture based on magnetorheological (MR) fluids, a class of smart materials which can drastically, quickly and reversibly change their consistency in a magnetic field.

529

Co-operative research

- 1 FUNDACIÓN FATRONIK (ES)
- 2 SUBCONTRATACIÓN DE PROYECTOS AERONÁUTICOS S.A. (ES)
- 3 HIGHTECH ENGINEERING S.R.L. (IT)
- 4 ROEMHELD GMBH (DE)
- 5 TALLERES AIBE S.A. (ES)
- 6 AVIATION INSTITUTE BUCHAREST (RO)
- 7 FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG (DE)
- 8 UNIVERSITÄT DES SAARLANDES (SAARLAND UNIVERSITY) (DE)

www.fatronik.com

**Contract:** 32818  
**Call:** FP6-2004-SME-COOP  
**Starting Date:** 01/09/2006  
**Duration (months):** 24  
**Total cost:** € 1 787 521  
**EC Contribution:** € 1 037 261

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Transport

# Spotstir

## The Development of a Hand-Held Friction Stir Spot Welding Gun for Automotive Vehicle Body Repair

530

Co-operative research

Aluminium usage in automotive vehicle bodies within Europe is increasing, as is the use of high-strength steels. This increase is predominantly due to demands placed on manufacturers to reduce fuel consumption, reduce exhaust emissions and meet recyclability targets. It is expected that the use of aluminium in cars and light vehicles will increase by 7 % per year, up to 50 % by 2010, and that production volumes of high aluminium-content vehicles is expected to reach around 30 % of the total production volume in the EU in 2010. Common methods for joining aluminium panels in production include resistance spot welding, fusion welding and the use of rivets, clinching, adhesives, etc. There is a problem, however, that exists in the vehicle body repair sector, which is dominated by small to medium-sized enterprises (SMEs). This is associated with the repair of aluminium-bodied vehicles and also the repair of high-strength steel body panels. Current joining methods can be very expensive; for example, the Audi A8 is quoted as being 40 % more expensive to insure than its steel-bodied equivalents, for this reason.

There is an opportunity for the SME partners to develop technology in the areas of aluminium vehicle body and high-strength steel vehicle body repair that will be used in SME vehicle repair body shops. Friction stir spot welding (FSSW) is emerging as a very attractive joining method for aluminium vehicle bodies, with potential for high-strength steel too. It is a variant of the friction stir welding process and involves plunging a rotating tool into a lap joint, forging a spot weld and then retracting the tool. There are significant advantages of FSSW over more established joining methods — there is less power consumption, it produces an excellent joint, it is extremely fast when compared with mechanical methods, and it produces a homogenous joint suitable for recycling.

- 1 TWI LTD (UK)
- 2 HARMS & WENDE GMBH & CO. KG (DE)
- 3 PARAGON PRECISION ENGINEERING LTD (UK)
- 4 STANNER EQUIPMENT LTD. (UK)
- 5 PRVA ZVARACSKA A.S. (SK)
- 6 THYSSENKRUPP AUTOMOTIVE TALLENT CHASSIS LTD (UK)
- 7 STADCO LTD (UK)
- 8 THATCHAM (UK)
- 9 INSTYTUT SPAWALNICTWA (PL)
- 10 VYZKUMNY A ZKUSEBNI LETECKY USTAV A.S. (CZ)



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**Duration (months): 24**  
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# TRANSMAN

## A Product to Extend the Life of Energy Transmission and Distribution Transformers by Total Management of Insulation Systems

High voltage power transformers have a life of approximately 40 years. The majority of transformers in the power distribution network in Europe were installed in the 1960s and 1970s. These transformers are reaching the end of their life. Deregulation of the power industry, while benefiting consumers, has led to power companies becoming profit driven. Competition has led to lower energy prices which have led to reduced capital investment. The lack of money available has resulted in reduced maintenance activities which have resulted in the recently witnessed increases in occurrences of power blackouts in Europe and North America.

There is a quantifiable need to extend the life and improve the reliability of existing high-voltage transformer networks, thereby satisfying the European Directive for ensuring the security of power supply, and the desire for power utilities to maximise the financial return on their assets, thus improving the quality of life for society. Our solution will provide high-voltage transformer operators with an innovative product to manage transformer oil and/or insulation monitoring and treatment, which is the most influential factor in extending the life of transformers.

This proposal represents an opportunity for a large community of small to medium-sized enterprises (SMEs) across Europe to benefit from the deregulated European power industry by providing a fully featured innovative product currently unavailable in a EUR 1 200 million European marketplace. This industry has traditionally been dominated by large enterprises, but by adapting a range of technologies from complementary SME sectors we believe we have the partnership strength and capability, along with assistance from the Sixth Framework Programme's (FP6) specialist research and development providers, to offer an innovative solution to transformer insulation management, at an attractive cost to the power distribution companies. Based upon our market estimates of 60 000 distribution transformers in Europe and our expectation of 6 % market penetration, we will generate an extra EUR 72 million in revenue (assuming EUR 20 000 unit price),

creating 732 jobs (assuming an industry average of 1 job created per additional EUR 120 000 of revenue generated) and providing technology transfer to the wider SME community.

531

Co-operative research

- 1 KELMAN LTD (UK)
- 2 G.R.A.S SOUND & VIBRATION AS (DK)
- 3 BARCELONA SEMICONDUCTORS SL (ES)
- 4 ELECTRICIDAD INDUSTRIAL SALVIO BUSQUETS S.A. (ES)
- 5 MINERWA UMWELTECHNIK GMBH (AT)
- 6 OPTILAN UK LTD (UK)
- 7 INSTYTUT ENERGETYKI (PL)
- 8 ESBI ENGINEERING & FACILITY MANAGEMENT LTD (IE)
- 9 PERA INNOVATION LTD (UK)
- 10 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. (DE)
- 11 SEMELAB PLC (UK)

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**Duration (months): 24**  
**Total cost: € 1 578 878**  
**EC Contribution: € 817 798**

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Transport

# U-RAIL

## Non-Contact Ultrasonic System for Rail Track Inspection

532

Co-operative research

Periodic in-track rail inspections are performed to detect critical defects before they develop enough to cause structural failure. Non-destructive inspection (NDI) technologies currently used worldwide rely mainly on conventional ultrasonic technologies. These use water-filled rubber wheels, containing transmitter-receiver piezoelectric transducers, that are kept in continuous contact with the rail-running surface.

These methods have limitations, as they require contact conditions between the inspection probes and the surface of the rail track. Although such contact ultrasonic methodologies have been extensively and successfully used in detecting many surface-breaking and internal cracks, and have been proved to be reliable, they are not perfect. In fact, train derailments caused by broken rails, which pass inspection, still occur. Defect detectability may be affected by rail surface condition, railhead geometry, defect geometry and orientation, electrical and/or mechanical noise introduced into the transducer, and inadequate transducer-to-rail surface coupling. Moreover, inspection speeds are very low, to maintain constant coupling between the two parts.

In an effort to improve rail track inspections, this project proposes a non-contact ultrasonic system for periodic in-field inspections of rail tracks that has recognised advantages over conventional technologies currently available to the railroad industry. In particular, the system, consisting of a pulsed laser and an air-coupled transducer, has the following advantages:

1. flexibility to discover cracks that are not detectable with methods currently available to the railroad industry;
2. the inspection is non-contact and remote;
3. presence of oxides or oil on the rail surface enhances laser generation;
4. inspection speed can be higher than with contact methods.

The feasibility study, the development and the manufacture of a prototype will prove the capability of the proposed inspection technique for in-track rail flaw detection.

- 1 TECNOGAMMA S.A.S. (IT)
- 2 PADOVA RICERCHE SPA (IT)
- 3 JENAER MESSTECHNIK GMBH (DE)
- 4 UNIVERSITA DEGLI STUDI DI PALERMO (IT)
- 5 UNIVERSITE DE LIEGE (BE)
- 6 REGIE AUTONOME DES TRANSPORTS PARISIENS (FR)
- 7 ENTE PER LE NUOVE TECNOLOGIE, L' ENERGIA E L'AMBIENTE (IT)
- 8 RETE FERROVIARIA ITALIANA (IT)
- 9 ATTIKO METRO OPERATION COMPANY S.A. (GR)
- 10 EUROTUNNEL GROUP LTD (UK)
- 11 CM4 INGINIERIA S.A. (ES)
- 12 QUANTEL (FR)

**Contract:** 507622  
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**Starting Date:** 01/11/2004  
**Duration (months):** 27  
**Total cost:** € 1 524 776  
**EC Contribution:** € 1 044 428

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# WEATHER

## Wind Early-Alarm System for Terrestrial Transport Handling Evaluation of Risks

Over the years, the effects of high winds on road and rail vehicles have become of increasing concern to transportation system operators. Cars, high-sided lorries and trains can be at risk of a wind-induced accident on exposed sites such as embankments or long span bridges.

The objective of the Craft "WEATHER" is to develop an innovative wind alarm system for terrestrial transportation, which will enable risk evaluation. The WEATHER system will predict both the wind and the risk for a road transportation vehicle, taking into account the real-ground configuration. The aim of the project is to improve the safety of ground vehicles, specifically rail and road vehicles when exposed to strong high winds.

WEATHER's expected innovative achievements are the following.

- To elaborate spatial-time wind models (including prediction models) in compliance with the needs of wind alarm systems (Work Package 1). The expected gain towards current methods is to reduce by a factor two, the uncertainty on the predicted wind speed.
- To develop robust methods to get cross-wind forces on vehicles (wind-tunnel, CFD, field measurements) and acquire a database used in the Wind Alarm System (Work Package 2). The criteria of success will be provided by a comparison between the field experiment and the computations or wind tunnel studies.
- To develop innovative methods to assess the risk of wind-induced accidents of rail and road vehicles occurring at exposed sites (Work Package 3). Publication of the proposed methods in scientific journals shall assure the control and acceptance of the scientists' community.
- To implement these methods and to assist WEATHER small to medium-sized enterprises

(SMEs) in the development of the proposed wind alarm systems for terrestrial transport (Work Package 4). The operational character of the several prototypes developed will be tested in real working conditions. A comparison between prototypes will be conducted (on operational character, availability, price, etc.).

The overall objective of WEATHER's proposed wind alarm system is for a class of vehicle to predict the wind-induced risk, better than a factor five.

WEATHER's SMEs decided to collaborate and share their complementary know-how and knowledge from the perspective of the subsequent mutual benefit of promising commercial opportunity. The WEATHER Craft project required the involvement of SMEs from four Member States (France, Italy, Spain and the United Kingdom), two other partners from two Member States (France and Spain) and three research and technological development (RTD) performers from two Member States (the United Kingdom and Italy).

- 1 METEODYN (FR)
- 2 AUTOMATIC & TELEMETRIC METEOROLOGICAL OBSERVING SYSTEMS (FR)
- 3 ETUDES ET MAINTENANCE INDUSTRIELLE (FR)
- 4 NUBILA S.A.S. DI ANNA PRODI E C. (IT)
- 5 GEONICA S.A. (ES)
- 6 CAMPBELL SCIENTIFIC LTD (UK)
- 7 ALSTOM TRANSPORT S.A. (FR)
- 8 LECIÑENA S.A. (ES)
- 9 UNIVERSITY OF BIRMINGHAM (UK)
- 10 UNIVERSITY OF NOTTINGHAM (UK)

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**Total cost: € 1 506 620**  
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Transport





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