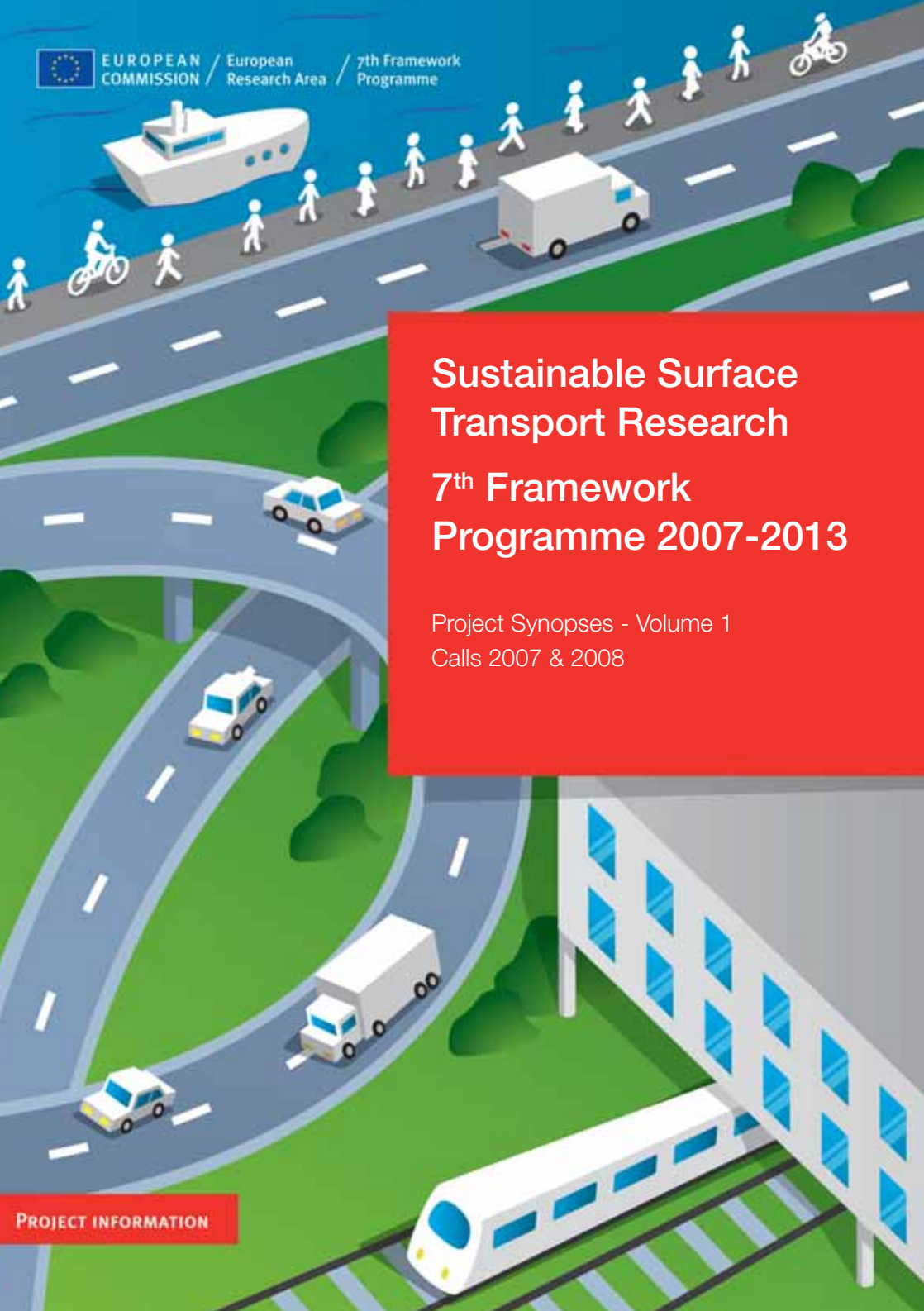




EUROPEAN
COMMISSION

European
Research Area

7th Framework
Programme

A stylized, isometric illustration of a sustainable transport system. It features a multi-lane road with a dedicated lane for a white delivery truck. Pedestrians are shown walking on a sidewalk and crossing the road. A cyclist is riding on a path. A white car is driving on the road. In the background, a large white ship is on the water. A modern white building with blue windows is on the right. A white train is on a track in the foreground. The scene is set against a blue sky and green grass.

Sustainable Surface Transport Research

7th Framework Programme 2007-2013

Project Synopses - Volume 1
Calls 2007 & 2008

PROJECT INFORMATION

EUROPEAN COMMISSION

Directorate-General for Research

Directorate H - Transport

Unit H2 - Surface Transport

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European Commission

Office CDMA 04/187

B-1049 Brussels

Sustainable Surface Transport Research 7th Framework Programme 2007-2013

Project Synopses - Volume 1

Calls 2007 & 2008

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Efficient transport is one of the cornerstones of sustainable wealth and prosperity in Europe. Our transport systems compare well with those of other developed regions of the world, providing

essential resources and means of mobility, while driving employment, economic growth and global exports. In addition, transport-related technological advances stimulate and accelerate knowledge acquisition, innovation and European integration.

Surface transport, including road, rail and waterborne modes, represents 11% of GDP and provides 16 million jobs in Europe. At the same time, serious challenges can be created when transport grows in an unsustainable way.

In terms of the environment, the impact of transport systems on climate change and the pollution of air, water resources and soil must be minimised to protect public health and biodiversity. Transport accounts for 30% of the total energy consumption in Europe and the vast majority of that consumption (98%) is derived from fossil fuels – in particular from oil.

The recent enlargement of the EU has raised the total population of the Union by 27%, while the land surface is some 34% larger. People and goods need access to mobility across Europe to ensure economic development and free movement of resources.

The competitive advantages of our transport industries need to be ensured and enhanced. And, of course, transport is an important factor in many international agreements and key policies, including trade, competition, employment, cohesion, security, maritime and internal market policies, as well as the Kyoto Agreement and its successors.

Finally, the toll in human lives and suffering due to transport-related accidents is still woefully high, and citizens rightfully feel that they deserve safer means of mobility.

Meeting these challenges requires sustained and innovative responses. The White Paper on Transport *'European Transport Policy for 2010: Time to decide'* (COM (2001) 370 final) and its mid-term review *'Keep Europe Moving – sustainable mobility for our continent'* (COM (2006) 314 final) set out the objectives that should be addressed at a pan-European level. Research priorities for FP7 are based on these objectives and are also aimed at supporting industrial competitiveness.

The overarching objective for European research policy is the creation of an open and competitive European Research Area (ERA). The 'common vision' for ERA in 2020, adopted in 2008, calls for concrete actions, clearly orientated towards the free circulation of researchers, knowledge and technology within a European internal market for research.

The largest part of the FP7 budget is dedicated to the 'Co-operation' programme (more than €32 billion over seven years). Within that, the 'Transport' theme receives the third largest share, with a total budget of €4.16 billion. This represents a 60% increase per year compared to the Sixth Framework Programme (FP6) for transport research.

This book provides you with a concise overview of the projects selected for funding under the first two FP7 Calls for Proposals in the area of Sustainable Surface Transport. While the budget allocated to these important projects is substantial, we hope and expect that the value of the results they achieve will be much greater.

András Siegler
Director, Directorate Transport (RTD- H)
Directorate-General Research (RTD)

The Sustainable Surface Transport Unit of the Directorate-General for Research is pleased to provide you with a short description of more than 134 projects funded in the first two Calls for Proposals of the Seventh Framework Programme in the field of Sustainable Surface Transport.

The book starts with an introduction that gives an overview of the Sustainable Surface Transport sector, the FP7 instruments, and some information on the European Technology Platforms (ETPs), the Joint Technology Initiatives (JTIs) and the European Green Cars Initiative.

For each project you will find a short description of the state of the art, the objectives, the work planned during the project and the expected results. The contact details of the project coordinator and the partnership are also provided. We hope that this information will be helpful to research policy-makers, project proposers who are looking to achieve an exhaustive state of the art, and stakeholders in the research community who want to identify ongoing research projects of interest to them or to identify potential partners for future collaboration.

The research projects are grouped by the activities of the Work Programme:

- The Greening of Surface Transport
- Encouraging Modal Shift and Decongesting Transport Corridors
- Ensuring Sustainable Urban Mobility
- Improving Safety and Security
- Strengthening Competitiveness
- Cross-cutting Activities for Implementation of the Sub-theme Programme

At the end of the book, indexes by acronyms, partners and instruments are also provided. Contact details of the National Contact Points, whose role is to relay the information on the Seventh Framework Programme in the European Union Member States, are also given. Finally, contact details of the people involved in the following up the projects in the European Commission are also provided.

As the editor of this publication, and on behalf of all my colleagues in the Sustainable Surface Transport Unit, I wish you fruitful co-operation under the Seventh Framework Programme.

The Editor



Frederic Sgarbi

Table of contents

Introduction	9
Index by Activities	13
Description of Projects Classified by Activities	21
The Greening of Surface Transport	23
Encouraging Modal Shift and Decongesting Transport Corridors	123
Ensuring Sustainable Urban Mobility	149
Improving Safety and Security	215
Strengthening Competitiveness	357
Cross-cutting Activities for Implementation of the Sub-theme Programme	409
Index by Acronyms	455
Index by Instruments	463
Index by Partners	471
List of National Contact Points	511
European Commission Staff Contact List	519

European Surface Transport Research under the Seventh Framework Programme

Transport is a key component of the European economy and society; it is an important industrial sector in its own right, while allowing millions of Europeans to get to their jobs every day, and permitting goods to hit supermarket shelves. The automotive sector alone provides 1.9 million direct jobs and a further 10 million indirect jobs in Europe, and accounts for 3% of EU GDP.

The increasing demand for mobility remains a major challenge. Rising levels of traffic bring increased safety and health concerns. The environment suffers from transport activities, with CO₂ emissions now having a real impact on climate change. Meeting transport challenges requires radical solutions, highlighting the essential role of research.

Transport – a critical industry

Surface transport encompasses road, rail, and waterborne transport modes, each of which plays an important part in the daily lives of European citizens. The surface transport industries are central to the economy, supporting competitiveness and employment:

- The road transport industry provides jobs for more than 14 million people and contributes 11% of European GDP.
- Maritime transport accounts for 90% of EU external trade. European shipbuilders have an annual turnover of €20 billion and employ some 350 000 people.
- Europe produces 60% of the world's railway rolling stock, employing 250 000 people and creating an annual turnover of €20 billion. Rail operators employ 1 million people and account for €75 billion in turnover per year.

Tough challenges ahead

Under the Seventh Research Framework Programme (FP7), current EU research and

development in surface transport is aimed at a number of strategic objectives, including:

- Reducing the **environmental impact** of transport, including harmful emissions and noise
- Improving the **safety and security** of transport operations and services
- Increasing the **mobility** of people and goods while achieving better balance among the transport modes
- Improving the **competitiveness** of the European surface transport industries, including manufacturers and operators.

Ongoing commitment to the ERA

The underlying concepts of the European Research Area (ERA) are co-operation, sharing and exchange. There are still barriers to overcome in order to create an open space for research in Europe. Such barriers include, for example, linguistic, administrative and cultural differences.

The ERA initiative combines three complementary goals:

- The creation of an 'internal market' in research, an area of free movement of researchers, technology and knowledge, with the aim of increasing co-operation, stimulating competition and achieving a better allocation of resources
- A restructuring of the European research fabric, in particular by improved coordination of national research activities and policies, which account for most of the research carried out and financed in Europe
- The development of a comprehensive European research policy, addressing not only the funding of research activities, but also taking into account all relevant aspects of other EU and national policies.

The pooling of dispersed resources and expertise will allow the undertaking of more important and potentially more beneficial research programmes. Improved information exchange and coordination will help to eliminate redundancy, increasing efficiency and confidence. Ultimately, the ERA will provide increased coherence and greater force for European research.

FP7 Research instruments

Over the course of seven years (2007-2013), FP7 will put **€4.16 billion** towards the development of **safer, greener and smarter** pan-European transport systems that will benefit all citizens, help preserve the environment and increase the competitiveness of European industries in the global market. FP7 makes available a number of instruments for implementing research on selected priority themes, including Sustainable Surface Transport.

Collaborative projects

Collaborative projects are focused research projects with clearly defined scientific and technological objectives and specific expected results, such as developing new knowledge or technology to improve European competitiveness. They are carried out by consortia made up of participants from different countries, and from industry and academia.

Coordination and support actions

These are actions that cover not the research itself, but the coordination and networking of projects, programmes and policies.

This includes, for example:

- Coordination and networking activities, dissemination and use of knowledge
- Studies or expert groups assisting the implementation of the FP
- Support for transnational access to major research infrastructures
- Actions to stimulate the participation of SMEs, civil society and their networks
- Support for co-operation with other European research schemes (e.g. 'frontier research').

New FP7 instruments and approaches

European Technology Platforms (ETPs)

ETPs provide a framework for stakeholders, led by industry, to define research and development priorities, timeframes and action plans on a number of strategically important issues. ETPs make important contributions towards achieving Europe's future growth, competitiveness and sustainability objectives, all of which depend on major research and technological advances in the medium to long term. There are three technology platforms which support the SST programme: ERTRAC (European Road Transport Research Advisory Council), ERRAC (European Rail Research Advisory Council) and WATERBORNE TP.

Joint Technology Initiatives (JTIs)

JTIs are an entirely new mechanism for performing research at EU level, comprising long-term Public-Private Partnerships managed within dedicated structures enabling the necessary leadership and coordination to support large-scale multinational research activities. The JTIs are focussed on areas of major interest to European industrial competitiveness and issues of high societal relevance.

Sustainable Surface Transport Research under FP7

Sustainable Surface Transport priorities are aimed at solving problems from an all-encompassing and global perspective. Research efforts focus on the development of new products and systems that are safer and more environmentally friendly, but also address the key problem of clean and cost-efficient industrial processes, for the production, inspection, maintenance and recycling of vehicles, vessels and transport infrastructure.

Research priorities include the development of systems and technologies for more efficient interfacing between transport modes and the development of new approaches to improve rail interoperability. Finally, the integration of 'smarter' information and communications technologies is of importance in the optimisation of safety and infrastructure capacity.

What is being funded?

'Sustainable Surface Transport' includes three modes:

1. Road transport- Funding priorities are:

- Creating 'greener' road transport
- Encouraging modal shift and decongesting transport corridors
- Ensuring sustainable urban mobility
- Improving safety and security
- Strengthening competitiveness

2. Rail transport- Funding priorities are:

- Interoperability
- Intelligent mobility
- Safety and security
- Environment
- Innovative materials and production methods.

3. Waterborne transport - Funding priorities are:

- Safe, sustainable and efficient waterborne operations
- A competitive European maritime industry
- Managing and facilitating growth and changing trade patterns.

In addition, research on **Multimodal transport** seeks the more efficient use and greater integration of all transport modes.

Looking to the future – European Green Cars

The European Green Cars Initiative was launched in response to two major concerns. First, with the European car industry a major employer, any disturbance, including the recent global economic downturn, risks affecting the entire economic and social fabric of Europe. This is why the European Commission made the car industry a key focus of its 2008 recovery package.

At the same time, today's environmental imperatives mean that all road transport stakeholders need to be encouraged to move towards more sustainable transport.

The European Green Cars Initiative provides financial support to research into the green technologies that will propel our cars, trucks and buses in the near future – spending on research today to meet the demands of tomorrow. Funding schemes include grants from the European Commission's scientific research budget, and loans from the European Investment Bank.

Index by Activities

The Greening of Surface Transport

2020 INTERFACE	Tailoring of Tribological Interfaces for Clean and Energy-Efficient Diesel and Gasoline Power Trains	23
ARGOMARINE	Automatic Oil-Spill Recognition and Geopositioning Integrated in a Marine Monitoring Network	26
BB GREEN	Battery powered Boats - Greening, Reduced resistance, Electric, Efficient and Novel	29
BEAUTY	Bio-Ethanol engine for Advanced Urban Transport by light commercial vehicle and heavy duty	32
CLEANER-D	Clean European Rail - Diesel	35
CO2NTROL	Integrated Solutions for Noise and Vibration Control in Vehicles	38
DIRECT-MAT	DISmantling and RECYcling Techniques for road MATerials - Sharing knowledge and practices	41
DIVEST	DISmantling of Vessels with Enhanced Safety and Technology	44
ECOQUEST	Efficient Cooling systems for Quieter Surface Transport	47
EE-VERT	Energy Efficient Vehicles for Road Transport	50
EU-CARGOXPRESS	Greening of Surface Transport through an Innovative and Competitive CARGO-VESSEL Concept Connecting Marine and Fluvial Intermodal Ports.	53
EURECOMP	Recycling thermoset composites of Sustainable Surface Transport	57
HEATRECAR	Reduced energy consumption by massive thermoelectric waste-heat recovery in light duty trucks	60
HELIOS	High Energy Lithium-Ion Storage Solutions	63
HERCULES-B	Higher efficiency engine with ultra-low emissions for ships	66
HOSANNA	Holistic and sustainable abatement of noise by optimized combinations of natural and artificial means	69
HOVERSPILL	Multi-environment air cushion oil spill fast response and post-emergency remediation system	72
HYMAR	High efficiency hybrid drive trains for small and medium-sized marine craft	75
INFRAGUIDER	Infrastructure guidelines for environmental railway performance	79

INGAS	Integrated gas powertrain - Low-emission, CO ₂ -optimised and efficient CNG engines for passenger cars and light duty vehicles	82
KITVES	Airfoil-based solution for vessel onboard energy production destined to traction and auxiliary services	86
LESSCCV	Large-Eddy and System Simulation to predict Cyclic Combustion Variability in gasoline engines	89
POSE²IDON	Power Optimised Ship for Environment with Electric Innovative Designs ON board	92
POWERFUL	POWERtrain for FUTURE Light-duty vehicles	96
QUIESST	Quietening the Environment for a Sustainable Surface Transport	99
RE-ROAD	Re-road – End of Life Strategies of Asphalt Pavements	102
SARTRE	Safe Road Trains for the Environment; Developing strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety and comfort benefits	106
SILENV	Ships oriented Innovative soLutions to rEduce Noise & Vibrations	109
STORAGE	Composite Structural Power Storage for Hybrid Vehicles	112
STREAMLINE	Strategic Research For Innovative Marine Propulsion Concepts	115
TIFFE	Thermal SystemsIntegration for Fuel Economy	118

Encouraging Modal Shift and Decongesting Transport Corridors

AEROTRAIN	Aerodynamics: Total Regulatory Acceptance for the Interoperable Network	123
DYNOTRAIN	Railway vehicle dynamics and track interactions: Total regulatory acceptance for the interoperable network	127
EIRAC II	EIRAC 2008-2010	131
INTEGRITY	Intermodal global door-to-door container supply chain visibility	134
PANTOTRAIN	PANTOgraph and catenary interaction: Total Regulatory Acceptance for the Interoperable Network	137
SMART-CM	SMART Container Chain Management	141
TelliBox	Intelligent MegaSwapBoxes for advanced intermodal freight transport	145

Ensuring Sustainable Urban Mobility

ACCESS 2 ALL	Mobility schemes ensuring accessibility of public transport for all users	149
BIKE INTERMODAL	THE INTERMODAL BIKE - Multi-modal integration of cycling mobility through product and process innovations in bicycle design.	152
CATS	City Alternative Transport System	156
CITYHUSH	Acoustically Green Road Vehicles and City Areas	159
CITYLOG	Sustainability and Efficiency of City Logistics	162
CITYMOVE	CITY Multi-role Optimized VEHICLE	165
CITYNETMOBIL	City Network for Fair Mobility	168
CONDUITS	Coordination Of Network Descriptors for Urban Intelligent Transportation Systems	171
DELTA	Concerted coordination for the promotion of efficient multimodal interfaces	174
EBSF	European Bus System of the Future	177
HCV	Hybrid Commercial Vehicle	181
I-TOUR	i-TOUR: intelligent Transport system for Optimized Urban trips	184
MEDIATE	METHodology for Describing the Accessibility of Transport in Europe	187
MODSAFE	Modular Urban Transport Safety and Security Analysis	190
NICHES+	New and Innovative Concepts for Helping European transport Sustainability - Towards implementation	193
PICAV	Personal Intelligent City Accessible Vehicle System	196
PUBTRANS4ALL	Public Transportation - Accessibility for All	199
STADIUM	Smart Transport Applications Designed for Large Events with Impacts on Urban Mobility	202
TRANS-AFRICA	Promoting Public Transport in Africa	205
TURBLOG_WW	Transferability of urban logistic concepts and practices from a worldwide perspective	208
VIAJEO	International Demonstrations of Platform for Transport Planning and Travel Information	211

Improving Safety and Security

2-BE-SAFE	2-Wheeler Behaviour and Safety	215
ADSEAT	Adaptive Seat to Reduce Neck Injuries for Female and Male Occupants	219
ADVISE	Advanced Dynamic Validations using Integrated Simulation and Experimentation	222
ALARP	A railway automatic track warning system based on distributed personal mobile terminals	225
ASPIS	Autonomous Surveillance in Public transport Infrastructure Systems	228
ASSESS	Assessment of Integrated Vehicle Safety Systems for Improved Vehicle Safety	231
ASSET-Road	ASSET advanced safety and driver support for essential road transport	234
CASPER	Child Advanced Safety Project for European Roads	238
CORFAT	Cost-effective Corrosion and Fatigue Monitoring for Transport Products	240
COVER	Coordination of Vehicle and Road safety initiatives	243
DHErgo	Digital Humans for Ergonomic designs of products	246
EPOCH	Enabling Protection for Older Children	250
ESTEEM	Enhancing Safety and security aspects in Transport rEsearch in the Euro-Mediterranean region	253
EXTREME SEAS	Design for Ship Safety in Extreme Seas	256
FIMCAR	Frontal Impact and Compatibility Assessment Research	259
FIREPROOF	Probabilistic framework for onboard fire-safety	263
FLOODSTAND	Integrated flooding control and standard for stability and crises management	266
GOALDS	GOAL Based Damage Stability	270
HORIZON	Research into Effects on Cognitive Performance of Maritime Watch-keepers under Different Watch Patterns, Workloads & Conditions, with Reality Usage of Ships Bridge, Engine & Cargo Control Simulators	273
IMVITER	Implementation of Virtual Testing in Safety Regulations	277
INESS	INtegrated European Signalling System	281

INTERACTION	Differences and similarities in driver INTERACTION with in-vehicle technologies	285
INTERAIL	Development of a Novel Integrated Inspection System for the Accurate Evaluation of the Structural Integrity of Rail Tracks	289
ISi-PADAS	Integrated human modelling and Simulation to support human error risk analysis of Partially Autonomous Driver Assistance Systems	293
ITERATE	IT for Error Remediation And Trapping Emergencies	296
MINOAS	Marine Inspection Robotic Assistant System	299
PROLOGUE	Promoting Real Life Observations for Gaining Understanding of Road Behaviour in Europe	302
SAFEGUARD	Ship evacuation data and scenarios	305
SAFER BRAIN	Innovative Guidelines and Tools for Vulnerable Road Users Safety in India and Brazil	308
SAFERAIL	Development of Novel Inspection Systems for Railway Wheelsets	312
SAFETRIP	Satellite Application For Emergency Handling, Traffic Alerts, Road safety and Incident Prevention	315
SAFEWAY2SCHOOL	Integrated System for Safe Transportation of Children to School	318
SAFEWIN	Safety of winter navigation in dynamic ice	320
SAVE ME	System and Actions for VEHICLES and transportation hubs to support disaster Mitigation and Evacuation	323
SECUREMETRO	Inherently secure blast resistant and fire safe metro vehicles	326
SKIDSAFE	Enhanced Driver Safety due to Improved Skid Resistance	329
SMART RRS	Innovative Concepts for Smart Road Restraint Systems to Provide Greater Safety for Vulnerable Road Users	332
SUSY	Surfacing System for Ship Recovery	336
THOMO	Development of a Finite Element Model of the Human Thorax and Upper Extremities	339
THORAX	Thoracic Injury Assessment for Improved Vehicle Safety	342
TRANSFEU	Transport fire safety engineering in the European Union	345
TULCS	Tools for Ultra Large Container Ships	349
TYROSAFE	Tyre and Road Surface Optimisation for Skid Resistance and Further Effects	352

Strengthening Competitiveness

ARIADNA	Maritime Assisted Volumetric Navigation System	357
BESST	Breakthrough in European Ship and Shipbuilding Technologies	360
CASMARE	Coordination Action to Maintain and Further Develop a Sustainable Maritime Research in Europe	364
CO-PATCH	Composite Patch Repair for Marine and Civil Engineering Infrastructure Applications	367
ComPair	Continuous health monitoring and non-destructive assessment of composites and composite repairs on surface transport applications	370
ENABLE	Stimulate Sustainable Freight Transport Systems with Latin American countries	373
ERRAC-ROADMAP	ERRAC Road Map	376
EXCITING	Exact Geometry Simulation for Optimized Design of Vehicles and Vessels	378
FLOWHEAD	Fluid Optimisation Workflows for Highly Effective Automotive Development processes	381
IceWin	Innovative Icebreaking Concepts for Winter Navigation	384
MID-MOD	Mid-frequency vibro-acoustic modelling tools / Innovative CAE methodologies to strengthen European competitiveness	387
MoDe	Maintenance on Demand	390
NAVTRONIC	Navigational system for efficient maritime transport	393
PMnIDEA	Predictive Maintenance Employing Non-intrusive Inspection & Data Analysis	395
PROMARC	Promoting Marine Research Careers	399
RISPECT	Risk-based expert system for through-life ship structural inspection and maintenance and new-build ship structural design	402
VISIONS-OLYMPICS	The next generation of products and procedures for vessels and floating structures	405

Cross-cutting Activities for Implementation of the Sub-theme Programme

B2B LOCO	Baltic - To - Balkan Network for LOGistics COmpetence	409
CETRRRA	Actions to Stimulate Participation of Cooperation Partners in Surface Transport Research	413
EMAR2RES	Support Action to initiate cooperation between the Communities of European MARine and MARitime REsearch and Science	417
FUTURAIL	Job opportunities for the railway community of tomorrow	419
MARPOS	MARitime POLicy Support	422
PRESS4TRANSPORT	Virtual Press Office to Improve EU Sustainable Surface Transport research Media Visibility on a National and Regional Level	425
SAFIER	Support Action for Implementation of ERTRAC's Road Transport Research Priorities	428
SIMBA II	Strengthening Road Transport Research Cooperation between Europe and Emerging International Markets II	431
SKILLRAIL	Education and Training Actions for high skilled job opportunities in the railway sector	434
SMART	Services for SMEs in collAborative tRansporT research projects	437
Star-net Transport	European Network to support the sustainable surface transport SMEs	440
TECH-CLINIC SST	Setting-up of Effective Technological Clinics to Address Real Knowledge Needs of Surface Transport Industry	443
TRANSBONUS	Transport EU-Western Balkan Network for Training, Support and Promotion of Cooperation in FP7 research activities	446
YEAR	Young European Arena of Research	449
YEAR-2010	Young European Arena of Research - 2010	452



2020 INTERFACE

Tailoring of Tribological Interfaces for Clean and Energy-Efficient Diesel and Gasoline Power Trains

State of the art - Background

Lubrication is critical to the efficient operation of the powertrain which refers to the group of components that generate power and deliver it to the road surface. Durability and friction control are currently delivered from a complex package of lubricant additives in fully formulated engine oil. These oil additives, through the interaction in a tribochemical sense with the surface, produce nanostructured composite, self-healing and smart tribofilms at the surface. It is these produced layers that give the functionality, namely durability and fuel economy. To date, virtually no functionality of the surface or design of the interface is considered when lubrication optimisation is sought and for this reason it is postulated that the lubricant/surface "system" is not optimised.

The project concept is underpinned by the need to reduce reliance on lubricant additives, which are harmful to catalytic converters and thus shift more of the emphasis towards a "systems approach" where innovative interface design can deliver the green and fuel efficient performance sought by the major Original Equipment Manufacturers (OEMs).

Objectives

The objectives are:

- To summarize the understanding of interfacial reactions and processes occurring at tribological interfaces between conventional materials and current lubricants and consolidate it to potential "use" in "new optimised powertrain systems".
- To select and define the required DLC coatings fundamental structure-property relationships in combination with the lubricant components, which will facilitate the development and "design" of interfaces, and will

provide ultra low friction, enhanced durability and clean powertrain operation.

- To understand the interfacial mechanics, reaction kinetics and durability to enable a new approach to interface design.
- To develop a "system" for which the laboratory and industrial scale testing indicates clearly that the ERTRAC 2020 Vision for fuel reduction is achievable.

Description of Work

The work plan is split into five basic steps to cover the experimental, theoretical, validation and management aspects of the programme and to address the grand challenge set out in the 2020 Vision. These are as described below:

- A number of existing coating systems will be thoroughly checked from their properties and their published data to select an adequate reference against which benefits of the new system can be measured. Lubricants compatible with environmental legislation will be chosen (WP1).
- Combining theoretical and experimental prior art the design requirements for the optimum powertrain interface are defined in terms of the mechanical and chemical nature of the produced tribofilm (WP2).
- Coating production is considered and in particular a variation of properties as a function of system (PACVD or PVD) and as a function of dopant, hydrogen content etc (WP3, WP5).
- Tribology testing and tribofilm evaluation for selected powertrain components provide the link to the interface design - the resulting tribofilm being the component for which an optimum design is sought (WP4).
- The results are validated with full scale testing of the powertrain "system" for improvements in fuel economy and durability (WP6).

- Project Management and Exploitation have dedicated work packages (WP7, 8 & 9).

Expected Results

The impact will be improved fuel economy and durability to align with current OEM targets and fulfilling the longer term legislation as lubricant additives must become greener. Novel materials, in the form of nanostructured nanometre thick reaction tribofilms, will be produced, tested and validated.

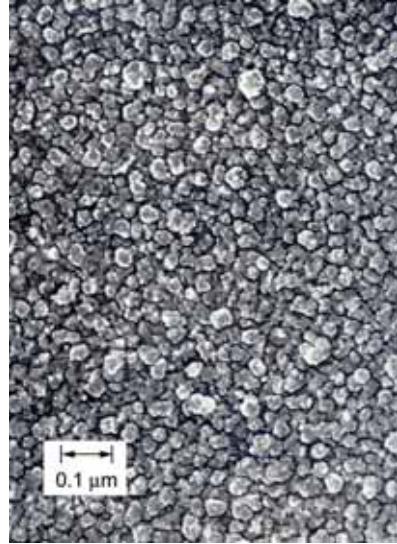
The successful execution of the project will push forward frontiers in science and engineering but will also have impact on societal and environmental agendas.

The major technical and scientific impact will be from

- The successful design of novel, smart, adaptive and functionally-graded reaction films (tribofilms) formed from a series of interfacial reactions between a functional DLC and a new generation (CHON) lubricants
- The development of a set of design criteria for a nanostructured thin film (tribofilm reaction film) as a result of tribological reactions
- The successful use of multivariate analyses to properly define the effects of each parameter on the characteristics of the tribofilm – culminating in structure/property relationships for a system never yet studied in such a systematic manner.

The main environmental impact will be derived from the:

- Reduction in fuel consumption as the tribofilm design is optimized to achieve the target Stribeck curve.
- Reduction in wastage of material and hence replacement of engine components as the systems are optimized for durability.
- Use of next generation lubricants with S, P and Zn free ashless properties.



Acronym:	2020 INTERFACE	
Name of proposal:	Tailoring of Tribological Interfaces for Clean and Energy-Efficient Diesel and Gasoline Power Trains	
Contract number:	234324	
Instrument:	CF – FP	
Total cost:	3 867 411 €	
EU contribution:	2 591 690 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.12.2009	
Ending date:	30.11.2012	
Duration:	36 months	
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	Josef Stefan Institute	SI
	Bekaert Advanced Coatings NV	BE
	Lubrizol Ltd	UK
	Volvo Technology AB	SE
	SKF Research and Development Company B.V.	NL

ARGOMARINE

Automatic Oil-Spill Recognition and Geopositioning Integrated in a Marine Monitoring Network

State of the art - Background

According to the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC, 2002), 360-370 million tons of oil and refined products are transported every year across the Mediterranean Sea, representing 20-25% of the world total. Maritime traffic in the Mediterranean is characterized by the existence of a large number of ports in the region (over 300), and by a significant volume of traffic which transits the Mediterranean, without ships entering any of these ports. The East Mediterranean Sea is a high-risk area for pollution as the Black, Red and Mediterranean Seas are interconnected. Daily ship traffic through the Mediterranean basin consists of 2,000 ferries, 1,500 freight ships and 2,000 commercial crafts, 300 of them tankers (20% of the world amount of oil sea traffic), carrying more than 350 million tons of oil per year (8 million barrels per day). Thus, decision-makers in this region have a strong need for an efficient pollution monitor and forecast system, to support them in planning and conducting preventative and emergency interventions. Such a system must provide timely and reliable access to all available observations and forecasts for the area of interest, and seamlessly integrate these as well as software for analysis, decision-support and dissemination.

Objectives

The scope of the proposed ARGOMARINE Project is to develop and test an integrated system for monitoring marine traffic and pollution throughout environmentally sensitive areas. This will be done by means of electronic geopositioning, through a high speed communication network. Data from SAR (Synthetic Aperture Radar), hyperspectral sensors, thermal sensors, electronic noses,

and acoustic sensors will be collected and sent to a central server where they will be integrated thanks to web mapping technology. Accident modelling and post-accident intervention simulation tools for impact prediction will be implemented and tested through field experiments. The envisaged goal is connected to the necessity of pollution control in Marine Protected Areas. Data from both satellite and airborne remote sensors and in situ sensors (optical and chemical sensors as well) on vessels and buoys will be used to get information about water quality and the presence of oil slicks over large areas. External data such as weather station data, weather operational models and large scale hydrodynamic and wave models will be gathered from the external providers. All the data will be merged in a Marine Information System (MIS), i.e. an information system where remote sensing data, field experiment results and estimates from simulation models can be integrated and available through a common interface.

Description of Work

Project work is articulated as follows:

- WP1 will be dedicated to imaging and analysis by using SAR (Synthetic Aperture Radar)
- WP2 will be concerned with hyperspectral and thermal infrared image analysis

(by using CASI-Compact Airborne Spectrographic Imager, spectroradiometer, TABI-thermal airborne broadband imager, and satellite images if available), Airborne sensors will be operated and hosted on mobile platforms (helicopter/aircraft).

- WP3 will be devoted to the application of Electronic Nose technology to the monitoring of oil/hydrocarbon spills in marine environments, hosted both on an autono-

mous buoy and aboard a AUV-autonomous underwater vehicle.

- WP4 will be dedicated to the development of underwater monitoring technologies
- WP5 will set up a mathematical modelling system and apply it to the study sites.
- WP6 will develop the ARGO-Geomatrix platform to set up and realize a telecommunication infrastructure
- WP7 will approach implementing an integrated Marine Information System (MIS)
- In WP8 test activity will be carried out. During the third year, a final test exercise will be carried out on the overall system, in real operational situations.
- WP9 will consist of the dissemination and exploitation of project results
- WP10 deals with project management

Expected Results

The main aim of the ARGOMARINE project is to provide an integrated environmental monitoring and management system, mainly for public authorities (security enforcement agents, park rangers, coastguards), civil protection and fleet operators to promptly manage oil and chemical spill accidents (or deliberate tank washes) that can cause injuries and fatalities to citizens, and environmental disasters, by means of early warnings and alarms.

The ARGOMARINE project has the ambitious goal of integrating a wide range of technologies, from sensor networks, radar regarding the acquisition of data, large databases for storing wide historical information, complex data flow and communications using satellites technologies, to distributed computational systems with the aim of decreasing the impact of maritime transportation on both biodiversity and protected fragile environments.

Acronym:	ARGOMARINE
Name of proposal:	Automatic Oil-Spill Recognition and Geopositioning Integrated in a Marine Monitoring Network
Contract number:	234096
Instrument:	CF – FP
Total cost:	4 299 005 €
EU contribution:	3 270 314 €
Call:	FP7-SST-2008-RTD-1
Starting date:	01.09.2009
Ending date:	01.09.2012
Duration:	36 months
Website:	http://www.argomarine.net
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EC Officer:	Maurizio Maggiore
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BB GREEN

Battery powered Boats - Greening, Reduced resistance, Electric, Efficient and Novel

State of the art - Background

Many European cities or communities at the coast or on different types of waterways rely mainly on land-based transport. In Rotterdam, the project has identified a couple of routes that take at least 45 minutes to cover by car. With BB GREEN the trip could be done in approximately 5 minutes. The difference is due to heavy road traffic congestion resulting in severe environmental problems. Shifting passenger and light cargo transport from public roads to zero-emission boating will reduce the traffic load on the roads and allow a smoother traffic flow and less parking problems in the centres. The suggested change in transport handling will only give full environmental effect if diesel engines are replaced with electric power (from sustainable energy sources) as suggested in the project.

The proposed project meets all key EU objectives related to greening, CO₂ emissions, innovation and a request for transport solutions able to meet future requirements.

Objectives

The principal objective in BB GREEN is to develop new, robust, highly capable zero-emission maritime transportation solutions, designed to fulfil tomorrow's community and customer requirements today.

BB GREEN will launch innovative and competitive waterborne transport solutions, presenting a step-change in the public service offered, emitting zero greenhouse gas and introducing a climate-friendly travel choice. The approach is radical and brave, and the new vessels can be introduced quickly, cost-efficiently and without affecting current infrastructure. The battery powered, low-wake wash, fast and efficient air-supported craft will deliver a climate-friendly waterborne

travel choice across Europe. Feasibility will be shown by means of a fully operational prototype vessel to be trial-operated under real life conditions with end users on board to determine market and customer reactions. The new transport system can contribute to reducing traffic congestion and improve traffic flow in and around cities and densely populated areas with waterway access.

The project uses a holistic approach to achieve the demanding main goal of exhibiting feasibility and market acceptance for the new solution, taking advantage of new and emerging technologies from other sectors as well as maritime.

Description of Work

BB GREEN will start out with an assessment of requirements and critical factors to achieve the project goals, followed by a design development phase, including 3D modelling and full model testing of two new candidate air-supported vessel (ASV) hulls. A selection will be made and the main systems, including new battery pack, electric driveline, propulsion and lift fans will be developed and prototype units tested. The BB GREEN design will be further developed including superstructure and general arrangement design. Engineering, construction methods and materials will be selected and the whole design will be assessed by Det Norske Veritas to meet the rules and regulations on construction and safety aspects. An operational test vessel will then be constructed, outfitted, tested and optimised. The vessel will be fully instrumented for final tests and documentation before being shipped to Rotterdam for practical feasibility testing on a selected test route. Public response and environmental impact will be studied on the test route. Case studies will be prepared to evaluate the potential market

impact, and an active dissemination plan using the BB GREEN test vessel will be carried out.

Expected Results

The project will design and tank-test two new BB GREEN ASV hull forms and select the most suitable based upon operator and route particulars.

Engineering, construction method and use of appropriate materials will be prepared and evaluated against rules and regulations. A full-scale test vessel will be constructed, instrumented and outfitted for testing. Debugging, optimisation and final tests with documentation will then be carried out before the test vessel is tested for feasibility on a test route in

Rotterdam. Response from the test group will be accumulated and analysed.

BB GREEN's role in future transport/city infrastructure, including contributions to reducing negative climate and environmental effects, will be assessed and backed by case studies highlighting effects on transport patterns in and around cities with BB GREEN types of transport. Recommendations to improve the BB GREEN concept and expand the application will be proposed. The zero-emission waterborne transport solution will be disseminated widely in Europe and beyond, with an active use of the test vessel for feasibility demonstration and proof of impact.



Acronym:	BB GREEN	
Name of proposal:	Battery powered Boats - Greening, Reduced resistance, Electric, Efficient and Novel	
Contract number:	234142	
Instrument:	CF – FP	
Total cost:	4 860 655 €	
EU contribution:	3 468 676 €	
Call:	FP7-SST-2008-RTD-1	
Duration:	36 months	
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Partners:	SSPA Sweden AB	SE
	Det Norske Veritas	NO
	Carbonia AB	SE
	Diab Norge AS	NO
	High Modulus Europe Ltd	UK
	Siemens Norge AS	NO
	Aqualiner	NL
	Amberjack Projects Ltd.	UK

BEAUTY

Bio-Ethanol engine for Advanced Urban Transport by light commercial vehicle and heavy duty

State of the art - Background

Since the introduction of the internal combustion engine, the use of alcohols as an alternative fuel has been regularly investigated. Intensive work was performed between the late 1970s and the 1990s, the driver being the production of a synthetic fuel from coal or natural gas. Now the attention is on bio-fuels, such as biodiesel and bioethanol. As an internal combustion (IC) engine fuel, bioethanol is similar to gasoline and shows interesting characteristics but with some aspects that require specific engine adaptations. When used in spark ignition engines, its higher octane number allows the increase of compression ratios with a better thermodynamic efficiency. The pollutant emissions of bioethanol can be basically lower than those of the gasoline engine. Bioethanol shows significant differences in greenhouse gas (GHG) emissions between different sources and production routes. This is the reason why, when bioethanol use is promoted, a detailed Well-to-Wheel analysis is required for assessing the best production route. Most biofuels have significantly lower Well-to-Tank GHG emissions than conventional fossil fuels, but they can vary considerably. Biofuels could lead to greenhouse emission savings when compared with fossil fuels, ranging from negative to over 100% depending on the type of feedstock, the method of cultivation and the bio-fuel production processes employed.

Objectives

The use of bioethanol in a captive fleet can play an important role in reducing local pollution from the urban transport sector whilst introducing, at the same time, the use of a renewable fuel with a high potential in GHG containment.

The dedicated internal combustion engines considered in the proposal can be fuelled with pure bioethanol or blended with hydrocarbon-based fuel; their application is intended for light commercial and medium to heavy duty (M-HD) vehicles in captive fleets, thus allowing a much higher amplitude of adaptation of bioethanol blends to the need of the combustion process. Three technological methods will be explored:

- a spark ignition (Otto cycle) engine based on the stoichiometric approach for M-HD urban vehicles;
- a spark ignition (Otto cycle) engine using an innovative controlled auto-ignition (CAI) process for light commercials;
- a compression ignition (Diesel cycle) engine using an innovative surface ignition system for light commercials.

The objective of the project is to build engine solutions based on these three methods which are able to meet the ambitious targets in terms of:

- future emission limits (Euro 6);
- fuel conversion efficiency (at least 10% higher than that of today's SI engine running on equivalent bioethanol blends);
- cold startability down to -15°C of ambient temperature.

Description of Work

Starting from existing powertrains, the engine systems (including after-treatment), components and materials will be adapted and optimised in view of the development of bioethanol advanced combustion concepts. The most promising route for maximising the benefits in terms of local and global emissions will be identified. The basic innovative elements of each method which deal with the characteristics of bioethanol blends will be

shared with other methods in order to integrate the technology where possible. This will allow the design of a road map showing the steps involved to favour a progressive introduction in the European Union of bioethanol as requested by the Commission.

The outcome of the three methods will result in:

- the development of a 4-cylinder 3.0 liter displacement turbocharged SI-dedicated engine based on the stoichiometric approach;
- the definition of a surface ignition system on a single-cylinder engine and on a multi-cylinder 1.9 liter displacement engine;
- the definition of a single-cylinder engine using the CAI system on a 1.8 cylinder displacement engine.

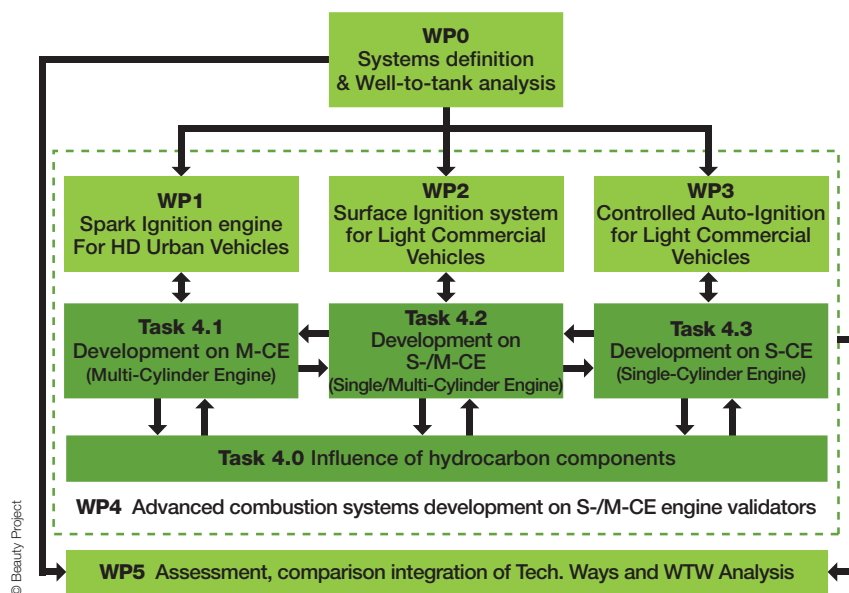
These will be compared in terms of costs and time to market.

Expected Results

Besides the fuel market perspective, the increased usage of biofuels is gaining importance all over the world due to concerns regarding the increasing CO₂ emissions.

Bioethanol is one of the most promising alternative fuels due to its high potential in reducing GHG emissions. The use of bioethanol should be considered not only because of its GHG reduction potential, but also in terms of a better fuel conversion efficiency, achievable with a dedicated engine.

The expected outcome of BEAUTY is to build engine solutions based on three methods which are able to meet the stringent targets, and to compare these solutions in terms of cost and time to market. By developing dedicated solutions based on the use of bioethanol for local fleets in an urban context, the most promising integrated route for maximising the benefits in terms of local and global emissions will be identified. The dedicated ICE considered in the proposal can be fuelled with pure bioethanol or blended with hydrocarbon-based fuel; their application is intended for light commercials and HD buses or municipal trucks on captive fleets, allowing for a much higher amplitude of adaptation of bioethanol blends for the requirements of the combustion process.



Acronym:	BEAUTY	
Name of proposal:	Bio-Ethanol engine for Advanced Urban Transport by light commercial vehicle and heavy duty	
Contract number:	218512	
Instrument:	CF – FP	
Total cost:	6 145 634 €	
EU contribution:	2 970 000 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2009	
Ending date:	31.12.2010	
Duration:	24 months	
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	Rheinisch-Westfälische Technische Hochschule Aachen	DE
	Daimler AG	DE
	AVL List GmbH	AT
	E4tech Sarl	CH
	Politechnika Warszawska	PL
	ExxonMobil Research and Engineering Company	US

CLEANER-D

Clean European Rail - Diesel



State of the art - Background

The railway sector, together with the engine manufacturing industries, concluded a risk study on the disruptive effect of the Non-Road Mobile Machinery (NRMM) Directive application for the railway diesel vehicle supply market, which could lead to the risk of a partial modal shift from rail to road on regional passenger lines and on specialised routes for freight transportation, with even foreseeable consequences on the operations of the main electrified system. Such a shift would of course be highly detrimental to the achievement of sustainable development within the European transport system. There is a need to find the best balance between environmental and economical requirements to avoid a possible shift from rail transport to a less sustainable mode such as road. Electrified main routes would also encourage the engine industry to give rail applications serious consideration in their product development plans and provide the European Commission with proposals for a flexible move to the III-B objective.

This project is therefore built on the basis of several sub-projects representative of the different engine applications that will enable the industry to evaluate the different solutions to be applied to rail systems in real operating conditions.

Objectives

The objective of this research will be to develop, improve and integrate emission-reduction technologies for diesel locomotives and rail transportation vehicles. The quantitative target will be to achieve emission levels below the limits established by the new European Directive 2004/26/EC and further upcoming regulations while, in addition to the topic description, evaluating the best possible innovative and hybrid solutions for contributing to the reduction of CO₂ emissions.

The main goals of the project are to demonstrate the feasibility and the reliability in service of railway rolling stock powered with diesel engines compliant with the requirements of stage III-B of the NRMM European Directive.

Currently there is no existing experience in any after-treatment technology and no comparisons for rail applications regarding the advantages and disadvantages of Selective Catalytic Reduction vs. Exhaust Gas Re-circulation. By testing on both test bench and service trials, this project will help to identify advantages and disadvantages of different solutions in different kinds of operation (DMU, railcars, main line and shunting locomotives) in terms of the operational constraints and reliability of the additional equipments.

Additional scientific and technical studies will also be conducted to support the use of more innovative solutions at a sustainable cost to the sector.

Description of Work

The project has been structured into two main frameworks:

- An operational part, where significant applications of railway vehicles are selected for engine manufacturers to test their new concept engines within the short timeframe granted by the NRMM directives.
- A scientific part, where innovative solutions to deal with further NRMM implementation phases beyond III-B will be studied and analysed, and the sustainability of solutions in terms of cost/benefits will be evaluated for the entire project.

The work is divided into sub-projects.

System Requirements aims to identify the system requirements of the demonstration projects.

Railcar deals with a railcar operated by Czech Railways that is equipped with two very low-power engines. The extremely restrictive space constraints make the application really challenging for manufacturers willing to fulfil III-B requirements.

Heavy Haul focuses on high-power engines (2 800kW).

Light Weight deals with diesel hydraulic locomotives (<2 000kW).

Sustainability and Integration deals with the socio-economic and environmental impacts on the railway sector.

Emerging Technologies investigates existing and potential emission-reduction technologies for integration into diesel locomotive packages.

Hybrid Solutions evaluates the potential energy savings generated by an onboard energy storage system concept.

Expected Results

The expected results are:

- III-B-compliant diesel engine systems with the specific rail application:
- at reasonable cost,
- good LCC,
- in-use compliance system;
- knowledge about necessary boundary conditions;
- cross-check with EPA (US environmental agency) developments and regulations;
- evaluation of overall impacts of technical solutions and project results with cost/benefit analysis and sustainability impact assessment;
- recommendations for further legislation:
- significantly improving the efficiency of CO₂ reductions,
- investigating new technology.

The project will be disseminated via the external interactive information share and communication.

Acronym:	CLEANER-D	
Name of proposal:	Clean European Rail - Diesel	
Contract number:	234338	
Instrument:	CF – FP	
Total cost:	13 395 980 €	
EU contribution:	7 975 574 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.06.2009	
Ending date:	31.05.2013	
Duration:	48 months	
Website:	http://www.cleaner-d.eu	
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	Union Internationale des Chemins de Fer	FR
	ALSTOM Transport S.A.	FR
	Association of Train Operating Companies	UK
	Vossloh España SA	ES
	Société Nationale des Chemins de Fer Français	FR
	Deutsche Bahn AG	DE
	Bombardier Transportation GmbH	DE
	Siemens AG	DE
	MTU Friedrichshafen GmbH	DE
	Caterpillar SARL	CH
	Centre for Research and Technology Hellas	GR
	Voith Turbo GmbH & Co. KG	DE
	University of Newcastle Upon Tyne	UK
	Universidad Politécnica de Valencia	ES
	Consiglio Nazionale delle Ricerche	IT
	Chalmers Tekniska Högskola AB	SE
	České dráhy AS	CZ
	Hochschule für Technik und Wirtschaft Dresden (FH)	DE
	Continental Rail S.A.	ES
	The Engine Consultancy Ltd	UK
	Institut für Zukunftsstudien und Technologiebewertung GmbH	DE
	Saft SA	FR
	Universität Rostock	DE
	TEDOM s.r.o.	CZ

CO₂NTROL

Integrated Solutions for Noise and Vibration Control in Vehicles

State of the art - Background

Today's cars represent a complex compromise between contradictory requirements with regards to safety, exhaust emissions, noise, performance and price. However, since it is widely recognised that quality of life, particularly in the urban environment, is heavily influenced by air and noise pollution resulting from road traffic, one of the top priorities for car manufacturers is the reduction of noise and emissions from vehicles, with particular attention currently being focused on CO₂.

Today, engine downsizing represents the most direct and cost-effective approach to improve fuel efficiency in road vehicles. However this new generation of engines, while being ideally suited to city vehicle applications, can result in a perceivable degree of deterioration in noise and vibration characteristics when compared with the vehicles currently on the market.

Similarly, the mass reduction required to lower CO₂ emissions and fuel consumption can lead to considerable augmented noise levels, which should be adequately compensated by integrated, light noise abatement means. Although current vehicles already have a structure optimised to have low weight without reducing the required performances, some components of the structure can be further reduced in weight whilst still matching resistance, crash and fatigue performance. Once again these weight reductions result in a poor performance in terms of noise and vibration, increasing both the structure-borne and airborne sound transmission.

Objectives

Within a vehicle, many components contribute to the overall emitted noise of a vehicle by individually radiating noise between 60 – 70 dB(A). In addition the problem of multiple noise sources and transfer paths will become more and more challenging with the upcom-

ing multi-material design of vehicle bodies and envisioned flexibility and modularity of the vehicle power train. In order to achieve an overall noise reduction for vehicles, all noise sources, and their transfer paths to radiating components, have to be treated simultaneously, and in a holistic approach.

The scope of this project is therefore to develop flexible, integrated passive and active solutions, which will not only permit noise and vibration to be attenuated in new vehicles equipped with the next generation of highly fuel-efficient power trains, but enable vehicle design guidelines to be defined so as to reduce weight without compromising comfort and safety. Frequently, new technologies in the field of smart materials and active control provide potential solutions but have only been proved in a laboratory. Within Co2ntrol, such advanced laboratory-level technologies will be combined with conventional solutions applying directly to next generation city cars in order to assess their practical feasibility, promote industrial development and determine cost-benefit evaluations.

Description of Work

During the project, city car prototypes will be developed, featuring pioneering technology aiming to push their environmentally-friendly characteristics to a new level. The starting point will be a next-generation city car equipped with a newly developed twin-cylinder engine which will provide very significant gains in terms of reducing fuel consumption and, as a consequence, CO₂ emissions. Furthermore, the vehicle will be provided with the latest technology in terms of safety aspects related to pedestrian impact and car-to-car compatibility, both of which are of major importance in an urban environment. The noise reduction technology to be developed and implemented on such a city car will be oriented to decrease the mass of the com-

plete sound packages, using new materials, passive or active piezoelectric or electro-magnetic patches on vehicle and engine panels, smart Helmholtz resonators, and broadband active noise cancellation. Further improvements will be pursued through the development of new tyres aiming at the reduction of noise and rolling resistance. The innovation lies in the novel design process rather than in the tyre itself. In this project the design process will be shifted towards rolling resistance, airborne noise and reduced structure borne sound will transfer towards the passenger compartment with respect to lightweight vehicle and suspension structures.

Expected Results

In general, the concept of integrated noise and vibration solutions leads to a more efficient use of energy and weight savings in a vehicle. Pursuing the different concept in a holistic approach, the project aims to demonstrate the feasibility of applying active systems to NVH (Noise, Vibration and Harshness)-related problems of advanced power trains from a holistic point of view. This approach should lead to an overall reduction in noise and vibration levels in the order of 10 dB(A), measurable in the city car provided.

The overall expected results of the project are summarised as follows:

- Providing an holistic approach of noise and vibration control for city cars
- Validating the feasibility of an integrated noise & vibration control on vehicle level having
- the same interior noise, possibly reduced exterior noise with significant weight reduction and improved fuel consumption as compared to the state-of-the-art vehicle
- potentially competitive costs with conventional solutions
- Provision of an integrated noise & vibration control on vehicle level resulting in a 10 dB(A) reduction in noise and vibration levels at same weight and energy consumption
- Increased modularity of integrated noise & vibration control
- Increased acceptance of city cars with energy efficient power trains from a comfort point of view.

Acronym:	CO ₂ NTROL	
Name of proposal:	Integrated Solutions for Noise and Vibration Control in Vehicles	
Contract number:	233764	
Instrument:	CF – FP	
Total cost:	5 802 950 €	
EU contribution:	3 494 933 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.09.2009	
Ending date:	31.08.2012	
Duration:	36 months	
Website:	http://www.green-city-car.eu	
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	Continental AG	DE
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	Rieter Automotive Management AG	CH
	University of Southampton	UK
	Chalmers tekniska högskola AB	SE

DIRECT-MAT

DISmantling and RECycling

Techniques for road MATerials -

Sharing knowledge and practices

State of the art - Background

The EU-25 main road network is essential for passenger and freight transportation across Europe. Its maintenance is costly. It is also responsible for detrimental impacts to the environment relative to waste production and natural resource consumption. As a result it is necessary to simultaneously optimise the quality-to-cost ratio of road infrastructure and encourage environmentally friendly road maintenance practices (ERTRAC, 2006), mainly by reducing the proportion of road materials originating from natural resource extraction and increasing the recycling of locally available road wastes into new road materials.

Over the past few years, most European countries have started to work towards this goal, by implementing national strategies for dismantling and recycling road materials back into new roads.

However the practice at national level differs significantly from one European country to another, depending on available wastes and

local regulations. In this way, a wide array of research results on road material recycling has been produced, but are dispersed throughout the various Member States and not widely implemented.

Furthermore, pertinent databases and available documents are not often translated into a common language and site data is frequently not available to specialists from other countries.

Objectives

DIRECT-MAT aims to facilitate the sharing of national experiences at European level, which will provide major benefits to the European economy and environment.

The objectives of the project are to build a European web database and draft best practice guidelines on dismantling and recycling road materials and vehicle tyres back into roads. The best practice guidelines are aimed at issuing recommendations for dismantling and recycling these materials in order to offer the highest added value.



The project addresses the recycling of unbound, hydraulically-bound and asphalt road materials, as well as other road materials not presently recycled to any great extent in road construction. It also addresses strategies for recycling road-related materials, such as vehicle tyres, in road construction.

Description of Work

The work is divided into work packages (WP).

WP1: Management and coordination.

WP2: Unbound materials: this focuses on end-of-life strategies for unbound layers and the recycling of other reclaimed road materials as unbound material for sub-layers.

WP3: Hydraulically-bound materials: experts determine the results stemming from national experiences involving end-of-life strategies for hydraulically-bound road materials that are used as hydraulically-bound layers in the sub-base, base courses and heavy-duty surface courses.

WP4: Asphalt materials: knowledge acquired on the assessment, dismantling, disposal, re-use and recycling of asphalt road material will be detailed here, together with the use of other recycled road materials in bituminous-bound layers.

WP5: Other materials not commonly recycled in roads: this work package will study road construction materials and techniques not considered in WPs 2-4, e.g. substances capable of causing problems during the dismantling and recycling processes, hazardous materials for human health and the environment. The use of recycled vehicle tyres in road construction will also be investigated.

WP6: A web database will be developed on the dismantling and recycling of vehicle tyres and road materials back into roads: this will comprise of harmonised data assembled and coordinated during the project.



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Road dismantling in Vienna, Austria

Expected Results

The web database will provide accessible online information to road authorities, practitioners and researchers.

From a technical standpoint, this project will provide stakeholders with available and validated guidelines to help them decide and proceed appropriately with the dismantling and recycling of road, and road-related, materials back into new roads.

From a scientific perspective, an integrated and shared view of road material research needs shall be stated in order to improve the coordination of corresponding national research programmes at the European level and establish priorities for European research and technological development.

The web database will provide scientists with online access to national document references, harmonised literature review and practical application case studies based on jobsite datasets.

From a regulatory point of view, this project will help experts from various CEN (European Committee for Standardisation) technical committees to incorporate scientifically-based requirements into European standards regarding the recycling of road materials into new roads.

Acronym: DIRECT-MAT

Name of proposal: DISmantling and RECycling Techniques for road MATerials - Sharing knowledge and practices

Contract number: 218656

Instrument: CSA – CA

Total cost: 1 199 980 €

EU contribution: 1 199 980 €

Call: FP7-SST-2007-RTD-1

Starting date: 01.01.2009

Ending date: 31.12.2011

Duration: 36 months

Website: <http://direct-mat.fehrl.org/>

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Statens geotekniska institut

Danish Road Directorate / Danish Road Institute

Technische Universität Braunschweig

Közlekedéstudományi Intézet. Közhasznú Társaság

BE

SE

DK

DE

HU

DIVEST

Dismantling of Vessels with Enhanced Safety and Technology

State of the art - Background

Current and past research and development calls from the European Commission on the topic of ship dismantling are all faced with the need to better define what is meant by ship dismantling, and to address the fundamental issue of the actual applicability and sustainability of the solutions that they are contributing to define.

In an environment characterised by a lack of clear boundaries, with vast amounts of often conflicting information available in the public domain, it is understood that policy-making bodies are in dire need of up-to-date objective scientific data to support and enhance their decision making process.

Incumbent industrial actors are looking to the European Commission and other organisations for affordable, practical advice on what needs to be done to ensure better control over their operations, as well as compliance with upcoming regulations. Potential newcomers need to understand where the potential for innovation lies.

The aim of the DIVEST Project is therefore to develop a set of methodologies and processes that can be used by such stakeholders to understand the social, economic and

environmental aspects of ship dismantling from their point of view. By benchmarking their approaches against this understanding they will be able to clearly define the relevant dependencies, constraints and benefits, and to act accordingly.

Objectives

The objective of this project is to define a total integrated risk and economic framework applicable to the optimisation of ship dismantling activities and infrastructure from a social, economic and environmental point of view. This framework will apply across the life cycle of a vessel and it will be developed using both risk-based analysis and economic modelling/value-based analysis. In building this framework, particular emphasis will be placed upon the dismantling value and competence chain.

Ultimately, it is believed that DIVEST will balance quantitative and qualitative approaches to provide a core definition of ship dismantling that will be common to all stakeholders.

Description of Work

It is anticipated that the objectives of the project will be achieved through the implementation of several analytical steps as follows:

1. the review of various risk and economic analysis methodologies and the selection of that which best fits the needs and constraints of the ship dismantling/recycling process,
2. the validation of the applicability of the selected method(s) using modelling and actual case studies. This activity will pay particular attention to the dynamic combination of technical, environmental and human factors,
3. the organisation of the research data and output into a readily accessible database

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Ship Dismantling in Bangladesh



that will be made available to support risk management and decision making for ship dismantling.

In the first instance the Project will endeavour to review the entire value/competency chain of the ship dismantling activity. This review will aim at identifying and understanding the relationships between the physical act of dismantling vessels and the upstream/downstream activities that constitute this chain.

The main objectives of the project will be achieved during the project life-cycle, there won't be any issues left for subsequent development. All project objectives are in measurable and identifiable form. Project progress will be controlled using a combination of milestones, reviews and project stage-gates.

Expected Results

DIVEST will provide a holistic understanding of ship dismantling through the combination of requirements and impacts (with associated procedures and processes) from pertinent social, technical, economic and environmen-

tal drivers into a single, integrated and validated decision support tool (database).

In this context, project deliverables will be as follows:

- a set of validated risk and economic models that will cover the entirety of the ship dismantling space,
- a set of policy recommendations on the optimum recycling/dismantling facility and process,
- a suite of tailored training programmes tested and validated in situ (India for example), and
- an information exchange accessible to the stakeholder community.

In the end, DIVEST will provide a core, validated and practical definition of ship dismantling that will be common to, and useable by, all stakeholders. With business and operational risks and value drivers better defined and understood, DIVEST will also make an immediate and positive contribution to business practices globally.

Through practical, on-the-ground case studies and training, as well as through the involvement of non-European partners in the Project Consortium, DIVEST will facilitate technological improvement and the betterment of human and environmental conditions

in countries involved in the study, as well as broad public engagement and international dialogue.

Acronym:	DIVEST	
Name of proposal:	Dismantling of Vessels with Enhanced Safety and Technology	
Contract number:	218695	
Instrument:	CF – FP	
Total cost:	3 364 885 €	
EU contribution:	2 442 568 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.08.2008	
Ending date:	31.07.2011	
Duration:	36 months	
Website:	http://www.divest-project.eu	
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	SWEREA IVF AB	SE
	MEDI Metal Aktiebolag	SE
	S.C. NAVALINK ROM SRL	RO
	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek – TNO	NL
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	University of Patras	GR
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ECOQUEST

Efficient Cooling systems for Quieter Surface Transport

State of the art - Background

Transport is one of Europe's strengths but at the same time has a tremendous impact on its citizens and the environment. An important subsystem in nearly all vehicles is the cooling module with its demand for external energy and its sound emission. Under specific operational conditions the cooling system is the major noise source and the component with the largest consumption of energy. The demand for highly efficient and low-noise cooling systems for ground vehicles – rail bound, automotive and heavy duty (trucks, wheel loaders, etc.) – is expected to increase, even with the advent of new drive technologies such as hybrid or fuel cells in automotive applications.

The European Road Transport Research Advisory Council (ERTRAC) sets "noise reduction" as one of the major goals for future surface transport research (Strategic Research Agenda 2020, www.ertrac.org, April 2008) and the European Rail Research Advisory Council (ERRAC) identifies very similar future efforts (ERRAC, Strategic Rail Research Agenda 2020, www.errac.org, April 2008). Hence, manufacturers need novel

methods and ideas for optimising their components with respect to noise, reducing costs for development and testing and thus further improving the competitiveness attained by the European industries in the global market.

Objectives

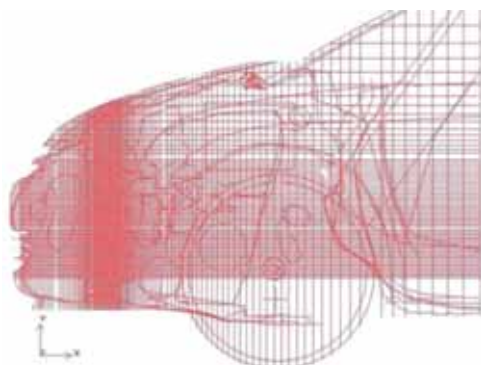
The overall objectives are innovative contributions towards novel cooling units with reduced noise radiation and decreased CO₂ emissions.

Intermediate objectives concern:

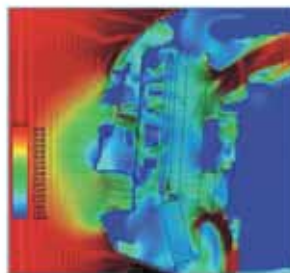
- implementation of an integrated simulation platform for noise mechanisms, scattering and propagation;
- development of design procedures for thermally and acoustically optimal units;
- research on innovative fan designs and new passive noise control measures and their integration.

The scientific objectives comprise:

- the extension and validation of both existing and innovative modelling approaches and acoustic simulation technologies in order to meet the specific needs and constraints related to the achievement of smarter and greener sustainable surface transport;



Automotive under-hood flow simulation



© Valeo Thermal Systems

- the combination of these high-end acoustic simulation techniques with state-of-the-art thermal efficiency assessment methods, aiming to reduce jointly the acoustic and CO₂ footprint of automotive, heavy-duty vehicles and rail transportation.

The technical objectives, backed up by the scientific outcomes, are the multidisciplinary optimisation of:

- intelligent thermal management for reduced noise emission and energy consumption altogether;
- the lay-out of cooling systems.

Description of Work

The strategy adopted is to revisit the component modelling, to couple the methods, and to validate the simulation-based tools with laboratory and full-scale experiments. The five work packages (WP) are structured as follows:

WP1 covers project coordination.

WP2 is concerned with the combination of different modelling strategies involved in the pre-

diction of the noise emitted by generic cooling units. Regarding source modelling, the tonal and broadband noise and the broadband noise scattering are addressed individually. Combining the methods yields a simulation platform addressing all noise features.

In WP3, realistic train and automotive environments will be considered. The design of mobile cooling systems is revisited in a more integrated manner as compared to the state of the art. Within a multidisciplinary study, the thermal layout of cooling systems and the overall flow employing advanced numerical simulation tools will be optimised.

In WP4 the impact of the new design strategies is validated by full-scale tests. Two full-scale modules, one for car/truck and another for locomotive will be implemented in vehicles and experimentally investigated under realistic test conditions.

WP5 deals with the overall assessment of the outcomes of the whole project, guidelines, exploitation plan and dissemination of the knowledge generated during the project.



Locomotive cooling fan (model and full scale)

Expected Results

The expected results are:

- new design tools for cooling units with a special focus on integrated noise prediction, based on high fidelity numerical simulation methods and empirical correlations;
- new layout and control strategies for cooling units;
- two innovative prototype cooling units for automotive and locomotive, including new fan designs and integrated micro-perforated absorber elements;

- knowledge on the effects of realistic environment layouts on the propagation of sound and sound quality. This plays an important role in the certification of products.

The level of success of the new design tools are gauged by a step-wise validation, beginning with laboratory, continuing with mock-up and ending with full-scale experiments. Indicators for progress achieved by the new designs are performance data measured in full-scale tests.

Acronym: ECOQUEST

Name of proposal: Efficient Cooling systems for Quieter Surface Transport

Contract number: 233541

Instrument: CP - FP

Total cost: 4 427 319 €

EU contribution: 2 872 897 €

Call: FP7-SST-2008-RTD-1

Starting date: 01.12.2009

Ending date: 30.06.2013

Duration: 42 months

Website: <http://www.uni-siegen.de/ecoquest/>

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Voith Turbo Lokomotivtechnik GmbH & Co. KG

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EE-VERT

Energy Efficient Vehicles for Road Transport

State of the art - Background

Road transport is the second largest EU producer of CO₂, one of the greenhouse gases responsible for climate change. While some improvements in the efficiency of road vehicles have been achieved, continued growth in traffic and congestion mean that CO₂ emissions from road transport have grown overall. At the same time, rising fuel prices and supply instability also put pressure on increased efficiency. The EC has set targets for the average CO₂ emissions of new vehicles to be 120 g/km by 2012, with further reductions needed to achieve a 40% reduction in CO₂ from light passenger vehicles by 2020.

Despite improvements in individual areas of the modern vehicle such as the powertrain, a considerable amount of energy is wasted due to the lack of an overall onboard energy management strategy. Further electrification of auxiliary systems (the 'more electric vehicle') promises energy and efficiency gains, but there is a need for a coordinated and predictive approach to the generation, distribution and use of energy. In the state of the art, power is generated with little knowledge of the actual loads, and some systems (both electrical and mechanical) consume power continually regardless of demand. The introduction of systems such as alternator set-point control and EPAS are the first steps towards optimising energy use but such systems operate in isolation.

Objectives

EE-VERT will develop technologies that will play a key part in achieving the above goals. It is estimated that these technologies can reduce CO₂ emissions by around 10% for a car. For a large vehicle savings of around 40% of the CO₂ that is created by an auxiliary system such as climate control is possible.

The main concepts of EE-VERT are:

- The electrical energy supply in road vehicles is an essential enabling technology for further CO₂ reductions and for more safety, and the optimised co-operation between the different types of energy in a vehicle offers high potential for minimising the total energy required.
- To manage the use of different types of energy, such as electrical, mechanical or thermal energy, vehicle overall optimisation and management concepts are required.

EE-VERT will deploy a distributed network of smart components, whose characteristics are coordinated to optimise their interaction and their efficiency.

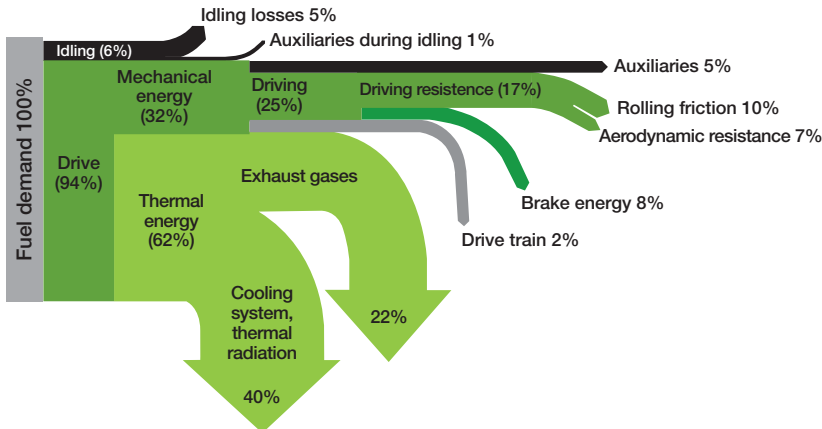
The basic concept is an overall vehicle optimisation of generation, storage, distribution and usage of energy. The project will identify 'hidden' sources of energy that could be harvested and will quantify the achievable savings. The optimisation strategy will be based on a complex combination of diverse parameters (e.g. actual power request, actual engine speed, expected power demands).

Description of Work

The project will develop strategies in conventional vehicles, which are also applicable to hybrids, for overall energy management (thermal and electrical) to reduce fuel consumption and CO₂ emissions. The need for the strategies to guarantee power supply to safety-related systems will also be considered.

The main innovation areas in the project are:

- the design of several smart component prototypes, including power electronics (generator, actuators, storage devices) with considerably improved energy efficiency (defining theoretical boundaries);
- the analysis of individual electrical components in terms of their percentage of overall energy consumption, based on a novel car



Energy use in a typical passenger car

concept, including X-by-wire functionalities (non-optimised operation);

- developing predictive algorithms for an energy-optimised operation of cross-linked, smart electrical onboard components;
- ascertaining the potential for energy saving from smart electrical components and optimised operation modes utilising accurate simulation models;
- the analysis of achievable benefits by the following innovative measures: re-use of thermal energy, integration of solar panels directly on a vehicle's chassis, introduction of solar service stations (e.g. in parking lots for charging batteries), involving detailed information about the prospective route (e.g. in the case of repetitive urban traffic patterns).

Expected Results

EE-VERT will assist in the efforts towards 'green' surface transport by providing means to reduce CO₂ emissions in vehicles with conventional powertrains. Many of the EE-VERT technologies will also be applicable to hybrid vehicles. Specifically the project will deliver:

- an improved power generation concept for conventional vehicles, integrating energy recovery from on-board (e.g. brake energy recovery, waste heat recovery) and off-board (e.g. solar cells);
- targeted improvements to energy consumers (e.g. actuators on the vehicle);
- the technologies to integrate these components into a network of smart devices incorporating an overall energy management strategy.

Although there is considerable interest in the pure electric vehicle, conventional vehicles will remain an important part of the model range of manufacturers in the short to medium term. EE-VERT will bring benefits to improving the efficiency of these vehicles, alongside the improvements also being developed for hybrid and electric vehicles:

- energy recovery;
- improved (more efficient) actuators;
- network of smart components;
- overall energy management strategy.

Acronym:	EE-VERT	
Name of proposal:	Energy Efficient Vehicles for Road Transport	
Contract number:	218598	
Instrument:	CF – FP	
Total cost:	6 466 966 €	
EU contribution:	3 617 978 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2009	
Ending date:	31.12.2011	
Duration:	36 months	
Website:	http://www.ee-vert.net	
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EC Officer:	Maurizio Maggiore	
Partners:	Volvo Technology AB	SE
	Centro Ricerche Fiat SCpA	IT
	Robert Bosch GmbH	DE
	Lear Corporation Holding Spain SLU	ES
	Engineering Center Steyr GmbH & Co. KG	AT
	FH Joanneum Gesellschaft mbH	AT
	Universitatea 'Politehnica' din Timisoara	RO
	S.C. Beespeed Automatizari S.R.L.	RO

EU-CARGOXPRESS

Greening of Surface Transport through an Innovative and Competitive CARGO-VESSEL Concept Connecting Marine and Fluvial Intermodal Ports.

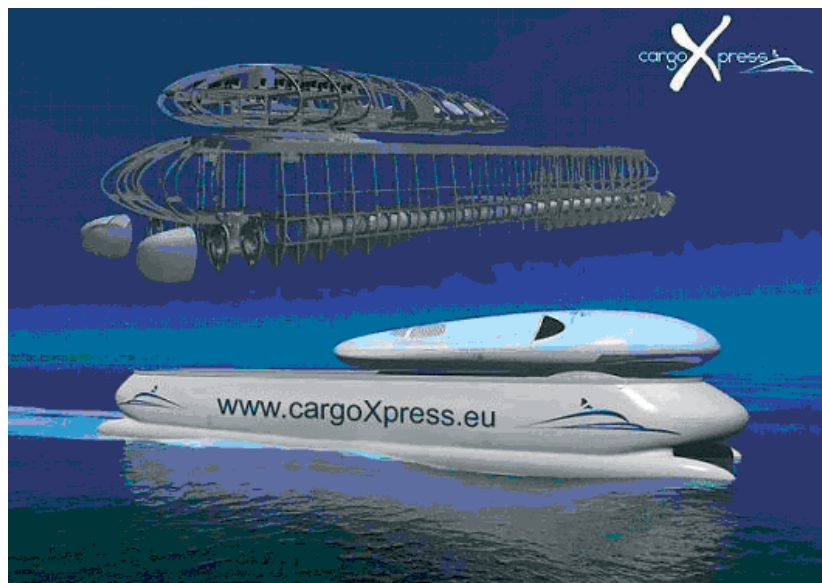
State of the art - Background

CARGO-VESSELS suitable for the Motorways of the Sea (MoS) have undergone only a weak technological development in the last decades.

- The U-shaped hull form which generates a draught of 5-6m, impeding the access to most ports or fluvial waterways.
- The need for ship-to-shore cranes in the ports to unload containers or cargo, which excludes many ports from maritime transport.

- Antiquated and energy-consuming power and propulsion systems. The use of heavy oil is highly contaminating and will become widely forbidden.
- The lack of standardisation and serial design, creating unique units with long training and maintenance periods.

The goal of the European Commission is to move a substantial part of road transport towards waterways. This would require 2,000 to 3,000 new vessels for MoS plus the replacement of the existing outdated units.



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Shows the main outline of the vision

This R+D project is being executed by an international consortium and with EU funding because it has to create a new class of vessels and not a specific vessel for the financing ship owner who is motivated by medium-term economic success.

Objectives

The objective is to develop a new generation of competitive CARGO-VESSELS for accelerated maritime and fluvial shipping using innovative concepts and technologies which support greening surface transport and prepare for fast and efficient modal shifts in ports:

O1: Low capital investment via standardisation and serial technologies:

Current vessels are costly and require an experienced technical crew. The project aims for a large number of identical units to be built in a serial production environment.

O2: Reducing operation costs by decreasing energy consumption:

Sustainable and green maritime transport, investigating alternative energy forms, usage and conversion, the best low-resistance hull forms and lightweight materials.

O3: Reducing operation costs through less maintenance downtime:

Lowering or eliminating maintenance downtime by installing modular interchangeable equipment and standardised procedures.

O4: R+D to increase speed and flexibility in cargo-handling:

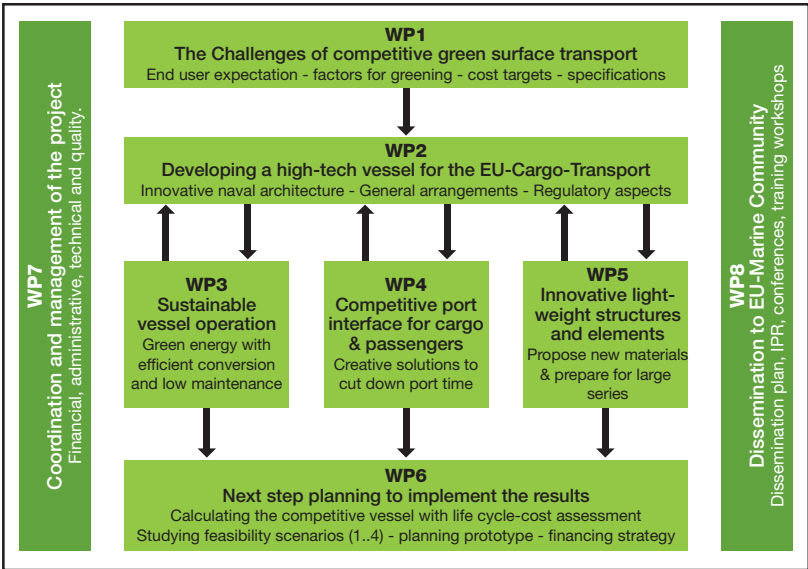
Investigating innovative cargo-loading and port-accessing devices to make this concept competitive and lowering port idle time considerably.

O5: Providing service close to customers:

Many European and African ports are inaccessible to conventional CARGO-VESSELS with draughts of over 5-6m. As these ports are very close to the customer, the project will create a concept for direct delivery.

1.3.1 Overall strategy of the work plan

EU-CargoXpress



Description of Work

There are eight Work Packages (WPs):

WP1. Define end-user expectations for a new generation of competitive CARGO-VESSELS and study high-impact factors in vessel design and operation affecting surface transport greening.

WP2. Create and define a new generation of competitive vessels responding to end-user expectations from WP1:

- Prepare and test a hull form for low-resistance sailing and safe port-loading.
- Naval architecture and general arrangement plans.
- Hazard assessment of innovative solutions.

WP3. Focus on factors influencing future performance, speed, energy and energy consumption plus the costs of sailing and loading/unloading and low CO₂ operations.

WP4. Investigating requirements for loading/unloading vessels with on-board equipment, preparing ports for fitting interface functions, and encouraging the logistic industry to move more containers and cargo towards maritime transport.

WP5. Developing structural concepts for innovative hull structures with improved costs, strength, weight and safety fit for serial production.

WP6. Showing that life-cycle costs and environmental impact for innovative energy-saving equipment equal conventional solutions, plus plans for a fully functional seaworthy prototype.

WP7. Planning, coordinating, monitoring and controlling.

WP8. Presentation and dissemination of WP5 demonstrators and project results.

Expected Results

The results of the investigation will be an innovative concept for a new competitive CARGO-VESSEL and full-scale structural parts of lightweight material for testing.

Impacts:

- Positive and invigorating impacts on the ship-building community, giving Europe an advantage over the low-cost competition in Asian shipyards.
- Innovative features which lend themselves to encouraging start-up SMEs to become suppliers of specific elements or services.
- Impacts on energy savings, the environment, CO₂ reduction and climate change.
- The revitalisation of small and medium-sized ports.

Acronym:	EU-CARGOXPRESS	
Name of proposal:	Greening of Surface Transport through an Innovative and Competitive CARGO-VESSEL Concept Connecting Marine and Fluvial Intermodal Ports.	
Contract number:	233925	
Instrument:	CF – FP	
Total cost:	3 860 449 €	
EU contribution:	2 600 788 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.09.2009	
Ending date:	30.04.2012	
Duration:	32 months	
Website:	http://cargoxpress.eu/	
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	Universidad Politécnica de Madrid	ES
	Innovación Logística Cargo-Xpress SL	ES
	Center of Maritime Technologies e.V.	DE
	Swerea SICOMP AB	SE
	Kockums Aktiebolag	SE
	Fjellstrand AS	NO
	Royal Institute of Technology Machine Design	SE
	National Technical University of Athens	GR

EURECOMP

Recycling thermoset composites of Sustainable Surface Transport

State of the art - Background

Recycling plastic waste is an important element in working towards a sustainable, ecological and economical use of non-renewable raw materials. Recycling helps the environment since it saves not only space in landfill sites, but also reduces pollution and saves energy and raw materials. It is now crucial to recycle raw materials wherever possible into high-value products.

In particular, the recycling of thermosets is much more complex than that of thermoplastics and metals due to the cross-linked nature of the polymer matrix. Thus, a simple re-melting and re-use, suitable for thermoplastics, is not applicable in this case. Nowadays, the amount of recycled thermoset material is very small, probably less than 1% of the material manufactured, whereas thermosets make up 20% of plastics produced (about 900 000 tonnes per year).

The whole composites sector is now aware of the environmental rules about wastes (Directive on End-of-life Vehicles 2000/53/EC or Directive 2002/96/EC on Waste Electrical and Electronic Equipment) which apply to their industry. The recycling routes currently available are expensive and do not give the best use of these wastes, since they are mainly burnt. The heat generated by the combustion process and the ashes in cement furnaces are, in the main, low-value returns. End products from grinding usually give bad quality products when reused in polymers.

Objectives

The EURECOMP consortium believes that it is possible to get a better recycling route for thermosets if the organic phase is converted to 'small' molecules, which can be used by the chemical industry, and if the mineral phases can be used again in composites. The community wants to define the best con-

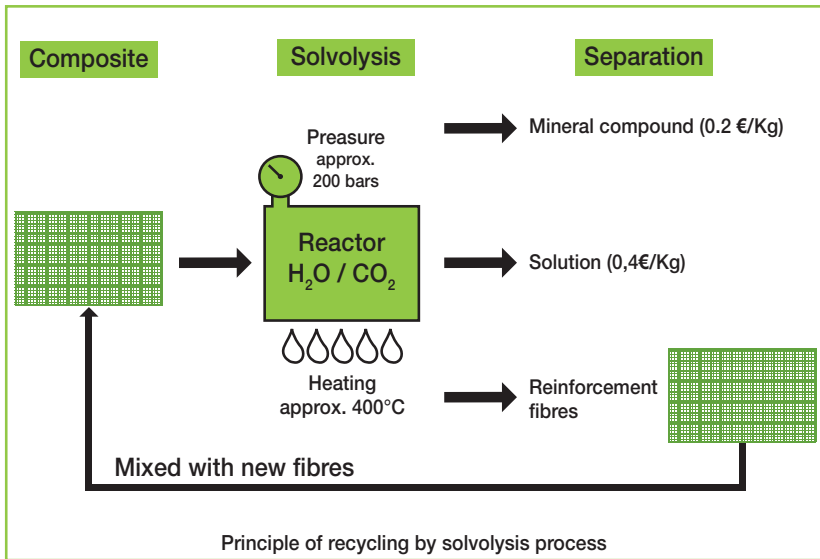
ditions in order to obtain a physico-chemical separation (solvolysis) of the different components of the composite and get the best commercial added value from the end products. In addition, by improving the general standard of competitiveness of the European composite industry and reducing the waste management cost, the process will help them to comply with European regulations.

EURECOMP aims at setting up a new route to recycle composites which will decrease the cost of waste disposal production by 50%. EURECOMP gathers together partners from various fields of activity (universities and industrial companies, from material producers through to end users) and will explore both the fundamental processes and the practical facility development. In addition, the project will collate the necessary information on upstream and downstream markets, economic efficiency and life-cycle assessment.

Description of Work

A decomposition and recovery method is proposed to separate, through a water-based depolymerisation process, the different elements of the composites to retrieve them in a suitable form for re-use in the chemistry and composites fields.

The chemical recycling is based on high reaction rates from supercritical water dissolving capabilities and high transportability due to the low viscosity and high diffusibility. After treatment by supercritical water under suitable conditions, the expected products will be re-usable, good quality, low-weight organic molecules, and solid inorganic components. The simultaneous recovery of organic molecules (e.g. styrene derivatives in the case of polyester resins) and fibres, with high length and properties suitable for re-use as reinforcement in composites, represents a great advance beyond current methods.



The proposal also seeks to investigate the viability of subsequent supercritical CO_2 -based 'fractionation-extraction-cleaning' technology at laboratory scale by substituting traditional solvents in the recovery stage. Supercritical CO_2 has a low critical temperature and a moderate critical pressure, being a non-toxic and non-flammable compound. It is a relatively cheap reagent, available in large quantities; if optimised, the process involves less material, shorter time, and lower costs and risks than other conventional methods.

Expected Results

The main expected results of the project are:

- a laboratory-scale solvolysis reactor prototype, with pressure and temperature sensors;
- an optimised large-scale reactor prototype, equipped with pressure and temperature sensors;
- knowledge of the best set of reaction parameters in order to retrieve good quality, re-usable matrices, fibres and fillers;
- training programmes and documentation.

The RTD partners will patent, in conjunction with the industrial partners, the solvolysis process, product separation and valorisation.

The industrial partners (i.e. the waste producers) will use the technology for their wastes, gaining a significant saving in the waste treatment cost. Some of them will patent the recycling process.

The manufacturer of the reactor will retain the patent for the technological reactor device.

As the requirements for this kind of installation will escalate in the future, the partners will sell licences to recycling companies for operating the process all over the world. Training will be operated by the main RTD partners.

This action will probably create spin-offs and start-ups.

Acronym:	EURECOMP	
Name of proposal:	Recycling thermoset composites of Sustainable Surface Transport	
Contract number:	218609	
Instrument:	CF – FP	
Total cost:	2 549 229 €	
EU contribution:	1 974 793 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.05.2009	
Ending date:	30.04.2012	
Duration:	36 months	
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EC Officer:	Grzegorz Domanski	
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	Jiangyin Xie Tong Automobile Accessories Co. Ltd	CN
	SACMO SA	FR
	European Composite Recycling Services Company scrl	BE
	The British Plastics Federation LBG	UK
	Uriarte Safybox SA	ES
	Association de Gestion de l'Institut Catholique d'Arts et Métiers de Nantes	FR
	Fundación Gaiker	ES
	University of Limerick	IE
	University of Exeter	UK
	University of Bristol	UK
	Composittec	FR

HEATRECAR

Reduced energy consumption by massive thermoelectric waste-heat recovery in light duty trucks

State of the art - Background

The consumption of automotive fuel due to the electricity demand on board vehicles has been steadily increasing and is likely to remain so in the years to come. It currently amounts to several percent of the overall petrol consumption for road transportation in Europe. The basic principle addressed in this project consists of directly converting the heat in the exhaust system into electricity, thereby alleviating or even eliminating the alternator. A few projects which have aimed at this objective have led to insufficient results, but with the rising price of fossil fuels and ever more stringent constraints on CO₂ emissions, the need for direct conversion of heat into electricity has increased.

Objectives

The project objective is to design a thermoelectric generator (TEG) that can be installed in a combustion engine vehicle and produce 3 kW electrical power under full load conditions and 1-2 kW under partial load conditions.

The concept addressed by this proposal is to make an efficient use of the energy wasted in the form of heat in thermal engines. This heat is mainly dissipated in the exhaust device and in the cooling circuit. Many attempts have been made at trying to recover this waste heat but none have been shown to be really viable. One of the recurrent ideas in this field is the use of thermoelectric devices – converting heat into electricity statically – which has also failed to reach large-scale deployment because of its lack of performance. Three trends are being currently witnessed that combine in such a way that allows this idea to be now considered in a different perspective:

- electric power consumption is continuously increasing due to the growing number of

electric and electronic devices on board modern vehicles;

- recent improvements obtained in thermoelectric specialist laboratories show that it is close to being a viable approach;
- the environmental problems have led to strong commitments concerning the reduction of fossil-energy consumption and the emission of CO₂.

Description of Work

This project will work to reduce the energy consumption and curb CO₂ emissions of vehicles by massively harvesting electrical energy from the heat within the exhaust system, either by re-using this energy to supply electrical components within the vehicle or by feeding the powertrain of hybrid electric vehicles (HEV). The recovery of the thermal energy will be performed by novel, laboratory-available thermoelectric (TE) materials which are able to work at the high temperatures and exhibit high performance.

The project will:

- apply TE materials with high performance and therefore efficiency (compared to conventional thermoelectric modules) in automotive technology, in particular toughening up those TE materials and TE modules to be used under automotive conditions (thermal cycling, vibration, aging, corrosion, etc.);
- recover a part of the wasted thermal energy in order to produce sufficient electrical power to alleviate the alternator or to support the powertrain in HEVs;
- reducing fuel consumption and CO₂ emissions due to the reduced mechanical load at the crankshaft which is necessary to drive the alternator.

Expected Results

Generally admitted figures concerning the electrical power consumption of different kinds of vehicles are in the range of 1-2 kW and expected to increase up to 5 kW, especially for heavy trucks and buses within the next decade.

The TEG developed within this project should exhibit a high overall efficiency, i.e. it should present sufficient fuel savings so that the return on investment is two years or less.

The project will especially concentrate on light-duty trucks equipped with diesel engines for the following reasons:

- commercial vehicles are being frequently used under long-distance conditions with upper load level;
- the recovered electrical energy can be used to supply onboard auxiliaries such as refrigerating sets, fans, pumps or other motors;
- there is more available installation space for the TEG.

The project also plans to establish a supply chain among European companies capable of delivering all the components for thermoelectric waste-heat recovery.

Acronym:	HEATRECAR	
Name of proposal:	Reduced energy consumption by massive thermoelectric waste-heat recovery in light duty trucks	
Contract number:	218541	
Instrument:	CF – FP	
Total cost:	5 084 056 €	
EU contribution:	3 086 252 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.11.2009	
Ending date:	31.10.2012	
Duration:	36 months	
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HELIOS

High Energy Lithium-Ion Storage Solutions

State of the art - Background

The Li-ion battery system was developed in the 1980s and was well established on the portable battery market by the mid 1990s. The fast introduction of Li-ion batteries was motivated by electronic devices with high-energy consumption. The tendency towards smaller and lighter devices has pushed the development of Li-ion batteries even further over the past decade. The application of new materials and components has enabled almost a tripling of the energy density of Li-ion cells.

In contrast to portable batteries, automotive batteries for Electric Vehicles (EV), Hybrid Electric Vehicles (HEV) and Plug-In-Hybrid Electric Vehicles (PHEV) have to meet much stronger demands, especially with respect to energy content, power performance and life endurance. Li-ion batteries are the most prominent candidate, especially for EV and PHEV, since other systems would represent too high a weight burden. Li-ion cells with a high-energy design may achieve specific energy values of more than 150 Wh/kg. Besides power performance and energy, the demand for a longer life is another important point. For automotive applications, a life period of more than ten years is required in order to meet the economical targets. All these aspects are making Li-ion batteries the only option in an Electric Vehicle so as to have them accepted by customers.

Objectives

In the present project, the aspects of energy content, power performance, fast recharge capability, long-term endurance and safety shall be investigated for four different electrochemical Li-ion-based systems. The technical demands of EV and PHEV applications are at the forefront here. Besides the passive components (mechanical cell design, separa-

tor, electrolyte) it is mainly the active electrode materials on the positive polarity that affect performance data and the cost of the battery system. Most of the development work in the project will therefore concentrate on this aspect.

The general goal of the project is thus to correlate the different electrode chemistries to the life performance and safety. Special attention is given to this in-depth analysis by opening aged cells and having them studied by various analytical methods.

Description of Work

The project cells have first to be developed and manufactured. These cells will be used for electrical and physical characterisation, abuse testing and investigations on aging behaviour in the corresponding tasks of this project. The timing is the result of a balance between the necessary optimisation of the electrodes composition and cell layout on the one hand, and on the rapidity of the development on the other, which is crucial to ensure that the test campaigns (in particular the cycling and storage tests) will be performed on representative high-energy (HE) large-size cells.

One work package is dedicated to the cells post-failure analysis, performed by the academic partners and research institutes, in order to understand the failure mode and the impact of the electrode materials on the tests results.

The price sensitivity on the battery pack with respect to the chosen electrochemistry will be studied for a defined EV, PHEV and Hybrid Heavy Duty Trucks application.

Finally, efforts will be made to identify the recycling output products that could have (high) market values. Based on these target compounds, different potential recy-

cling processes will be screened, and the most promising will be chosen for further development/improvement.

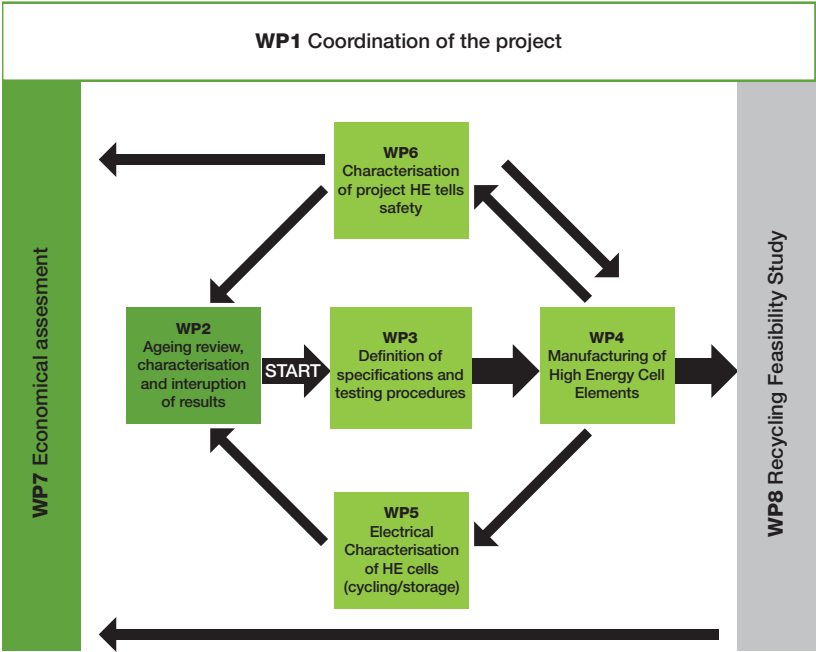
Expected Results

The outcome of the project is to introduce a commercialisation strategy for automotive battery packs for pure electric and plug-in hybrid vehicles that will contribute towards reducing CO₂ emissions.

Three public reports will be issued within the first eight months of the project, providing respectively the first common European cell specifications for high energy applications (EV, PHEV, and Hybrid Trucks), the corre-

sponding updated cycle profiles and the relevant safety test procedures. These reports will be transferred to the active standardisation working groups worldwide. This action is important in order to take the specificities of European driving cycles and driving ranges into account.

In the medium to long term (i.e. by the end of the project), three industrially produced high-energy Li-ion advanced technologies will be available, offering a higher level of abuse tolerance and a mastered evolution of the performance (life). These cells will be ready for integration in a complete battery pack system, as defined in the project.



Interdependence between work packages

Acronym:	HELIOS	
Name of proposal:	High Energy Lithium-Ion Storage Solutions	
Contract number:	233765	
Instrument:	CF – FP	
Total cost:	4 335 101 €	
EU contribution:	2 839 976 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.11.2009	
Ending date:	30.11.2012	
Duration:	36 months	
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	C.R.F. Società Consortile per Azioni	IT
	Centre National de la Recherche	FR
	Uppsala universitet	SE
	RWTH Aachen University	DE
	Umicore N.V.	BE
	Institut national de l'environnement industriel et des risques	FR
	Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg	DE
	Electricité de France SA	FR
	Johnson Controls Hybrid and Recycling GmbH	DE
	Österreichisches Forschung- und Prüfzentrum GmbH	AT
	Commissariat à l'Énergie Atomique	FR
	Ente per le Nuove tecnologie, l'Energia e l'Ambiente	IT
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HERCULES-B

Higher efficiency engine with ultra-low emissions for ships

State of the art - Background

HERCULES-Beta represents a major international co-operative effort to maximise fuel efficiency combined with ultra-low emissions, and to develop future generations of optimally efficient and clean marine diesel engines.

HERCULES was conceived in 2002 as a seven-year R&D programme to develop new technologies for marine engines:

- to increase engine efficiency, thus reducing fuel consumption and CO₂ emissions;
- to reduce gaseous and particulate emissions.

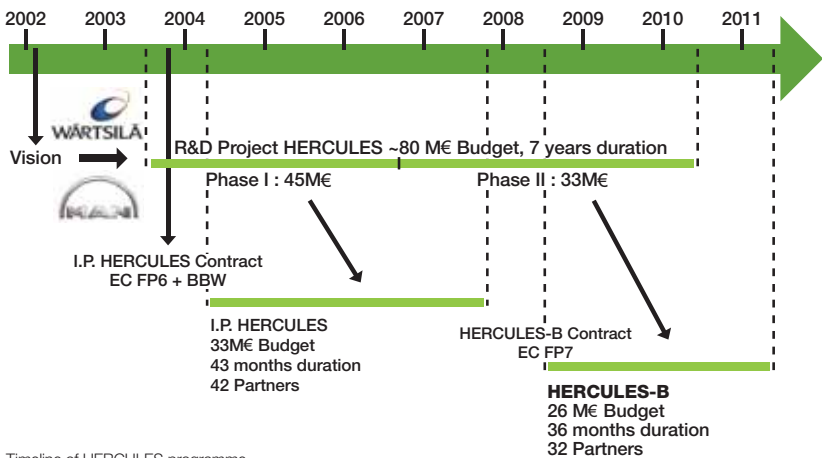
The R&D Programme HERCULES is the outcome of a joint vision by the two major European engine manufacturer groups MAN & WARTSILA, which together hold 90% of the world's marine engine market.

It was the first time that these two groups had participated together in a project with commonly defined research areas.

The first phase of the HERCULES project (materialised as the FP6 Integrated Project 'I.P. HERCULES') concentrated on the development of tools (e.g. simulation software, measurement techniques, etc.) and the general investigation of potential avenues for reducing emissions and fuel consumption. Initially, the project established and operated prototypes. The results stemming from this indicate a great potential for significantly reducing fuel consumption and emissions, and reaching the project's ambitious targets.

Objectives

The present project, HERCULES-B, is Phase II of the original seven-year programme concept. The general targets for emissions and fuel consumption are retained here; however, based on the developed know-how and results of I.P. HERCULES (A), it is possible to narrow down the search area, focus on potential breakthrough research and further develop the most promising techniques.



Timeline of HERCULES programme

The general objectives are ambitious yet realistic, and are the following overall targets with respect to economy and environmental impact of marine engines:

- 10% reduction in specific fuel consumption (and CO₂ emissions);
- ultra-low gaseous and particulate emissions.

HERCULES-Beta aims to surpass the current limits set by the International Maritime Organisation (IMO) to radically improve the environmental performance of waterborne transport.

Description of Work

The project's structure of work comprises seven work packages (WP).

WP1: Extreme Parameter Engines: work will advance towards the engine of the future. Components will be designed and tested on experimental engines operating with pressures, temperatures and mean piston speed.

WP2: Combustion: the very large spray combustion chamber facility conceived and built during HERCULES (A) will be commissioned, fully instrumented and used to provide spatially resolved combustion process data under various configurations.

WP3: Turbocharging: experimental configurations with multiple stages will be further developed and installed on test engines.

WP5: Exhaust Emission Reduction: both NO_x and particulate pollutants will be considered here.

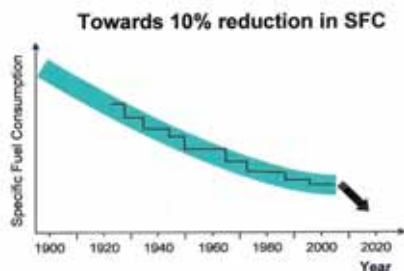
WP6: Overall Powertrain Optimisation: a new concept of compound design involving a close-coupled boiler on the high pressure side of the engine will be investigated.

WP7: Advanced Materials, Friction and Wear: new piston-ring tribology codes will be utilised with new friction and wear models, and validated with performance data from test rigs as well as from controlled full-scale piston-ring running experiments on-engine.

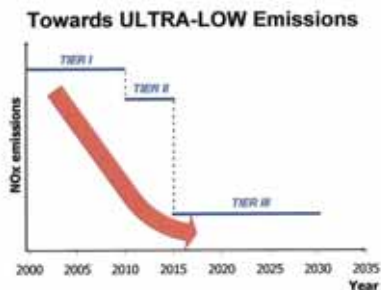
WP8: Electronics and Control: evaluation and verification of sensors for NO_x, O₂ and in-cylinder pressure in HFO engines will take place in parallel with the development of signal processing methods for engine diagnostics.

Expected Results

The project started in September 2008 with a duration of 36 months. There will be 59 deliverables. More information on these results will be posted on the project website: www.hercules-b.com



General targets of HERCULES-B project



Acronym: HERCULES-B

Name of proposal: Higher efficiency engine with ultra-low emissions for ships

Contract number: 217878

Instrument: CP – IP

Total cost: 26 369 500 €

EU contribution: 15 000 000 €

Call: FP7-SST-2007-RTD-1

Starting date: 01.09.2008

Ending date:	31.08.2011	
Duration:	36 months	
Website:	http://www.hercules-b.com	
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	Delft University of Technology	NL
	ECKA Granulate GmbH & Co. KG	DE
	EMPA - Swiss Federal Laboratories	CH
	ETH Zurich	CH
	Helsinki University of Technology	FI
	Ingenieurgesellschaft Auto und Verkehr GmbH	DE
	MAN Diesel, Filial af MAN Diesel SE, Tyskland	DK
	MAN Diesel SAS	FR
	MAN Diesel SE	DE
	Miba Gleitlager GmbH	AT
	National Technical University of Athens - Laboratory of Marine Engineering	GR
	Paul Scherrer Institut	CH
	PBS Turbo s.r.o.	CZ
	Praxair Surface Technologies GmbH	DE
	Sandvik Powdermet AB	SE
	Tampere University of Technology	FI
	Technical University of Munich	DE
	University of Karlsruhe	DE
	University of Kuopio	FI
	University of Siegen	DE
	Vansco Electronics Oy	FI
	Valtion Teknillinen Tutkimuskeskus	FI
	Wärtsilä Finland OY	FI
	Wärtsilä Schweiz AG	CH
	Federal Mogul Friedberg GmbH	DE
	Wärtsilä Propulsion Netherland BV	NL
	ABB Turbo Systems AG	CH

HOSANNA

Holistic and sustainable abatement of noise by optimized combinations of natural and artificial means

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State of the art - Background

Noise pollution is a major environmental problem in the EU. Outside of our homes, it is estimated that most of the population is exposed to road traffic noise levels above the WHO's threshold for the onset of negative health effects. The corresponding figure for rail traffic noise is lower, but still warrants action. The social costs of traffic noise have been estimated at 0.4% of total GDP. It is expected that road and rail traffic levels will increase steadily, while the source strength will not decrease significantly over the next two decades. So, a means of attenuation is needed during noise propagation from source to listener. Whereas interior noise from traffic can be reduced sufficiently for a good sound environment, the outdoor sound environment is more difficult to protect. The toolbox and descriptions for best practice developed aim to advance the state of art, using greening of buildings, as well as vegetation and recycled materials on other surfaces, innovative barriers, and new surface treatments.

A poor outdoor sound environment and access to greenery may threaten public health in the long term. The costs of having green areas and surfaces in urban and rural environments are well accepted and established without considering noise issues. The main concept is that exploiting these green areas

while minimising noise impact will lead to a better use of resources.

Objectives

- To develop new, powerful and sustainable abatement methods for noise reduction, based on natural means in combination with artificial means;
- To show by full-scale evaluation that the abatement methods work;
- To develop prediction methods applicable to the analysis and design of the developed abatements;
- To make available simplified models applicable to the developed abatements, which can be used in engineering noise-mapping software and to demonstrate that the innovative approaches of HOSANNA are relevant to reporting strategic maps and action plans to the EU;
- To make available assessment methods for the perceived improvement of the sonic environment and reduced noise annoyance;
- To show the cost benefit of the resulting abatement methods, including the positive effect on urban air quality and CO₂ neutrality;
- To disseminate the results to the user community (consultants, local authorities and planners), mainly by producing, making available and presenting a good practice guide.

Description of Work

The project will result in a toolbox and best practice guide for the reduction of road and rail traffic noise in the outdoor environment, which is cost effective and shows positive effects on the environment as a whole. The project concentrates on noise-abatement techniques in the noise propagation path, dealing with a large variety of approaches, embracing new ground and road surface treatments, the development of low barriers with vegetation and recycled materials, optimised planting of trees, greening of building rooftops, inner yards and traffic-facing façades.

Expected Results

HOSANNA proposes to use the costs of existing and proposed green areas in city and rural environments in a more efficient way, i.e. to reduce the noise, too. This will be made for a wide range of surface transport configurations while also considering annoyance aspects. Solution methods for noise abatements combining natural and artificial means and their optimised combinations will be developed to be applicable at the end of the project. HOSANNA will also devise simplified methodologies so that the planning, consulting and engineering communities can choose and incorporate the project's innovative solutions by taking them into account in their work and engineering simulations. Assessment methods for the perceived noise environment will be developed, including new indicators for parks and green areas.

The main goal of HOSANNA is to contribute with knowledge and know-how to large-scale, cost-effective noise abatement. If implemented, the corresponding effects on European health will be considerable. When translated into good practices and recommendations, the project results will help city planners and engineers in defining the most adapted action plans as required in the European Commission's Directive on Noise 2002/49/EC.

Acronym:	HOSANNA	
Name of proposal:	Holistic and sustainable abatement of noise by optimized combinations of natural and artificial means	
Contract number:	234306	
Instrument:	CF – FP	
Total cost:	5 098 389 €	
EU contribution:	3 900 000 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.11.2009	
Ending date:	31.10.2012	
Duration:	36 months	
Website:	http://www.greener-cities.eu	
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	University of Bradford	UK
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	Interdisciplinair Instituut voor BreedBand Technologie vzw	BE
	Institute of Transport Economics	NO
	Müller-BBM GmbH	DE
	CANEVAFLORE SAS	FR
	ACOUCITE	FR
	City of Stockholm, Environment and Health Administration	SE

HOVERSPILL

Multi-environment air cushion oil spill fast response and post-emergency remediation system

State of the art - Background

In the case of an accidental oil spill, the existing technological solutions for coastal and shore remediation consist of a system which recovers floating oil before it reaches the coast. Compact dimension vehicles, which are either small vessels or pontoons with a skimmer sucking the floating oil, are the only systems currently available on the market. These vehicles only work in limited areas and rarely in very shallow waters.

The hovercraft can operate easily in these environments: they move on any liquid or solid surface, including rough seas, and can operate at high speed or whilst floating. However there are no available hovercraft on the market with the appropriate characteristics for oil-spill intervention and post-emergency actions.

The project proposes a specific air-cushion vehicle that is amphibious and capable of working on land and water, in areas with high and soft mud. The vessel is designed to be cheap and easy to maintain, capable of high operative speeds (>30 kn) and storing spilled oil. The vehicle behaves the same as an amphibious vehicle with a floating pontoon and an operative platform for soft and inconsistent mud, and since it has no need to take water to cool the engine it can work on land, both as a generator and as a separator of washing waters, as well as being able to transport, supply and deploy crews and equipment.

Objectives

The main objective of HoverSpill is the development of an innovative integrated system for oil-spill emergencies in the transitional areas between land and sea, working with im-

mediacy and efficiency. The project intends to develop a specialised air cushion platform which will:

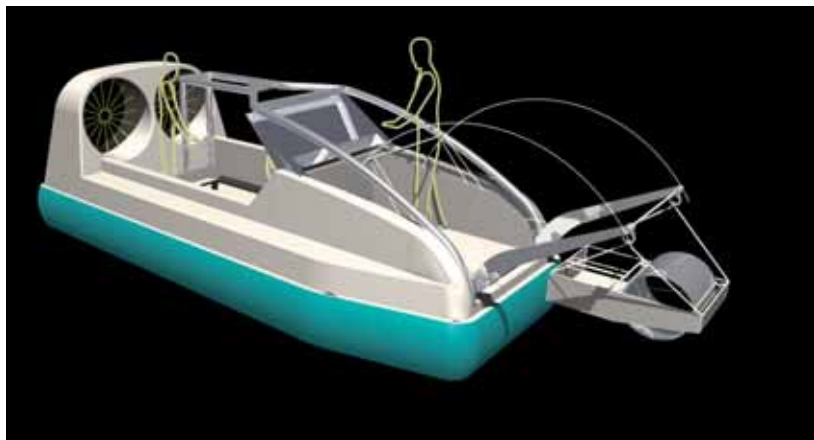
- be propelled by diesel engines, with an effective cooling system compatible with the high power needed for good manoeuvrability, and capable of cooling the compressed air before its introduction in the intercooler;
- have a highly effective double-stage integrated system to separate floating oils, with an internal storage tank, a system for the transfer to remote tanks or into floating bags, and the possibility of transporting absorbing booms and confining barriers;
- have integrated power take-off, and generators to supply the tools necessary to power pressure or brush washing systems, recuperating the skimmed oil and restoring the polluted areas in the post-emergency phase;
- be capable of being positioned on the deck of a ship or oil-tanker ready for use during oil transfer operations in case of spillage.

Description of Work

The project is structured in seven technical work packages (WP):

WP1: analyse oil-spill response strategies and techniques potentially available from land and sea, which operate on shorelines with bad access such as estuary, marsh and wetland areas, focusing on the constraints and limits encountered by response equipment and the logistics usually used in these environments.

WP2 defines the preliminary HoverSpill system design. The vessel architecture will be designed, with flow, pressure and air volumes for lift maintenance defined as ducts, sections and load distribution.



WP3 works on the separation system design to obtain the maximum possible separation and consequently the minimum water quantity inside the storage tank, including:

- skimmer design and development;
- second-stage separator (cyclone) design and development;
- main input and output interfaces.

WP4 aims at the integrated system design, based on a single turbocharged diesel engine, able to provide energy to the vessel movement and to the oil-spill response system. The integrated cooling system will be one of the key items of the whole integrated system.

WP5 develops a prototype from the created subsystems and components.

WP6 concerns the testing of all subsystems installed on a test bench, in order to verify their performances.

WP7 tests the HoverSpill vehicle in several situations simulating polluted areas.

Expected Results

The result of the project will be an innovative procedure for oil-spill emergencies, providing the greatest immediacy and effectiveness. This procedure will have a huge economic and social impact on coastal activities and on the stakeholders exploiting the sea's resources. The main social impact caused by marine pollution related to accidental oil spills is on fishing resources and, as a consequence, on the entire value chain connected to the fishing economy. The most direct economic impact is related to the clean-up costs at sea and around coasts, which is estimated at € 100-200 million. Due to its technical characteristics, HoverSpill has the potential to positively mitigate the negative economic impacts by reducing the clean-up costs. Thanks to its rapidity in reaching the place of disaster and the response efficiency, the system reduces the environmental impact of an oil spill. Moreover, due to its small dimension it can be positioned on the decks of ships or oil tankers and could be also used during oil transfer operations, providing early intervention in case of an accident.

Acronym:	HOVERSPILL	
Name of proposal:	Multi-environment air cushion oil spill fast response and post-emergency remediation system	
Contract number:	234209	
Instrument:	CF – FP	
Total cost:	3 449 113 €	
EU contribution:	2 598 021 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.12.2009	
Ending date:	30.11.2012	
Duration:	36 months	
Coordinator:	Dr. Federica Marotti INNOVA S.p.A. Via della Scrofa 117 IT 00186 Rome	
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	YLec Consultants	FR
	Admarin Designers Consultants Contractors	TR
	SC Terra Mediu SRL	RO
	Hovertech Ltd	UK
	Università degli Studi di Padova	IT
	Centro Ricerche Fiat S.C.p.A.	IT

HYMAR

High efficiency hybrid drive trains for small and mediumsized marine craft

State of the art - Background

The primary rationale for electric propulsion in smaller vessels is to minimise environmental impact and improve fuel efficiency.

Unlike bigger ships which can bring multiple generators on line to optimise fuel efficiency, most small vessels only have a single generator. This must be run at varying speeds and loads, presenting a significant challenge to optimising efficiency.

A further challenge for electric propulsion in smaller vessels is the potential to operate silently and emissions free for periods of time off stored energy, and to integrate 'green' energy sources into the overall energy equation.

Conceptually, the systems are simple. In reality, they have to integrate the operating characteristics of a fossil-fuelled engine with those of a complex electric motor and motor controller, while managing the charge and discharge profile of a battery bank in a manner that results in an acceptable battery life. It takes a lot of data inputs and sophisticated algorithms, synthesised in a 'black box' management module, to successfully balance all the components in the system.

Some of the necessary pieces are understood and some of the components are available from other applications but it is the optimisation of the complex interaction of all these pieces in marine hybrid applications that is lacking, and the central controller necessary to achieve this.



© K Wittamore

HYMAR trials vessel

© K Wiltmore



Trial engine and generator layout

Objectives

The principal objective is to research, develop and validate the design specifications, tools and components necessary to build a fully integrated and optimised marine electric hybrid system for small to medium-sized commercial and recreational vessels.

Other aims include:

- An open platform and design tools for the widespread implementation of marine hybrid technologies.
- More consumer choice.
- Single-fuel boats.
- A fully integrated marine hybrid drive system demonstrator for displacement commercial and recreational craft up to 24m.
- Zero emissions to air and zero discernible noise and vibration in harbour.
- A 50% increase in the lifetime kilowatt-hour performance of lead-acid batteries in marine hybrid applications.
- Propeller efficiency increased by 5% at full load and >15% at 'off design point' operation.
- 20% reduction in overall fuel consumption, tending to >90% in long-distance sailing boats.

- Contribution to new standards for measuring fuel efficiency and for installation of high-voltage DC electrical systems.

The hybrid platform represents a necessary first step towards replacing the internal combustion engine. It will be compatible with, and provide a framework for developing, emerging International Standards Organisation (ISO) and American Boat and Yacht Council (ABYC) standards.

Description of Work

A number of interlinked but parallel pieces of work will produce the missing components and knowledge needed to produce an efficient hybrid drive system:

1. An extensive programme of waterborne data collection
2. Formation of an 'algorithm committee' to integrate the existing experience of HYMAR members with new knowledge acquired so as to produce the control algorithms needed by the EMM
3. Creation of a new hybrid energy management module (EMM) which will use the logic from the algorithm committee to integrate and control all electrical and digital functions
4. Electric motor efficiency mapping and controller development
5. Generator efficiency mapping and controller development
6. R&D to produce missing power electronics components with high operational efficiency and capable of being managed by the energy management module
 - a. 144 volt DC inverter
 - b. Battery charger with 144 volt DC output and universal input
 - c. DC to DC charger with high voltage DC input and 12 or 24 volt output
 - d. Battery controller with CAN bus interface
7. R&D to model and develop the torque-following propeller

8. R&D to model a rim-drive propulsor
9. R&D to develop thin-plate pure lead-plate batteries optimised for hybrid propulsion
10. Technology foresight tracking of other energy-storage technologies

As components become available they will be installed and tested in the trials boat

Expected Results

The major new technologies resulting from the project will be:

- An Energy Management Module monitoring all elements of the system and providing efficient and holistic control.
- A generic design tool to specify the components required to produce an optimum hybrid drive system for a specific vessel.
- A torque adapted, self-pitching propeller, derived from the Bruntons Autoprop.
- A design tool for self-pitching propellers.
- A new generation of thin-plate pure lead (TPPL) batteries with optimised geometry and electrochemistry for hybrid applications, derived from the Enersys Odyssey batteries.
- A dynamic permanent magnet DC (PMDC) motor controller.
- A dynamic PMDC generator controller.
- A proof of concept rim-drive propeller based on a PMDC motor and self-pitching propeller.
- A design specification for large PMDC drive motors.
- A design specification for PMDC generators.
- An outline design for a keel-mounted hybrid drive unit.
- Contributions to NMEA 2000 standards.
- Contributions to the development of a harmonised ISO safety standard for electric propulsion systems above 50v DC.
- Universal AC input to a 144v DC battery charger.
- Efficient DC to DC converter 144v to 12 volts and 24 volts.

Acronym:	HYMAR	
Name of proposal:	High efficiency hybrid drive trains for small and medium sized marine craft	
Contract number:	233718	
Instrument:	CF – FP	
Total cost:	2 762 960 €	
EU contribution:	2 000 106 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.05.2009	
Ending date:	30.04.2012	
Duration:	36 months	
Website:	http://www.hymar.org	
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	Malo Yachts AB	SE
	ESP Ltd	UK
	Steyr Motors GmbH	AT

INFRAGUIDER

Infrastructure guidelines for environmental railway performance

State of the art - Background

In the last ten years, railway companies have developed a new sensitivity to environmental management and made considerable efforts to reduce the railway's impact on the environment. In 1998 the UIC Agenda 21 was signed, which included as objectives: CO₂ and noise reduction, efficient use of energy, support of 'polluter-pays' principle, vegetation management, reduction of soil, water and air pollution, recycling etc.

Many EU infrastructure managers started introducing Environmental Management (EM) Systems between 2001 and 2003 on a voluntary basis or following government recommendations, by achieving compliance with ISO 14001.

Practical tools for evaluation do not exist in this context. EM implementation methods are not harmonised on an international or national basis, and environmental performance indicators are not defined for the railway infrastructure construction, operation or maintenance processes. The consequence is that the overall awareness of the Environmental Aspects in Railway Infrastructure procurement, operation and maintenance is rapidly evolving and only now beginning to be addressed at an international level.

A lesson to approach the environmental issues in railway infrastructure can be learned in Rolling Stock Procurement in recent years. After research projects such as RAVEL, REPID and PROSPER, completed in 2006, the UIC Code 345 has been defined.

Objectives

The objective of the InfraGuidER Coordinating Action is to enable an efficient and profitable exchange of know-how, experience, insight and research results among different actors and experts of railway research focusing

on the Railway Infrastructure Environmental Impact Evaluation.

The goal is to coordinate the ongoing research activities toward the following specific objectives:

- a shared understanding of both the common and different environmental aspects relevant to the railway infrastructure system in Europe, and identification of a common practical approach to harmonise material procurement based on these environmental aspects (i.e. eco-procurement guidelines);
- a description of the environmental aspects relevant to the European railway infrastructure system;
- the definition of a draft set of Environmental Performance Indicators (EPIs) formulated as a harmonised European eco-procurement guideline for railway infrastructure. Such EPIs can also be used for assessment of the environmental performance of existing railway infrastructure;
- the identification of an appropriate set of methods and tools for the assessment of the environmental significance of materials used in railway infrastructure systems, including systems analysis (SA) and material flow analysis (MFA).

Description of Work

The strategic management is developed with two work packages (WP0: Management and assessment and WP5: Communication and dissemination) where the partners participate in order to define the strategic plan, and to organise and finalise the scientific and technical workshops.

This process is monitored by the Strategic Board. The aim is to broaden the Coordinated Action and the consensus process, as well as reducing the risk of a lack of results, by running a high number of workshops.

The integrated scientific approach is developed within WP1, WP2 and WP3, and is aligned with the integrated technical approach so as to include all of the final harmonised guidelines for enhancing the environmental performance of railway infrastructure.

The contingency actions or specific resolutions will be taken not only at work package and task level but also by means of Task 0.4, which is devoted to coordinating joint activities to keep consistent system boundaries for WPs 1-3.

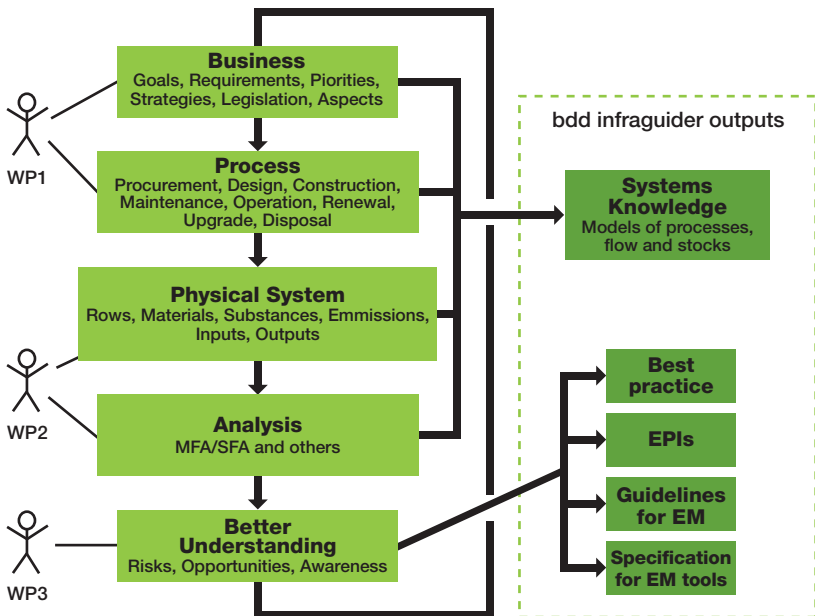
Finally WP4 is devoted to creating the final harmonised results, which include the environmental tools' technical specifications and the general guidelines so as to improve the environmental performance in railway infrastructure.

Expected Results

The major project deliverables are:

- list of key environmental aspects;
- list of proposed EPIs;
- proposed list of environmentally significant materials;
- recommended material assessment tools, e.g. design support, material localisation support, material flow analysis;
- draft eco-procurement guidelines;
- a handbook with four to five main sections, such as (level of detail based on infrastructure management priorities):
- environmental management of railway infrastructure;
- designing and planning railway infrastructure in consideration of environmental impacts during the whole life cycle;
- list of tools (level of detail for each tool based on infrastructure management priorities);
- management of waste fractions from the different life-cycle phases of railway infrastructure.

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InfraGuidER activities

The expected impacts are:

- initiating harmonisation among the environmental management systems (EMS) of railways with the creation of a standardised environmental process model;
- setting up a global model for an EMS for railway infrastructure managers;
- creating the baseline and requirements for a database/calculation tool for infrastructure managers and suppliers that can predict the environmental impact of materials;
- supporting the creation process of a new legislation for an eco-procurement process for railway infrastructure.

Acronym:	INFRAGUIDER
Name of proposal:	Infrastructure guidelines for environmental railway performance
Contract number:	218662
Instrument:	CSA – CA
Total cost:	1 138 665 €
EU contribution:	1 138 665 €
Call:	FP7-SST-2007-RTD-1
Starting date:	01.01.2009
Ending date:	31.12.2010
Duration:	24 months
Website:	http://www.infraguider.eu
Coordinator:	Dr. Marina Fracchia Consorzio Nazionale Interuniversitario per i Trasporti e la Logistica Via all'Opera Pia 11A IT 16145 Genoa
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INGAS

Integrated gas powertrain - Low-emission, CO₂-optimised and efficient CNG engines for passenger cars and light duty vehicles

State of the art - Background

Natural gas (NG) vehicles were introduced on the market more than ten years ago but today's market share of compressed natural gas (CNG) vehicles, though rapidly increasing, is relatively small. Today's gas engines have the serious drawback of being developed as multifuel engines from conventional gasoline-fuelled combustion engines. Optimised gas technology development suffers from the insufficient infrastructure of filling stations, which results in a clearly reduced operating field of CNG mono-fuel vehicles, thus reducing their acceptance to the end customer. In addition there are the challenging storage requirements for gaseous fuels.

The market introduction of dedicated CNG vehicles requires the development of technologies which can solve the problems concerning gas storage, gas feeding, the combustion system and after-treatment, and the quality of the natural gas. These technologies do not follow a unique path but take different routes regarding the gas feeding/combustion systems, aiming at the given target once actions concerning gas quality, gas onboard storage and after-treatment have been successfully performed. This approach can only be carried out by a large-scale collaborative project where all the actions are strictly integrated.

Objectives

The objective of the Collaborative Project InGas is to deploy a custom-designed engine integrated with specific after-treatment systems applied to a light duty (LD) vehicle capable of achieving a 10% higher fuel conversion efficiency than that of a corresponding 2006 diesel vehicle, and complying with an emis-

sion level lower than Euro 6. Additional features will be advanced storage systems and vehicle architectures, as well as multigrade fuel tolerance and fuel flexibility.

Description of Work

SP B0: Fuels for advanced CNG engines – defines and supplies the gas mixture of the requested quality to the other sub-projects.

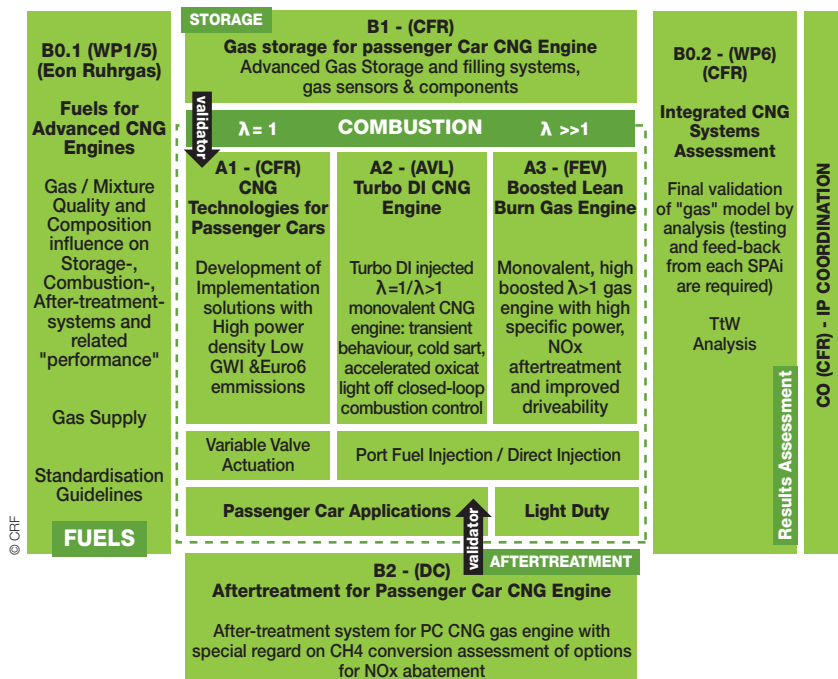
SP B1: Gas storage for passenger car CNG engine – develops advanced gas storage and filling systems, including specific components and gas sensors (vehicle range target of more than 500 km).

SP B2: After-treatment for passenger car CNG engine – deals with the development of an after-treatment system for natural gas vehicles with special regard to CH₄ conversion efficiency and NO_x abatement under lean combustion operations.

SP A1: CNG technologies for passenger cars – develops a natural gas car powered by a 1.4 litre displacement engine, made by adopting the innovative technology of variable valve management on a stoichiometric combustion/sequential multipoint port gas injection approach.

SP A2: Turbo DI CNG engine – develops a natural gas car powered by a 1.8 litre displacement engine, made by adopting the innovative technology of direct gas in-cylinder injection for a stoichiometric and stratified lean burn approach.

SP A3: Boosted lean burn gas engine – develops a natural gas light-duty vehicle powered by a 1.9 litre displacement engine, made by adopting an innovative over-boosted ultra-lean combustion system.



INGAS overall plan

Expected Results

The expected results are:

- three different custom-designed LD NG engines (including vehicle performance as fun-to-drive) with three different combustion and injection technologies for higher efficiency on fuel to energy conversion:
1. multicylinder with small displacement, port fuel injection, stoichiometric combustion and variable valve actuation;
 2. multicylinder with medium displacement, direct injection, partly lean combustion;
 3. possibly multicylinder with ultra-lean combustion combined with after-treatment and able to comply with EURO 6 limits;
- a specific CH4 after-treatment for fuel-neutral emission targets more severe than Euro 6;

- a highly integrated CNG storage module fulfilling all automotive constraints: gasoline-like vehicle range, weight, volume, costs, assembly/disassembly, maintenance and safety requirements; also by means of numerical simulations of different crash-load cases;
- multigrade fuel (NG) tolerance and fuel flexibility increasing the security of energy supply by means of gas sensors;
- an assessment of well-to-tank (WtT) performance of the different gaseous mixtures necessary to establish the overall well-to-wheel (WtW) balance based on a tank-to-wheel (TtW) assessment resulting from the three different technological methods.

Acronym:	INGAS	
Name of proposal:	Integrated gas powertrain - Low-emission, CO ₂ -optimised and efficient CNG engines for passenger cars and light duty vehicles	
Contract number:	218447	
Instrument:	CF – FP	
Total cost:	21 644 528 €	
EU contribution:	12 284 757 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.10.2008	
Ending date:	30.09.2011	
Duration:	36 months	
Website:	http://www.ingas-eu.org	
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	SAAB Automobile Powertrain AB	SE
	Adam Opel GmbH	DE
	GDF Suez S.A.	FR
	IFP Energies Nouvelles	FR
	Istituto Motori - Consiglio Nazionale delle Ricerche	IT
	Technische Universität Graz	AT
	Ecocat Oy	FI
	Continental Automotive GmbH	DE
	Siemens AG	DE
	Politecnico di Torino	IT
	Chalmers Tekniska Högskola AB	SE
	Haldor Topsoe A/S	DK
	Rheinisch-Westfälische Technische Hochschule Aachen	DE
	MEMS AG - Matter Engineering for Metering Systems	CH
	Ceské vysoké učené technické v Praze	CZ
	ALPHA Composites GmbH	DE
	VENTREX Automotive GmbH	AT
	Bundesanstalt für Materialforschung und -prüfung	DE

Politechnika Wroclawska	PL
Delphi Automotive Systems Luxembourg SA	LU
Universität Stuttgart	DE
Politecnico di Milano	IT
Instytut Katalizy i Fizykochemii Powierzchni Polska Akademia Nauk	PL
Katcon Global SA	LU

KITVES

Airfoil-based solution for vessel onboard energy production destined to traction and auxiliary services

State of the art - Background

The sea transportation sector has two major concerns today: its environmental footprint and operating costs. These concerns are relevant to all maritime sectors: owners of cruise liners are particularly affected by the former, while the cost of fuel remains a key factor in sea-freight transportation.

In order to maintain and strengthen its position of global leadership in the waterborne transport sector, Europe needs to set the highest possible quality standards for safe and sustainable maritime operations, as well as increasing the pace of waterborne transport innovations.

Waterborne transport industries need to ensure continuous and cost-effective improvements, as well as reducing risks and keeping the environmental footprint of waterborne transport and operations to a minimum.

More than 3 million people work directly in the European waterborne sector and generate a turnover of about € 200 billion with an added value totalling about € 100 billion. This represents more than 1% of EU GDP. Maritime transport continues to grow at twice the rate

of global GDP, with between 80 and 90% of all goods imported and exported by Europe being transported by sea. Within the EU, more than 40% of goods are carried by water.

In order to face these two issues, new power systems based on renewable energy sources are being studied.

Objectives

Wind, together with human energy, was the first energy source to be exploited for vessel traction over the sea. As the wind is a renewable and virtually endless energy source, it is foreseeable that, as long as the energy problem continues to increase and become urgent, it could also be destined to be the future of navigation.

Traditional sail traction evolution over the years has improved performance, mainly thanks to new materials. However, traditional sailboats only exploit low altitude wind.

Direct traction used by airfoils was patented by BP in 1982 and adopted by SkySails as a possible solution. But medium and large-vessel traction and onboard service energy supply is normally performed by electric motors



Flying kite

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supplied by an IC generator, so wind as an energy source would have to be collected at high altitude and converted into electricity. Kite Gen technology represents a more advanced technical solution to exploiting high altitude wind for energy generation (see www.kitegen.com).

KitVes' main goal is to explore the exploitability of this already proven generating solution in a brand new field of application: vessel transportation. KitVes will provide an innovative solution supplying vessels with electric energy, available for onboard services and auxiliaries and, furthermore, supplying energy for traction purposes on electric motor-powered vessels.

Description of Work

The KitVes solution is based on the onboard realisation of a wind-powered generator, capable of harvesting the altitude winds and efficiently converting wind power into electrical power.

The project is broken down into eight work packages (WP).

WP1: Project management, quality assurance, exploitation, training and dissemination.

WP2: Carry out a comparison with other optional competing solutions.

WP3: Carry out a geometric energy balance and fully integrate the KitVes operation with international rules and conventions.

WP4: Assess the most suitable solution for the wing/wing array and the lines that have to equip the Kite Steering Unit (KSU).

WP5: Optimisation of the control algorithms, onboard sensors and data transmission from and to the sensors; energy generation and storage for the sensors and the transmission devices; realisation of a full model of the system.

WP6: Adaptation and optimisation of the Kite Steering Unit's mechanical design.

WP7: Navigation trials.

WP8: Risk assessment, Failure Mode and Effects Analysis/ Failure Modes, Effects and Criticality Analysis, safety and environmental issues.

Expected Results

The expected results are new patents and knowledge, since the project encompasses both consolidating and evolving disciplines and technologies, such as atmosphere dynamics, flight mechanics, hydrodynamics, electrical engineering, predictive control engineering, 3D movement tracking sensors and impressively performing new materials.

By adopting the KitVes solution, the IC generator will be set aside or replaced with a single-wing array Kite Wind Generator, which will have the following advantages over traditional wind traction:

- the ability to harvest powerful geostrophic and gradient wind in the troposphere and transform it into electrical energy;
- generating power commensurate to the vessel requirements for auxiliary services, traction or both;
- providing automatic optimisation of the balance between the amount of the generated energy and the resulting forces referring to the velocity and direction of the vessel;
- allowing freedom of direction, with airspace occupancy compatible to other vessels equipped with the same system and flying objects, automatically controlling any risk of collision;
- implementing the take-off/landing of the wings and their recovery thus allowing for unattended operations.

Acronym:	KITVES	
Name of proposal:	Airfoil-based solution for vessel onboard energy production destined to traction and auxiliary services	
Contract number:	218691	
Instrument:	CF – FP	
Total cost:	4 254 055 €	
EU contribution:	2 955 738 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.10.2008	
Ending date:	30.09.2011	
Duration:	36 months	
Website:	http://www.kitves.com	
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	Modelway srl	IT
	University of Sheffield	UK
	Katholieke Universiteit Leuven	BE
	Fundación Fatronik	ES
	Haute École Arc Ingénierie	CH
	Bergische Universität Wuppertal	DE
	SVMtec GmbH	DE
	TEKS SARL	FR

LESSCCV

Large-Eddy and System Simulation to predict Cyclic Combustion Variability in gasoline engines

State of the art - Background

In a context of more and more stringent constraints on fuel consumption, CO₂ production, and pollutant emissions from road transport, it is becoming crucial to be able to predict and control individual engine cycles, and thus to address the occurrence and effects of cyclic combustion variability (CCV). Gasoline engine technologies as direct fuel injection, controlled auto-ignition or downsizing are key elements to reducing the CO₂ emissions from future engines. Yet the occurrence, under certain operating conditions, of excessive CCV when implementing these technologies is one of the factors limiting their theoretical performance or range of operation. Being able to predict CCV in early design phases based on an improved knowledge of their sources and effects could be essential to exploit the full potential of these promising SI technologies under real operation. Yet, today's standard engine simulation tools, which are a key element for speeding up and optimising the design of new concepts, cannot address these phenomena.

Objectives

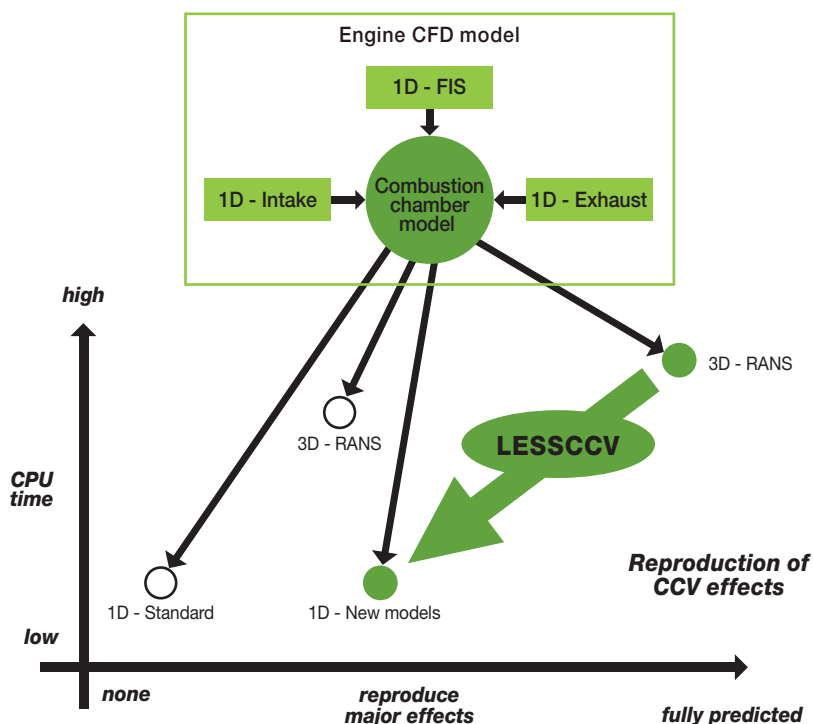
LESSCCV aims to use recent options in advanced computational fluid dynamics (CFD) tools to improve the understanding of CCV related to flow in SIE and provide adequate modelling. Key to this is exploitation of the emerging Large-Eddy Simulation (LES) technique. In contrast to today's standard approaches in industrial design, LES allows the local instantaneous flow phenomena to be addressed on a cycle-to-cycle basis, without assuming small variability. Work in the FP5 LESSCO₂ project had shown the unique capability of LES to reproduce cyclic variations in a gasoline engine. LESSCCV will not only further develop LES for study-

ing local flow effects inside the cylinder and their impact on the appearance of combustion variability, but will combine this with one-dimensional simulations (1D CFD) of a whole engine or vehicle system. Coupling LES and 1D CFD codes will reveal how interaction between local and global flow characteristics can lead to CCV's appearance in gasoline engines. Analysing such simulations will improve understanding of their origins and nature, resulting in phenomenological models for use in 1D CFD of complete engines to reproduce the effects of CCV. As such models are currently based on ad-hoc assumptions, the result could be a real innovation, enabling use of 1D CFD to develop and test control algorithms to reduce CCV's negative impact in modern gasoline engines.

Description of Work

The proposed research work can be summarised thus:

- Develop multi-scale CFD tools able to predict CCV in SIE, based on coupling innovative 3D-CFD tools based on Large-Eddy Simulation (LES) with 1D-CFD tools used to simulate full engines under realistic operation;
- Apply the resulting multi-scale CFD tools to the study of CCV in indirect injection (II) SI, direct injection (DI) SI and CAI engines for a basic understanding of the origins and impact of CCV;
- Complement the multi-scale CFD findings with studies of local effects of CCV related to early flame kernel growth at the spark plug, and interactions between injector flow and fuel spray;
- Based on findings from the multi-scale CFD studies and studies of local effects of importance to CCV, propose models which combine with combustion chamber mod-



els to reproduce effects of CCV in multi-cycle 1D-CFD simulations of full engines, in regions where CCV were found to be important. The chosen approach aims to address cyclic variations of heat-release rate (and thus cylinder pressure), the impact on pollutants resulting from applying existing approaches for their kinetics;

- Apply the CCV models developed in industrial 1D-CFD software, and perform case studies to assess the improved reproduction of the CCV characteristics and effects they enable. Explore how this can further improve the design and operation of advanced SIE.

Expected Results

LESSCCV proposes to demonstrate how the use of advanced engine simulation tools can contribute to the acquisition of an unprecedented understanding of the sources of CCV,

and of ways to predict them. The originality of the proposed work is to develop and apply novel simulation tools that enable the study of CCV in full engines under realistic operating conditions, and to show how the analysis of the obtained results can help deepen the understanding of the way the different possible sources for CCV lead to the variability observed under real engine operation.

The resulting simulation tools will be available after the project to optimise new engine designs in order to lessen the negative effects related to the occurrence of CCV. This will contribute to reducing the CO₂ and pollutant emissions from such concepts, thereby having a positive impact on the greening of European road transport, as well as on the competitiveness of the European automotive industry.

Acronym: LESSCCV
Name of proposal: Large-Eddy and System Simulation to predict Cyclic Combustion Variability in gasoline engines
Contract number: 233615
Instrument: CF – FP
Total cost: 3 224 684 €
EU contribution: 2 058 617 €
Call: FP7-SST-2008-RTD-1
Starting date: 01.12.2009
Ending date: 30.11.2012
Duration: 36 months
Coordinator: Dr. Christian Angelberger
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POSE²IDON

Power Optimised Ship for Environment with Electric Innovative Designs ON board

State of the art - Background

The 'electric ship' concept has been limited to electrical propulsion and reserved for ships requiring:

- flexibility in manoeuvring;
- reduction of airborne noise;
- low acoustic signature in water;
- high torque at slow speed.

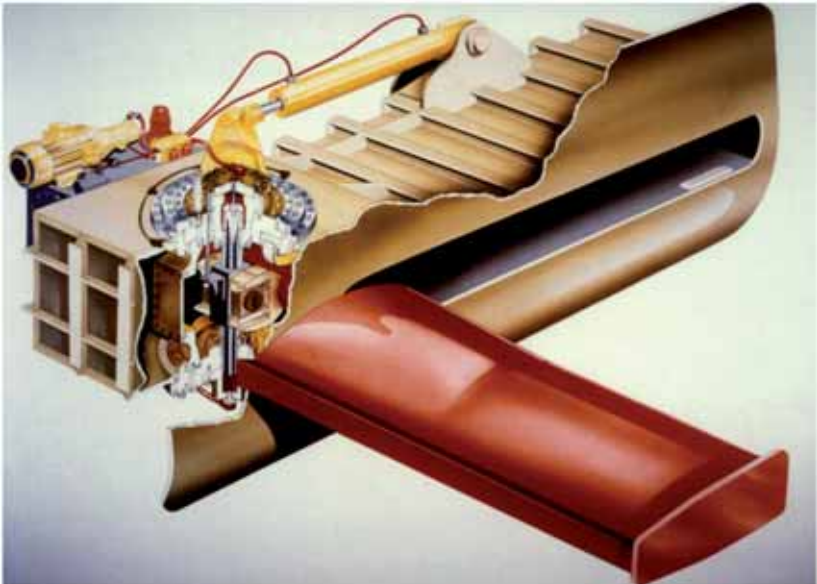
Typically the electrical solutions were applied for cruise ships, oceanographic vessels, cable layers and submarines. These vessels represented less than 1% of the world complement but this was the first step in the development of electrical propulsion. The electrical propulsion has already extended to supply vessels for the offshore industry and to LNG carriers,

stabilising the electric ship market close to 4% of the global market.

New electrical auxiliaries for ships have been developed and tested over the last ten years due to the technologies developed on board naval vessels, for instance European multi-mission frigates (FREMMs) and submarines. Electrical propulsion has confirmed its advantages in terms of flexibility, maintenance and noise reduction, and represents a major solution to significantly reducing airborne emissions. Its enlargement to new ship types will depend on the capacity to develop new technologies for the propulsion:

- enhancing the overall efficiency and fuel use in manoeuvring;

© Converteam HTS Technology New electrical auxiliaries Rolls-Royce and Accab





- reducing the total volume and weight of the power chain;
- reducing the cost distortion between direct mechanical and electrical solutions.

Objectives

The project proposes to apply the high-temperature superconducting (HTS) technology to the power chain - generators, motors, converters and main distribution cables - a technology whose performance is presently demonstrated in some other industrial segments. The move to integrated all-electric designs for commercial vessels will significantly improve efficiency, effectiveness and survivability, while simultaneously increasing design flexibility, reducing costs and enhancing operational efficiency.

The main option is to connect the ship to a shore-based power supply instead of using heavy oil-fuelled generators on board vessels. For several years now efforts have been made to establish shore connections for use during port time. For small vessels with power of less than 1MW, basic solutions are known and have been implemented in some harbours. An arc fault in switch-gear assemblies is frequently the reason for a total blackout on board. It is characterised by a substantial arc

power, which causes destruction of the switch gear assembly. Wireless operation of sensors and field devices is one possible response to this problem. It is expected that a 50% reduction of cables can be achieved saving material, space, weight, installation and maintenance costs in the same order of magnitude.

Description of Work

POSE²IDON is a response to this extension of the 'electric ship' concept, representing the first large integrated project of the European marine electrical industry. It proposes the following R&D technology advances applied to the different ship systems:

- high temperature superconducting (HTS) technology applied to the power generation and the propulsion;
- HTS DC power transmission and distribution;
- wireless monitoring system concept for the control;
- green shore electric supply or cold-ironing concept;
- electric concept applied to all auxiliary systems;
- arc fault resistance technology for an efficient protective system of the power distribution.

The expected benefits issued from these technologies will be checked by integrating them in the design of various vessel types representing some categories of ships, while classification societies will evaluate the incidences of safety on board and the environmental impacts.

Expected Results

The demonstration system will include generators and motors of significant size - around 1 MW - using HTS technology and integrated power electronics, the new distribution architecture and HTS power distribution cables. The shore-based demonstrator linked with the propulsion demonstrator above will allow testing of different types of new actuators (rotation and translation) and different sizes of

electric actuation systems for different cases of applications on ships: rudder-roll systems, deck equipment and stabilisation systems.

The technical work packages should be ready to give definitive results within the first two years of the project in order to construct the shore-based demonstrator, commission it and test the different components.

A mid-term conference will inform the scientific community about the results of the work packages.

At the end, an exploitation plan will summarise the obtained results on the capability of extending the 'all-electric' concept to a wider range of vessels and propose some trends or innovative subjects for increasing the achieved performances.

Acronym: POSEIDON

Name of proposal: Power Optimised Ship for Environment with Electric Innovative Designs ON board

Contract number: 218599

Instrument: CF – FP

Total cost: 21 464 230 €

EU contribution: 10 130 278 €

Call: FP7-SST-2007-RTD-1

Starting date: 01.01.2009

Ending date: 31.12.2012

Duration: 48 months

Website: <http://www.poseidon-ip.eu/index.php/>

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Converteam Technology Ltd	UK
DCNS SA	FR
Det Norske Veritas AS	NO
Groupeement Industriel des Constructions et Armements Navals	FR
Jeumont Electric SAS	FR
Stichting Maritiem Research Instituut Nederland	NL
Marinelec Technologies	FR
Müller GmbH	DE
University of Newcastle Upon Tyne	UK
Nexans France S.A.S.	FR
Odense Steel Shipyard Ltd.	DK
Rolls-Royce Power Engineering plc	UK
Saft S.A.	FR
SAM Electronics GmbH	DE
Société d'Ingénierie, de Recherches et d'Études en Hydrodynamique Navale S.A.	FR
Société Marine de Service et d'Équipement Naval	FR
Zenergy Power GmbH	DE
Siradel	FR
Nexans Deutschland GmbH	DE
Technische Universität Ilmenau	DE
Vamp Ltd	FI
Nederlandse Organisatie voor toegepast- natuurwetenschappelijk onderzoek	NL
Germanischer Lloyd AG	DE
STX France S.A.	FR
Damen Schelde Naval Shipbuilding B.V.	NL

POWERFUL POWERtrain for FUTURE Light-duty vehicles

State of the art - Background

Under the CO₂ cars proposal, the average CO₂ emissions from new cars in the EU would decrease from the today's level of about 160 g/km to 130 g/km in 2012. The proposed regulation is similar in stringency and timing to the earlier Commission proposal. However, the idea of an industry-wide, average CO₂ emission limit has been replaced by a more practical approach, where each manufacturer separately must meet an average specific CO₂ limit that depends on the mass of vehicles it manufactures: CO₂ limit = 130 g/km + 0.0457 x (Vehicle mass – 1289 kg). Hence, a limit of 130 g/km applies to vehicles of 1289 kg, with higher limits applicable to heavier vehicles, and lower limits for lighter cars. The vehicle reference mass of 1289 kg has been selected in such a way that the EU-wide fleet average CO₂ limit is 130 g/km; a correction factor, to be reviewed annually, will account for future changes in the vehicle mass. But, the status of CO₂ emissions from cars are very far away from the EC proposed target. Furthermore, the CO₂ target has to be met by complying with the Euro 6 emissions limits of the conventional new European driving cycle (NEDC). However, there is a gap between the performance of emission control measures during type approval (TA) tests and their effectiveness under real operating conditions because of the difference between the current conventional test of NEDC and real world driving conditions. Of course the difference affects also fuel consumption and then CO₂.

Objectives

The aim of the research is the development of new powertrain concepts able to give a substantial contribution to the achievement of a 50% CO₂ reduction (based on 2005 figures) for passenger cars and light-duty vehicles for the new vehicle fleet in 2020. In particular, the research target on spark ignited (SI)

engines powered vehicles is to achieve 40% lower CO₂ emissions with respect to the 2005 values and 20% lower CO₂ emission than the 2005 level for compression ignition (CI) engine powered vehicles.

The objective includes also the target of near-zero emission levels (better than Euro 6) maintained during the useful life of the engines and keeping into account real life emissions, in line with the intention to amend the test procedures in emission legislation in view of real life emissions.

The perspective will be to support the LEEV (Light-duty Environmentally Enhanced Vehicle) concept, meeting both the next stage of pollutant emission limit values and achieving the above mentioned level of CO₂ emissions.

Description of Work

The research, development, validation and demonstration of future light-duty vehicle engines for road transport are based on three vertical sub-projects aiming to:

- V1. An advanced 4-stroke SI (spark ignition) engine concept characterized by low-cost / low emissions;
- V2. An advanced 4-stroke CI (compression ignition) engine concept able to run also on new tailored fuels and integrating the LTC (low temperature combustion) mode in the CI combustion system;
- V3. An advanced 2-stroke CI engine concept running on diesel fuel and integrating the LTHC (low thermal homogeneous combustion) mode in the CI system.

The powertrains of the above three sub-projects will be characterized by:

Engine & valve Combustion mode Cyl Displac. [cm³] After-treatment FuelV eh. curb mass [kg]

SI 4-stroke VVA $\alpha=12700$ TWC gasoline 980

CI 4-stroke Dual-LTC 4 1968 DeNO_x+DPF tailored 1558

CI 2-stroke VVT Dual-LTHC 3 900 Light DPF diesel compatible with BTL 980

These concepts are accompanied by a transversal sub-project T1 taking care of:

- simulation tools on combustion systems and engine architecture interactions
- means for reducing eng. friction & performing intelligent energy management
- PEMS (portable emissions measurement system) approach.

Expected Results

A. to meet 40% lower CO₂ emissions with respect to the 2005 figures for SI engines powered vehicles and 20% lower CO₂ than the 2005 level for CI engine powered vehicles with comparable fun-to-drive of 2005 vehicles;

B. to meet CO, HC, NO_x and PM, as engineering targets, at least 10% less than Euro 6 limits (Euro 6 - SI engines: THC/NMHC/NO_x/PM = 100/68/60/5 mg/km, CI engines: CO/HC+NO_x/NO_x/PM = 500/170/80/5 mg/km);

C. to maintain the CO₂ and pollutant emissions levels during the useful engine life and keeping into account real world emissions, in accordance not only with the standard EU cycle (NEDC) but also with Artemis cycle. Furthermore the PEMS procedure will be applied to vehicles independently on any cycle;

D. by fulfilling the above targets, the realization of LEEV (Light-duty Environmentally Enhanced Vehicle) concept, defined as a vehicle that both meets next stage of emission limits and stays below the above CO₂ emissions

Acronym:	POWERFUL	
Name of proposal:	POWERtrain for FUTURE Light-duty vehicles	
Contract number:	234032	
Instrument:	CF – FP	
Total cost:	24 340 789 €	
EU contribution:	13 494 160 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.01.2010	
Ending date:	31.12.2013	
Duration:	48 months	
Website:	http://www.powerful-eu.org/	
Coordinator:	Mr. Pascal Tribotté	
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EC Officer:	Grzegorz Domanski	
Partners:	Volkswagen AG	DE
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	AVL List GmbH	AT
	FEV Motorentechnik GmbH	DE
	Delphi Diesel Systems S.A.S.	FR
	IFP Energies nouvelles	FR
	Le Moteur Moderne	FR
	Universidad Politécnica de Valencia	ES
	Ceske vysoke uceni technicke v Praze	CZ
	ECOCAT OY	FI
	Rheinisch-Westfälische Technische Hochschule Aachen	DE
	Poznan University of Technology, Institut of Combustion Engines and Transport	PL
	Magneti Marelli Powertrain SPA	IT
	Università degli Studi di Genova	IT
	Fundación Tekniker	ES
	Politechnika Lodzka	PL
	European Community represented by the European Commission - Directorate General Joint Research Centre	BE

QUIESST

Quietening the Environment for a Sustainable Surface Transport



State of the art - Background

When thinking about ways to enhance surface transport sustainability, we definitely need to consider the different possibilities for reducing noise, as well as the sustainability of the devices used for this purpose.

Through its Directive 2002/49/EC, the European Commission is clearly pushing in this direction. The requested noise reduction of 10 to 20 dB implies a global action encompassing all aspects of the noise problem: one should act (and optimise the means of action) at all the consecutive phases of the process (sound emission, sound propagation and sound reception).

Acting on sound propagation, ground transport Noise Reducing Devices (NRD) i.e. noise barriers, acoustically absorptive claddings and tunnels, play an important role in reducing noise levels. However, their effectiveness in reducing noise can vary from a few decibels (if used inadequately) up to 20 dB (if using appropriate design), depending on the different internal or external factors which interact with the devices.

Up to now, many efforts have been made to analyse the real acoustic properties of NRD. However, existing research has been mainly focused either on the product side or on the in-situ side. While the real final noise reduction clearly depends on both aspects, very few studies have integrated these two constituting elements of NRD so far.

Objectives

QUIESST aims at improving the global effectiveness and sustainability of ground transport NRD, thus contributing to the deployment of a more sustainable transport. In order to achieve this, the QUIESST project will overcome current R&D limitations and will, for the very first time, assess the global capacities of NRD, taking into account every single internal and external element which may interfere with the device and/or its environment.

QUIESST will carry on an in-depth analysis and evaluation of the following factors:

- the initial intrinsic acoustic characteristics of the industrial products used (i.e the characteristics inherent to the device itself; design, material for instance), and the long-term durability of those characteristics;
- their relevant design (intrinsic acoustic performances, flat/non flat - homogeneous/heterogeneous devices, dimensions and location) according to the targeted vehicle, infrastructure and environment;
- the whole sound propagation process: intrinsic performances which directly affect the near field propagation can affect the far field performances in a different way.

The project's outcomes will be synthesised and delivered in a comprehensive "Guidebook to NRD optimisation" which aims at becoming a reference tool for noise mitigation.

Description of Work

To achieve its objectives, the QUIESST partners will complete 5 main tasks:

- to clearly define the near field/far field relationship in order to master NRD acoustic performance. It will result in the production of a validated engineering computation method, including user friendly instructions for data processing and the corresponding far field indicator derivation.



- to develop a new in situ measurement method of NRD intrinsic sound absorption and airborne sound insulation, considering the actual future usage of the device, in a real open space environment.
- to build a NRD database collecting the acoustic performances of different European NRD. Such a database would allow a fair comparison between products referring to common standards, and provide stakeholders with relevant data in order to better use NRD.
- to set up a multi-criterion NRD global optimisation strategy. For the very first time, a project will propose a holistic approach on how to optimise the use of NRD, i.e.: starting from the real intrinsic performances, considering the optimised combination of their acoustic characteristics and design shapes, considering the best situation in order not only to reduce noise, but also the amount of people exposed to noise, without forgetting the cost/benefit ratio and the sustainability aspect...
- to create the first assessment method for NRD overall sustainability, based on relevant generic sustainability criteria for NRD.

Expected Results

The major deliverables of the QUIESST project will be:

1. A validated engineering computation method for assessing the near field/far field relationship of NRD effectiveness.
2. A new test method for measuring the real intrinsic sound absorption and airborne sound insulation properties of NRD. The project will push for this method to be translated into a harmonised CEN standard.
3. The first European database on the intrinsic acoustic properties of European manufactured NRD, including the method establishing the relationship between laboratory and in-situ test results.
4. A brand new global strategy on how to optimise NRD with regards to acoustic/non-acoustic/ sustainable/economic criteria.
5. The results of the first study ever carried out on NRD sustainability, referring to relevant parameters, generic sustainability criteria and an associated assessment method.

All these valuable outcomes will be merged into a comprehensive publication "Guidebook to NRD optimisation" which is hoped will become a reference tool for any manufacturer and end-user wishing to optimise his products and their use.

Acronym:	QUIESST	
Name of proposal:	Quietering the Environment for a Sustainable Surface Transport	
Contract number:	233730	
Instrument:	CF – FP	
Total cost:	2 559 959 €	
EU contribution:	1 948 968 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.11.2009	
Ending date:	31.10.2012	
Duration:	36 months	
Website:	http://www.quiesst.eu	
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	Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H. - ARSENAL	AT
	Centre Scientifique et Technique du Bâtiment - CSTB	FR
	University of Bradford - UNIBRAD	UK
	European Union Road Federation - ERF	BE
	Fundación Cidaut - CIDAUT	ES
	Associazione Costruttori di Acciaio Italiani - ACAI	IT
	CETE de l'Est - Laboratoire Régional des Ponts et Chaussées (LRPC) de Strasbourg	FR
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RE-ROAD

Re-road – End of Life Strategies of Asphalt Pavements

State of the art - Background

The vast majority (90%) of European roads are paved with asphalt material. At the end of the service lifetime of a road, when the damaged pavement cannot fulfil its purpose as a comfortable carrier of traffic any further, the road pavement must be renewed. This can be done either by removing the materials from the old road and constructing a new one, or by rehabilitation and reconstruction techniques which include recycling. The first solution is an expensive, yet widely used, process with severe environmental drawbacks, as it involves the creation of vast amounts of demolition waste and the consumption of equal amounts of new materials. The other solution (pavement rehabilitation including recycling of the road materials) is a sustainable solution for road construction. Utility works - especially in

urban areas - are also a dispersed yet important source for asphalt materials that need to be processed for recycling and reuse. Today, a large amount of demolished asphalt pavements still end up in landfill or as unbound granular layers where neither the bituminous binders, nor the special aggregates from old surface layers, are reused to their full potential. Using recyclable construction and demolition waste as landfill is proposed to be banned from 2020. On the other hand, natural resources, such as special stone material used in the top surface layer, are becoming more and more scarce.

Practice relating to the demolition and reuse of old asphalt pavements is also very divergent among the EU member states and associated countries. Many of the EU12 (New Member) States have limited experience in



Unloading sheets of asphalt concrete



Crushing and sieving of reclaimed asphalt

recycling asphalt material, but also among the EU15 Member States there are several countries with a low percentage of recycling, and problems with recycling old wearing course materials, especially thin surfaces, in new surface courses.

Objectives

The objectives of the project are to increase knowledge and develop innovative technologies for enhanced end-of-life strategies for asphalt road infrastructures, improving the sustainability of the materials used. A 99% re-use level for recovered asphalt concrete, by reintroducing it into new mixes with minimal downgrading of material and minimal introduction of virgin material, should be possible. Such strategies will have an important impact on the environmental footprint of the European transport system. The project's targets (to save natural resources and energy, to prevent the creation of waste and the occupation of landfills, and consequently minimize the need to transport materials to and from the work sites) will result in reduced energy consumption and CO₂ emissions.

Description of Work

The project is divided into five technical Work Packages (WP). The organisation of the WPs follows the natural flow of work and material: from sampling and characterisation of the reclaimed asphalt (RA), to the impact of old material on the new pavement material to be produced, adding the recycled material in the asphalt plant, and finally the performance of the new material, produced with recycled asphalt. A central WP among the technical WPs is the environmental assessment of the recycling process. This WP evaluates the spectrum of choices that are available from the solutions derived in all the other WPs.

WP1 aims to improve the characterization of the reclaimed asphalt and to study the potential of the RA to be recycled. The material is analysed.

The WP2 objectives are to analyse the potential use of old recovered material in new asphalt surface layers. The chemical compatibility of new binders with old ones and the physical performance of the resulting binder and asphalt mixes will be studied to develop mix-design guidelines to ensure a long service life of asphalt mixes with reclaimed asphalt.

The tasks of WP3 are risk assessments and life cycle assessments of reclaimed asphalt. The objectives are to understand the environmental and health impacts of the proposed end of life strategies and to compare them with alternative disposal routes and alternative construction methods from an environmental aspect.

WP4 focuses on the industrial factors that influence the performance of the final product. Milling procedures, handling of the reclaimed asphalt at the plant and the method of adding the material in the plant are all crucial factors that affect the final product.

WP5 aims to model the performance of the recycled pavement and to study the pavement life as well as their sensitivity to damage.

Expected Results

The final product will be an end of life strategy for asphalt pavements that could be used across Europe. The strategy will consist of different elements which are based on the technologies developed, and considerations made in the technical WPs. The elements are:

- Dismantling strategies which quantify the impact and potentially adverse effect of different dismantling procedures
- Characterisation strategies for improving the quality classification of the material.
- Handling strategies to optimise recycling at highest possible level and for the original layer. The strategy depends on the characterisation and environmentally sound reuse or disposal of the marginal materials that can not be recycled.
- Environmental criteria: Assessment of risks and benefits to the environment with the use reclaimed asphalt. Life cycle analysis of different methods used for recycling.
- Cost effectiveness of recycling: Short and long term performance, life time prediction by modelling asphalt mixes produced with different levels of reintroduced material.
- Strategies for adding the material in mixing plants.

Acronym:	RE-ROAD	
Name of proposal:	Re-road – End of Life Strategies of Asphalt Pavements	
Contract number:	218747	
Instrument:	CF – FP	
Total cost:	3 207 409 €	
EU contribution:	2 415 610 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2009	
Ending date:	31.12.2012	
Duration:	48 months	
Website:	http://re-road.fehrl.org/	
Coordinator:	Mr. Björn Kalman	
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	Statens Geotekniska Institut	SE
	Danish Road Directorate, Danish Road Institute	DK
	Technische Universität Dresden	DE
	Forum des Laboratoires Nationaux Européens de Recherche Routière	BE
	The University of Nottingham	UK
	Artesis Hogeschool Antwerpen	BE
	Peab Asphalt AB	SE
	University College Dublin, National University of Ireland, Dublin	IE
	Centre de Recherches Routières -	
	Opzoekingscentrum voor de Wegenbouw	BE
	TRL Limited	UK
	European Asphalt Pavement Association	BE

SARTRE

Safe Road Trains for the Environment; Developing strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety and comfort benefits

State of the art - Background

Work has been undertaken on platooning and road trains for several years with various scenarios being proposed. However, these solutions have typically required significant modification to the roadside infrastructure or even dedicated roads. It is becoming increasingly viable to develop a safe and reliable platooning system, although significant challenges remain with platoons interacting with conventional traffic on public highways. There are also notable acceptability issues that mean the adoption of platoons on public highways is not likely to be a near-term reality even given the understood environmental, safety and convenience benefits.

The feasibility of platooning has been analysed in some European (PROMOTE CHAUFFEUR I+II, the German national project KONVOI) and international projects (PATH in USA). These focused mainly on the concept's technical feasibility, concentrating, in Europe, only on the platooning of commercial vehicles.

Each of these programmes address an aspect of platooning with further incremental steps being taken to make platooning more feasible on public highways with each iteration: e.g. the PATH project used a guided vehicle principle with cables placed under the tarmac, a system currently used in factories but not on public highways. The Chauffeur project examined some of the technical challenges

of platooning without considering operation on public highways; technology from this project has contributed to the ongoing development of car-to-car communications technologies which are the basis of several new applications.

The German national project Konvoi is aiming to achieve an automated four truck platoon with following trucks maintaining a distance within 10 m.

Objectives

The project seeking to encourage a step change in personal transport usage through the development of safe environmental road trains (platoons). Prototype systems will be developed that will facilitate the safe adoption of road trains on unmodified public highways with full interaction with non-platoon vehicles.

The project will address cornerstone transportation issues (environment, safety and congestion) at the same time encouraging driver acceptance through increased 'driver comfort'.

Consideration of how platoons interact with other non-platoon users is a critical facet of the project and strategies will be implemented in the prototype system. A further unique element is the interaction between the lead vehicle and the following vehicles and how this can lead to a new business model for road use.

The project objectives are to:

1. Define a set of acceptable platooning strategies that will allow road trains to operate on public highways without changes to road and roadside infrastructure
2. Enhance, develop and integrate technologies for a prototype platooning system such that the defined strategies can be assessed in real life scenarios
3. Show how the use of platoons can lead to environmental, safety and congestion improvements
4. Illustrate how a new business model can be used to encourage the use of platoons with benefits to both lead vehicle operators and platoon subscribers.

Description of Work

SARTRE encompasses the operation of platoons on unmodified public highways with full interaction with other vehicles; this is a significant technical challenge. To achieve solutions that are both safe and convenient for both platoon and other road users requires an analytical, considered approach.

The project is divided into three main parts.

The first part is the analysis and definition of the platooning concept as an alternative to today's mobility concepts. This includes defining possible use cases to identify necessary requirements for the technology, as well as the boundary conditions for an automated, safe, clean and comfortable mobility alternative. Human factors will also be considered in the requirements, especially with regard to gender and age, considering the demographic development and the mobility needs of older citizens.

In the second part prototypes will be developed that allow (in a third phase) evaluation of the concept's technical feasibility as well as validation of the impacts of platooning on safety, environment, traffic efficiency and driving comfort. This part will focus not only on the necessary technology for platooning but also on the organisation and management of platoons. With regard to technology developments, new approaches will be developed especially in the sensorial (sensor fusion) and control parts.

Platoon strategies will be designed to handle both abnormal and normal operation modes.

Finally, the complete concept will be analysed with regard to its technical feasibility and its acceptance by potential users and impact on future mobility requirements.

Expected Results

The expected benefits from SARTRE can be summarised:

1. Environmental benefits from an expected decrease in fuel consumption of about 20% for highway (= high speed) driving, dependent on vehicle spacing and geometry.
2. Safety benefits from the reduction of accidents caused by driver action and driver fatigue.
3. Traffic flow benefits from improved traffic flow with a potential consequential increase in throughput.
4. Increased driver comfort benefits from smoother acceleration, reduced driver fatigue and "following" drivers able to undertake activities such as using a phone.
5. Economic benefits from reduced fuel consumption, increased mobility; reduced pollution and fewer accidents.

Acronym:	SARTRE	
Name of proposal:	Safe Road Trains for the Environment; Developing strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety and comfort benefits	
Contract number:	233683	
Instrument:	CF – FP	
Total cost:	6 550 800 €	
EU contribution:	3 937 496 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.09.2009	
Ending date:	31.08.2012	
Duration:	36 months	
Website:	http://www.Ricardo.com	
Coordinator:	Mr. Tom Robinson Ricardo UK Ltd Shoreham Technical Centre UK BN43 5FG Shoreham-By-Sea	
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Partners:	Volvo Technology Corporation	SE
	SP Technical Research Institute of Sweden	SE
	IDIADA Automotive Technology SA	ES
	Fundación Robotiker	ES
	RWTH Aachen für Institut für Kraftfahrwesen	DE
	Volvo Personvagnar AB	SE

SILENV

Ships oriented Innovative soLutions to rEduce Noise & Vibrations

State of the art - Background

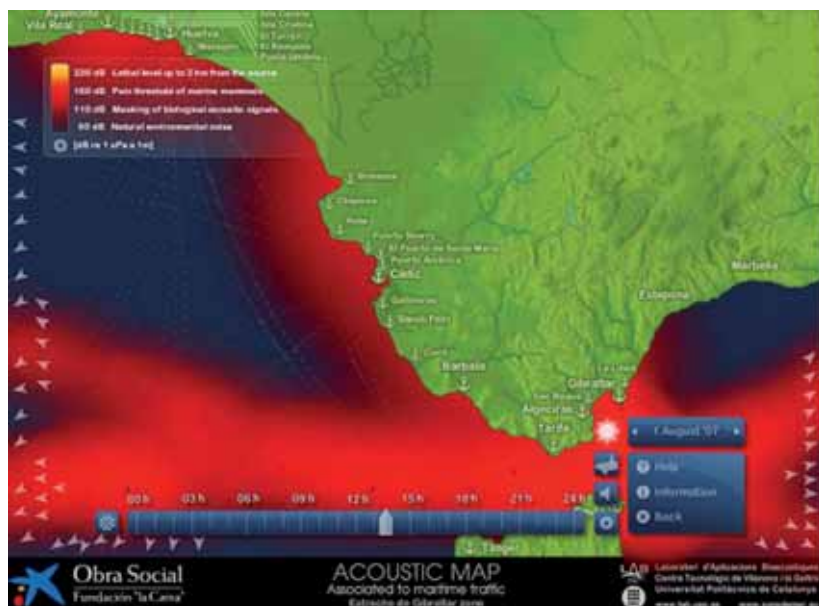
Transports are well known as major contributors to noise pollution. Noise and vibrations (N&V) abatement naturally appears as an important objective for the greening of surface transports.

The SILENV project is a response to this requirement for the maritime sector.

The consequences of N&V emissions from ships are multiple. They constitute a disturbance for passengers and may be a health issue for certain crew members. Many studies have already highlighted the effects of N&V on crews. Long exposure to continuous high

N&V levels cause fatigue and ear degradation in people working on-board. However, there is still room for investigations to check whether rules and requirements cover all nuisance aspects. Areas like intermittent or narrow band noise are still not fully covered by the norms.

Moreover, the increasing ship traffic-generated underwater noise causes ecological nuisances for marine wildlife. Marine mammals use sound for navigation, finding food, communication and are particularly affected by rising background noise levels from the growing global fleet of commercial and recreational shipping.



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Underwater noise due to maritime traffic - Example of calculation

Ship airborne noise can also cause major disturbance for residents in urban areas located near ports areas where emissions and limits are to be set by local authorities. This seems to be true in many European countries with a lack of homogeneity regarding standardisation.

Objectives

This project proposes a holistic approach to reduce ship-generated noise and vibration pollution.

The SILENV project's main final deliverable is an "acoustic green label" proposal that includes recommended target levels for N&V and associated design guidelines.

As seen above, the effects of N&V generated from ships are multiple. The ambition of SILENV is to study all these topics and to propose solutions, adapted to each type of ship, to reduce internal and external noise.

The interest surrounding this project concerns its very large scope: all effects of noise and vibrations are considered and a large range of ships are included in the studies.

the results of SILENV will be of concern to the main types of passenger ships as well as fishing boats and cargo ships.

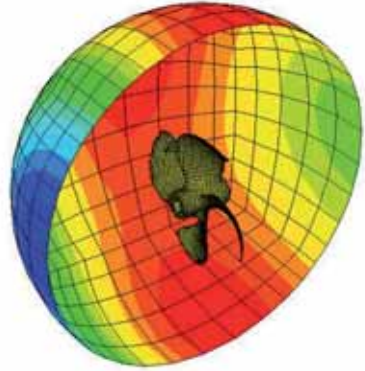
Description of Work

The SILENV project will consist of five inter-dependent Work Packages (WP) carrying out the technical work, one work package is dedicated to the overall management of the project and the final one to dissemination activities.

The first phase will include a thorough analysis of previous studies and existing international, national, local regulations and standards. The purpose of WP1 is complete identification of the targets for noise and vibration.

The purpose of the WP2 is to collect as many existing experimental data as possible on all topics and types of ships concerned. For missing data, measurement at sea will be performed.

WP3 constitutes one of the most important innovations of the project. The purpose is to identify and analyse all solutions which could be proposed in the design guidelines.



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Propeller noise - Example of pressure calculation

The purpose of WP4 is dual. The first step is the definition and validation of innovative calculation methods and procedures. The validation will be performed by using the experimental data collected from WP2. Then, the refined models will be applied to entire ships for the N&V predictions, the assessment of effectiveness of adopted solutions and comparison with the N&V requirements.

The final WP includes a "green label" proposal.

Expected Results

The main expected result of this project is the definition of the "N&V green label" applicable to the most prevalent type of ships. This is a first important step in the N&V abatement process.

In addition to the green label, the intermediate results issued from the Work Packages are expected to constitute significant progress beyond the state of the art. The following main deliveries can be highlighted: synthesis and analysis of regulations, standards and main studies related to N&V on-board ships, noise in ports and underwater noise effects, collecting and analysis of experimental N&V data, studies of innovative solutions to reduce noise pollution, definition and validation of N&V calculations tools dedicated to ship design.

The final impacts expected are multiple:

- the improvement of health and safety for sea workers, especially fishermen;
- the improvement of comfort for the users of maritime transport;
- the reduction of noise pollution for populations living around ports;
- the reduction of underwater noise pollution and its effects on the ecosystem.

The effective reduction of the noise pollution will, of course, depend on the dissemination of the results and the future application of this label on a large part of the civilian fleet.

Acronym: SILENV

Name of proposal: Ships oriented Innovative soLutions to rEduce Noise & Vibrations

Contract number: 234182

Instrument: CP – FP

Total cost: 5 075 896 €

EU contribution: 3 487 058 €

Call: FP7-SST-2008-RTD-1

Starting date: 01.10.2009

Ending date: 30.09.2012

Duration: 36 months

Coordinator: Mr. Loïc Mer

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UK

Valtion teknillinen tutkimuskeskus

FI

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STORAGE

Composite Structural Power Storage for Hybrid Vehicles



State of the art - Background

For efficient transportation, reducing structural weight is paramount, and in such applications anything that does not contribute to the load-carrying capacity of a component is structurally parasitic. The conventional design approach exploits advanced materials or new performance technologies to maximise the efficiency of the individual subcomponents. However, the designer has to wrestle with numerous complex and conflicting requirements, such as performance, cost, safety, and more recently, sustainability. All these demands require the individual sub-systems within the car to utilise their mass and volume with increasing efficiency. For example, a car chassis is required to provide mechanical performance and crashworthiness whilst minimising total structural weight. However, this is countered by the ever increasing power demands of systems such as air conditioning, instrumentation, entertainment systems. Consequently, difficult compromises have to be made between performance, cost and luxury, which inevitably become critical factors limiting technological advance and stifling innovative design.

Objectives

The approach is to create novel multifunctional materials, which simultaneously perform more than one function, thus offering significant savings in system level mass and volume, or performance benefits such as improved durability or redundancy. The key here is not simply to bind two disparate components together, but to produce a single coherent material that inherently performs both roles. The objectives are as follows;

Objective A: Through using material selection methodologies and cost-benefit analyses, provide guidance for the technical requirements of structural power materials and formulate an implementation plan for using them in current and future hybrid car applications.

Objective B: Develop constituents (reinforcements and matrices) that, when combined, form a composite material for structural power storage.

Objective C: Demonstrate the capabilities of these multifunctional materials through the manufacture and testing (mechanical and electrical) of laminates, and show that they offer at least a 15% improvement in the efficiency index (I) over the performance of discrete materials and devices.

Objective D: Address the system issues associated with structural power sources such as power management, packaging and connectivity.

Objective E: Ultimately, through the production and testing of the materials within demonstrator components on a benchtest, to assess the improvements these materials would imbue upon a hybrid car.

Description of Work

The material, which can simultaneously carry high mechanical loads whilst storing (and delivering) electrical energy. The versatility and constituent architecture of polymer composite materials means that they provide an ideal opportunity to develop novel multifunctional materials that can store the electrical energy required to power systems, whilst meeting the demands of mechanical loading. Carbon fibres are attractive as they are commonly used as both electrodes and structural reinforcements; usually the nature of the carbons used for these applications is different, but there is an appealing opportunity to unify

these roles with appropriate manipulation and nanostructuring of both matrix and reinforcement. Furthermore, conductive polymers are already available for use as electrolytes in batteries (e.g. Lithium ion batteries) and super capacitors.

Expected Results

The composite material that is being developed, made of carbon fibres and a polymer resin, will store and discharge large amounts of energy much more quickly than conventional batteries. In addition, the material does not use chemical processes, making it quicker to recharge than conventional batteries. Furthermore, this recharging process causes little degradation in the composite material, because it does not involve a chemical reaction, whereas conventional batteries degrade over time.

The material could be charged by plugging a hybrid car into household power supply. The researchers are also exploring other alternatives for charging it such as recycling energy created when a car brakes.

The project will further develop the composite material so that it can store more energy. The team will improve the material's mechanical properties by growing carbon nanotubes on the surface of the carbon fibres, which should also increase the surface area of the material, which would improve its capacity to store more energy.

They are also planning to investigate the most effective method for manufacturing the composite material at an industrial level.



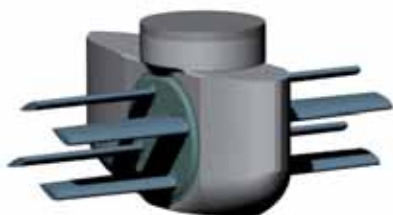
Structural Power Supercapacitor

Acronym:	STORAGE	
Name of proposal:	Composite Structural Power Storage for Hybrid Vehicles	
Contract number:	234236	
Instrument:	CP – FP	
Total cost:	3 374 386 €	
EU contribution:	2 510 412 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.01.2010	
Ending date:	31.12.2012	
Duration:	36 months	
Website:	http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/newssummary/news_5-2-2010-10-26-39	
Coordinator:	Dr. Emile S. Greenhalgh Imperial College of Science, Technology and Medicine Dept of Aeronautics, 362B Roderic Hill Building Exhibition Road UK SW7 2AZ London	
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EC Officer:	William Bird	
Partners:	Swerea SICOMP AB	SE
	Volvo Car Corporation	SE
	Federal Institute for Materials Research and Testing (BAM)	DE
	ETC Battery And FuelCells Sweden AB	SE
	INASCO - Integrated Aerospace Sciences Corporation	GR
	Chalmers tekniska hogskola AB	SE
	The Advanced Composites Group Limited	UK
	Nanocyl	BE

STREAMLINE

Strategic Research For Innovative Marine Propulsion Concepts

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The Walvisstaart POD - a biomechanical propulsion concept

State of the art - Background

Increasing environmental concerns and soaring oil prices are creating a new focus on fuel efficiency for the marine industry. Combining low emissions with demands for more advanced vessels than ever before is driving the need for radically new propulsion concepts delivering a step-change in efficiency.

Maritime transport continues to grow at twice the rate of global GDP, with between 80 to 90% of all goods imported and exported by Europe being transported by sea. Within the EU, more than 40% of goods are carried by water. With the World Bank predicting that world trade will triple over the next 25 years, it is clear that the world fleet must be able to adapt to service this unprecedented growth, as well as tackle the environmental issues this will bring.

There has been little real change in the state-of-the-art for conventional screw propeller propulsion for many years with only a marginal rate of improvement during the last 50 years. More substantial progress has been achieved through the use of better propulsor configurations and improved integration of the propeller with the vessel hull hydrodynamics.

These have achieved fuel savings in the order of 5% to 20%.

STREAMLINE is the marine community's response to these challenges.

Objectives

STREAMLINE's main objectives are:

An initial concept design of radical new propulsion systems using latest advances in hull-propulsor design, modelling and validation.

To apply novel technologies via mechanical and electric drive systems.

To develop these technologies through to system level.

To investigate the potential in designing an improved efficiency water-jet system.

To investigate how to increase the efficiency of pod propulsion.

To better understand the character and magnitude of scale effects.

Optimisation of propulsion by a systematic evaluation of propulsion configurations.

To develop and test extensions to CFD codes to enable analysis of flow conditions around a propulsor in relation to the ship aftbody by:

- Implementing and testing strategies for coupling different grids.
- Improving cavitation modelling and simulation of cavitation-induced pressure fluctuations.
- To exploit these new tools in the analysis and design of radically new propulsion systems.

To use these new methods to optimise current propulsion technologies.

To use model tank testing for validating new codes and concepts.

To use analysis tools to characterise operational performance, reliability, safety and economic factors of the new concepts.

To benchmark each concept, recommending suitable applications.

To examine safety and classification aspects of the propulsion concepts.

Description of Work

SP0 (Project management and dissemination) will manage the project, develop exploitation plans, disseminate results and manage IPRs.

SP1 (New propulsion concepts) will tackle the dual challenge of reducing fuel consumption and pollution emissions for the shipping industry by investigating a number of radical and innovative ship propulsion concepts – each of which will be modelled, tested, validated and evaluated against a number of benchmarks. The new propulsion systems that will be considered are: novel applications of large area propulsion, a biomechanical system and distributed thrust via multiple propulsors.

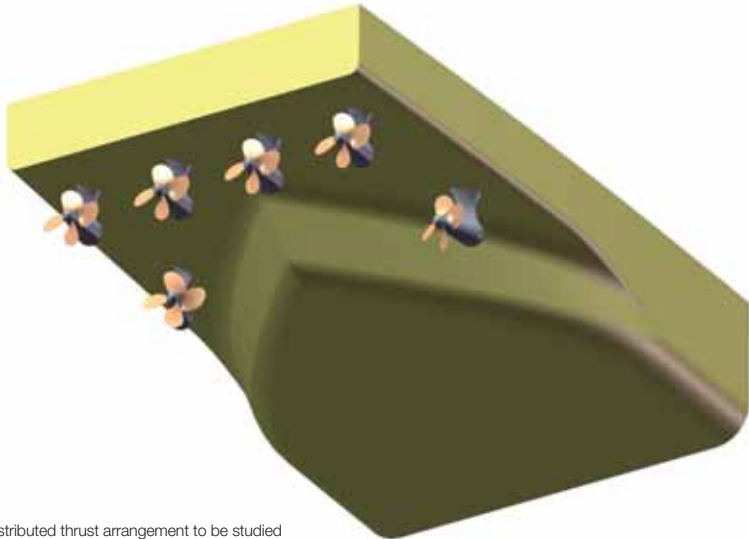
SP2 (Optimisation of state-of-the-art propulsion) will examine methods for increasing the efficiency of existing technologies by optimising the SoA of conventional screw propeller systems, pods and water-jets. Even though these optimisations may not have the same radical efficiency gains as those described in SP1, it is envisaged that these solutions would be easily applicable to existing hull forms and fleets, thus having the effect of increasing the efficiency and reducing emissions in the short term.

SP3 (CFD methods) will further develop the best possible codes for the analysis of propulsors. Four codes have been selected.

Expected Results

STREAMLINE has taken a balanced approach to the work that is envisaged, by working on both radical and optimised current concepts. It is anticipated that these will yield results as follows:

- radical concepts, which have the potential to increase efficiency by at least 15%, and
- optimised current concepts, where gains could be implemented in a short time period on many existing ships and have a major impact, even if the efficiency improvement is less substantial than for radical concepts.



A distributed thrust arrangement to be studied

Acronym:	STREAMLINE	
Name of proposal:	Strategic Research For Innovative Marine Propulsion Concepts	
Contract number:	233896	
Instrument:	CP – FP	
Total cost:	10 909 433 €	
EU contribution:	7 946 234 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.03.2010	
Ending date:	28.02.2014	
Duration:	48 months	
Website:	http://www.streamline-project.eu	
Coordinator:	Mr. Paul Greaves	
	Rolls-Royce Power Engineering	
	PO Box 2000	
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E-mail:	paul.p.greaves@rolls.royce.com	
Tel:	+44 (0)1332 667308	
Fax:	+44 (0)1332 667308	
EC Officer:	Dominique Ramaekers-Jørgensen	
Partners:	Rolls-Royce AB	SE
	Walvisstaart	NL
	Istituto Nazionale per Studi ed Esperienze di Architettura Navale	IT
	Development Centre for Ship Technology and Transport Systems	DE
	Maritime Research Institute Netherlands	NL
	Chalmers Tekniska Högskola AB	SE
	Centre National de la Recherche Scientifique	FR
	Hamburgische Schiffbau-Versuchsanstalt GmbH	DE
	Institute for Fluid Dynamics and Ship Theory of the Hamburg University of Technology	DE
	Lloyd's Register	UK
	SSPA Sweden AB	SE
	Stena Line	SE
	University of Newcastle	UK
	Arttic SAS	FR
	Rolls-Royce Marine AS	NO
	Rolls-Royce PLC	UK
	SCITEK Consultants Ltd	UK
	Totalförsvarets forskningsinstitut	SE
	Holland Rudder Propellers	NL
	Centrum Techniki Okrętowej S.A	PL
	Wilhelmsen Marine Consultants	NO

TIFFE Thermal Systems Integration for Fuel Economy

State of the art - Background

In the near future, on-board thermal energy management will become crucial to achieving CO₂ emission targets assuring performance and sustainability.

The conventional approach where a heat exchanger is used per each system to be cooled (e.g. charge air cooler, oil cooler, condenser, etc.) represents a serious limitation that risks affecting overall vehicle efficiency and increasing costs.

An integrated and innovative approach will help achieve the requirements of the incoming regulations on safety (pedestrian, etc.), fuel economy (95 CO₂ g/km) and improvement of air drag enabling more aerodynamic front-end design (CX reduction).

This engine evolution will bring about the rapid diffusion of turbochargers as well as the more sophisticated Exhaust Gas Recirculation, implying the need for increased heat rejection capacity and finer temperature control.

The introduction of Stop&Start and hybrid power trains will require solutions guaranteeing that cabin thermal comfort will not affect overall vehicle efficiency and additional heat rejection capacity.

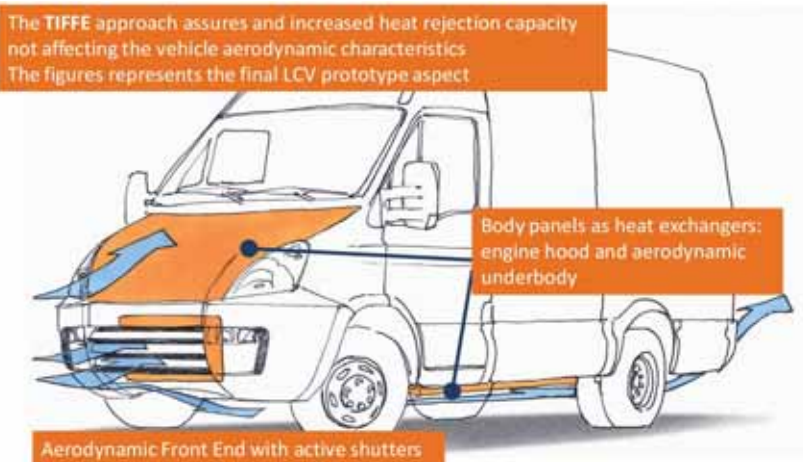
The introduction of new air-conditioning systems (e.g. HFO 1234yf) needs sustainable solutions to limit costs and risks.

In general, an initial review of the state of the art shows that thermal management has only been partially applied to isolated parts of the vehicle (i.e. single subsystem) but never approached as a whole.

Objectives

The project will aim to develop an innovative Integrated Vehicle Thermal System to improve on-board thermal management and energy efficiency. The major aspects are:

- Dual loop air-conditioning: one loop to transfer the cooling power and one to reject the heat;

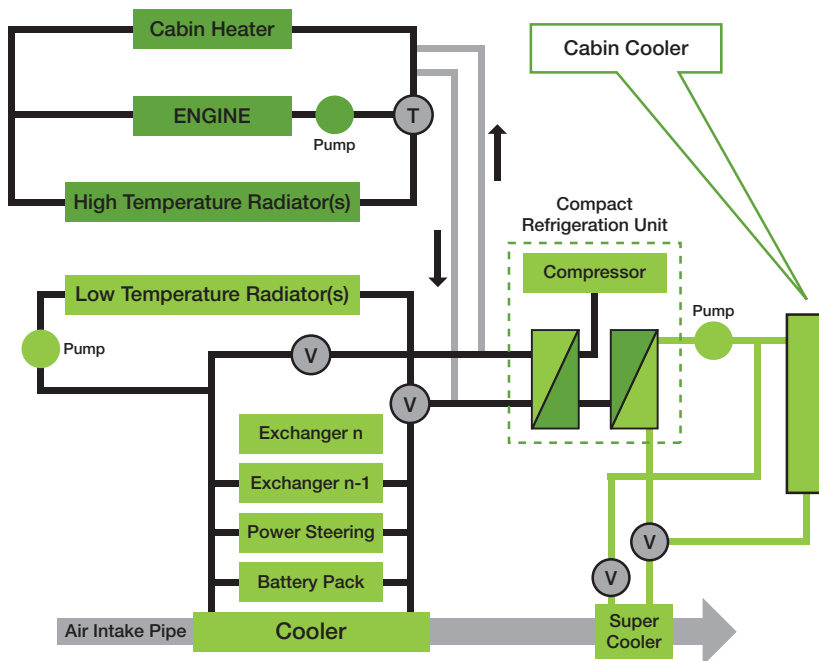


TIFFE LCV prototype

The **TIFFE** approach is based on a dual loop heat rejection system and on the **Compact Refrigeration Unit** concept.

This unit allow to use safely a veru limited quantity of refrigerant assuring high efficiency and very low leak rate.

Additional heat exchangers intergrated in the body panel allow to increase the ovrnal heat rejection capacity.



TIFFE thermal system scheme

- Two-level temperature heat rejection system: one to reject high temperature heat (e.g. engine waste heat) and one to cool locally the vehicle auxiliary systems;
- Innovative heat exchangers: new generation of compact fluid-to-fluid heat exchangers and application of innovative technologies for fluid-to-air heat rejection;
- Use of innovative coolants (e.g. nanofluids) to improve heat rejection, and redesign of heat exchangers;

TIFFE benefits can be summarised as cost reduction (due to resizing systems and their integration) and 15% increase in fuel economy thanks (ref. baseline vehicle) to the:

- improvement in aerodynamics due to new front-end design
- increase of auxiliary systems efficiency due to local cooling
- overall engine efficiency thanks to fine control of heat exchange, local cooling and improvement of engine intake
- reduction of engine re-starts on hybrid or Stop&Start
- compact refrigeration unit compliant with new refrigerants.

Two prototypes will be realised and validated:

- a gasoline passenger car with Stop&Start function
- a diesel light commercial vehicle with hybrid power train

Description of Work

Besides the project management, the technical work comprises 7 work packages:

WP1 is devoted to defining the testing protocols to assess in a realistic way improvement in vehicle fuel economy and the system target performance, major features and specification. The vehicle demonstrator (a passenger car with Stop&Start function and an LCV with hybrid powertrain) will be identified and fully characterised.

WP2, WP3 and WP4 represent the core of the project's technical development and research activity. Focus is on the TIFFE components, subsystems and control algorithms. A WP2 task will investigate the opportunities provided by the nanotechnologies (nanofluids) to enhance heat transfer.

The exploitation of the results is strictly related to the system impact on vehicle cost and on its technological feasibility. WP5 will lead the system development to assure its technological feasibility and monitoring costs, driving the project towards a sustainable solution.

WP6 aims to develop two vehicle-level demonstrators: one passenger car and one LCVs with hybrid powertrain that will be used to validate project results by demonstrating a quantifiable improvement in fuel consumption and CO₂ production in a vehicle equipped with the resulting TIFFE systems.

WP7 will focus on dissemination and exploitation ensuring that the project's results are known to and used by a wide audience.

Expected Results

The TIFFE approach will have a relevant and positive impact on vehicle energy efficiency contributing to the reduction of fuel consumption and GHG gases emissions:

Fuel consumption reduction (-15% in real use) thanks to improvements in the aerodynamics and increase in the efficiency of the auxiliary systems and engine thanks to the local cooling and the reduction of engine re-start in hybrid or Stop&Start vehicles.

Cost reduction: thanks to the reduced size of the systems and its integration.

Moreover, the TIFFE system will ensure an increase in the air-conditioning efficiency of about 15% (reference baseline systems) and of about 25% in the case of the Stop&Start or hybrid vehicle, contributing to an overall increase in the vehicle's fuel economy in real use.

Outcomes of the TIFFE project will contribute to the community's societal objectives to address climate change by reducing the level of CO₂ emissions from road transport.

Acronym:	TIFFE	
Name of proposal:	Thermal Systems Integration for Fuel Economy	
Contract number:	233826	
Instrument:	CP – FP	
Total cost:	4 576 090 €	
EU contribution:	2 658 050 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.07.2010	
Ending date:	30.10.2013	
Duration:	42 months	
Website:	http://tiffe.medien-host2.de/	
Coordinator:	Mr. Carloandrea Malvicino Centro Ricerche Fiat S.C.p.A. Strada Torino IT 10043 Orbassano	
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EC Officer:	M. Maggiore	
Partners:	MAFLOW SpA	IT
	SINTEF Energy Research	NO
	Technische Universität Carolo-Wilhelmina zu Braunschweig	DE
	Ford-Werke GmbH	DE
	DENSO Thermal Systems S.p.A.	IT

AEROTRAIN

Aerodynamics: Total Regulatory Acceptance for the Interoperable Network



State of the art - Background

When certifying a rail vehicle according to European regulation, two elements constitute a significant challenge: vehicle cost and time-to-market. A large part of vehicle certification mandates testing for safety, performance and infrastructure compatibility in each individual Member State. Hence the certification process can take up to 30 months and cost several million Euros, imposing a huge competitive disadvantage on the development of rail products, thus jeopardizing the development of a reliable and sustainable transport network.

Objectives

AeroTRAIN is part of the TrioTRAIN cluster of projects. TrioTRAIN, an acronym for Total Regulatory Acceptance for the Interoperable Network, is the common title given to a cluster of projects (three hence "Trio") dealing with key railway interoperability issues. The objective of these projects is to propose an innovative methodology that will ease rail vehicle certification process in Europe to become a faster, cheaper and better process for all stakeholders involved.

The overall goal of the project AeroTRAIN is to promote interoperable rail traffic in Europe by reducing costs and time of certification and closing "open points" in the TSI's.

The overall goal will be achieved by the following high level objectives:

1. To address HS & CR TSI's that effectively work to harmonise European and national standards on aerodynamics to reduce costs and certification time;
2. To reduce costs and certification time by replacing existing cross-wind and slip-stream tests with new alternatives without reducing safety;
3. To reduce costs of certification by introducing virtual testing as far as it can be validated for head pressure pulse loads and cross-wind aerodynamic loads;
4. To close "open points" in the HS and CR TSI's. Derive limit values and where necessary new certification procedures.

Description of Work

On the basis of the requirements for the new CR TSI and revision of HS TSI, where it is seen that virtual certification could be introduced, it has been decided to focus the study on five main aspects of rolling stock aerodynamics that are subject to certification. Hence the Work Program of the project is organised around five technical Work Packages:

- WP 1: Open Air Pressure Pulse;
- WP 2: Aerodynamic Loads on Tracks;
- WP 3: Cross-wind;
- WP 4: Train – Tunnel Interaction;
- WP 5: Slip Stream Effects.

WP6 is a quality assurance work package - transverse to the other ones - that aims at ensuring the acceptance of the results of the project by European and National Safety Authorities. In this WP methodologies will be

defined to be applied to all the procedures developed in the other WPs in order to check and guarantee the quality of the results and propositions, and in particular to prove that the project will not jeopardise the safety levels of the railway systems.

This specific WP will also deal with dissemination activities (WP6 Task 6.2), especially towards the European Railway Agency and the National Safety Authorities.

All the management activities of the AeroTRAIN project will be undertaken in WP0.

Expected Results

Open air pressure pulses

The project will bring:

- a procedure for virtual certification of head pressure pulse valid for streamlined and non-streamlined trains, including the applicability of inviscid panel methods, and
- a verification that the maximum peak-to-peak pressure change occur at the head of the train.

Aerodynamic loads on track

The main innovation brought by AeroTRAIN with regards to aerodynamic loads on tracks are the following:

- a measurement technique to assess the aerodynamic load in relation to the risk of ballast pick-up,
- a measurement of the aerodynamic load on track by different high speed trains with a common measurement procedure,
- a robust measurement and post processing procedure which captures the basic parameters of the ballast pick-up phenomenon suitable for certification,
- a standard track conditions to measure on, and
- a limit criterion for TSI.

Crosswinds

The AeroTRAIN project will introduce:

- limit Characteristic Wind Curves for Conventional Rail TSI and Class 2 High Speed trains,
- limit Characteristic Wind Curves for Class 1 High Speed trains based on reference trains,
- a range of application of CFD methods and the corresponding procedure for assessment of cross-wind aerodynamic load, and
- an appropriate test procedure for crosswind aerodynamic load with more realistic conditions (train movement and embankment) and limitations of CFD methods for the corresponding configuration.

Train – Tunnel interaction

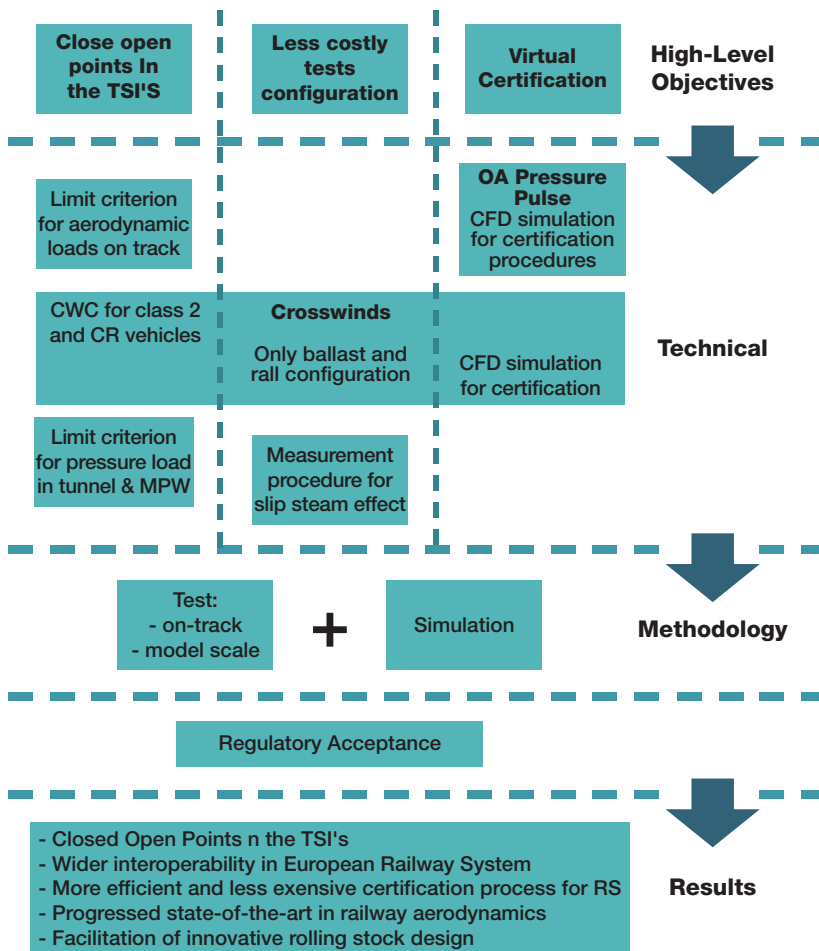
AeroTRAIN will establish common vehicle requirements:

- a technical specification regards pressure load on CR trains will be submitted to EN / CR TSI, and
- a technical specification regards train characteristics related to micro pressure wave generation will be submitted to TSI HS RST.

Slip stream effects

Expected results on slip stream effects are:

- the development of a transfer function which will enable measurements made at one location (e.g. at the trackside) to be related to those at a different location (e.g. on the platform), and
- a reduction in the technical requirements concerning the evaluation of slipstream velocities and hence an increase in the integration of rail transport activities across the EU.



AeroTRAIN: From objectives to results

Acronym:	AEROTRAIN	
Name of proposal:	Aerodynamics: Total Regulatory Acceptance for the Interoperable Network	
Contract number:	233985	
Instrument:	CP – FP	
Total cost:	4 040 710 €	
EU contribution:	2 499 998 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.06.2009	
Ending date:	31.05.2012	
Duration:	36 months	
Website:	http://www.triotrain.eu	
Coordinator:	Mr. Martin Couturier	
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	BE 1050 Brussels	
E-mail:	martin.couturier@unife.org	
Tel:	+32 (0)2 642 23 21	
Fax:	+32 (0)2 626 12 61	
EC Officer:	Peter Crawley	
Partners:	Alstom Transport S.A.	FR
	Bombardier Transportation GmbH	DE
	Ansaldobreda S.P.A.	IT
	Siemens AG	DE
	Rail Safety and Standards Board Limited	UK
	Deutsche Bahn AG	DE
	Société Nationale des Chemins de Fer Français	FR
	Université de Valenciennes et du Hainaut-Cambrésis	FR
	Università degli Studi di Roma La Sapienza	IT
	The University of Birmingham	UK
	Union Internationale des Chemins de Fer - UIC	FR
	Administrador de Infraestructuras Ferroviarias	ES
	Renfe Operadora	ES
	Alma Consulting Group SAS	FR
	Tecnología e Investigación Ferroviaria SA	ES
	Technische Universität Berlin	DE
	Construcciones y Auxiliar de Ferrocarriles Investigación y Desarrollo, S.L.	ES

DYNOTRAIN

Railway vehicle dynamics and track interactions: Total regulatory acceptance for the interoperable network



State of the art - Background

Certification against EN standards on railway dynamics in particular, together with the relevant technical annexes of the High Speed TSI, following various tests methods, extend train delivery times for months. Besides, the tests do not always capture all the operating conditions. There is thus a risk of failure or unsafe approximation in such tests. In addition to this, some uncontrolled environmental and other boundary test conditions combined with restrictive operational limits can influence results. The costs and duration of tests performed in such conditions are also often increased by the need to do these tests several times so as to explore all the range of environmental and boundary conditions as much as possible and secure the results.

DynoTRAIN is part of the TrioTRAIN cluster of projects. The objective of these projects is to propose an innovative methodology that will allow multi-system network and route approval in Europe to become a faster, cheaper and better process for all involved stakeholders. The successful implementation of the TrioTRAIN cluster results will lead to:

- a time reduction for relevant parts of the certification process from two years to six months;
- an 80% saving in effort for the acceptance of a new vehicle that has already been accepted in a previous country;

- an estimated potential financial saving of € 20-50 million per year.

Objectives

The high-level objectives of the DynoTRAIN project include:

1. improving the cross-acceptance of track tests: defining conditions used in different countries during on-track tests for certification of vehicles with the aim of defining the tests that can be directly cross-accepted, those that may stay specific to each country and the ones that must be completed either by tests or by simulation.
2. introducing virtual certification (VC): investigating the possibility of using computer simulations to validate comparisons with specified tests, and how these simulations could lead to significant savings of time and costs for the railway vehicle certification process;
3. defining track loading limits related to network access: improving this process by understanding the different conditions in different countries, clarifying the influence of the track construction and maintenance on the track load limits, and developing infrastructure limit values related to the boundary conditions.
4. gaining regulatory acceptance: ensuring that the research carried out in the project fully exploits existing knowledge and is focused on the critical aspects of the work; that the research forms a basis for the continuous uptake of the results of the project, taking full advantage of synergy with the other TrioTRAIN projects and arriving at a convincing proposal for standard.

Description of Work

DynoTRAIN will promote interoperable rail traffic in Europe by reducing costs of certification and closing 'open points' in the TSIs. On the basis of the requirements for the new CR TSI and revision of HS TSI, and opportunities to reduce certification costs and introduce virtual certification where possible, the focus of the study is on the main aspects of rolling stock dynamics that are, or need to be, subject to certification. The project is organised around six technical work packages (WP):

WP1: Measurements of track geometry quality and virtual homologation

WP2: Track geometry quality

WP3: Contact geometry

WP4: Track loading limits related to network access

WP5: Model building and validation

WP6: Virtual certification of modified vehicles and vehicles running in other conditions.

WP7 is a quality assurance work package that aims at ensuring the acceptance of the results of the project by European and National Safety Authorities. Methodologies will be defined and applied to all the technical WPs in order to check and guarantee the quality of the results and propositions, and in particular prove that the project will not jeopardise the safety levels of the railway systems.

WP7 will also deal with dissemination activities, especially towards the European Railways Agency and the National Safety Authorities.

All the management activities of DynoTRAIN will be undertaken in WP0.

Expected Results

Cross-acceptance of track tests in railway dynamics

DynoTRAIN will limit the costs of the certification by improving cross-acceptance through the following innovations:

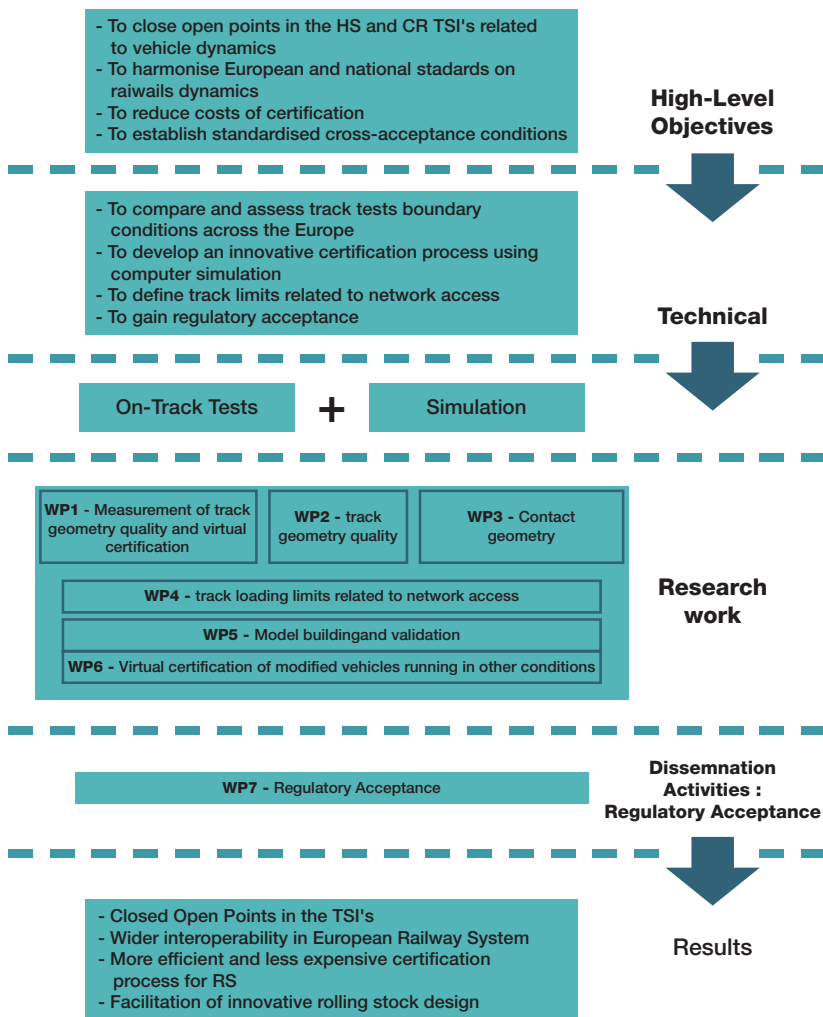
- characterisation of the irregularities of the track;
- characterisation of contact geometry of wheel and rail;
- determination of the friction coefficient;
- use of simulation to facilitate the cross-acceptance.

Contact geometry and track geometry quality: there will be a new description of track geometry quality with a good correlation to the vehicle's response.

Virtual certification in railway dynamics

Using virtual certification in the design process of simulating the dynamic behaviour of rail vehicles make the following possible:

- it is envisaged to use multi-body vehicle models for the certification of a vehicle, once submitted to a first series of tests, to extrapolate the tests results to other conditions as required for certification. For cases in which the latter conditions would have been difficult to meet, time and money can be saved in the vehicle certification process;
- it is also envisaged to use the simulated behaviour of a new or modified vehicle close to a vehicle already certified by test, to avoid repeating certification tests on the new or modified vehicle.



DynoTRAIN: From objectives to results

Acronym:	DYNOTRAIN	
Name of proposal:	Railway vehicle dynamics and track interactions: Total regulatory acceptance for the interoperable network	
Contract number:	234079	
Instrument:	CP – FP	
Total cost:	6 623 121 €	
EU contribution:	3 997 952 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.06.2009	
Ending date:	31.05.2013	
Duration:	48 months	
Website:	http://www.triotrain.eu	
Coordinator:	Mr. Martin Couturier UNIFE - The European Rail Industry Avenue Louise 221 BE 1050 Brussels	
E-mail:	martin.couturier@unife.org	
Tel:	+32 (0)2 642 23 21	
Fax:	+32 (0)2 626 12 61	
EC Officer:	Peter Crawley	
Partners:	ALSTOM Transport SA	FR
	Bombardier Transportation GmbH	DE
	Ansaldo Breda S.p.A	IT
	Siemens Aktiengesellschaft	DE
	Construcciones y Auxiliar de Ferrocarriles, S.A.	ES
	Rail Safety and Standards Board Ltd	UK
	Deutsche Bahn AG	DE
	Société Nationale des Chemins de Fer Français	FR
	Trenitalia S.p.A.	IT
	Union Internationale des Chemins de Fer	FR
	Università degli Studi di Roma 'La Sapienza' - Dipartimento di Idraulica, Trasporti e Strade	IT
	Centro de Estudios e Investigaciones Técnicas de Gipuzkoa	ES
	Manchester Metropolitan University	UK
	Politecnico di Milano Dipartimento di Meccanica	IT
	Kungliga Tekniska Högskolan	SE
	Technische Universität Berlin	DE
	Ineco Tifsa	ES
	Institut National de Recherche sur les Transports et leur Sécurité	FR
	Réseau Ferré de France	FR
	Network Rail Infrastructure Ltd	UK
	Alma Consulting Group S.A.S.	FR

EIRAC II

EIRAC 2008-2010

State of the art - Background

The European Intermodal Research Advisory Council (EIRAC) was launched in May 2005. EIRAC determined that a Strategic Intermodal Research Agenda 2020 (SIRA) for intermodal transport and an implementation plan were needed as instruments to direct European and national resources towards targeted research, as together they could cover an important step towards the creation of a coordinated intermodal research strategy. The SIRA was published on 14 December 2005.

The overall structure of the SIRA is built around five pillars of research: Interoperability, Logistics, Security, Socio-Economics, Education and Training, supporting the implementation of the characteristics of intermodal transport and logistics so as to achieve the EIRAC Vision.

The SIRA was followed by its Implementation Plan, published on 12 December 2006. This plan goes beyond a mere research agenda as it also acknowledges the need to pursue changes that are not dependent on further research. The Implementation Plan provides the basis on which the intermodal transport industry, national transport authorities and European authorities will act together to implement the necessary changes in intermodal transport.

EIRAC has been very successful in its first two and a half years of activities. It has been acknowledged by the European Commission as a major source of expertise and a reliable entity to deal with.

Objectives

The global objectives of EIRAC 2008-2010 are to:

- provide daily management of EIRAC (administration, innovation management, and communication), thus stimulating the implementation of the proposed changes and the market up-take;

- support EIRAC in updating the SIRA and its Implementation Plan;
- support EIRAC in making strategic recommendations at national and EU levels for implementing the SIRA and influencing research programmes, in order to achieve the 2020 business scenario;
- support EIRAC in managing the research results by assessing the overall benefits of the SIRA and its Implementation Plan and the potential for market up-take;
- develop and implement a strong communication and campaigning strategy to create awareness on EIRAC and its SIRA and Implementation Plan, and to disseminate information on research programmes and news of changes;
- enhance the networking and clustering of EU research and development capacity in intermodal transport;
- update and provide the required structure for supporting the running of EIRAC;
- stimulate the creation of 'national EIRACs', i.e. national technology platforms on intermodal transport and logistics;
- develop a plan for external communication;
- draw scenarios for running EIRAC independent of EC funding, including future activities, and the required networking and financial plans.

Description of Work

In order to ensure a complete coverage of the proposed topics and an effective co-operation between the partners, which will help in moving the EIRAC work forwards, the EIRAC II work plan has been organised into five different work packages (WP).

The workflow can be summarised as follows.

WP1 (EIRAC Secretariat) will provide the proper coordination of EIRAC II, as well as guaranteeing the necessary secretariat support to all EIRAC bodies, in co-operation with WP2 (Service-kit for EIRAC).

Networking with Member States (WP3) aims at facilitating the realisation of the Implementation Plan topics into national research programmes, enhancing the potential for market up-take of EIRAC results, stimulating the creation of national Intermodal Research Advisory Councils, and maintaining close relationships with both national and European technology platforms.

Starting from month 13 until the end of the project, WP4 will assess the topics contained in the current Implementation Plan on the basis of the characteristics of intermodal transport as defined in the SIRA 2020, and will support the progress of the Strategic Intermodal Research Agenda and the Implementation Plan in order to extend their vision beyond 2020.

Finally, WP5 will define the strategy and options to ensure the continuation of EIRAC in its next phase, independent of EC funding.

Expected Results

EIRAC II deliverables are:

- the EIRAC service-kit, which will help EIRAC members to influence research and spread the EIRAC message;
- to hold four road shows in the Member and/or Associated States, which are meetings with the National Ministries of Transport/Infrastructure/Research on one side and EIRAC members on the other, to facilitate EIRAC in influencing the national research and infrastructure programmes;
- the new EIRAC website, which will include easy access to all EIRAC documents, interviews with leading stakeholders in intermodal transport, overview of funding opportunities, events, etc.;
- establish links with the ERA-NET Transport Project, and strengthen relations with the relevant EU and national technology platforms;
- prepare scenarios for the continuation of EIRAC activities beyond 2010, to be approved by the EIRAC members.



Task force visiting member's plant

Acronym: EIRAC II
Name of proposal: EIRAC 2008-2010
Contract number: 218693
Instrument: CP – FP
Total cost: 1 385 021 €
EU contribution: 1 099 999 €
Call: FP7-SST-2007-RTD-1
Starting date: 01.06.2008
Ending date: 30.11.2010
Duration: 30 months
Website: <http://www.eirac.eu>
Coordinator: Mr. Valerio Recagno
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INTEGRITY

Intermodal global door-to-door container supply chain visibility



State of the art - Background

The growth in container transport, bottlenecks in hinterland connections, complex logistics chains consisting of many actors, information gaps, as well as new security regulations, are challenges to be managed by industry and administration.

Current door-to-door chains still show a lack of information flow that prevent the provision of highly efficient and reliable services. Due to the unpredictability and unreliability, actual procedures lead to certain bottlenecks. Too many goods have to be held in safety stocks and too many goods are locked in security processes causing avoidable economic drawbacks.

There are several measures and initiatives to enhance the transport security (such as the ISPS Code) but coverage of the entire supply chain is still an open issue. Challenges for customs authorities are the increasing number of import containers to be checked, low quality of information received, and low data integrity for the containers to be processed.

The World Customs Organisation recommends pushing the cargo control to the exporting country rather than performing the checks at the late stage of arrival in the import country as done today. Optimal clearance procedures, using eSeals or Container Security Devices, applying the Authorised Economic Operator (AEO) scheme along the chain, agreeing mutual agreements between customs authorities are appropriate building blocks.

Objectives

INTEGRITY aims at significant improvements in the reliability and predictability of global door-to-door container transport by optimising the co-operation between the transport industry and customs authorities in the China-EU trade corridor.

New procedures and software tools shall enable this improvement to be acceptable by the key stakeholders. This will be mainly achieved by the direct involvement of key players in the projects for sharing their experience and expectations.

The core of the project is the development of the Shared Integrated Container Information System (SICIS) that allows authorised companies and authorities to access planning and status information of selected consignments. Proactive planning according to the SCEM (supply chain event management) approach allows problems to be forecast well before they might occur. Matching logistics data with security information, including data from electronic seals, container security devices and scanning equipment, together with the integration of the AEO concept, are basic concepts. Ongoing efforts, e.g. from the EU-China Customs Project (SSTL), will be included in the total concept.

The applicability of the INTEGRITY approach will be proved by demonstrating the benefits and following 5 000 containers on their door-to-door transport from China to Europe.

Description of Work

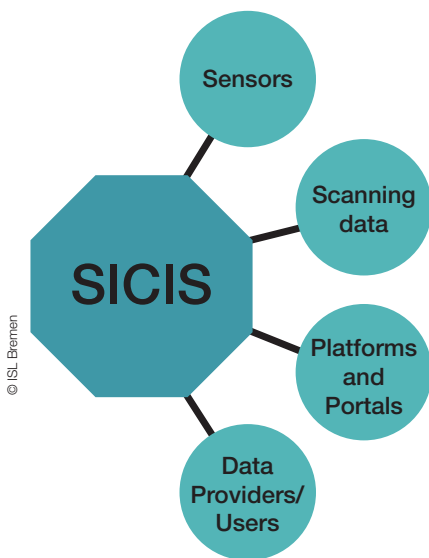
The first steps serve as the basis for the development. It will start with a compendium that provides a sound compilation of relevant actors with their responsibilities, the legal framework and existing technical solutions to support supply chain visibility, and continue with the specific logistics and security require-

ments from the partners in the INTEGRITY corridors. This will result in a common set of requirements, as well as basic functions for the INTEGRITY and SmartCM platforms.

The technical specification and system architecture for the INTEGRITY system SICIS has a special focus on openness, data quality, integrity and confidentiality. According to the specification, these components will be developed in different releases. Test cases will be defined and validated, and the demonstration phase prepared.

During the demonstration of the INTEGRITY, components in real-life operation measurements on quantifiable objectives will be performed allowing assessment of the adoption potential of the INTEGRITY solution for the stakeholder groups.

In the exploitation phase, business models and management options for the SICIS platform will be investigated. Neutrality is the key issue here. Appropriate dissemination actions will spread the INTEGRITY idea. Networking and consensus building measures are essential for the success of INTEGRITY, as well as co-operation with other projects.



Shared Integrated Container Information System

Expected Results

The expected result is to make door-to-door chains more secure and predictable. Both the main client groups - customs and shippers/ third-party logistics - will be satisfied with one integrated approach. Several recent investigations show that the enhancement of supply chain visibility provides economic benefits for all participants in the chain.

The expected results of INTEGRITY for the particular supply chain actors are:

- technical validation if all new and integrated components work as expected;
- specific analyses on the benefits for all players in the chain, such as
- enhanced predictability and reliability of door-to-door container chains,
- reduction of uncertainty in these chains,
- enhancement of the speed of administrative and operational performance;
- comparison with the related costs for such a service;
- addressing the recent lack of critical supply-chain visibility, uncoordinated multi-tier supply-chain processes and longer lead times, and lead-time visibility.

The real-life demonstration of the SICIS system, together with the related evaluation of quantifiable objectives, will provide good experience on the applicability of the INTEGRITY concept. This concept is further regularly validated by a broader audience, the accompanying Joint Advisory Board of INTEGRITY and SmartCM, providing knowledge from additional stakeholders.

Acronym:	INTEGRITY	
Name of proposal:	Intermodal global door-to-door container supply chain visibility	
Contract number:	218588	
Instrument:	CP – FP	
Total cost:	10 717 959 €	
EU contribution:	6 499 956 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	17.06.2008	
Ending date:	31.05.2011	
Duration:	36 months	
Website:	http://www.integrity-supplychain.eu	
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Partners:	Cross-border Research Association	CH
	ECT Delta Terminal B.V.	NL
	The Felixstowe Dock and Railway Company	UK
	Yantian International Container Terminals Limited	CN
	DeCeTe Duisburger Container Terminal Gesellschaft	DE
	Xerox Manufacturing Nederland B.V.	NL
	Seacon Venlo Expeditie B.V.	NL
	DHL Global Forwarding (Belgium)	BE
	A.S. Watson (Europe) Holdings B.V.	NL
	HM Revenue and Customs	UK
	Ministerie van Financiën, directoraat-generaal Belastingdienst	NL
	ECT Venlo B.V.	NL
	Erasmus Universiteit Rotterdam	NL
	OHB Teledata GmbH	DE
	BAP Logistics Ltd	UK

PANTOTRAIN

PANTOgraph and catenary interaction: Total Regulatory Acceptance for the Interoperable Network



State of the art - Background

When certifying a rail vehicle according to European regulation, two elements constitute a significant challenge: vehicle cost and time to market. A large part of vehicle certification mandates testing for safety, performance and infrastructure compatibility in each individual Member State. The certification process can thus take up to 30 months and cost several million euros, imposing a huge competitive disadvantage on the development of rail products, and thus jeopardising the development of a reliable and sustainable transport network.

PantoTRAIN is part of the TrioTRAIN cluster of projects. TrioTRAIN, an acronym for Total Regulatory Acceptance for the Interoperable Network, is the common title given to a cluster of projects (three hence 'Trio') dealing with key railway interoperability issues. The objective of these projects is to propose an innovative methodology that will ease rail vehicle certification processes in Europe to make them faster, cheaper and better for all involved stakeholders.

Objectives

PantoTRAIN aims at developing and introducing a computer-aided certification process to allow the reduction of the time and cost of pantograph certification against ENs and TSI by transferring current physical track tests to laboratory testing and numerical simulation.

The high-level objectives include:

- introducing new procedures based on numerical simulations and Hardware-in-the-Loop testing into the current certification process of the pantograph/catenary system, thus reducing migration time for the implementation of new interoperable solutions;
- using the numerical and physical simulation to extend pantograph homologation to different catenary systems, thereby enhancing the interoperable use of existing infrastructure and the development of new interoperable pantographs;
- fostering the use of innovative and mechatronic pantographs, by understanding how the homologation process relates to these systems and by revising the limits provided by the TSIs;
- using the simulated behaviour of new/modified pantographs or catenaries 'close' to those already certified by line tests, thereby avoiding the repetition of certification tests on the new/modified designs, and allowing the saving of a large portion of the costs associated with homologation;
- fostering the use of 'Hardware-in-the-Loop' (HIL) testing as a more objective and less expensive alternative to line tests.

Description of Work

Virtual homologation techniques will be applied to extend pantograph homologation across different national railway networks. The collection of pantograph and catenary databases at European level will be an essential step towards this ambitious goal.

The project is organised into the following work packages (WP):

WP1: Criteria to build and validate pantograph/catenary numerical simulation tools

WP2: Hardware-in-the-Loop testing of pantographs

WP3: Virtual homologation for interoperability

WP4: Virtual extension of homologation for a pantograph that presents minor changes from an already homologated one

WP5: New innovative pantograph designs with control functionalities

WP6: Assessment of virtual homologation procedures and Regulatory Acceptance.

WPs 1-5 deal with the definition of numerical and experimental tools for the virtual certification of the pantograph/catenary couple.

WP6 aims at the final assessment of the tools previously developed and, at the same time, ensuring the acceptance of the project results by European and national authorities. In this last WP, methodologies will be defined and applied to all the technical WPs in order to check and guarantee the quality of the results and propositions, and to undertake appropriate actions in terms of proposing new standards, consensus building and contacts to standardisation bodies, NSAs and ERA.

Expected Results

The expected results are as follows:

Numerical simulation of pantograph/catenary interaction:

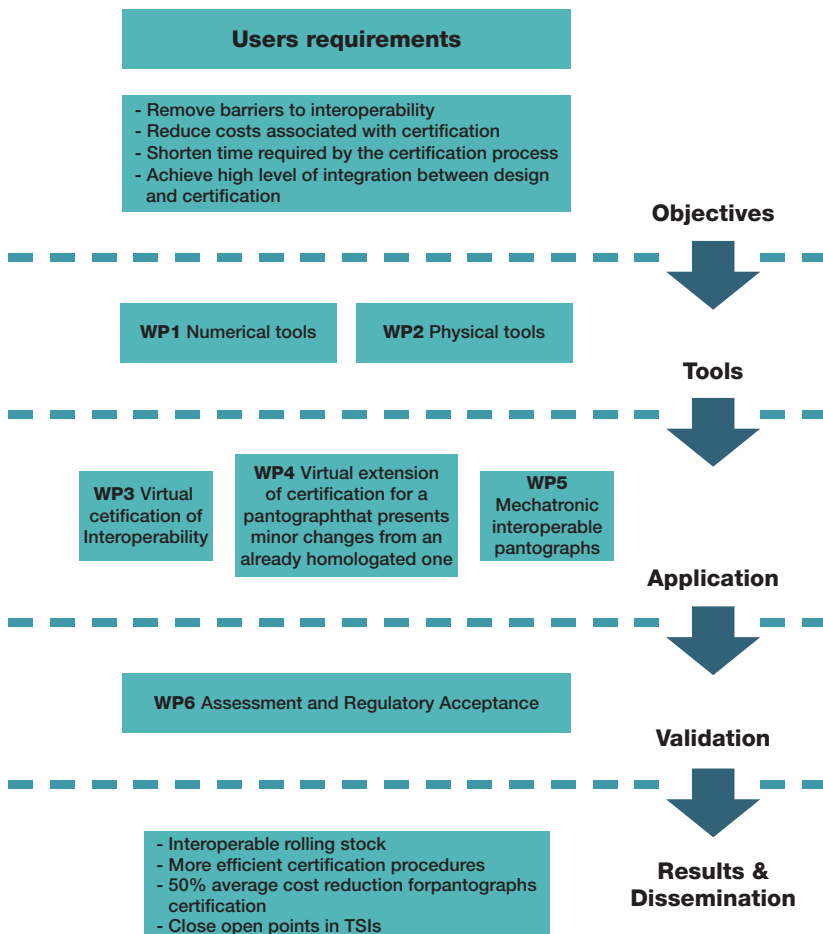
- using simulation tools to 'virtually' perform part of the tests needed for the certification of pantographs and catenaries;
- using simulation tools in combination with the European Catenary Database for pantograph certification of cross-border operations, thereby achieving virtual certification for interoperability;
- using simulation tools to achieve the certification of new/modified pantographs and catenaries that can be considered sufficiently close to ones for which physical certification was already performed.

Hardware-in-the-Loop testing of pantograph systems:

This technology has a clear potential to improve methods for product development and testing and to simplify homologation procedures. The main innovation will be the introduction of HIL testing into the homologation process, not only for pantograph/catenary systems, but also for railway rolling stock.

Pantograph design and mechatronic application:

- systematic design optimisation to reduce weight and improve the overall contact force;
- improving pantograph interoperability through the exploitation of control technologies;
- developing appropriate strategies for active control of pantographs;
- performing a complete revision of the homologation process for innovative/mechatronic pantographs.



PantoTRAIN: From objectives to results

Acronym:	PANTOTRAIN	
Name of proposal:	PANTOgraph and catenary interaction: Total Regulatory Acceptance for the Interoperable Network	
Contract number:	234015	
Instrument:	CP – FP	
Total cost:	3 611 908 €	
EU contribution:	2 166 370 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.06.2009	
Ending date:	31.05.2012	
Duration:	36 months	
Website:	http://www.triotrain.eu	
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Partners:	ALSTOM Transport S.A.	FR
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	Stemmann-Technik GmbH	DE
	Société Nationale des Chemins de Fer Français	FR
	Rail Safety and Standards Board Ltd	UK
	Politecnico di Milano	IT
	Instituto Superior Técnico	PT
	Università degli Studi di Roma 'La Sapienza'	IT
	Union Internationale des Chemins de Fer	FR
	Network Rail Infrastructure Ltd	UK
	Alma Consulting Group S.A.S.	FR
	Tecnología e Investigación Ferroviaria S.A.	ES
	Contact Srl	IT
	Associação Portuguesa para a Normalização e Certificação Ferroviária	PT
	Deutsche Bahn AG	DE

SMART-CM

SMART Container Chain Management

State of the art - Background

The modern economy expects an unbroken logistics chain from production to consumption, with constant access to information about shipment status for all concerned, enabling them to make adjustments, should an incident occur. However, global container transportation systems have not achieved this goal revealing a gap between data availability and data need. SMART-CM will fill this gap by offering information capture and exchange throughout the chain. The project responds to the trade and transport industry's request for increased security and improved efficiency in global door-to-door intermodal container transport chain management.

In practical terms this means:

- Continuous monitoring of container and consignment passageways throughout global chains using interoperable and cost-effective container security technologies.
- Quick containers' customs clearance, through technical integration of multiple technologies and neutral provision of standardised information to all customs authorities involved in the chain.
- Easy access to services and tools for total chain quality and visibility improvement with main emphasis on managing unexpected situations and minimising costs by facilitating container management by exception.
- Provision of container-transport-related information from different sources, container security devices providers' platforms, port MIS systems, fleet cargo monitoring systems, traffic management systems etc, in a technology-agnostic way.

Objectives

The SMART-CM project aims to develop a neutral, single window, service platform enabling secure and interoperable data communications in global door-to-door container transport management, using standard track

and trace technologies (GPS, RFID, GPRS, satellite, etc). It will allow:

- Interoperable and seamless data exchanges along the chain, while complying with commercial data exchange rules.
- Interfaces with existing container management service platforms.
- Integration of compliant application of B2B and B2A container security data solutions with international customs operations via a neutral interface.
- New B2B and B2A services to add efficiency to chain visibility and player co-operation.
- Innovative solutions and advanced application of prototypes in global container management, such as dynamic rescheduling of container transportation.

On a non-technical level,

- Analysis of standards, legal, market and business operations and future logistics approaches to door-to-door container chains.
- Assessment of current and potential intermodal container transport logistics opportunities.
- Matching proposed efficiency improvements with seamless, integrated administrative and business processes.
- Alleviating the negative impact of legal complexities by developing technological solutions to meet legal requirements.

Description of Work

The SMART-CM platform, which will facilitate data exchange among all stakeholders in the intermodal container chain, is the responsibility of the technological WP2, 3, 4, where the neutral layer (customs oriented), logistics layer and value-added services will be developed. The technical solution will be adjusted according to the findings and results of WP1 which assesses the state of the art gap analysis and definition of industry requirements of the platform.

WP5 and WP6 are the two demonstrators where the platform and its services will be tested, covering four supply chains and linking the Asian and European coasts, where the industrial partners are mostly active. The evaluation WP7, based on requirement conclusions, the SMART-CM services and the demonstrators' results, will assess business benefits, and validate the technical solution and socio-economic impact.

Special emphasis is placed on the Dissemination & Consensus building activities under WP8 where a specific strategy for diffusion of results and project visibility are envisaged. Finally, the exploitation project activity (WP9) focuses on identification and analysis of the major success parameters and business models that could facilitate the implementation and exploitation of SMART-CM platform components.

Expected Results

In fulfilling its objectives, SMART-CM will produce the specific outputs below:

1. A technology agnostic platform for seamless and interoperable handling of container transport management related data which will come from a variety of sources including container monitoring technology providers' data bases.
2. Innovative value-added services, including:
 - Information handling and administering according to data-owner chosen retention policies, in order to make available to them specific services at specific levels and stages of the chain
 - Algorithms for dynamic rescheduling of container transportation in order to achieve specific efficiency and environmental benefits.
 - Chain visibility enabling techniques for fulfilling operational requirements of the actors in managing global container chains.
3. Neutral layer as part of the SMART-CM platform able to contribute to efficiently achieving the mutual recognition between customs involved in the Secure Trade Lanes implementation in line with current AEO activities.
4. Proof of the single window interoperability architecture with external to the project platforms and technologies.
5. Proposals for extending or completing existing global standards for container transport monitoring and control (technologies and processes).
5. Definition of the roadmap of the platform business model in the global container chain environment based on the results of the demonstrators, evaluation and exploitation activities.

Acronym:	SMART-CM
Name of proposal:	SMART Container Chain Management
Contract number:	218547
Instrument:	CP – IP
Total cost:	10 263 825 €
EU contribution:	6 499 942 €
Call:	FP7-SST-2007-RTD-1
Starting date:	01.08.2008
Ending date:	31.07.2011
Duration:	36 months
Website:	http://www.smart-cm.eu
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Partners:	Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung E.V. DE BPV - Beratung und Planung im Verkehrswesen GmbH DE DHL Management (Switzerland) Ltd CH COSCO Network E Logistics Co Ltd CN COSCON - Cosco Container Lines CN EDC- European Datacomm NV BE TNO - Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek NL EIA - European Intermodal Association BE VTT - Altion Teknillinen Tutkimuskeskus FI Dievropaiki Ektairia Symbolon Metaforon Anaptikis kai Pliroforikis AE GR TREDIT - Transeuropean Consultants for Transport, Development and Information Technology S.A GR Planet S.A. GR PTV - Planung Transport Verkehr AG. DE Università degli Studi di Roma Tor Vergata IT TIFFA - Thai International Freight Forwarders Association TH TIFFA EDI Services Co., Ltd TH Ningbo Port Group Information & Communication Co. Ltd. CN Thessaloniki Port Authority SA GR Kuhne + Nagel GmbH AT PSA - Hesse-Noord Natie NV BE

Administration of Customs and Excises	BE
Antwerp Port Authority - Gemeentelijk Havenbedrijf Antwerpen	BE
Thessaloniki Port Authority SA	GR
Sequoyah NV	BE
VIL - Vlaams Instituut voor de Logistiek VZW	BE
Porthus NV	BE
PRODOS SA	GR
CEN - Comité Européen de Normalisation	BE
ICSO - International Cargo Security Organisation	BE
Hellenic Ministry of Finance - Greek Customs	GR
DP World - The Peninsular & Oriental Steam Navigation Company	UK
MARI - Maritime Association For Research and Innovation	IT
Anonymos Etaireia Ellinikon kai Diethnon Metaforon Proodos AE	GR
Hellenic Ministry of Economy and Finance	GR

TelliBox

Intelligent MegaSwapBoxes for advanced intermodal freight transport

State of the art - Background

Today, the European transport system has to face various challenges in terms of safety and protecting the environment, reducing traffic congestion and improving loading processes and interoperability of available transport modes. Transport costs may be reduced further by following the trend towards high-volume loading units. However, some transport modes may not meet the requirements of every cargo. The lack of standardisation concerning intermodal loading units hinders the connectivity of modes and generates costs. Some transport solutions concern not only dimensions, like the high-cube containers or 'mega'-semitrailers, but also loading facilities, for example curtain-side swap bodies or boxes with liftable tops that were brought on to the market. But single solutions can often only be used in special areas of application and in fact necessitate special operational technologies, thus incurring extra costs.

The success of intermodal transport solutions depends significantly on cost-efficient loading processes, improvement of interoperability and the exploitation of a maximised cargo area. Intermodal transport is hampered by technical constraints, particularly with regard to the standardisation of the loading units and transhipment technologies.

Objectives

For a sustainable growth of efficient freight transport, more flexibility and intelligent use of capacity is needed. By drawing together the ideas and contributions of freight forwarders, manufacturers and scientists, the scientific aim is to achieve an all-purpose, intermodal loading unit that is applicable for transport via road, rail, short sea and inland shipping. The

advantages of containers and semitrailers will be integrated in one MegaSwapBox. Challenges facing the development are that the MegaSwapBox has to be:

- trimodal (suitable for road, rail and waterway);
- stackable;
- have an inside height of 3 metres;
- have a loading capacity 100m³;
- carried from the top;
- openable on 3 sides;
- pilfer and theft-proof;
- comply with all existing standards;
- suitable for use on existing low-loader railway wagons;
- usable in road transport on a suitably adapted chassis.

The overall objective is to find an optimal solution regarding the technical and efficient feasibility of the MegaSwapBox and to introduce the system on the intermodal market. The MegaSwapBox will encourage the shift from road transport to an intermodal system.

Description of Work

An extensive analysis phase was implemented at the beginning of the project. This included analysing and prioritising all the technical, operational and constructive requirements of the MegaSwapBox and the development of a solution space. The solution space considered component technologies already existing on the market as well as new approaches for creating alternatives. It was essential that all partners of the consortium were intensively involved.

During the next step, the technical attractiveness of possible combinations in the solution space were analysed, and methodologies like technical feasibility, sensitivity analysis and cost-benefit analysis were applied.

In order to create concepts for the design, new workshops were developed. Finally, three concepts, which had been designed in detail, arose as a result of these consortium activities. Within an evaluation phase, the concept with the best design regarding technical, operational and economical suitability was chosen. At present a prototype of the MegaSwapBox and chassis is being produced. After certification the prototypes will be tested. The results of these test runs will be used to optimise the designs.

Expected Results

The expected overall results of the project are the prototypes of the MegaSwapBox and the adapted chassis for road transport. These prototypes should meet all the challenges of an intermodal loading system and be ready for use in commercial transport. This will be achieved as a collective result of the following sectional project outcomes:

- the analysis of existing and new constructive solutions, resulting in the development of an adequate solution space and forming the basis for the ensuing project activities;

- three concepts for design solutions, resulting from an evaluation of the solution space, considering its technical attractiveness and feasibility;
- realising these design solutions in intelligent and innovative constructions. Some patents have already been applied for;
- an extensive analysis of the profitability, leading to the choice of optimal designs for the prototypes;
- building two certified prototypes of the MegaSwapBox and chassis;
- commercial test runs on an intermodal European corridor will result in the evaluation of the usability of the prototypes and in recommendations for further improvements to be implemented within the optimisation loop;
- after designing and building the optimised prototypes, further test runs will be done for the final evaluation;
- adequate marketing strategies will complete the expected results.



TellBox Consortium

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Acronym:	TelliBox		
Name of proposal:	Intelligent MegaSwapBoxes for advanced intermodal freight transport		
Contract number:	217856		
Instrument:	CP – FP		
Total cost:	4 366 534 €		
EU contribution:	3 099 665 €		
Call:	FP7-SST-2007-RTD-1		
Starting date:	01.04.2008		
Ending date:	31.03.2011		
Duration:	36 months		
Website:	http://www.tellibox.eu		
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	HRD Trailer-Engineering GmbH	DE	
	Zilinská Univerzita v Ziline	SK	
	CTL Logistics S.A.	PL	
	Wincanton GmbH	DE	
	European Intermodal Association	BE	
	Intermodal Concepts & Management AG	CH	

ACCESS 2 ALL

Mobility schemes ensuring accessibility of public transport for all users

State of the art - Background

Since the mid 1990s, we have witnessed sweeping economic, political and social transformation in Europe. Against a background of profound structural change, most countries in the developed world have been reviewing their policies with regard to their public transportation services at local, regional and national level.

There is a demand for better quality services and cost rationalisation in the public transport sector. A new awareness of the relationship between economic competitiveness and efficient public transport are the key factors underpinning the 're-engineering' of the public transport sector. The intention is to improve the quality and efficiency of services and operations for ALL citizens.

To meet the above challenge, ACCESS 2 ALL develops a coordinated framework for current and future actions in research, education and technology transfer in the field of public transport accessibility in Europe, so as to transform the public transport research area into an all-inclusive, dynamic, innovative and knowledge-driven field.

Objectives

The main aim is to encourage public transport operators to adopt innovative technological concepts and mobility schemes that enable high quality mobility and transportation services for all. It will also provide their personnel with the necessary knowledge on the particularities of specific user groups, such as the elderly and disabled, ICT-illiterate, dyslectics and illiterate people, etc. To achieve this, it is necessary to identify best practices and existing gaps, coordinate ongoing research efforts, agree on guidelines for transportation systems and services, and promote these



towards all-inclusive standards and policies. ACCESS 2 ALL also aims at producing a common research roadmap, in co-operation with all major stakeholders, aiming at further enhancing the quality of transportation services for ALL users through identifying the technological or operational gaps that persist.

Description of Work

The project is divided into eight technical work packages (WP).

WP1: identifies the different types of problems that mobility impaired end users of public transport have to face; based on this initial identification, users are clustered according to type and degree of impairment and related mobility difficulties.

WP2: identifies trends between accessibility and safety.

WP3: a specific set of activities analyse innovative technological concepts in the field of public transport, aiming to increase the mobility of people in cities and, with new vehicle and infrastructure concepts, achieve a barrier-free travel chain.

WP4: innovative service provision and interface concepts are analysed and promoted contributing to the enhancement of Quality



of Service of public transport information and services for mobility impaired users.

WP5: investigates public transport-related issues, like usability, social and cross-cultural issues.

WP6: formulates design guidelines for accessible public transport services, based on existing best practices identified within the project, as well as novel concepts arising through the ACCESS 2 ALL work, covering all aspects of operation.

WP7: a parallel set of activities aims at the development of a dissemination plan and the implementation of related knowledge diffusion activities.

WP8: another parallel set of activities are devoted to project management.

Expected Results

As a Coordinated Action, the project aims to collect structured best practices and innovative solutions, enabling the promotion of accessible transport for all. It focuses upon:

- bringing all the key actors together, starting from local areas and moving to a pan-European scale;
- establishing a holistic view of public transport and accessibility needs for all user groups;
- benefiting from worldwide best practices in each end-user category;
- defining a barrier-free travel chain, including infrastructure, vehicles and relevant travel information;
- recognising and promoting new vehicle concepts, as well as personalised travel information systems;
- achieving all the above fields through a strong involvement with mobility impaired persons, by means of a relevant network;
- creating a new, high quality research network on the topic;
- issuing concrete accessibility guidelines for public transport operators;
- developing training methodology curricula and tools for the public transport operators and various other related stakeholders;
- issuing recommendations of international validity, covering the accessibility needs of all the main types of public transport end users;
- creating a commonly agreed research roadmap for lasting integration of relevant knowledge and tools, as well as for coordinating research initiatives in the area and actively promoting the project.

Acronym:	ACCESS 2 ALL	
Name of proposal:	Mobility schemes ensuring accessibility of public transport for all users	
Contract number:	218462	
Instrument:	CSA-CA	
Total cost:	797 422 €	
EU contribution:	797 422 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	31.12.2008	
Ending date:	30.11.2010	
Duration:	24 months	
Website:	http://www.access-to-all.eu	
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	INRETS	FR
	Universitas	PT
	Universität Stuttgart	DE
	Blue Print IT Solutions	RO
	IAS	DE
	Lunds Universitet	SE

BIKE INTERMODAL

THE INTERMODAL BIKE – Multi-modal integration of cycling mobility through product and process innovations in bicycle design.

State of the art - Background

The research will provide - by means of product and process innovations - an advanced compactable bicycle, making it possible to carry bicycles on-board public transportation, easily, safely and for a large number of passengers. The ultimate goal is a synergic, intermodal integration of public transport and cycling, expanding the share of both modalities in urban mobility.

The folding bikes currently available on the market with ergonomics comparable with the

commonly accepted posture requirements fall into two categories of folding:

- a) cubic-ish folding, approximately the size of a suitcase ($70 \times 50 \times 30 = 105 \text{ Cu.dm}$);
- b) long-ish folding, approximately the size of a set of golfclubs ($110 \times 30 \times 30 = 100 \text{ Cu.dm}$).

The ride quality of the best models is satisfactory, and appropriate for the city range, but such folding dimensions, coupled with a weight which, for most models, is upwards of 12kg, make it difficult in many ways to carry the bikes on buses, trains and cars.



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Early mock-ups at Compasso d'Oro Prize exhibit in Torino

Furthermore, their folded size is not compliant with the allowed baggage size in most bus or metro systems in the European Union, is often subject to payment of an extra ticket, and acceptance on-board is discretionary based on how crowded the vehicle is. In addition, the average volume, comparable to a suitcase, is such that safety concerns would arise if a few passengers carried one on a bus.

Objectives

To obtain a lighter, smaller folding bike, with the correct ergonomics, the research will validate and translate into a coherent design the following assumptions:

1. Size of the folded bike. As is the case for other deploying-retracting structures (aircraft landing gears, satellite solar panels, convertible car roofs, etc.) all parts will be designed together as a coherent whole, actuated by robotic links for opening-closing, and without the classic 'frame and components' system of the cycling industry.
2. Reduction of bicycle weight. As is the case for other load-bearing structures, from skyscrapers and bridges to sports cars, efforts will be made to reduce bending and torsion stresses in the materials and to use spaceframes as much as possible.
3. Cost. As is the case for most contemporary industrial products, the project will leverage cost-effective technologies currently in use in such highly developed, mass-production sectors as the automotive, industrial tools, home appliance and sports equipment sectors, and not necessarily those associated traditionally with bicycle manufacturing, establishing a new supply chain.
4. Ergonomics. The lack of data on the postural and bio-mechanics of the 'everyday bicycle', in particular of the cycling dynamics of small-wheeled bikes, will be filled by in-depth research able to cast new light in the field.



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Early concept - Rendering

Description of Work

The project will move from the current conceptual state to the complete engineering of the envisioned intermodal bike in a two-stage action:

In the first part, new specific know-how will be produced in several parallel-running 'technology modules' which will then be blended into the conceptual scheme to develop a new 'platform' framework. The areas covered will be ergonomics, riding dynamics, power transfer, structure, materials, tyres, suspensions and opening-closing frame kinematics.

The completion of these parallel tasks will generate a new overall geometric scheme, which will mark the separation between the first and the second phase.

The second part will be devoted to industrial engineering and style, focusing on three key areas:

- Assembling of a new, ad-hoc, industrial supply chain, drawing from technologies and materials which are already common but not optimised for the specific task;
- Designing an industrial plan able to provide very good quality at a reasonable price; and
- Dealing with the cultural issue of the 'uncool'-ness of the social perception of folding bikes, implementing an adequate, contemporary styling as an important factor for the acceptance of a mobility tool that inevitably, as a personal, lifestyle product, will have an impact on the social image of the user.

Expected Results

New knowledge is expected in robotics, ergonomics data and production processes in order to achieve the following design goals:

1. A factor 6 improvement on the volume and a factor 3 improvement on the weight, based on the averages of the current production described above;
2. Develop a better comprehension of the dynamic/biomechanic parameters of everyday cycling into a design tool, for an 'ergonomic compliance' of the bicycle;
3. The incorporation into the bicycle design of such mass-production technologies to allow for cost-efficient manufacture, and to ensure the economic feasibility and sustainability of the production.

If the above performance indicators will actually be met by the research - as per design goals - a wider contribution of the bicycle to the urban transportation is expected through:

- a) An increase in the number of casual users of the cycling mode, due to simpler, more carefree, easier and less fussy use of the bike, without the problems of parking, storage, lifting and the like, extending the number of bike users to a share of the current non-users;
- b) A widespread intermodal use of the bicycle, enhancing both the bike's value as a daily commuter vehicle and public transportation;
- c) A new synergy of the bicycle with the car, as a range extender, adding further value to the infrastructural investment in commuter parking lots.

Acronym:	BIKE INTERMODAL		
Name of proposal:	THE INTERMODAL BIKE – Multi-modal integration of cycling mobility through product and process innovations in bicycle design.		
Contract number:	234374		
Instrument:	CP – FP		
Total cost:	2 179 900 €		
EU contribution:	1 581 000 €		
Call:	FP7-SST-2008-RTD-1		
Starting date:	01.04.2010		
Ending date:	01.04.2013		
Duration:	36 months		
Website:	http://www.bike-intermodal.eu		
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EC Officer:	Nataschia Lai		
Partners:	Ticona GmbH	DE	
	University of Florence	IT	
	Tecnologie Urbane Srl	IT	
	Maxon Motor AG	CH	
	ATAF- Azienda Trasporti Area Fiorentina S.p.a.	IT	
	LPP - Ljubljanski Potniski Promet D.O.O.	SI	

CATS

City Alternative Transport System

State of the art - Background

CATS' aim is the full development and experimentation of a new urban transport service based on a new generation of vehicle. Its major innovation is the utilisation of a single type of vehicle with two different uses: individual use or semi-collective transport. This new transport service is aimed at filling the gap between public mass transport and private individual vehicles. It is based on two operating principles: the self-service concept where small, clean urban vehicles are offered on a short-term rental basis, and the flexible shuttle service where a convoy of vehicles of variable length, driven by a professional driver, operates at fixed hours along a route on a permanent basis or on a case-by-case basis. Both of these principles are integrated in a single service (composed of vehicles and stations) called Cristal. The goal of this new service is to provide more efficient transport in cities through a more balanced use of small clean vehicles and mass transport. This inclusive new transport system is well adapted to the needs of people with reduced mobility, young passengers and tourists.

Objectives

Based on the Cristal technology and system design and demonstration, CATS will develop an innovative strategy to test and introduce a clean urban transport system in three selected sites.

The project mainly focuses on the following issues:

- to demonstrate the complementarity of the Cristal system with the classic public transport network;
- to test all issues linked to station design and vehicle running in terms of urban integration, accessibility and the environmental effect of the system;
- to implement and exploit services and innovative applications.

Four Cristal vehicles and two stations will be made available by Lohr Industrie for experiments. CATS will investigate the impact of introducing such a new system through an in-depth mobility needs analysis, on-site demonstrations and showcases in three different European cities – Strasbourg (FR), Ploiesti (RO) and Formello (IT). The impact on environment and especially on CO₂ emissions, as well as the acceptance and the evaluation of market take-up of the system, will be studied. CATS will improve the design and manufacture of the Cristal transport system via a detailed definition of its operating principles and by a design of its urban settings (stations, infrastructures) in accordance with cities' and citizens' needs. The system will be tested in real operating conditions.

Description of Work

The project is divided into five technical work packages (WP).

WP1 deals with the task of determining, especially for Strasbourg, the most appropriate operational site and also predefines the best implementation of the Cristal system. WP3, WP4 and WP5 will develop methodologies in order to optimise the best implementation of the Cristal system in the city based on the recommendations from WP1. WP2 designs the operating principles of the transportation system for the two modes: the self service and the urban shuttle convoy. Simulation tools are used to design and evaluate the operating principles.

WP3 consists of designing the stations, and defining the services and the use of the stations, based on the results from WP1 and WP2.

After obtaining the results of the 3D demonstrations of the static integration and the operating system, the demonstration in real conditions, the showcase and the exhibitions are performed in WP4.



The impacts and the success of the CATS project are evaluated by using different indicators in WP5. Citizens' experiences of the Cristal system are also addressed here.

Expected Results

The results of the CATS project will contribute to the 'zero accident' vision as well as to a significant improvement in efficiency within the EU's urban transport systems. These environmentally friendly systems will bring a radical change to urban transportation when integrated with other new innovations in the field of Cybernetic Transportation Systems (CTS) by offering solutions to the problems encountered today. They will provide a much more effective system in terms of organised urban mobility, congestion and air pollution, noise, CO₂ emissions, accessibility and safety. The result will be a higher quality of living and an enhanced integration with spatial and societal developments.

In summary, CATS is intended to yield the following impacts:

- drastic reduction of energy dependency, pollutants and carbon dioxide emissions;
- technological progress;
- improvement in the choice of urban mobility with substantial gain in time and comfort for travel;
- an improved urban quality of life.

Acronym:	CATS	
Name of proposal:	City Alternative Transport System	
Contract number:	234341	
Instrument:	CP – FP	
Total cost:	4 163 830 €	
EU contribution:	2 970 245 €	
Call:	FP7-SST-2008-RTD-1	
Duration:	48 months	
Website:	http://www.cats.inrets.fr ; http://www.cats-project.org	
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	GEA Vallaton et Chanard SA	CH
	Institut National de Recherche en Informatique et en Automatique (INRIA)	FR
	Technion - Israel Institute of Technology	IL
	Centro di ricerca per il Trasporto e la Logistica – Università degli Studi di Roma 'La Sapienza'	IT
	Ecole Polytechnique Fédérale de Lausanne (EPFL)	CH
	Ploiesti City Hall	RO
	Agenzia Regionale per la Mobilità del Lazio	IT

CITYHUSH

Acoustically Green Road Vehicles and City Areas

State of the art - Background

More than 20% of the European population is exposed to traffic noise exceeding the L_{den} -level of 60 dB(A). Therefore, traffic noise represents a major environmental challenge that negatively affects a substantial part of the European population. Thus, powerful tools must be made available to city administrations in order to reduce the noise exposure to residents.

This provides the backdrop of the call Sustainable Surface Transport - Greening of Surface Transport, which mandates that successful projects must produce credible proposals to reduce traffic noise by 10-20 dB(A), and at the same time reduce CO₂ emissions for passenger cars by 50%.

It is against this background that the CITYHUSH project is situated under the call Sustainable Surface Transport – Greening of Surface Transport, which mandates that proposals must make credible 30% for heavy vehicles.

Objectives

The CITYHUSH partners think that simultaneously reducing road traffic noise by 10-15 dB(A) units and the CO₂ emissions of passenger cars by 50% is achievable through the creation of special environmental quiet zones or Q-Zones. Access to these Q-Zones is limited to electrically driven cars with low tyre/road noise (or normal cars with similar characteristics) referred to here as Super Quiet Vehicles (SQVs). Normal-Noisy-Cars (NNC) will have to pay gate fees at the boundary of the zone. Previously performed analyses reveals that a 12-14 dB(A) noise reduction can be achieved if all NNCs are banned from the quiet zone. Since electrically driven cars or hybrid cars, driven in electric mode, do not emit any CO₂ at all, it is obvious that the goals set by the European Commission will be met.

An especially important task is the reduction of tyre/road noise from the electric Super Quiet Vehicles (SQVs). Indeed, at higher speeds (e.g. 50 km/h), the tyre/road noise dominates the total vehicle noise. This implies that with normal tyres on a normal road surface, an electric car is just as noisy as a NNC. Thus, it is essential that tyre designs or tyre/road combinations that reduce noise generation are made available with the aim of reducing tyre/road noise by 4-8 dB(A).

Description of Work

SP1 Acoustically green city areas - Q-Zones

SP1 investigates e.g. increasing quietness in a park by embedding it in a Q-Zone.

SP2 Noise-score-rating models and annoyance

A noise-score-rating model will be developed enabling evaluation of the outdoor environment by pedestrians. The existing noise-score-rating model for the indoor noise environment will be improved.

SP3 Noise and vibration control at source - acoustically green vehicles

Quiet vehicle noise will be recorded and integrated into a traffic noise synthesiser for psycho-acoustic evaluations. Clear criteria defining quiet vehicles will be developed so they can be used to limit access to Q-Zones. Low-noise road surfaces will be developed. To maximise the benefits of quiet vehicles, they must be equipped with quiet tyres, which will be achieved with optimised tread patterns and other novel techniques. The noise effects of motorcycles will be studied.

SP4 Propagation attenuation of road traffic noise

Previously, tyre manufacturers focused noise-reduction efforts on cars. This WP investigates what can be done for heavy vehicle tyres. Of the mitigation measures studied, air-

cooled tyre hoods is the measure closest to the source. Another aspect is how absorbing façades contribute to noise reduction.

SP5 Validation

All methods, concepts and innovations produced and evaluated will be tested and validated.

Expected Results

1. The concept of Q-zones where only quiet low-emission vehicles are allowed and where noise levels will be reduced by more than 20 dB(A)
2. The concept of parks embedded in Q-zones where noise levels will be reduced by more than 25 dB(A)
3. Indoor noise-rating models that correlate better with annoyance and complaints
4. Noise-score-rating model for outdoors, which is an entirely new concept.
5. An objective and psycho-acoustic evaluation tool for low-noise/low-emission vehicles
6. Noise synthesis tool for low-noise vehicles for simulation studies
7. General performance noise specifications for low-noise vehicles
8. Novel concepts for low-noise roads: dense elastic asphalt - asphalt road grinding
9. Low-noise tyres for low-noise vehicles
10. Criteria for motorcycles for urban use
11. Active and passive noise attenuation by tyre hoods
12. Solutions for noise mitigation by treatment of building façades
13. Solutions for noise mitigation of low-frequency noise in the propagation path to reduce ground-borne noise.



Acronym:	CITYHUSH	
Name of proposal:	Acoustically Green Road Vehicles and City Areas	
Contract number:	233655	
Instrument:	CF – FP	
Total cost:	5 150 000 €	
EU contribution:	3 500 000 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.01.2010	
Ending date:	31.12.2012	
Duration:	36 months	
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	Goodyear	LU
	Head Acoustics GmbH	DE
	Kungl. Tekniska Högskolan (KTH)	SE
	NCC Roads AB	SE
	Stockholm Environmental Protection Agency	SE
	Netherlands Organisation for Applied Scientific Research (TNO)	NL
	Trafikkontoret Goteborg – Traffic & Public Transport Authority	SE
	Traffic and Transportation Consultants (TTE)	GR
	University of Cambridge	UK
	Promotion of Operational Links with Integrated Services (POLIS)	BE

CITYLOG

Sustainability and Efficiency of City Logistics



State of the art - Background

Today, 80% of European citizens live in cities and their commercial and industrial activities generate a large part of the country's GNP (worldwide an average of 60%). For this reason, 34% of the total freight transport is concentrated in our cities, hugely affecting urban mobility in terms of safety, traffic efficiency and pollutants.

An efficient transport of freight is required as a decisive factor in the economic competitiveness of cities, today, more than 90% of the distribution of urban goods in Europe is "done on the road", with potentially serious consequences on living standards (damage of public health, stress caused by noise, competition for urban space, loss of attractiveness of urban areas). The problem is getting worse because of current trends in supply chain organisation (e.g. just-in-time delivery, fragmentation of loads), which have led to an exponential increase in the number of freight missions, especially for small parcels that are often carried by almost empty transport vehicles.

Objectives

Through its research and development activities, the CITYLOG project will work to achieve the following goals:

- To limit the number of vehicles entering the city centre thanks to the freight bus concept.
- To reduce the number of unsuccessful deliveries through innovative concepts and solutions.

- To optimise the urban distribution of goods via the creation of an adaptive and integrated model and mission management system that will be flexible and able to be applied with different logistic management policies.
- To make acceptable, in terms of costs and time, transshipment operations during the freight distribution process.
- To develop and exploit the CITYLOG telematic services on the newest vehicle and in the complex city organizations to offer logistics-targeted services.
- To design and prototype specific configurations for the freight delivery vehicles in order to improve their operational flexibility, and to introduce novel vehicle technologies to increase road safety and traffic efficiency.
- To model and simulate the impact of the CITYLOG model on very different city logistics situations.

The overall achievement will be an integrated and optimised urban freight delivery concept and tools that will be adaptive to very different urban contexts, sensibly reducing emissions, increasing traffic flow and reducing the number of accidents in urban areas, especially those involving pedestrians.

Description of Work

The CITYLOG concept aims at making a significant breakthrough in urban freight transport. In order to achieve this high-aiming goal, the CITYLOG consortium is selected as highly experienced thus being able to bring good knowledge of the current state-of-the-art.

CITYLOG will make a step forward to include different action fields in a new integrated approach, where technologies become tools in the hands of both logistic operators and public authorities to deal with the city logistics challenges and to propose more sustainable models. The basic idea is that every single

initiative in a specific domain could not be enough if not supported by parallel actions to cover all the aspects that compose the city logistics. Therefore, CITYLOG aims at stressing the three drivers that can be identified in the freight distribution:

- The final customers want to have a high efficiency level - receiving the parcels on time;
- The public authorities want to limit the impact of commercial vehicles on urban traffic;
- The logistic operators need to reduce the costs to move the freight along the whole supply chain, from the sender to the final receiver.

Expected Results

Three action domains have been identified to improve today's city logistic system:

1. Logistic-oriented telematic services are expected to give an important contribution to improve mission planning processes through optimized routing and drivers' support systems. Towards the final customers, tracking and communication capabilities should be deployed to reduce the number of unsuccessful deliveries.
2. Vehicle technologies will represent a key factor to increase the operational flexibility of lorries and vans. This means that the vehicles shall be requested to support different mission profiles, thus leading to a reduction in their number. In other words, what should be achieved is the interoperability among the vehicles, especially in terms of load unit handling.
3. Innovative load units shall be carefully designed to operate, like the vehicles, on different missions.

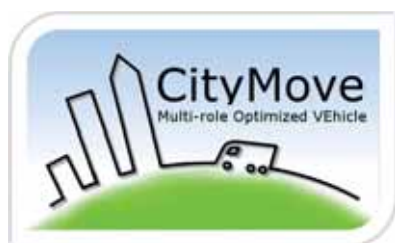
Major impacts are expected on the following items:

1. Increased acceptance and uptake of new urban transport solutions and technologies.
2. Reduction of CO₂, pollutant emissions and noise at least in compliance with EU legislation.
3. Increased efficiency by at least 20% in urban transport and improved transport safety.
4. Improved traffic efficiency and road safety in urban areas especially for pedestrians.

Acronym:	CITYLOG	
Name of proposal:	Sustainability and Efficiency of City Logistics	
Contract number:	233756	
Instrument:	CP – FP	
Total cost:	6 066 936 €	
EU contribution:	3 580 887 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.01.2010	
Ending date:	31.12.2012	
Duration:	36 months	
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	NAVTEQ B.V.	NL
	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek TNO	NL
	PTV Planung Transport Verkehr AG	DE
	MIZAR Automazione S.P.A.	IT
	Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.	DE
	EUROPLATFORMS G.E.I.E	BE
	Senate Department for Urban Development	DE
	Communauté Urbaine de Lyon	FR
	Regione Piemonte	IT
	European Road Transport Telematics Implementation Coordination scril (ERTICO)	BE
	Combibox System	CH
	Interface Transport	FR
	RE:LAB S.r.l.	IT
	LogisticNetwork Consultants GmbH	DE
	TNT Global Express S.p.A.	IT

CITYMOVE

CITY Multi-role Optimized VEHICLE



State of the art - Background

CityMove aims at developing an innovative integrated vehicle solution fitting in with the integrated city transport solution approach for a secure, flexible, reliable, clean, energy-efficient and safe road transportation of goods across European cities, also having a significant impact on the reduction of CO₂ emissions and improvements in terms of safety and security.

CityMove is focused on the achievements of the FIDEUS project, Freight Innovative Delivery in European Urban Spaces, especially in terms of urban safety. FIDEUS used medium and micro vehicles, together with light commercial vehicles, focusing the research on solutions for safe and efficient transshipment inside urban areas. The CityMove proposal is the natural follow-up to the FIDEUS, especially since several partners (i.e. Volvo, IVECO and CRF) – including the CityMove coordinator – were FIDEUS partners.

Objectives

CityMove aims to use state-of-the-art technology in freight vehicle design. It is a co-operative venture between Europe's leading freight vehicle companies and other key stakeholders. The aim is to develop an innovative freight vehicle solution adaptable to the diverse needs of European cities. The solution will provide freight transport vehicles that are secure, flexible, reliable, clean, CO₂ energy

efficient and safe. Developing this common industrial platform for future freight systems requires greater emphasis on economic efficiency, combined with social, energy and environmental considerations. These are paramount for European city policy-makers when matching the objectives of local economic growth with a sustainable environment. Developing such a range requires a coordinated effort by all stakeholders, so that future freight vehicles have the flexibility to adapt to changes in the city commercial environment in the short, medium and long terms. In developing these new freight vehicle options, CityMove will involve all stakeholders, acting as a bridge between the freight vehicle industry, the transport research community, city planning authorities and local business communities. The main innovation will look at the needs in a holistic and integrated approach, developing a new vehicle architecture specifically designed for optimisation of freight transport in urban areas.

Description of Work

CityMove has the following main work packages:

User needs and specifications

Analysis of user needs and technical specifications, aiming at establishing the functional requirements and high-level specifications for new vehicle concepts.

Architecture and vehicle layout

Development of the most appropriate layout and vehicle architecture for freight operations in an urban context, i.e. maximising the reduction of urban congestion and operating in narrow roads typical of city centres. In addition, power-train, body solution and auxiliary systems for urban goods delivery and services will be designed with special attention to CO₂ emissions and fuel-consumption reduction.

Safety and functionalities

Define, develop and demonstrate system functionalities guaranteeing a sustainable use of medium modular vehicles circulating in urban areas. Activities are structured following two main factors affecting safety issues - i.e. predictive anti-rollover, pedestrian/vulnerable-user protection, collision avoidance & driver assistance - and environmentally friendly functionalities (low noise & fuel economy).

Use cases and evaluation

Setting up selected and segmented field tests at cross-EU use cases to evaluate the City-Move solutions ensuring the full deployment and transferability of the application at EU level and key learning points.

Expected Results

Two prototypes will show the following features:

Vehicle-body integrated concept (including an overall reduction of external dimensions while keeping similar capacity and dimension).

Increased vehicle ratio 'paying load/gross weight' via revised vehicle architecture, vehicle power-train and use of innovative material (for vehicle and body).

Low emissions and fuel consumption. Exploiting the state of the art in hybrid technology and taking it further by optimising goods delivery in urban contexts (e.g. use of electric PTO, identifying electrifications of auxiliaries, etc.).

New concepts of refrigerated goods delivery with missions lasting longer.

Environmentally/city-friendly vehicle. Going beyond the current use of manufacturing materials by using 100% recyclable materials. Use of refrigerating gas with a GWP about 1 000 times lower compared to the state of the art. Reduction of external noise in a range of 50% with reference to the state of the art.

Vehicle flexibility. Improving travel performances (e.g. longer refrigeration time allows longer mission, less travelled kilometres). Reduced cost for body builders, more flexibility and modularity with several type of trailers.

Safety & Security. Enhance driver safety (e.g. innovative anti-roll over and collision avoidance). Improve protection of urban VRU (Vulnerable Road Users) through dedicated innovative ADAS.

Acronym:	CITYMOVE	
Name of proposal:	CITY Multi-role Optimized VEHICLE	
Contract number:	233996	
Instrument:	CP – FP	
Total cost:	5 809 084 €	
EU contribution:	3 291 255 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.01.2010	
Ending date:	31.12.2012	
Duration:	36 months	
Website:	http://www.citymoveproject.eu	
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	Centre National de la Recherche Scientifique (CNRS)	FR
	Fit Consulting srl	IT
	Schenker AB	SE
	Danone PDPA srl	RO
	Promoting Operational Links with Integrated Services aisbl (POLIS)	BE
	Jean Chereau SAS	FR
	Plastic Omnium Auto Extérieur Services	FR
	Continental Aktiengesellschaft	DE

CITYNETMOBIL

City Network for Fair Mobility



State of the art - Background

Over the last few years, the EC has funded several research projects on transport systems based on small automated road vehicles (cybercars): CyberCars, CyberCars2, EDICT, CyberMove, NetMobil and CityMobil.

All these projects have proved how automation in urban transport is:

- technically feasible (the state of the art technology is sufficient to implement working and reliable systems);
- performing well as a transport system (waiting time and travel time provided by these systems are generally shorter than the conventional transport systems they are designed to substitute);
- energy efficient and environmentally friendly (energy consumed and emissions produced per passenger kilometre are in the range of one tenth to half of that of a bus system and 2 to 20% of cars);
- generally well-received by users (interviewed users rated the systems as easy to use, safe and as more attractive than conventional systems);
- financially neutral (these systems can, in most cases, cover operational costs and sometimes even repay part of, or all of, the initial investment);
- socio-economically viable (cost-benefit analyses generally show a very positive Net Present Value).

Despite all these benefits, (with the exception of a few pilot installations such as the Rivium business park in the Netherlands) these systems are not yet in use.

Objectives

CityNetMobil's main objective is to disseminate knowledge about automated transport systems and their costs and benefits to citizens, city authorities, local transport planners and managers to overcome the 'diffusion barrier' which so far has hampered the widespread adoption of a system which proves to be: technically feasible, performing well as a transport system, energy efficient and environmentally friendly, generally well-received by users, financially neutral, and socio-economically viable.

The objective will be achieved by organising events. Each event will feature the installation of a small showcase of moving automated vehicles, a conference, and audiovisual and poster displays.

The events will mainly be addressed to the general public to spread awareness among potential final users, but the support of local authorities and transport planners will be fundamental to the site selections.

A site selection process will be organised to choose where and when such events will be held. This selection will be based on criteria such as:

- the availability of the city to help in the organisation of the event,
- the likelihood of the city deciding to implement an automated transport system after the event,
- the size of the expected audience and its geographical coverage,
- the concomitance with other attractive events.

Description of Work

CityNetMobil's approach is as follows:

- Taking over the coordination of a group of cities interested in understanding how automated transports systems can help solve some of their mobility problems, namely

the Reference Group, from a number of projects;

- Enlarging the Reference Group, allowing a continuous subscription of new members;
- Selecting, from the Reference Group members, sites to host the events over the three years project time
- Preparing common dissemination material to inform and invite people to the events such as
 - preparing and running a project website,
 - designing and printing project leaflets featuring the event schedule,
- Greeting people at the events with
 - audiovisual material,
 - presentations sharing a common layout and corporate identity,
 - posters, and
 - gadgets;

- Planning the timing and schedule of such complex events featuring
 - the installation of a small showcase of moving automated vehicles,
 - a conference, and
 - an exhibition featuring audiovisuals and a poster display; and
- Running the events.

Expected Results

The main measurable impact that the project aims to have is the increased knowledge of the general public on automated transport systems, and the increased confidence in them as solutions to urban mobility problems.



Automated vehicles in urban scenarios

Acronym:	CITYNETMOBIL	
Name of proposal:	City Network for Fair Mobility	
Contract number:	217941	
Instrument:	CSA-CA	
Total cost:	960 000 €	
EU contribution:	960 000 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.09.2008	
Ending date:	31.08.2010	
Duration:	36 months	
Website:	http://www.citynetmobil.org	
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EC Officer:	Patrick Mercier-Handisyde	
Partners:	Institut National de Recherche en Informatique et Automatique (INRIA)	FR
	GEAJ-M Vallotton et T. Chanard Architectes-Urbanistes FSU SA	CH
	POLIS - Promotion Of Operational Links with Integrated Services, Association Internationale	BE

CONDUITS

Coordination Of Network Descriptors for Urban Intelligent Transportation Systems

State of the art - Background

Intelligent Transportation Systems (ITS) are increasingly being deployed in urban areas as part of the response to the transport issues they face. The services offered range from traffic control through public transport information to travel demand management. However, as each urban area tends to be autonomous and act in response to its own political pressures it is very difficult to build a picture across Europe and beyond of how ITS are being used to provide solutions, the scale of deployment and the comparative effectiveness of that deployment. There is no coherent data source summarising the ITS features implemented in European cities in order to manage traffic demand. There are several data sources containing some data but these do not provide sufficient structure to give a clear picture. Furthermore, there is no framework to evaluate whether particular ITS implementations constitute best practice considering the specific city context.

A comparison of the impact of ITS strategies is also timely in relation to the ITS Action Plan and identification of ITS as a priority area to be implemented in developing urban transport systems (Action Plan on Urban Mobility). ITS applications are key elements in delivering the overall strategy. Learning from best practice in other cities is therefore key in order to avoid costly mistakes.

Objectives

The goals of coordinating ITS research and development activities are to gather information about programmes in cities and research teams, to improve communication, and to define the mutual needs and develop better reciprocal knowledge, promote sharing and dissemination of best practices and bench-

marking. The aim of this coordination is to bring together various actors at the city level, enabling them to exchange experiences, and to establish guiding principles and a common approach throughout the EU.

Coordination and exchange of information would enable the planning authorities, city officials, academic researchers, and the high-tech industry to define the needs and the future demands for ITS products. As a result, the risks of developing new products would decrease and more entrepreneurs would be attracted to investing in the field of transportation.

Deliverables of the project include a searchable web tool on ITS functions employed in European cities, reviews on future R&D needs and the publication of a report on a feasible set of Key Performance Indicators (KPIs) tested in real applications implemented by partner cities. Further, the project will explore the possibility of establishing a "city club" that continues the CONDUITS research. The inclusion of Polis in the project is to ensure wider dissemination among European cities.

Description of Work

The main research activities of CONDUITS are split into three Work Packages:

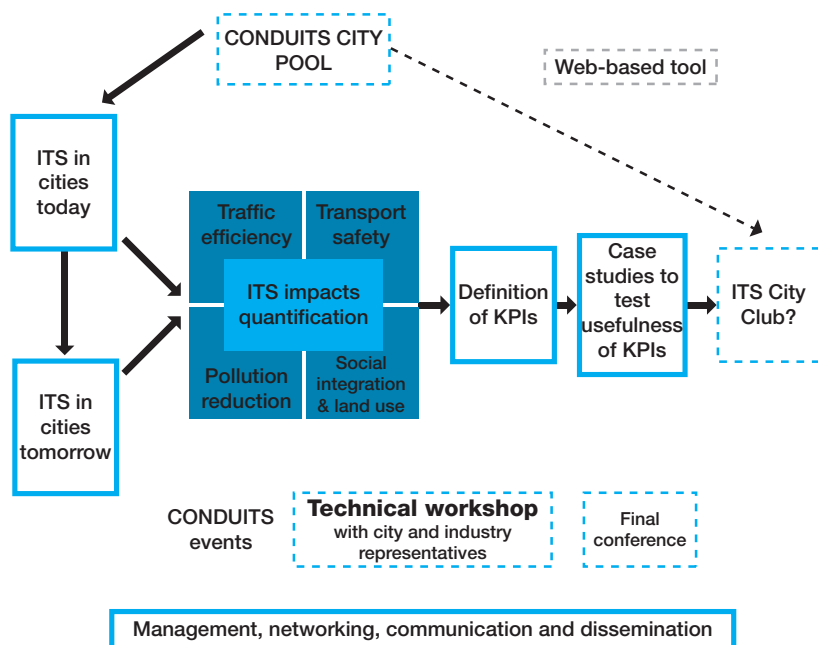
1. Review of current transportation problems and ITS solutions in European cities. This analysis will be based on in-depth information provided by the five city partners (Paris, Brussels, Rome, Barcelona and Istanbul) as well as data gathered through a survey of approximately 50 cities worldwide (making up the CONDUITS city pool) leading to a description of the main ITS applications deployed in partner cities, understanding the needs of ITS applications and whether

or not performances have met expectations, and a comparison of ITS in partner cities with leading ITS cities worldwide.

2. Assessing the future ITS situation in European cities and beyond and comparing this to probable technological advancements, pointing out the commonalities in the vision of different cities in Europe. These should lead to the definition of ITS R&D needs for cities.
3. Quantification of possible benefits achieved through ITS in terms of traffic efficiency, traffic safety, environmental aspects, indirect impacts such as those on land use and social integration, via a set of key performance indicators which will be applied to three partner cities: Rome to the expansion of its Mobility Control Centre, Paris to the bus priority system investments and Barcelona to traffic signal upgrading.

Expected Results

CONDUITS will lead to an understanding of the current status of ITS implementation in European cities, their future ITS plans in comparison with ITS worldwide, a clarification of the market for specific ITS applications and the understanding of the barriers to implementation. The main result will be the establishment of a coherent set of performance indicators to indicate ITS good practice. These indicators will lead to a better understanding of the areas in which the transport network of a city is performing well and will be useful for transport planners and engineers to make business cases for future ITS investments. In addition, it will be used to set up a structured technical exchange on ITS solutions applied in major European cities through a series of workshops, and possibly the establishment of a city club specifically to promote best practice.



The CONDUITS methodological framework

Acronym:	CONDUITS	
Name of proposal:	Coordination Of Network Descriptors for Urban Intelligent Transportation Systems	
Contract number:	218636	
Instrument:	CSA - CA	
Total cost:	947.915 €	
EU contribution:	947.915 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.05.2009	
Ending date:	30.04.2011	
Duration:	24 months	
Website:	http://www.conduits.eu	
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EC Officer:	Patrick Mercier-Handisyde	
Partners:	Imperial College London (ICL)	UK
	Technical University of Munich (TUM)	DE
	Israel Institute of Technology (Technion)	IL
	Rome Mobility Agency (RMA)	IT
	City of Paris - Department of roads and transportation (Paris)	FR
	Istanbul Metropolitan Municipality - Department of Transportation (Istanbul)	TR
	Administration de l'Équipement et des Déplacements/AED (Brussels Capital Region)	BE
	City of Barcelona (BN)	ES

DELTA

Concerted coordination for the promotion of efficient multimodal interfaces

State of the art - Background

Managing varying or seasonal transport demand in small communes, large agglomerations or between them requires comprehensive transport services planning, balanced use of the resources of alternative transport modes, transport system transparency and efficient adaptation techniques of transport services to demand variations. The effects of varying or seasonal demand are so prevalent that nearly every sector in every country experiences them. For transport, these effects include infrastructure congestion, environmental pollution, increased travel times, accidents and low-quality services for passengers.

In the context of many research projects executed in the past, a variety of R&D activities has been undertaken that resulted in systems, methodologies and techniques for intelligent demand management, traffic control and passenger information with the ultimate objective to make public transport systems and services more suitable to the transport demand profiles of European cities. Several research projects have been carried out within the context of Europe's RTD Framework Programmes that have addressed the concerned issues. However, little attention has been paid to the issues of mobility affected by transport demand variations in areas with seasonal peaks.

Objectives

DELTA addresses the problems and needs associated with passenger transport systems that face high and steep seasonal demand. The project will define and validate intelligent mobility tools, practices and policy guidelines addressing the optimum management of seasonal transport demand in areas with proven relevant problems.

The end result will take the form of a Decision Support Instrument composed of a set of roadmaps to help local transport or other agencies to apply actions, techniques and strategies able to minimise unnecessary passenger trips, to create efficient multimodal interfaces and synergies between the transport means, and to maximise the use of their resources.

The tool will also furnish an ITS architecture developed using FRAME, the European Framework for ITS, able to identify the main user needs and functions of a technological system based on ICT, which is able to support the actors in improving the effectiveness and efficiency of public transport services and mobility management policies.

The development and promotion of the above results will be based on the results of previous R&D efforts, on a wide review in target cities, on selected feasibility studies, on effective networking at local and European level and on wide dissemination. DELTA will also contribute to the definition of future research needs and future EU policies in the concerned thematic areas.

Description of Work

The overall strategy to be followed in DELTA has been structured around the organisation of an effective and active coordination network, as well as the definition and validation of the Decision Support Instrument (DSI) and its roadmaps.

The main activities contributing to this result are:

- Regional inventory and classification
- Framework of Mobility Schemes
- Analysis of success and failure stories
- External research stakeholders' and local stakeholders' forums

- Establishment of a network of European target regions
- Validation studies in seven regions: Balearic Islands (ES), Aquitaine (FR), Öland (SW), Chalkidiki (GR), Ischia Island (IT), Logarska dolina (SI) and Lake Balaton (HU)
- Extensive dissemination and promotional actions.

The innovative character of DELTA will be demonstrated by gaining insight and uncovering aspects that play a major role in the variation of transport demand in areas with seasonal peaks, by integrating the proposed solution factors with the variation of transport, by encouraging synergies and multimodality, and by giving the local stakeholders tools that will facilitate their plans and decision-making processes to smooth out the seasonal peaks and create a sustainable urban environment.



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DELTA project logo

Expected Results

DELTA's goals will be served through the implementation of several outcomes:

- A Decision Support Instrument to promote intelligent and sustainable mobility in areas with varying passenger transport demand;
- A detailed data and knowledge base of all the collected information;
- Classification of regions in broad categories based on their profiles;
- Framework of Mobility Schemes, strategies and related measures;
- Handbook of Benchmarks for regions with varying and seasonal peak problems;
- External research stakeholders' forum that will identify critical benchmarks towards sustainable mobility and provide guidance and direction;
- Local stakeholders' forums in all seven participating regions;
- Network of European regions that will foster experiences and best practice exchanges and ensure the transferability of the project's results;
- A research and policy document for the EU, based on the consolidated project's results;
- Extension to FRAME architecture focusing on areas characterised by varying and seasonal peak problems.

In addition to the effective handling of the seasonal traffic peaks, other expected impacts include:

- Efficient energy use in transport and increase of road safety;
- Provision of optimised transport systems and mobility services;
- Encouragement of collaboration and synergies between organisations and regions in order to meet varying transport demand.

Acronym:	DELTA	
Name of proposal:	Concerted coordination for the promotion of efficient multimodal interfaces	
Contract number:	218486	
Instrument:	CSA – CA	
Total cost:	1 080 340 €	
EU contribution:	1 080 340 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2009	
Ending date:	31.12.2010	
Duration:	24 months	
Website:	http://www.delta-project.eu	
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EC Officer:	Natascia Lai	
Partners:	Swedish National Road and Transport Research Institute	SE
	Forschungsgesellschaft Mobilität GmbH - Austrian Mobility Research	AT
	Trivector Traffic AB	SE
	Budapest University of Technology and Economics	HU
	BDO EOS Svetovanje d.o.o.	SI
	Mizar Automazione S.p.A.	IT
	Università degli Studi di Salerno	IT
	Anatoliki S.A. Development Company	GR
	Segura Durán Assessors S.A.	ES
	Ente Autonomo Volturno Srl	IT
	Municipality of Solčava	SI
	Centre d'Études Techniques de l'Équipement du Sud Ouest	FR

EBSF

European Bus System of the Future



State of the art - Background

The bus is a very efficient mode of transport: cheap, flexible, able to operate in mixed traffic and easy to put into service without the need for any infrastructure except a depot and workshop.

From an economic, environmental and social point of view, the bus still remains the most universal solution for a balanced and sustainable urban development:

- Buses' energy consumption per passenger/km is one-third of that of a car;
- Only 5% of the CO₂ emissions generated by vehicles with internal combustion engines come from buses;
- The 50 largest bus network operators in Europe have 54,700 buses;
- The top five bus manufacturers produce 73% of Europe's buses (8,500 vehicles/year);
- Passengers capacity: 120-150 (single-articulated buses);
- 80% of all public transport passengers worldwide are carried by bus.

Tremendous congestion due to the increased road space consumption of private motorised transport has a direct impact on bus operations: speed, service quality, reliability, energy consumption, economy and overall profitability. Buses' efficiency and performance depend heavily on dedicated lanes and

stops. The most advanced of such systems is known as 'bus rapid transit' (BRT).

Through its 'system approach', EBSF looks beyond the vehicle technology and considers the bus system as a whole taking into account the vehicle, the infrastructure and the operations.

Objectives

Genuine innovations, mainly targeted on technical performance, have taken place in the field of bus manufacturing over recent years. It is now time to raise the bus profile and secure its identity by improving its image and perception. The aim is to capture the enthusiasm of politicians and users, thus encouraging the cultural change needed in European society to promote a greater sustainable mobility.

The main goals of EBSF are:

- conceive and develop an innovative, high quality bus system, fully integrated to the urban environment that will demonstrate the full potential of a new generation of urban bus networks;
- make a breakthrough design of vehicles, infrastructures and operations;
- improve the competitive position of the European bus manufacturers and operators by promoting the new concept known as 'the European Bus System'.

EBSF is conceived as a driver to increase the attractiveness and raise the image of bus systems in urban areas, by means of developing new technologies for vehicles and infrastructure in combination with operational best practices. The project will build upon state-of-the-art clean vehicular technologies and concentrate on improving the bus system as a whole.

The development of a new generation of urban bus systems will stimulate European cities to deploy new bus lines making public transport more attractive.

Description of Work

The EBSF project is one of the largest surface transport R&D projects ever funded by the European Union with 46 partners and a total budget of around € 26 million.

The International Association of Public Transport (UITP) is the project leader. UITP represents some 3,100 mobility actors from 90 countries (www.uitp.org).

For the first time, this project brings together the five leading European bus manufacturers and 41 other partners, including transport operators and national transport associations, public transport authorities, the supply industry and research/consultancy.

Convinced by the necessity to urge the innovation of urban bus public transport, EBSF partners have decided to join forces for four years. Their main objective is to define a common standard of bus system applicable to the majority of European cities. Representing all the main bus stakeholders, EBSF partners share their knowledge, expertise and ideas to boost the inevitable and needed bus revolution in design, technology and organisation. Six major European cities – Bremerhaven (DE), Budapest (HU), Gothenburg (SW), Madrid (ES), Rome (IT) and Rouen (FR) – will test and validate in operational conditions innovative vehicles evolving in the urban environment.

Expected Results

EBSF will produce several outputs, mainly grouped into two main families: practical and theoretical deliverables.

1. Practical output: technological developments and their integration
 - European driver cockpit mock-up
 - Open IT architecture for vehicular applications
 - IT based predictive and adaptive energy management system
 - Open IT architecture for infrastructure applications (back-office)
 - Use cases: a combination of prototypes or demonstration vehicles will run in operational conditions to measure and calculate key performance indicators. The vehicles will be delivered for final tests and verification under operational conditions.
2. Theoretical deliverables: concepts, tools, simulations, specifications and recommendations
 - Users' needs collection (operators, authorities, passengers)
 - Set of key performance indicators (KPIs)
 - Software environment for the KPI assessment
 - System architecture definition
 - System and sub-systems requirements
 - Identification of standardisation and harmonisation potentials
 - Methodology to develop city-integrated bus transport systems
 - The EBSF Vision: common message from the consortium about an ideal bus system. Based on the results of the project, this booklet will be complemented in 2012 by a set of concrete recommendations for operators and authorities on how to implement attractive bus systems.

Acronym:	EBSF	
Name of proposal:	European Bus System of the Future	
Contract number:	218647	
Instrument:	CP-IP	
Total cost:	26 314 098 €	
EU contribution:	15 810 606 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.09.2008	
Ending date:	31.08.2012	
Duration:	48 months	
Website:	http://www.ebsf.eu	
Coordinator:	Mr. Umberto Guida	
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EC Officer:	Nataschia Lai	
Partners:	D'Appolonia S.p.A.	IT
	ACTIA S.A.	FR
	Innovative Informatikanwendungen in Transport-, Verkehrs- und Leitsystemen GmbH	DE
	ASSTRA – Associazione Trasporti	IT
	Berends Consult	DE
	BKV Ltd - Budapest Transport Closely Held Corporation	HU
	Centre d'Études sur les Réseaux, les Transports, l'Urbanisme et les Constructions publiques (CERTU)	FR
	Chalmers Tekniska Högskola AB	SE
	Union des Transports Publics et Ferroviaires	FR
	Consortio Regional de Transportes de Madrid	ES
	Tekia Consultores Tecnológicos S.L.	ES
	EvoBus GmbH	DE
	Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung e.V.	DE
	Universidad Politécnica de Madrid	ES
	Hübner Gummi- und Kunststoffe GmbH	DE
	Iveco France S.A.	FR
	FIT Consulting Srl	IT
	Hogia Public Transport Systems AB	SE
	Nantes Métropole - Communauté Urbaine de Nantes	FR
	MAN Nutzfahrzeuge AG	DE

University of Newcastle Upon Tyne	UK
PE International GmbH	DE
Régie Autonome des Transports Parisiens (RATP)	FR
Azienda Trasporti Verona Srl	IT
Regia Autonomă de Transport București (RATB)	RO
Scania CV AB	SE
Vultron Trade American-Hungarian Developing and Trading Co. Ltd	HU
Institut national de recherche sur les transports et leur sécurité (INRETS)	FR
Société Régionale Wallonne du Transport	BE
Digigroup Srl	IT
Västtrafik AB	SE
Tramibus S.p.A.	IT
Verband Deutscher Verkehrsunternehmen e.V. (VDV)	DE
Azienda Trasporti Milanese S.p.A.	IT
Volvo Technology AB	SE
Università degli Studi Roma Tre	IT
Verkehrsgesellschaft Bremerhaven AG	DE
Veolia Environnement Recherche et Innovation Snc	FR
Università degli Studi di Roma 'La Sapienza' - Dipartimento di Idraulica, Trasporti e Strade	IT
INEO Systrans	FR
Pilotfish Networks AB	SE
TIS.pt - Consultores em Transportes, Inovação e Sistemas S.A.	PT
Centro de Estudios e Investigaciones Técnicas de Gipuzkoa	ES
Centro di Ricerche Fiat S.C.p.A.	IT
Koninklijk Nederlands Vervoer	NL
BIS Bremerhavener Gesellschaft für Investitionsförderung und Stadtentwicklung mbH	DE

HCV

Hybrid Commercial Vehicle

State of the art - Background

The evolving emission legislation and increasing fuel prices, accompanied by a global CO₂ emission reduction request represent an extremely challenging demand for research and development within the transport sector. Known improvement measures of pollutant emissions usually accompany deterioration of engine efficiency and vice versa, e.g. the NO_x/fuel economy trade-off is well known for diesel engines. Therefore, the real challenge is to find new compromises on the improved levels for both fuel consumption and pollutant emissions.

With this background, a hybrid electric vehicle is an excellent option for simultaneous reduction of fuel consumption and exhaust emissions. Research efforts are needed to develop high-efficient hybrid systems, including hybrid components such as the energy storage system, the electric machine, power electronics and electric auxiliaries. Today, cost is considered as a major obstacle to the market introduction of hybrid technologies in commercial vehicles. A hybrid system is more complex but offers possibilities to simultaneously improve on fuel consumption, emissions and driveability.

Objectives

The objectives of the HCV concept are to develop high-efficient hybrid systems and components enabling mass market introduction. This will be achieved through a number of activities:

- Cost reduction objective in this project corresponds to an average 40% decrease at powertrain level compared to early second-generation hybrids.
- Develop and evaluate state-of-the-art auxiliary components for passenger comfort, chassis and powertrain functions. In order to achieve maximum efficiency, the electrical and thermal flows will be optimised

from both hardware and control strategies perspectives.

- Exhaust emissions will be substantially improved during real-life driving conditions. Noise reductions will be demonstrated in full electric mode during take-off.
- A new innovative gearbox will improve driveability in the bus, since torque interrupt will be eliminated. Another strategy will be evaluated for the truck by optimising gear-shifting synchronisation thereby reducing the torque interrupt period.
- The energy-storage modules will be based on a chemistry which has a low tendency for thermal run away. New models for the state of health of this new Li-Ion technology will be developed.
- For the bus, new lightweight materials will be used and evaluated for future use in commercial products.
- Development of cycles for certification of hybrid vehicles will be performed.

Description of Work

There are four main clusters of activities:

- Early second-generation vehicles will be used by OEMs and a fleet operator in real city environments in Europe and in rig tests (chassis dynamometer) together with non-hybrid reference vehicles. The hybrid vehicles will be used to communicate with customers and to create public awareness of hybrid technology in commercial transport. Market obstacles to hybrid vehicles will be assembled and categorised through customer questionnaires and interviews.
- Common components, functionalities and communication standards will be developed for the energy-storage system and auxiliaries used in the two second-generation hybrid demonstrators. Auxiliaries and energy supply will be optimised for energy flow by suppliers and research institutes alongside the OEMs which should use the technology.



European locations where HCV vehicles will be demonstrated

- Two advanced second-generation hybrid demonstrators – an 18-tonne city bus and a 6-tonne distributor truck – will be developed and validated. The demonstrator vehicles will be tested in rigs (chassis dynamometer) and in real traffic. The bus will be assessed by a large European bus traffic operator. Relative product cost data, performance data (fuel consumption, noise, toxic emissions) and drivability data will be quantified.
- The results from the demonstrators will be used to assess how well second-generation hybrid vehicles address market obstacles.

Expected Results

The expected impacts from the project aligns well with the targets of the work programme for 'New transport and mobility concepts':

- Increased acceptance and take-up of new urban transport solutions and technologies.

- More inclusive urban transport system with better access for all.
- Reduction of CO₂, pollutant emissions and noise beyond compliance with EU legislation.
- Increased energy efficiency by at least 20% in urban transport and improved transport safety.
- Proposals must ensure at least a neutral impact on climate change.

The HCV project aims to meet the expected impacts in the work programme listed above by making hybrid electric transport solutions more accepted and accessible. Fuel consumption and global as well as local emissions of substances and noise should be reduced. The HCV project will undoubtedly have a better-than-neutral impact on climate change.

Acronym:	HCV	
Name of proposal:	Hybrid Commercial Vehicle	
Contract number:	234019	
Instrument:	CP – IP	
Total cost:	17 686 346 €	
EU contribution:	9 928 503 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.01.2010	
Ending date:	31.12.2013	
Duration:	48 months	
Coordinator:	Mr. Enhager Pontus Volvo Technology AB Sven Hultins Gata 9d SE S-41288 Gothenburg	
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EC Officer:	Maurizio Maggiore	
Partners:	ALTRA S.P.A.	IT
	Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H – arsenal research	AT
	AVL List GmbH	AT
	Robert Bosch GmbH	DE
	Aerosol & Particle Technology Lab. / Chemical Process Engineering Research Institute / Centre for Research and Technology Hellas	GR
	Centro Ricerche FIAT S.C.p.A.	IT
	DAF Trucks NV	NL
	Danaher Motion AB	SE
	DIMAC RED Srl	IT
	Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile	IT
	IVECO S.p.A.	IT
	Magna Steyr Fahrzeugtechnik AG & Co KG	AT
	Università di Pisa	IT
	IDMEC	PT
	Solaris Bus & Coach S.A.	PL
	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek	NL
	Veolia Environnement recherche et innovation SNC	FR

I-TOUR

i-TOUR: intelligent Transport system for Optimized URban trips

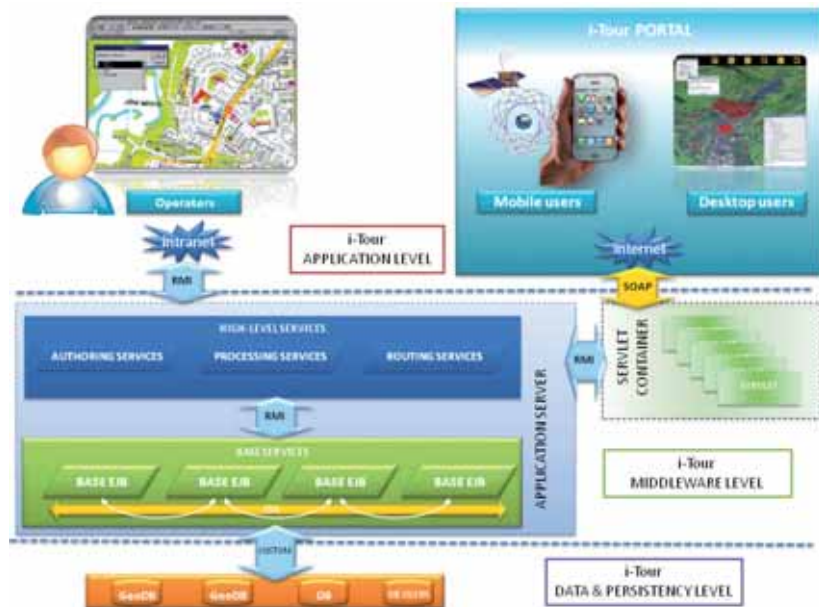
State of the art - Background

Recent years have seen the increasing success of navigation technologies, fuelled by the booming market of retail personal navigation systems. Anticipated technological development will increase the diffusion and acceptance of transportation services based on localisation technologies. Widespread diffusion of novel info-mobility services promoting multimodal transport will have a profound impact on citizens' lives across the EU in terms of:

- safety, as more than 40,000 people die on European roads each year with a cost to the European economy of approximately € 200 billion p.a.;
- efficiency, as congestion costs an estimated 1% of total EU GDP or € 100 billion p.a.;

- environmental sustainability, as transport accounts for 30% of total energy consumption in the EU, with the vast majority being consumed by road transport.

i-Tour answers these issues by proposing an open-source infrastructure to provide interoperable real data and services on a variety of multimodal transport systems. i-Tour will also develop a prototype portal from which desktop and mobile users can find and produce information on the transport system conditions through user-friendly clients capable of delivering personalised routing for trips combining different transport modes. Finally i-Tour will define trusted, secure privacy schemes to ensure the highest level of protection of users' information.



i-Tour software architecture

Objectives

The main science and technology objective of the project is made up of five macro goals:

- development of a reliable and secure data collection approach capable of benefiting from both measures of real-time conditions on public transport loads and information provided by the citizens. For this reason, a trust-based mechanism will be developed to ensure reliability of the uploaded content and accuracy of the consumed content, ensuring at the same time the highest level of privacy;
- development of a modular infrastructure based on standard open technologies that can be adopted by public transport providers to expose harmonised transport-related services;
- development of a personalised multimodal transport information system capable of providing tailored travel choices and capable of learning incrementally from the users' preferences;
- development of a user-friendly travel information system, promoting sustainable travel choices based on multimodal public transport;
- an additional goal of i-Tour will therefore be the identification of new business models based on real-time personalised LBS (location-based services) of interest to urban travellers.

Description of Work

Additional to horizontal work packages (WP) dealing with assessment, dissemination, and exploitation and management, i-Tour has six research and technology development WPs:

WP1 deals with defining the user and system requirements, and the system architecture.

WP2: Provision of relevant data and services deployment: transport data is collected and integrated. New data acquisition technologies, necessary to validate the public transport network load, are developed.

WP3: Multimodal transport systems, route finding and optimisation: the routing system is developed in order to process requests from mobile users according to the current system state and according to the specific users' profile.



The user group and the different transport modalities

WP4: User-friendly travel information portal: the i-Tour portal is developed, including a desktop and a mobile system, which supports forms of interaction based on the use of natural language.

WP5: Trust, virtual communities, and privacy: ensures proper support for trust mechanisms, necessary to ensure suitable management of information coming from the client as well as the proper privacy schema.

WP6: Infrastructure deployment and platform integration, where the i-Tour middleware services are developed, interfaced to existing legacy solutions and made interoperable.

Expected Results

The project will develop a service toolbox ready to be deployed by public transport providers, public administrations and companies to deliver intelligent, user-friendly mobility systems to citizens. The framework will be based on open-source technology and will include a set of services, necessary for access, distribution and processing of real-time data related to public transport. The toolbox will include a portal providing access to applications specifically designed to provide user-friendly interactive access to citizens, both in desktop and mobile scenarios. i-Tour will be available from a portal accessible through PCs as well as mobile devices (PDAs, smartphones, etc.) and will represent an interface to the mobility service infrastructure.

i-Tour moves a step further as citizens evolve from mere consumers of information to producers of data-rich content according to a level of trust similar to that developed in virtual communities such as Wikipedia or Google

Earth. The multimodal travel information services will be capable of generating personalised travel information systems and learning incrementally from the users' choices.

The results of the project will be validated in a number of different real-life scenarios and combination of transport modes through the involvement of five multimodal transport operators.

Acronym:	I-TOUR	
Name of proposal:	i-TOUR: intelligent Transport system for Optimized URban trips	
Contract number:	234239	
Instrument:	CP – FP	
Total cost:	4 861 192 €	
EU contribution:	3 539 968 €	
Call:	FP7-SST-2008-RTD-1	
Duration:	36 months	
Website:	http://www.itourproject.com/	
Coordinator:	Dr. Vincenzo Aquaro Formit Servizi S.p.A. Via Carlo Conti Rossini, 26 IT 00147 Rome	
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	Technische Universiteit Eindhoven	NL
	Magma Srl	IT
	Fondazione per la Ricerca sulla Migrazione e sulla Integrazione delle Tecnologie	IT
	Elasis S.C.p.A.	IT
	Planung Transport Verkehr AG (PTV)	DE
	Cadzow Communications Consulting Ltd	UK

MEDIATE

METHodology for Describing the Accessibility of Transport in Europe

State of the art - Background

European transport systems play a key role in the transportation of people and goods, and are essential for Europe's prosperity, being closely linked to economic growth. Despite the progress made in recent years in improving accessibility for all, it is estimated that 10 to 20% of European citizens, including people with disabilities and older people, are still experiencing barriers and reduced accessibility to transportation. These barriers can lead to a lack of opportunities and limited possibilities for employment, social and leisure integration, and full participation in society. People with luggage and people with children in prams are also facing barriers hampering their mobility. Furthermore, the demand for accessible transport will increase as a result of the rapid growth in the number and proportion of older persons aged 60 years and above.

The importance of ensuring accessible transport systems for all is emphasised by the European Council (Revised European Social Charter, 1996), the UN Convention (2006) Article 9 and in the Mid-term review (2006) of the European Commission's White Paper on Transport European Transport Policy for 2010.

Objectives

The overall objectives of MEDIATE contribute to the development of more inclusive urban transport systems with better access for all citizens. The MEDIATE project will assist public authorities and transport operators in achieving equality of access for all.

The operational objective of MEDIATE is to establish a common European methodology for measuring accessibility to transport by:

- establishing an overview of relevant initiatives and methodology describing and measuring accessibility to urban transport;
- identifying a set of common European indicators for describing accessibility to urban transport;
- collecting examples of good practice from European cities;
- developing a self-assessment tool for measuring accessibility to urban transport;
- establishing working groups involving European cities (local authorities and public transport operators) for exchange of information among the stakeholders and the provision of relevant input to the project;
- creating an End-User Platform, which provides end-user experiences and input from a broad range of passenger groups that will continue beyond the lifespan of the project

Description of Work

The MEDIATE project will provide coordination for a wide range of actors and activities related to a more inclusive urban transport system, by developing a methodology for describing the accessibility of transport in Europe. The first step is to define the knowledge base, by reviewing existing initiatives and methodological approaches that will lead to the development of a set of common indicators for accessibility at European level.

Examples of good practice will be collected, together with data supporting the indicators. The indicators and examples of good practice are input for the development of the self-assessment tool. The self-assessment tool for measuring accessibility will provide valuable information on possible gaps and give an indication of the actual level of quality of accessibility.

MEDIATE is characterised by a strong emphasis on user involvement. Stakeholders will participate through the membership of three groups:

- Expert group of 5-6 international experts;
- Working group of 20 European cities represented by transport authorities or public transport operators;
- End-User Platform of 10 organisations representing people with disabilities and older people.

Expected Results

Developing an inclusive urban transport system with better access for all citizens will have an impact on ensuring the human rights of all citizens by equal participation in employment, education and training, the community and social life.

MEDIATE will assist public authorities and transport operators in achieving equality of access, by providing common indicators and a self-assessment tool for measuring accessibility, making comparisons with good practice solutions and exchanging knowledge across Europe.

Public authorities, transport operators, policy-makers and other relevant stakeholders will be able to identify gaps and weaknesses, and develop strategies for making improvements. The self assessment tool will help cities and transport operators to identify where they are on the access scale (low level to high level of accessibility), and how much effort is required to reach a higher level of accessibility.



Boarding a London bus

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Acronym:	MEDIATE	
Name of proposal:	MEthodology for Describing the Accessibility of Transport in Europe	
Contract number:	218684	
Instrument:	CSA – CA	
Total cost:	1 097 803 €	
EU contribution:	1 097 803 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.12.2008	
Ending date:	30.11.2010	
Duration:	24 months	
Website:	http://www.mediate-project.eu	
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	Transport & Travel Research Ltd	UK
	TfL - Transport for London	UK
	Transportation Research Institute - Hasselt Univeristy	BE
	TIS.pt - Consultores em Transportes, Inovação e Sistemas SA	PT
	Timenco bvba	BE

MODSAFE

Modular Urban Transport Safety and Security Analysis

State of the art - Background

The European Urban Guided Transport sector (Lightrails, Metros, but also Tramways and Regional Commuter trains) is still characterized by a highly diversified landscape of Safety Requirements, Safety Models, Responsibilities and Roles, Safety Approval, Acceptance and Certification Schemes.

While a certain convergence in architectures and systems can be observed (e.g. through MODURBAN but also through larger procurements like OURAGAN in Paris or PPP-Refurbishments in London), the safety life cycle still differs from country to country and sometimes even within one country.

Furthermore, security items are considered to be more and more vital for the urban transport sector. In some cases these items are linked to the safety of the urban transport systems. In this context, safety is seen as everything dealing with the methods and techniques to avoid accidents. Security is concerned with protecting the people and the system from criminal acts.

In contrast to the Mainline Railway Domain, with European CENELEC Standards such as EN 50126, 50128 and 50129, European Research Projects and Networks have helped and are still helping to streamline and normalize the safety sector. The urban guided transport sector was until today only participating in this normalization development in some aspects. In other respects, the urban situation is coming across even more difficult challenges, which, for those ultimately responsible, the operators and industries, are rather increasing.

Objectives

While it appears difficult to justify the implementation of a Europe-wide authority interfering with the safety life cycle of urban projects,

the central objective of all Work Packages of MODSAFE will be to yield Cross Acceptance of once proven and certified technologies in one country to another country of the European Community.

Only if a harmonized and accepted Hazards and Risk Analysis and a joint Safety Requirements/Safety Integrity Level Database are available and the roles of the safety team members (e.g. Independent Safety Assessment) and the structure of Safety Cases/Safety files are clearly delineated and harmonized, the smooth cross acceptance of at least generic systems (and generic applications) appear feasible.

Furthermore, we intend to structure all Work Packages Deliverables and Outputs such that their future application by the respective industries is straightforward, simple to comprehend and modify so that in future, even for a first certification of a new technology, the efforts and manpower needs will be considerably reduced.

Description of Work

WP1 Description of the State of the Art

Providing an overview of safety approaches to urban transport, which will integrate and address safety requirements needed for coping with the new technical, administrative, regulation and certification arrangements.

WP2 MODSafe Hazard and Risk Analysis

Compilation of an agreed and harmonized Urban Guided Transport Hazards and Risk Analysis.

WP3 Hazard Control and Safety Response Analysis

The derived Preliminary Hazard Analysis from WP2 will help to identify safety measures to be taken to mitigate the resulting consequences. These safety measures/functions

will represent therefore one base of future cross acceptance schemes for generic architectures.

WP4 Common Safety Requirements

The main objective of this work package is to provide a list of common safety requirements definitions.

WP5 Functional and Object oriented Safety Model

The main purpose of the Functional and Object Oriented Safety Model is to combine for the first time beyond state-of-the-art not only potential Hazards, Safety Requirements and functions but link these elements to a generic functional and object structure of a Guided Transport System.

WP6 Safety Life Cycle Responsibilities

The objective of WP 6 is to identify common practices and/or similarities for the safety approval of guided urban transport systems in particular ATC-Systems by safety authorities and other involved parties, throughout the different countries of European Union. On this basis a potential common procedure for building, assessing and approving the different safety files will be developed and proposed, bearing in mind the different responsibilities along the safety life cycle and the roles and authorizations of the different actors.

WP7 Acceptance, Approval, Certification

The main objective of this work package is to develop a typical optimized frame for the AAC procedure based on elementary activity modules and on an analysis of current AAC procedures over Europe. Such typical optimized frame would offer relevant authorities a common reference over Europe and therefore facilitate the creation of new urban rail systems.

WP8 Level of sophistication and relevant technology of security surveillance systems

Identification, categorization and assessment of relevant technologies for security surveillance and prevention and for integration into an overall safety/security model.

WP9 Global approach for integrated security needs

With the aim of building an integrated security model for guided transport in urban areas in the form of guiding principles, in a way comparable to the safety model. The work in this WP will stream on Security Risk Assessment and Security Planning.

Expected Results

see above

Acronym:	MODSAFE	
Name of proposal:	Modular Urban Transport Safety and Security Analysis	
Contract number:	218606	
Instrument:	CP – FP	
Total cost:	5 213 439 €	
EU contribution:	3 469 161 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.09.2008	
Ending date:	31.08.2012	
Duration:	48 months	
Website:	http://www.modsafe.eu	
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	Budapesti Muszaki es Gazdasagtudományi Egyetem	HU
	Bombardier Transportation GmbH	DE
	Institut National de Recherche sur les Transports et leur Sécurité	FR
	Alstom Transport S.A.	FR
	Régie Autonome des Transports Parisiens	FR
	Technische Universität Dresden	DE
	Union Internationale des Transports Publics - UITP	BE
	Union des Industries Ferroviaires Européennes - UNIFE	BE
	Université de Valenciennes et du Hainaut-Cambrésis	FR
	Thales Rail Signalling Solutions Inc.	CA
	Kite Solutions S.N.C. di Dunne Catherine E.C.	IT
	DIMETRONIC SA	ES
	Rail & Bus Consultants GmbH	DE
	Ansaldo STS France	FR
	Ferrocarril Metropolita de Barcelona SA	ES
	Telsys GmbH	DE
	London Underground Limited	UK
	Université de Technologie de Compiègne	FR
	Metro de Madrid SA	ES

NICHES+

New and Innovative Concepts for Helping European transport Sustainability - Towards implementation



State of the art - Background

The first NICHES project facilitated the coordination of research activities of academic institutions, industry, mobility operators and transport authorities. It identified, examined and promoted 12 excellent, transferable innovative transport concepts in four crucial thematic areas of sustainable urban transport: new seamless mobility services, innovative approaches in city logistics, new non-polluting and energy-efficient vehicles, and innovative demand management strategies.

Throughout the NICHES project, it became clear that a range of other innovative themes and niches have the potential to become crucial for sustainable urban transport. The project also identified a significant need for further guiding local authorities in taking up the challenge of actually integrating and implementing such innovative concepts in their urban transport policies.

Objectives

The mission of NICHES+ is to build on the success of the first NICHES project by stimulating a wide debate on innovative urban transport and mobility between relevant stakeholders from different sectors and dis-

ciplines across the EU and accession countries, in order to promote the most promising new urban transport concepts, initiatives and projects and transfer them from their current 'niche' position to a mainstream urban transport application.

The project will look into the specific needs and expectations of potential users and implementers, while exploring topical new themes and corresponding innovative concepts to complete the picture. The project will also work directly with its main target group, i.e. local and regional authorities, to develop implementation scenarios for the integration of innovative concepts in existing urban transport policies. This way, NICHES+ can help to find answers to crucial questions relating to innovative and sustainable urban transport policy-making.

Throughout the project activities, NICHES+ will help to find answers to the crucial questions of innovative urban policy making: 'How can urban policy-makers move in an efficient manner from the development of innovative mobility solutions to their practical implementation?'.

Description of Work

NICHES+ follows five working steps:

- Selection of champion cities and innovative concepts
- Needs and expectations of potential users and implementers
- Reviewing the transferability of innovative concepts
- Research and policy recommendations
- Implementation scenarios and preparation of take-up

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Four new themes, each with three innovative urban transport concepts, are studied and promoted within NICHES+. For each of the thematic areas, a working group of experts was set up to facilitate networking activities and provide expertise for the project. The following are some of the concepts explored:

- tailored traveller information for users with reduced mobility;
- innovative cycling facilities for intermodal interchanges;
- using environmental pollution data in traffic management;
- group rapid transit.

To make the approach even more effective, seven champion cities were selected to work on establishing concrete implementation scenarios for innovative transport concepts within their cities. These scenarios will address issues that relate to the concrete roll-out of the transport measures. Managerial issues, stakeholder consultation, financing and timeframes will be elaborated. The project provides technical advice and financial support to these champion cities, which are: Artois-Gohelle (FR), Burgos (ES), Cork (IE), Daventry (UK), Skopje (MK), Trondheim (NO) and Worcester (UK).

Expected Results

The successive work steps of NICHES+ will generate in-depth knowledge of the 12 selected innovative urban transport concepts in terms of:

- the needs and expectations of their potential users and implementers;
- the conditions for their successful implementation and the assessment of their transferability potential towards other local contexts;
- practical steps required to deploy the innovative concepts;
- recommendations for further research;
- policy recommendations for the enhancement of urban transport innovations with respect to development and uptake;
- implementation scenarios for integrating selected concepts into the local transport policies of the seven champion cities.

NICHES+ will produce the following publications:

- Brochure on innovative urban transport concepts: attractive and concise overview of the 12 selected concepts;
- Effective guidance for cities: Twelve attractive brochures - 'policy notes' - that include

key information on how to successfully implement the selected urban transport innovations;

- Study-tour catalogue offering the possibility of site visits to cities where innovative concepts have been implemented successfully and providing information on the concepts.

The project will also further extend the OSMOSE portal on urban transport innovation, www.osmose-os.org

Acronym:	NICHES+
Name of proposal:	New and Innovative Concepts for Helping European transport Sustainability - Towards implementation
Contract number:	218504
Instrument:	CSA – CA
Total cost:	1 237 078 €
EU contribution:	1 237 078 €
Call:	FP7-SST-2007-RTD-1
Starting date:	01.05.2008
Ending date:	30.04.2011
Duration:	36 months
Website:	http://www.niches-transport.org
Coordinator:	Ms. Karen Vancluysen Promotion of Operational Links with Integrated Services, Association Internationale (POLIS) rue du Trône BE 1050 Brussels
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PICAV

Personal Intelligent City Accessible Vehicle System

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Early concept design of the PICAV vehicle

State of the art - Background

Personal mobility vehicles

Few personal cars had been proposed and analysed at the time of writing the PICAV proposal: see below. But in recent months, many personal concept cars have flourished confirming the topicality of the subject.

- Toyota Personal Mobility PM-01 (Japan)
- SEGWAY HT (USA)
- MIT CITY CAR: The Smart Cities group at the MIT Media.

New mobility systems

- CyberMove/Cybercars
- Brescia has a system for electric cars, where these are charged in a parking area near the station and can be hired for use in the city.
- La Rochelle has introduced a pooled car system using electric cars.
- Shopmobility in UK lends electric scooters and electric wheelchairs.

The proposal presents a new mobility concept for passengers ensuring accessibility for all in urban pedestrian environments. The concept addresses a new Personal Intelligent City Accessible Vehicle PICAV and a new transport system integrating a fleet of PICAV units.

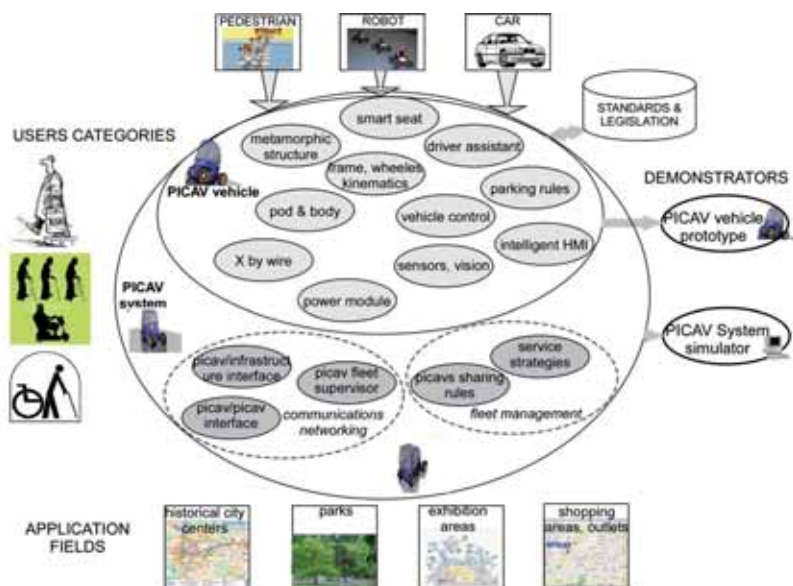
The PICAV transport system aims to provide an efficient and rational service in urban areas where traffic is restricted. The PICAV application fields are pedestrian areas, 'shared space' areas, pedestrian environments where conventional public transport services cannot operate because of the width and slope of the infrastructures, uneven pavements and interactions with high pedestrian flows and indoor pedestrian areas (e.g. shopping malls).

Objectives

This proposal aims to develop a smart personal carrier system enabling ageing and disabled people to move autonomously in urban environments, where public transport cannot go, thereby contributing to their full integration into society. The same personal carrier could offer a useful and currently lacking transport service to families with young children, and people whose movements are hampered by heavy or cumbersome objects.

A fleet of PICAV will serve a specific urban zone as part of the urban mobility chain enabling citizen mobility in the whole city area.

Ergonomics, comfort, stability, assisted driving, eco-sustainability, parking and mobility dexterity plus vehicle/infrastructures intelligent networking are PICAV's main objectives. The innovative electrical vehicle will present new frame-suspension structure, new seating sub-assembly, and a new efficient power supply module. Because of its small dimensions, tiny footprint, on-board intelligence and zero environmental impact the vehicle behaves almost like a pedestrian.



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PICAV system design and development, target users and demonstrators; application fields

The transport system will be produced as an on-demand system based on the car-sharing concept. To overcome the barriers of traditional car-sharing systems, the following will be provided: instant access, open-ended reservation, one-way trips and easy to find. The single units are networked and can communicate with each other and city infrastructure.

Description of Work

In order to achieve the ambitious objectives, this initiative will focus on:

- 1 - A radical move towards clean energy-efficient, safe and intelligent personal vehicles: a number of new concept vehicle modules (sub-assemblies), that are considered critical for the targeted elderly and limited mobility end-users and for the environment, are being developed and breakthrough solutions for the following modules are proposed:
 - Ergonomic seat-module: for comfort and well-being of users
 - Reactive suspension-module: for high safety of the vehicle

- Clean efficient power module: for greenhouse emissions beyond the targets expressed in the Kyoto Protocol and Euro V
- Driving assistance module: for collision avoidance, parking in crowded roads
- Body-embedded sensorial system: for safe behaviour within crowded pedestrian environments through a suitable distribution and intelligent use of vision and tactile sensors
- Intelligent vehicle-infrastructure networking: for the proposed system, there is a need for an innovative dynamic networking design to be developed so that the vehicle can respond adequately to real-time changes in the network status.

Expected Results

The main results, as expected at the beginning of the project, are listed as follows:

- Seat module: prototype; key features - reconfigurable seat adaptable to elderly and disabled; target market - automotive industry.
- Mobile platform: prototype, key features - agile, mobility and stability, target market - mobile robotics

- Pod & body: prototype, key features - accessibility, ergonomics, target market - automotive industry
- Power system: prototype, key features - efficiency, target market - automotive industry, mobile robotics
- Driver's assistant: software, key features - efficiency, fast, target market - automotive industry
- HMI: prototype, key features - acceptance, easy to use, target market - automotive industry
- PICAV vehicle: prototype, key features - intelligent, safe, small, accessible for all, target market - transport industry, urban

- mobility managers, exhibitions, outlets, private managers
- PICAV system simulator: software, key features - PICAV multi-agent model, planning and management, target market - sustainable transport authorities and info-mobility operators
- PICAV fleet management: software, key features - service, efficient use, target market - public transport administrators; private managers of exhibitions and outlets.

Patents are foreseen to protect intellectual property rights for any result if it demonstrates to be innovative.

Acronym: PICAV

Name of proposal: Personal Intelligent City Accessible Vehicle System

Contract number: 233776

Instrument: CF – FP

Total cost: 3 938 757 €

EU contribution: 2 797 050 €

Call: FP7-SST-2008-RTD-1

Starting date: 01.08.2009

Ending date: 30.06.2012

Duration: 36 months

Website: <http://www.picav.eu>

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	Transportes Colectivos do Barreiro	PT
	ZTS Vyskumno-Vývojovy Ustav Kosice AS	SK
	Mazel Ingenieros, Sociedad Anonima	ES

PUBTRANS4ALL

Public Transportation - Accessibility for All

State of the art - Background

The process of boarding rail vehicles consists of several connected steps: first, passengers must get to the rail station. Next, they must get to the platform, finally, they must get from the platform to the rail vehicle. Once on the rail vehicle they must have an appropriate space to ride and access to various facilities. The process of alighting follows the same steps in reverse. The PubTrans4all project focuses on the third step: getting from the platform to the rail vehicle.

New rolling stock and infrastructure are generally accessible. The majority of new metro and light rail transit lines, for example, are accessible by level boarding. The main accessibility problem for rail transport operators is that many old trains, metro or tramway lines have significant vertical differences (e.g. steps) and horizontal gaps between rolling stock and platform.

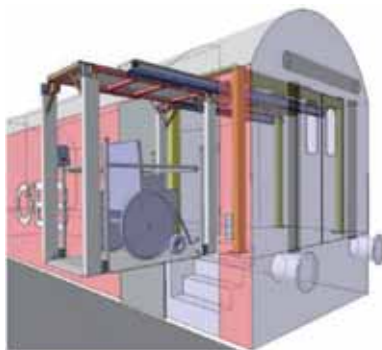
This problem is accentuated by the fact that rail rolling stock and infrastructure has a very long life. This means that operators will be using their current rolling stock for many more years and therefore, temporary solutions must be found until the fleet can be replaced with modern fully accessible rolling stock. Another key problem is the fact that low floor vehicle solutions do not work for some types of specialized vehicles, for example high speed trains.

Objectives

Pubtrans4all will develop a prototype vehicle-based boarding assistance system (BAS) that can be built into new rail vehicles or retrofitted into existing rail vehicles to improve accessibility for all persons. PubTrans4all will help make existing public transport systems more accessible, improving service for everyone.

The PubTrans4all project's objective is to develop a standard boarding assistance system that can be used on many different types of rolling stock and infrastructures. The boarding assistance system will not simply be a device, but rather include contributing elements that make it possible to effectively use the device to access rail vehicles. The prototype will be developed by a multi-disciplinary consortium including users, public transport operators, academic researchers and manufacturers.

As part of the process of developing the prototype BAS, the project will survey state of the art accessibility devices and make recommendations for best practices in the use and operation of these existing devices. The project will include an extensive dissemination program designed to communicate study results widely, but also to help inform the general public and decision-makers about the importance and challenges in providing accessibility for all.



Description of Work

The PubTrans4all project consists of five Work Packages (WPs) that will be completed over three years. The project's work plan is straightforward and simple: it combines an analysis of current research and operating practices (WP2) to develop recommendations for best practices and for development of a standardized system to provide accessibility to rail vehicles (WP3). Next, it uses these recommendations to develop a prototype standardized BAS and field tests this prototype on an operating rail transport system (WP4).

The three research and technological development (RTD) work packages (WP2, WP3 and WP4) each focus on a single aspect of the project under the leadership of a work package leader. This structure ensures that each of the three elements are developed in a complete and timely manner. These elements will be coordinated through the participation of beneficiaries in all three WPs and by the project coordinator through regular project management meetings/teleconferences.

The work plan structure is simple:

WP2 produces the initial data; WP3 uses this data to make recommendations for improving rail transport accessibility and to assist in the development of the BAS prototype; and WP4 uses these recommendations to help develop the BAS prototype.

Expected Results

Within each type of boarding assistance systems there are many different specific devices and practices employed in their use. Furthermore, there is also a huge variety of different infrastructure settings (e.g. platform types).

Given this wide variability the first element of the PubTrans4all project consists of surveying the main types of boarding assistance systems and developing best practice recommendations for the selection and operation of BAS. The selection recommendations will be useful for rail operators who are seeking to deploy existing BAS to their systems. The operational recommendations will be useful for all public transport companies using the different BAS. These recommendations will include a description of elements such as contrast marking on ramps, lifts, steps, handles, clear signing, sufficient visual and tactile indicators and alternative information systems. The goal will be to develop standardized approaches that can be employed in all countries.

The second element of the PubTrans4all project is developing and testing a standardized boarding assistance system. The BAS should make boarding and alighting easy, fast and comfortable for everyone. It is important to understand that the prototype BAS is a system, not simply a boarding device. Therefore, the project does not consist simply of a BAS device in isolation, but rather the consortium will also consider issues such as the locations and functions of rail car entrances, signs and markings that are clear and easily understandable, and safety for all users in all situations, both during normal use and in emergency situations.

Acronym:	PUBTRANS4ALL	
Name of proposal:	Public Transportation - Accessibility for All	
Contract number:	233701	
Instrument:	CP – FP	
Total cost:	2 750 614 €	
EU contribution:	1 807 662 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.09.2009	
Ending date:	30.11.2012	
Duration:	39 months	
Website:	http://www.rabcon.eu/pubtrans4all	
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EC Officer:	Natascia Lai	
Partners:	Vienna University of Technology / Technische Universität Wien	AT
	Faculty of Mechanical Engineering, University of Belgrade	RS
	ÖBB-Personenverkehr AG	AT
	Verkehrsbetriebe Karlsruhe GmbH	DE
	Schweizerische Bundesbahnen	CH
	National Railway Infrastructure Company	BG
	MAV-START Bahnpersonenverkehrs AG (MÁV-START Vasúti Személyszállító Zrt.).	HU
	MBB Liftsystems AG	DE
	Bombardier Transportation GmbH	DE
	Siemens Transportation Systems GmbH & CO KG	AT
	Slovenske železnice d. o. o.	SI
	BDZ Passenger Traffic EOOD	BG

STADIUM

Smart Transport Applications Designed for Large Events with Impacts on Urban Mobility

State of the art - Background

The ultimate goal of the project is to improve the performance of transport systems made available to a wide and differentiated range of users in the framework of large events hosted by big cities.

Hosting a large event for a city is both a challenge and a big opportunity – an occasion to improve both the infrastructures (beyond the specifically dedicated ones) and services to bring the city to a higher level of efficiency after the events.

The challenges come from the exceptional rise of resource allocation in a limited time due to the superimposition of the event's connected impacts over the normal functions of the city.

Transport is always the most complex, critical and sensitive sector implicated in the hosting of large events.

The most recent experiences have demonstrated the crucial necessity for the Local Authorities to develop an integrated transport management system to monitor and control road traffic, harmonizing public transport services with dedicated services, and delivering the appropriate information to support carrying out daily events smoothly by minimizing and/or managing the onset of critical situations. To reach this objective, past experience has proved the effectiveness of ICT as supporting tools (currently identified as ITS – Intelligent Transportation Systems) for the fulfilment of the traffic management functions.

Objectives

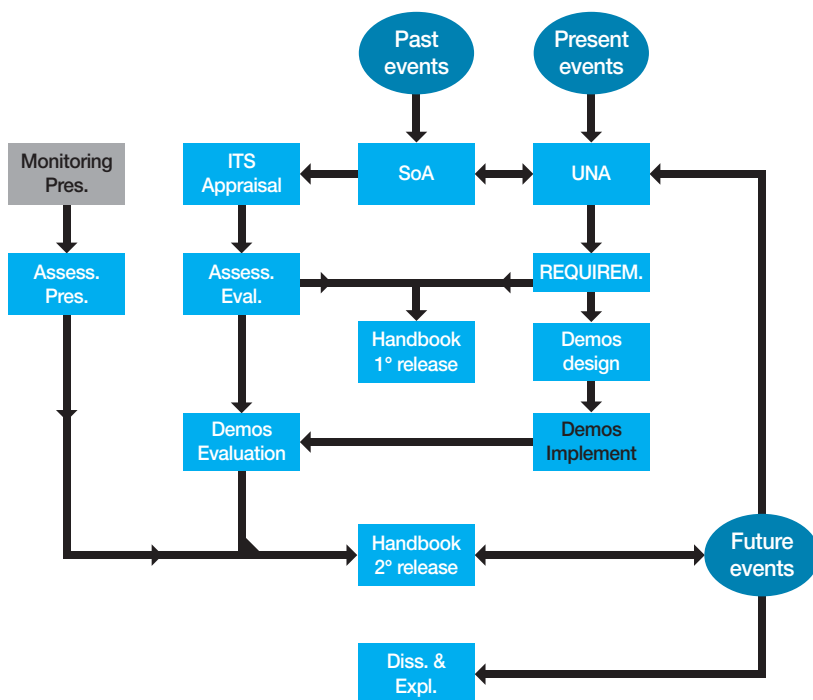
The project is set out to contribute to the achievement of the above general objectives by pursuing a twofold concrete aim:

- The identification, design and implementation of demonstrators in selected sites (India, South Africa, London), where large events are planned within the timeframe of the project. These demonstrators will concentrate on specific applications, involving the innovative use of advanced technologies and solutions that are expected to contribute to increasing the level of performance of transport services in all or most of the targeted performance dimensions, together with the appropriate level of security.
- The design, production and testing of an integrated handbook to support all players involved in the organisation and implementation of transport services for large events. In a strongly integrated approach, the demonstrators will produce original evidence feeding directly into the handbook preparation, while the handbook will help guiding the demonstrations and ensuring that these are designed and developed in accordance with sound, general principles, technological choices and organisational instruments. The demonstrators will inevitably be limited to specific – though meaningful and important – application areas, whereas the handbook will be comprehensive in addressing the full range of possible applications.

Description of Work

The overall functional approach of the STADIUM project is illustrated by the enclosed diagram. Its workplan is organized in WPs.

WP2 includes the state of the art and the user needs of past, current and future large events. WP3 will develop a Handbook to provide ITS guideline solutions for the management of the mobility in view of large events. WP4 will take care of the design of the demonstrators taking the outputs provided by WP2. Design



STADIUM functional approach

will follow the adoption of the FRAME reference architecture from the top conceptual model down to component specifications, and define the main activities required for the successive Demonstrators' Implementation (WP5a,b,c). WP5a will deal with the DRT demonstration in SA during the 2010 FIFA World Cup.

WP5b will execute the Delhi Demonstration at the Commonwealth Games 2010, testing the applications of planning, fleet real time management and infomobility on mobile devices.

WP5c will execute the London Demonstration at Summer Olympics in 2012 focusing on visual scene analysis tools to support the monitoring of both passenger and vehicle congestion. WP6 will deal with the evaluation components of the project. Finally, WP7 represents the dissemination and exploitation components of the project. It aims to establish the project as a reference among inter-

ested cities and international organisations and associations involved in organising large events.

Expected Results

The handbook proposed by STADIUM will give an adequate guideline to all public entities to gain knowledge of needs and requirements for big event transport systems. The guidelines will support public authorities as well as Local Organizing Committees to save time on the transfer of knowledge of "big event basics" and to start the planning and implementation phase directly from a higher common level. Rules, processes and principles of operation of any big event are common in any host city. Therefore – due to the handbook summarizing these principles – local authorities will be able to prepare strategies designed to implement a useful tool to manage multiple venue transport service networks, years in advance. A long term implementation phase gives the

opportunity to make careful decisions on any investment for intelligent transport management systems. Sustainable investment strategies can be studied, to render budget impacts on ITS/vehicles/infrastructure suit-

able for the big event as well as for the future improvement of the ordinary transport management systems of the host city, in a way that is careful to minimize the impacts on the deployed transport system.

Acronym:	STADIUM	
Name of proposal:	Smart Transport Applications Designed for Large Events with Impacts on Urban Mobility	
Contract number:	234127	
Instrument:	CP – FP	
Total cost:	6 246 823 €	
EU contribution:	3 998 820 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.05.2009	
Ending date:	30.04.2013	
Duration:	48 months	
Website:	http://http/www.stadium-project.eu	
Coordinator:	Mr. Maurizio Tomassini Istituto di Studi per l'integrazione dei Sistemi (ISIS) Via Flaminia 21 IT 00196 Rome	
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EC Officer:	Patrick Mercier-Handisyde	
Partners:	IMPACTS Europe	FR
	European Road Transport Telematics Implementation Coordination scrll (ERTICO)	BE
	Transport for London	UK
	Agenzia per la Mobilità del Comune di Roma Società per Azioni	IT
	NEA Transport research and training	NL
	THETIS S.p.A.	IT
	Mizar Automazione SpA	IT
	Pluservice srl	IT
	POLIS - Promotion of Operational Links with Integrated Services, Association Internationale	BE
	Technische Universität Berlin	DE
	MultiMedia InnoVation	ZA
	SAHA International (South Africa) (Pty) Ltd	ZA
	Society of Indian Automobile Manufacturers (SIAM)	IN
	Ashok Leyland Limited, Telematics Business Unit	IN
	Council for Scientific and Industrial Research - CSIR (South Africa)	ZA

TRANS-AFRICA

Promoting Public Transport in Africa

State of the art - Background

Historically, in almost all African countries, the need to establish a public transportation system for the mobility of populations has been manifested very early, often even before the countries gained their independence. States sought to create state-owned and parastatal companies with large buses in line with a "modern" and Western definition of public transport. However, a classic pattern of population growth coupled with uncontrolled urban sprawl has occurred almost everywhere, with the official companies unable to meet this demand. The already existing traditional informal sector, neglected by the public authorities, gained momentum by supplementing the services of the formal structure and later by competing with it. Consequently, most of the formal public transport companies created around the time of African countries' independences went into bankruptcy. As a result, today the African public transport sector is largely dominated by the informal sector, which is a source of many dysfunctions to the transport systems, such as congestion, air pollution and road accidents, which are significantly costly for the community.

This situation might be worsened by the fact that the majority of Sub-Saharan African inhabitants are expected to live in urban areas by 2025. It is therefore imperative that measures be conceived and applied to anticipate these major urban mobility challenges, otherwise the precarious socio-economic balance of the African metropolises might again be affected.

It is now unanimously acknowledged that such population access to sustainable mobility cannot take place without the implementation of proactive policies in favour of public transport development.

It is in this context that the Trans-Africa project has been conceived and started on 1 June 2008, led for two years by the International Association of Public Transport (UITP) and the

African Association of Public Transport (UATP) with the financial support of the European Commission.

Objectives

The overall objective of the Trans-Africa project is to point out the benefits of public transport as a means of poverty alleviation which might entail a better economic competitiveness of the Sub-Saharan Africa countries.

Its specific objectives are to:

- Research the impact of public transport in African cities in order to use the findings to organise strategic support actions to increase awareness and build support from the political decision-takers and international donor agencies.
- Define the technical specifications for public transport vehicles to be operated in Africa, in order to facilitate and speed up the development and production process and reduce delivery times and prices.

Description of Work

Work Package 1: State-of-the-art

With the help of a survey covering a wide range of actors in public transport in sub-Saharan Africa, this first part leads to an overview of the state-of-the-art organisation and operation of public transport services on the continent.

Furthermore, as an introductory part to the assessment of the technical specifications of the African bus, this state-of-the-art also reports the main hindrances to the proper technical functioning of buses in Africa.

Work Package 2: Strategic Research Assessment

This second work package firstly deals with research for facts and indicators on an appropriate sample of African cities which may enable the assessment of the sector's impact on the economy and the society in Africa. This

work package, in its second part, will also lead to the gathering of practical information on the technical standards to be considered for the delivery of vehicles for operation in Africa with regard to specific difficult operating conditions. The output will be collated in a handbook of technical specifications for public transport vehicles in Africa, which may be used by operators as a basis for future discussions with manufacturers.

Work Package 3: Research road map

The third work package will define the next steps for future research avenues in the public transport field in Africa, identifying the main hot topics to be addressed in short and medium terms, such as the formalization of informal public transport, the opportunity to disseminate "light BRTs" throughout the continent and some practical guidelines and tools to integrate public transport development and land planning.

Work Package 4: Dissemination

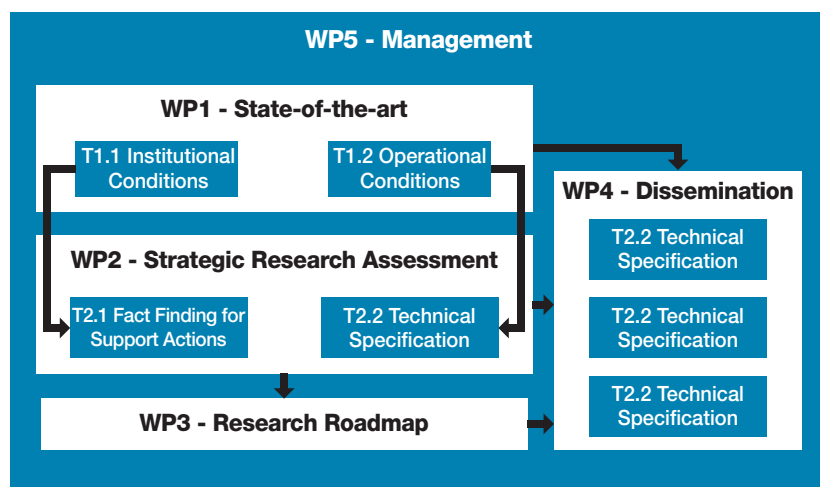
Through the channel of the media, participation in events, and official visits to institutions, this work package intends to spread and distribute the project findings and contribute to raise awareness on African public transport issues among the international and African decision-makers.

Expected Results

The key outcomes expected at the end of the project are:

- an overview of public transport in Sub-Saharan Africa
- a booklet assessing some "best practices" in various African public transport networks, sustained by clear performance facts and indicators, to be used for advocacy in favour of public transport
- a technical specifications book for the conception of an "African" bus, fitting the particular and difficult operational conditions on the continent
- the identification of avenues for future research projects able to tackle the key issues in African public transport

With its findings, the project's aim is to foster the development of significant national policies in favour of public transport in Africa.



Project structure

Acronym: TRANS-AFRICA
Name of proposal: Promoting Public Transport in Africa
Contract number: 218225
Instrument: CSA – SA
Total cost: 399 697 €
EU contribution: 399 697 €
Call: FP7-SST-2007-RTD-1
Starting date: 01.06.2008
Ending date: 31.05.2010
Duration: 24 months
Website: <http://www.uitp.org/transafrica>
Coordinator: Mr. Tony Dufays
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EC Officer: Patrick Mercier-Handisyde
Partners: Union Africaine des Transports Publics - UATP

CI

TURBLOG_WW

Transferability of urban logistic concepts and practices from a worldwide perspective



State of the art - Background

Although urban mobility involves the movement of both people and goods in most cities, those who are responsible for urban transport policy and planning have historically paid more attention to the movement of people and less attention to the movement of goods.

As Ogden(1992) states, the "explicit consideration of urban goods movements has the potential to contribute in a useful and positive way to achieving both the goals of urban transport and some of the broader goals of urban policy and planning".

As acknowledged on the EC Thematic Strategy on Urban Environment, urban freight represents typically between 20% and 25% of road space use, contributing to between 10% and 20% of urban road traffic. This clearly highlights how indispensable urban freight is for the economy of the cities, but also how it may significantly affect the attractiveness and quality of life in urban areas. At the EU level, a set of different projects have been dedicated to urban logistics development, such as City-

Freight, Mosca, eDrul and Fideus. The integrating role of the Bestufs I and II thematic networks should also be mentioned.

TURBLOG_WW is designed from a complementary perspective for the work that is being promoted at EU level by addressing urban logistics from a wider, geographical perspective, focusing upon a worldwide level in general, and on Brazil and Peru in particular.

Objectives

The main goal of TURBLOG_WW is to extend, expand and transfer the existing knowledge to other countries and thus effectively contribute to the overall objective of extending the research and knowledge dissemination between the EU and Latin America.

The project has the following main strategic objectives:

- facilitate the establishment of personal connections and the widening of contact networks in the field of urban logistics;
- establish an international forum of individual experts on urban logistics, with a particular focus on Latin America;
- promote that forum from a consensus-based approach for the assessment and validation of concepts, projects, tools and policies, in particular on the technological and economic solutions for sustainable urban logistics schemes;
- identify, describe and disseminate best practices, success criteria and bottlenecks with respect to the movement of goods in urban areas;
- establish a research road map, looking forward to the transferability of practices between the EU and Latin America (Brazil and Peru);

- develop recommendations to ensure the compatibility and convergence between tools and mechanisms for policy support;
- disseminate project results and encourage their uptake by the different stakeholders;
- widely contribute to sustainable urban mobility and enrich the debate on the green paper for urban mobility and freight action plans.

Description of Work

The project will act as a coordination platform, gathering experiences so as to identify, generate and assess best practice solutions on urban freight initiatives by conducting a set of case studies, which will be undertaken to identify best practices and assess the lasting effects and impacts of previous projects and tools, and to compare experiences between Europe, Latin America, Asia and Africa. Workshops and site visits will also be promoted, so as to facilitate the exchange of information, raise awareness, disseminate and assess the potential to transfer, and to promote research results at the national, European and inter-continental levels.

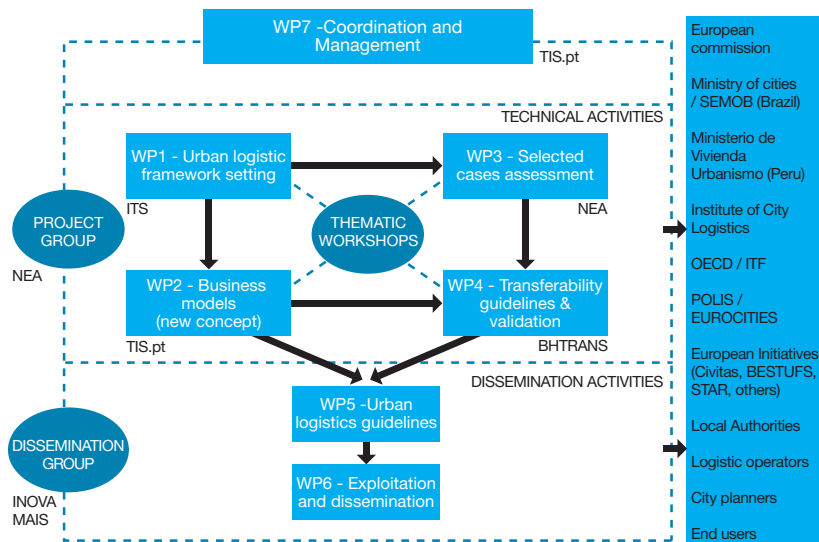
TURBLOG_WW is organised along the following work packages (WP):

- Network coordination (WP7);
- Selected case studies (WP3);
- Business concepts and business models (WP2);
- Transferability (WP4);
- Urban logistic guidelines (WP1);
- Thematic workshops (WPs 1-4);
- Overall dissemination activities (WPs 5-6).

The picture highlights the general approach of TURBLOG_WW and shows how the seven work packages of the project are linked.

Expected Results

The overall result of TURBLOG_WW and its role in EU research is the combination of past urban logistics experiences and their analysis, then extracting and disseminating valuable information, supporting ongoing and future related initiatives, and contributing to their transferability to Brazilian and Peruvian contexts (and thus to other Latin American countries).



General approach of TURBLOG_WW

The potential impact to be generated from TURBLOG_VWV is along three main dimensions:

- impacts in relation to the work programme objectives;
- impacts in relation to policy goals (thus coherence with Community policies);
- impacts resulting from co-operating with third countries.

The first group of impacts refers to the direct answer to the cascade of objectives from the Seventh Framework Programme co-operation programme.

The second group refers to the more general and indirect impacts that the project could generate. These are on sustainability, efficiency and performance, quality, pollution, energy consumption and safety.

The third set of impacts refers to the extension of EU influences to other parts of the world. The project will also support the European policy goals to make all modes more environmentally friendly, safer and more energy efficient. It is expected that TURBLOG_VWV will provide a significant contribution towards the freight action plan and the green paper on urban mobility.

Acronym:	TURBLOG_VWV		
Name of proposal:	Transferability of urban logistic concepts and practices from a worldwide perspective		
Contract number:	234061		
Instrument:	CSA – CA		
Total cost:	1 193 751 €		
EU contribution:	873 386 €		
Call:	FP7-SST-2008-RTD-1		
Starting date:	01.10.2009		
Ending date:	30.09.2011		
Duration:	24 months		
Website:	http://turblog.eu		
Coordinator:	Prof. Rosário Macário TIS.PT, Consultores em Transportes, Inovação e Sistemas, S.A. Av Marques de Tomar - 35 - 6 PT 1050-153 Lisbon		
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EC Officer:	Natascia Lai		
Partners:	NEA Transport Research and Training		NL
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	Inovamais SA		PT
	Empresa de Transportes e Trânsito de Belo Horizonte S.A.		BR
	Universidad Nacional de Ingeniería - Plataforma Tecnológica Transporte Logística y Movilidad		PE
	TIS.BR, Consultores em Transportes, Inovação e Sistemas Ltda		BR

International Demonstrations of Platform for Transport Planning and Travel Information

State of the art - Background

Cities face increasing demand on their transport systems, especially in developing regions with growing populations and car ownership. Coupled with heavy infrastructure investment, strategic mobility management is becoming the most important tool for meeting the demand. To achieve efficient mobility management, huge amount of information on the usage of the transport network is needed. Currently, traditional methods (such as roadside units to collect traffic data) and new methods (probe vehicles) have been used to collect traffic data. However, integration of such data is essential in order to support sustainable long-term planning and short-term proactive and reactive management of the transport network.

It is often the case that information from one transport mode cannot be used by other transport and traffic operators. Moreover, different transport authorities share neither real-time nor historical information even though the sharing has a potential to enhance efficiency of overall urban mobility. With fast development of technologies, new data sources and new media to disseminate information are emerging. Integration of new data sources and new services is a challenge to existing data management strategies.

The VIAJEO project addresses the above problems by bringing together various stakeholders to design, implement, and demonstrate an open platform to enhance efficiency of overall urban mobility. The project will implement and demonstrate the open platform in a number of carefully selected cities in Europe, China and Brazil.

Objectives

The global objective of VIAJEO is to design, demonstrate and validate an open platform to share and process data from different sources in order to:

- support transport operations, planning and a wide range of traveller information services
- integrate and manage different sources of traffic data, including floating vehicle and fixed detector collection methods
- deliver dynamic language-independent traffic and traveller information services for end-users
- deliver a solution for integrated traveller services including cross-modal journey planning covering motorised modes and non-motorised modes i.e. walking and cycling, dynamic route guidance, effective payment access and improved personal mobility, etc.
- provide adaptable data exchange and service interfaces to connect a variety of entities needed for the mobility services.

Description of Work

With four different sites and the development work necessary, a wide range of activities need to be carried out in VIAJEO, many of which are interrelated and need to be harmonised. To ensure that this complexity is addressed, a matrix work package structure has been created.

Work Packages (WP) 1 through 5 and 8 are horizontal.

- WP1 is mainly concerned with the project coordination.
- WP2 gathers information on the current status and planned developments for traffic and transport data, identifies the requirements of local transport planners and authorities for overall traffic and transport

planning and management, specifies the needs of end users for personalised redelivery of traffic information.

- WP3 develops architecture of the common platform, consisting of design of the common functionalities of the platform, definition of the interfaces for distribution of information and development of recommendation for implementation of the platform for each demo city.
- WP4 designs and implements the open platform to each of the demo cities. Coordination is required of WP4 activities with each demo city including a definition of common methodologies, development of modules and services which are ready for integration and demonstration in the demo cities.
- WP5 is mainly concerned with validation and impact assessment. The validation focuses on the assessment of the social and environmental impacts of the project and the evaluation of the acceptance of European technology and potential for further market development.

Because of the geographical spread of VIA-JEO and the number of partners involved, the development work for the different cities has been concentrated in vertical WPs as listed below:

- WP6.1 Athens Site Preparation
- WP6.2 San Paulo Site Preparation
- WP6.3 Beijing Site Preparation
- WP6.4 Shanghai Site Preparation

After the development work has been completed, demonstrations will be held at the different sites, this will be done in:

- WP7.1 Athens Site Demonstration
- WP7.2 San Paulo Site Demonstration
- WP7.3 Beijing Site Demonstration
- WP7.4 Shanghai Site Demonstration

Expected Results

The major deliverables of the project are:

- An complete and operational platform with interfaces to a wide range of mobility services
- Implemented and validated platform in the four demo cities
- New data collection and processing tools for transport planner and traffic operation and a wide range of traveller information services in the four demo cities supported by the open platforms

Expected social and environment impacts are:

- Increased acceptance and take up of new urban transport solutions and technologies
- More inclusive urban transport system with better access for all
- Reduction of green house gases, pollution and noise by implementation of more sustainable transport planning and improvement of urban network efficiency
- Increased energy efficiency in urban network and improved transport safety

Acronym:	VIAJEO	
Name of proposal:	International Demonstrations of Platform for Transport Planning and Travel Information	
Contract number:	233745	
Instrument:	CP – FP	
Total cost:	6 101 713 €	
EU contribution:	3 600 000 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.09.2009	
Ending date:	30.08.2012	
Duration:	36 months	
Website:	http://www.viajeo.eu	
Coordinator:	Dr. Yanying Li European Road Transport Telematics Implementation Coordination srl (ERTICO) 326 avenue Louise Brussels BE B-1050 Brussels	
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EC Officer:	Patrick Mercier-Handisyde	
Partners:	Associação Brasileira de Engenharia	BR
	Beijing Transportation Research Center	CN
	Center for Research and Technology Hellas	GR
	Centre d'études pour les réseaux	FR
	Deutsches Zentrum für Luft- und Raumfahrt (DLR)	DE
	Intelligent Traffic & Travel Information	GR
	KeyResearch ApS	DK
	Meta System S.p.A	IT
	Mizar Authomazione SPA	IT
	Plannung Transport Verkehr AG (PTV)	DE
	Research Institute of Highway, Minsitry of Communications, China	CN
	Groupeement ITS-JU	FR
	T-Systems P.R. China Ltd.	CN
	THETIS S.p.A.	IT
	Altea Italia, Srl	IT
	Magneti Marelli S.p.A.	IT
	ANCO S.A. Agencies, Commerce & Industry	GR
	Thales Software Systems (Shanghai) Co.,	CN
	Shanghai City Comprehensive Transportation	CN
	Beijing Public Transport Holdings, Ltd.	CN

2-BE-SAFE

2-Wheeler Behaviour and Safety

State of the art - Background

Powered Two Wheeler (PTW) users are overly involved in serious and fatal crashes. Between 2002 and 2008, PTW deaths increased from 11.3% to almost 18% as a proportion of the total number of road deaths in European countries.

The number of PTWs on European roads has more than doubled over the last two decades.

The recent MAIDS (Motorcycle Accident In-Depth Study) study of PTW crashes in Europe found that behavioural and ergonomic issues were major contributing factors to PTW crashes. The majority of PTW crashes involve a collision with a car. The primary accident cause for PTW crashes is the failure of car drivers to perceive two-wheelers. The behavioural and ergonomic factors contributing to accidents involving four wheeled vehicles have been studied for a long time through laboratory and simulator research, observational studies and, more recently, naturalistic driving studies, leading to countermeasures to reduce fatalities. There is no comparable research for powered two vehicles, and there is a lack of research tools, for example of motorcycle simulators to study motorcycle rider behaviour.

2-BE-SAFE designs and implements a broad-ranging research program that produces fundamental knowledge on PTW rider behaviour and on interaction between PTW riders and other road users. The produced knowledge will be used to propose relevant countermeasures to mitigate fatalities and injuries.

Objectives

The innovative program of research targeting the behavioural and ergonomic factors contributing to motorcycle crashes focuses on the following scientific issues:

- the analysis of crash causes and human error

- achieving the world's first naturalistic riding study involving instrumented PTWs
- the examination of PTW riders' perception and acceptance of risk
- the development of new research tools to support the research program, and in-depth research on the factors that underlie driver failures to see PTWs and their riders
- the development of recommendations for practical countermeasures for the enhancement of PTW rider safety.

Description of Work

The strategy consists of conducting three innovative axes of research focusing on riders' behaviour and on rider-driver interactions. These topics of research in these three areas are derived from accidentology findings, and are supported by research and activities in designing the required technological tools.

WP1 identifies accident situations in which PTW riders are over-involved, and identifies and characterises the behavioural "dysfunctions", including human errors that underlie these crash types.

WP2, 3 and 5 involve studies designed to provide an in-depth understanding of PTW rider behaviour and performance, and rider-driver interactions, in normal and emergency situations.

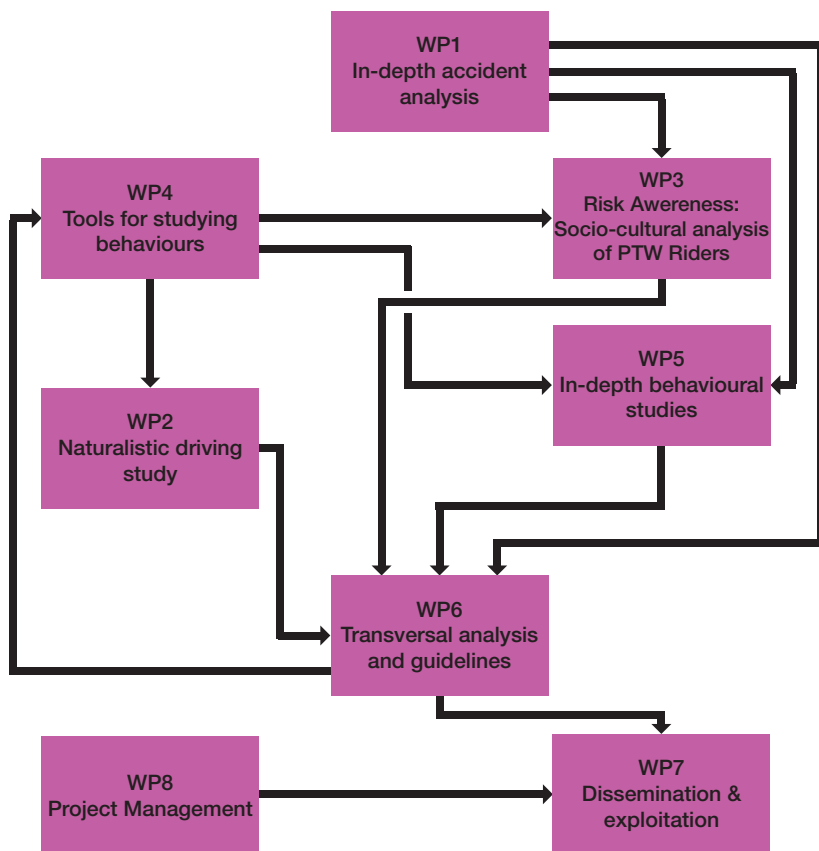
WP6 merges and distills the results from WP2, 3 and 5, analyses them and, using a systemic approach, produces guidelines and recommendations for the development of countermeasures.

WP4 designs the relevant tools and methodologies (instrumented vehicles, driving/riding simulators, videos) which are used in WP2, 3 and 5.

Expected Results

2-BE-SAFE will be the first study designed and implemented on a large-scale, integrated program of research on the behavioural and ergonomic factors that underlie PTW crashes. The countermeasures proposed will target the most critical safety problems identified in the MAIDS project. The implementation of the countermeasures will have the greatest impact possible on the reduction of road trauma for PTW riders. Specific recommendations will be made for improving PTW conspicuity, and actual technologies for improving PTW complicity will be developed and tested.

The most 'innovative technologies' will be six instrumented PTWs for naturalistic riding studies and two riding simulators which will be used to study rider behaviour and performance in both normal and emergency riding conditions.



Acronym:	2-BE-SAFE	
Name of proposal:	2-Wheeler Behaviour and Safety	
Contract number:	218703	
Instrument:	CP – FP	
Total cost:	5 287 545 €	
EU contribution:	3 800 000 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2009	
Ending date:	31.12.2011	
Duration:	36 months	
Website:	http://www.2besafe.eu	
Coordinator:	Mr. Stéphane Laporte Europe Recherche Transport c/o INRETS - Le Descartes 2 2 rue de la Butte Verte FR 93166 Noisy le Grand Cedex	
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EC Officer:	Ludger Rogge	
Partners:	Institut National de Recherche sur les Transports et leur Sécurité	FR
	Centre Européen d'Études de Sécurité et d'Analyse des Risques	
	C.E.E.S.A.R.	FR
	Technische Universität Dresden	DE
	Bundesanstalt für Straßenwesen	DE
	Università degli Studi di Firenze	IT
	Università degli Studi di Modena e Reggio Emilia	IT
	Università degli Studi di Padova	IT
	TRL Limited	UK
	FACTUM Chaloupka & Risser OHG	AT
	Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H.	AT
	Kuratorium für Verkehrssicherheit - KfV	AT
	Universität Wien	AT
	Centre for Research and Technology HELLAS	GR
	National Technical University of Athens	GR
	Institute of Communication and Computer Systems	GR
	Epitropi Ereunon Panepistimiou Thessalias	GR
	University of Thessaly	GR
	Faculdade de Motoridade Humana	PT
	Fndación CIDAUT	ES
	Valtion Teknillinen Tutkimuskeskus	FI

Centrum Dopravního Vyzkumu v.v.i.	CZ
Federation of European Motorcyclist Associations	BE
Ben-Gurion University of the Negev	IL
Monash University	AU
Piaggio & C. SpA	IT
API SA	FR
The University of Nottingham	UK

ADSEAT

Adaptive Seat to Reduce Neck Injuries for Female and Male Occupants

State of the art - Background

The development of adaptive safety systems addressing vehicle occupant protection requires the use of in-depth knowledge of various occupant features, specifically those related to the risk of injury. Whiplash associated disorders, so called whiplash injuries, resulting from car crashes, are a serious traffic safety issue, resulting in over 4 billion € costs to European society. Yearly, more than 300 000 European citizens suffer neck problems from these injuries and 15 000 result in long term consequences. All occupants in passenger vehicles are at risk of sustaining whiplash injuries in a low severity crash. However, females are at a higher risk of these injuries than males. The difference in risk between the male the female part of the population is between 40-100%. This has been reported from epidemiological studies from all over the world since the end of the 1960s until today. Yet still, when assessing the vehicle safety the only available occupant model for these impact scenarios is an average male. Adaptive anti-whiplash systems need to be evaluated for their benefits both for males and females. If there are no improved protective systems, further rising costs for the European Society can be expected.

Objectives

The overall objective of ADSEAT is to improve seat design for reducing whiplash injury. The project will focus on innovative adaptive seat design that can be adjusted to provide benefit for both male and female occupants. By focusing project resources on the latter group, the influence of occupant sex and additional factors on whiplash injury risk will be established.

The aims of ADSEAT are:

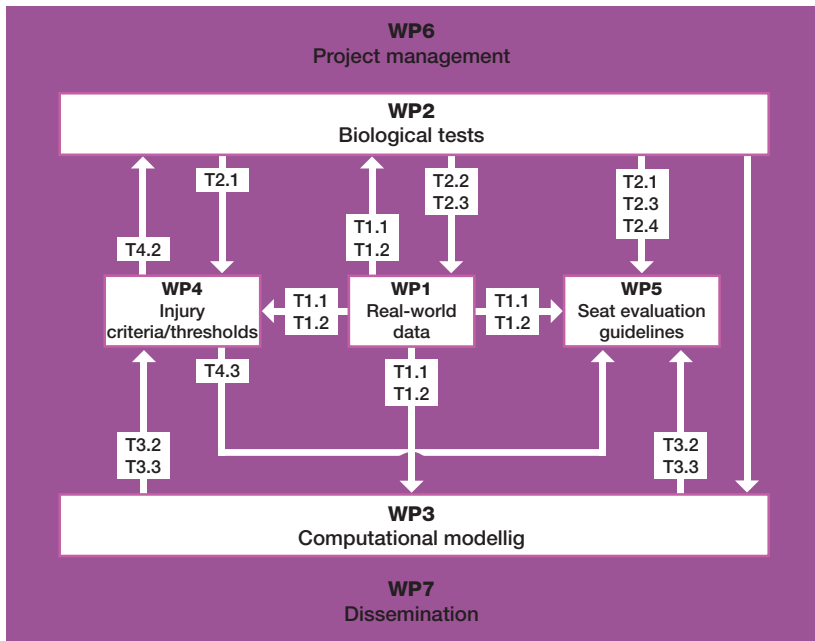
- From the analysis of real-world data, to evaluate the effect of recently introduced whiplash systems for females and males and define crash pulse characteristics representing high and low risks for females and males
- From biological data, to specify the properties and dynamic response for a model of an average female for low severity impact
- To develop a computational model of an average female, in addition to the male model that already exists, for low severity testing
- To use the developed computational model in the development of seat evaluation guidelines in order to provide enhanced neck injury protection from the seat.

Description of Work

ADSEAT facilitates both basic research in terms of creating new biomechanical knowledge that needs to be considered to address the whiplash injury risk of females and applied research by development of a computational model of an average female dummy, seat evaluation guidelines and a process to evaluate its benefits for both male and female car occupants.

The ADSEAT project is divided into five technical Work Packages (WPs) with the objectives to:

- analyse real world data (WP1) in order to
 - i) assess actual risk of female injury,
 - ii) evaluate the effect of recently introduced whiplash systems for females and males,
 - iii) define crash pulse characteristics representing high and low risks for females and males,
 - iv) carry out statistical evaluation of the influence of anthropometric differences



Schematic description of how the various work packages in the project ADSEAT relate to each other and the output from the project. From work packages (WP) the results of various tasks (T) serve as input to activities in other WPs.

- establish female biological data (WP2), in order to provide
 - i) dynamic motion and acceleration data for evaluation of the computer model,
 - ii) data on injury mechanisms, injury sites and risk assessment parameters,
- develop computational models of an average female dummy (WP3)
 - i) as a basis for dummy of an average female to serve as a design and test tool
- establish injury criteria and thresholds for females (WP4)
- develop seat evaluation guidelines illustrating how whiplash protection can be achieved for a wider population using adaptive seat design (WP5)

Expected Results

The results of ADSEAT will contribute to the technological foundation in the area of bio-mechanics of user diversity by providing dynamic response corridors of females from

low severity rear impacts. These corridors will be used within the project as a basis for the development of the first ever developed computational model of an average female. With occupant models of both males and females the number of injuries caused in traffic collisions can be further reduced. In addition, seat evaluation guidelines and injury protection of current anti-whiplash systems will be illustrated.

The major deliverables from the ADSEAT project are:

- Real-world data that will form the understanding of the loading pattern corresponding to injurious and non injurious cases for females and males.
- The specified geometry and mass distribution of an average female seated in a car seat.
- Dynamic response corridors of males and females.

- A computational dummy model of an average female.
- The investigation of injury criteria and thresholds addressing the differences between female and male responses.
- The formulation of seat evaluation guidelines and inclusion of these in a numerical illustrator with variable parameters.

Acronym: ADSEAT

Name of proposal: Adaptive Seat to Reduce Neck Injuries for Female and Male Occupants

Contract number: 233904

Instrument: CP – FP

Total cost: 3 129 734 €

EU contribution: 2 498 877 €

Call: FP7-SST-2007-RTD-1

Starting date: 01.10.2009

Ending date: 31.03.2013

Duration: 42 months

Website: <http://www.vti.se/ADSEAT>

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	Ludwig-Maximilians-Universität München	DE
	Folksam Ömsesidig Sakförsäkring	SE
	Graz University of Technology	AT
	Université de Strasbourg	FR
	AGU Zürich (Arbeitsgruppe für Unfallmechanik)	CH
	Loughborough University	UK
	First Technologies Safety Systems Europe	NL
	Fundación CIDAUT	ES
	Volvo Car Corporation	SE
	Faurecia Sièges d'Automobile	FR

ADVISE

Advanced Dynamic Validations using Integrated Simulation and Experimentation

State of the art - Background

The project falls within the Activity 'Improving Safety and Security; Area: Integrated Safety and security for surface transport systems (Safety and Security by design)' in response to an FP7 call for SUSTAINABLE SURFACE TRANSPORT.

The industry is constantly facing design challenges in maintaining reliability while introducing new technologies and materials to components and consumer products. A major issue for the industry is the safety of transport systems during critical events. The increasing number and capacity of transportation systems means an inevitable rise in the number of accidents and casualties, unless there are substantial advances in design. Two major challenges to the design of suitable safety features are: the mix of heavy and light-weight vehicles on the road, and the increasingly high speeds employed in rail transportation systems.

To meet these challenges, innovative approaches to design are being utilised, but need to be validated in order to demonstrate reliability and provide confidence. Although numerical simulation is an essential and valuable tool, experimental verification is a fundamental requirement for safe designs. Things become even more complicated if anisotropic and inhomogeneous materials such as fibre reinforced polymers, composites or foams, are considered. Design rules must be adopted to include safety margins that allow for an uncertainty in material parameters due to incomplete knowledge or variability due to accumulated manufacturing tolerances.

Objectives

The objective of the SST Work Programme (WP) is to develop new technologies and innovative solutions for the improvement of safety and security in transport operations and the protection of vulnerable persons. Activities in the ADVISE project will address approaches and technologies to ensure safer operations based on designs for safety, designs of advanced protection systems, and integrated safety designs.

The objective of the ADVISE project is to provide standardized procedures that allow confidence levels to be defined. While best practice guides exist for numerical modelling and static measurements of stress and strain, there are no international standards covering the validation of data from dynamic experiments and their use to validate numerical results in stress, vibration and impact response, i.e. to correlate finite element results with full-field experimental observations.

ADVISE is an extension from static strain to dynamic events of the successful "Standardization Project for Optical Techniques of Strain measurement" under the European Commission's FP5 Growth programme (SPOTS, see www.opticalstrain.org).

Description of Work

A unified approach to the design, simulation and validation processes is being taken. Partners include research laboratories, finite element analysis experts, instrument suppliers, and industrial end-users from the aerospace and automotive sectors.

The ADVISE objectives are pursued in three technical Work Packages (WPs) with additional WPs for 'Co-ordination' and 'Dissemination'. 'Advanced Tools for Simulation & Experimentation' focuses on suppliers for image processing, modelling and instrumentation; 'Dynamic Calibration' focuses on research laboratories; and 'Experimental Validation' focuses on end-users.

Significant creativity will be required to develop the reference materials and to a lesser extent to optimise methodologies; however the verification and validation is crucial in generating confidence in the outputs. Industrially-based case studies will be used to establish the transferability of the standard materials.

Expected Results

The main outcomes of the project will be:

- The development of reference materials for traceability and calibration of full-field optical measurements of deformation in cyclic, transient and non-linear dynamic events;
- The optimisation of methodologies for both optical measurement and computational modelling and the simulation of linear modal vibrations and non-linear impact responses;
- Contributions to standardisation activity for experimental validation of dynamic simulations: a recommended methodology for experimental validation by correlation of predictions with measurements.

We will work closely with CEN, ISO, NAFEMS and VAMAS TWA26 to ensure that these pre-normative materials can quickly become accepted globally thus providing worldwide traceability for validated designs. Dissemination through technical, professional and trade conferences and exhibitions will be done. Direct dissemination to the EU industrial base will be a priority to maximise the benefits of the research.

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Simulated impact damage of a sandwich structure.

Acronym:	ADVISE	
Name of proposal:	Advanced Dynamic Validations using Integrated Simulation and Experimentation	
Contract number:	218595	
Instrument:	CP – FP	
Total cost:	2 787 115 €	
EU contribution:	1 836 538 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.12.2008	
Ending date:	30.11.2011	
Duration:	36 months	
Website:	http://www.dynamicvalidation.org	
Coordinator:	Dr. Erwin Hack Eidgenössische Materialprüfungs- und Forschungsanstalt Überlandstrasse CH 8600 Dübendorf	
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Tel:	+41 (0)44 823 42 73	
Fax:	+41 (0)44 823 40 54	
EC Officer:	Grzegorz Domanski	
Partners:	Airbus UK	UK
	Dantec Dynamics GmbH	DE
	European Commission's Joint Research Centre	BE
	University of Liverpool	UK
	University of Patras	GR
	High Performance Space Structure Systems GmbH	DE
	MSU - Michigan State University	US
	Centro Ricerche Fiat S.C.p.A.	IT

ALARP

A railway automatic track warning system based on distributed personal mobile terminals



State of the art - Background

Safety of workers is a serious concern in most industrialised countries. Surface transport workers are facing very high risks as they often have to operate without service interruptions. The railway situation is even more strange, since vehicles are constrained to tracks so drivers have much less margin to react in case of emergencies and therefore workers are much more exposed to injuries and fatalities.

Independent studies have demonstrated that: most railway staff fatalities and serious injuries are the result of being hit by a train or by suffering an electric shock; trackside work has one of the highest fatality rates in the railway sectors; there is a clear need for a trusted and dependable device informing railway workers in a personalised, timely, and reliable manner about events that may temporarily increase their risks while working trackside.

Some existing Automated Track Warning Systems (ATWS) have been tested in recent years but the following intrinsic problems have hindered a widespread use of these devices: they are expensive; are complex to install and use; rely on existing signalling systems and therefore cannot be used on scarce-traffic lines without signalling; and their training is time consuming and complex.

Objectives

The objective of the ALARP project is to study, design and develop an innovative more efficient Automatic Track Warning System (ATWS) to improve the safety of railway trackside workers.

ALARP ATWS will be able to: selectively inform the trackside workers about approaching trains on the track, maintenance events on power lines and/or safety equipment on the tracks concerned that may put workers' safety at risk (e.g. being hit by a train or by an electric shock), emergencies on tracks and in tunnels near workers (e.g. fires in a tunnel, toxic smoke, etc.), escape routes in case of emergencies; keeping track of the status and localisation of the workers (and especially those at risk, not responding) and of the operating conditions concerning devices.

The proposed ALARP concept will be based on the following main components: the trackside train presence alert device (TPAD), able to sense an approaching train on the track without interfering with the signalling system; a set of distributed, low-cost, wearable, context-aware, robust, trustable and highly reliable, wireless Mobile Terminals (MTs) to inform the workers about possible approaching trains and/or other events that could put their safety at risk.

Description of Work

ALARP is based on 8 Work Packages, 6 of which are technical (WP1 to WP6) while WP0 refers to project management and WP7 to dissemination and exploitation. WP1 will set up the foundations of the system through risk analysis, requirements and validation scenarios specification and overall architecture design. Then 3 WPs will start in parallel for

the design of the main ALARP components: MT (WP3), TPAD (WP4) and resilient wireless communication (WP2). WP2 will design the resilient wireless communication system through: overall communication architecture definition; enhanced resilience adaptive protocols development; and iterations on the solution approaches. WP3 includes the definition, design and development of the main MT SW modules: the resilient core; the middleware; the self-localisation SW; the application logic; and the HMI. WP4 will design the TPAD according to the following activities: TPAD requirements definition; hazard analysis through detection model analytical modelling; TPAD architecture detailed design; TPAD subunit components development; TPAD application SW development. The 3 design WPs will be the input of the integration and proof-of-concept WP (WP5). Finally, WP6 will serve the entire project with the following activities: quantitative modelling; verification and validation; testing and evaluation; final assessment and guidelines.

Expected Results

ALARP intends to propose: a low-cost personalised (e.g. bracelet- or a watch-type) safe MT with sounding and/or flashing and/or vibrating alarm providing each worker with a personalised alarm; a much simpler system to carry, install and use through an accurate and innovative design; a device with limited training needs through a much simpler user interface to be developed during the project's life.

Moreover, the ALARP ATWS will have the following competitive advantages over existing devices: it will be completely independent of signalling systems, making it usable on any railway type, including scarce-traffic and regional lines; it will be more trustworthy and offer the possibility to give advice/directions to workers about reaching safe areas; it will have staff monitoring; it will offer the possibility to include a wider range of alarm causes; it will not depend on a centralised control room and each MT will be able to assume the role of leader thus increasing dependability and availability.

ALARP will directly contribute to the safety of the rail transport system by developing an innovative ATWS, thus reducing the number of casualties and the number and severity of injuries to the workers.

Being independent by design, the ALARP system will not impact on the Safety Integrity Level (SIL) of the signalling systems.

Acronym:	ALARP	
Name of proposal:	A railway automatic track warning system based on distributed personal mobile terminals	
Contract number:	234088	
Instrument:	CP – FP	
Total cost:	3 962 543 €	
EU contribution:	2 626 610 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.01.2010	
Ending date:	31.12.2012	
Duration:	36 months	
Website:	http://www.alarp.eu	
Coordinator:	Mr. Vito Siciliano Ansaldo STS S.p.A. Via P. Mantovani 3-5 IT 16151 Genova	
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Tel:	+39 010 6552976	
EC Officer:	Alexandra Gurau	
Partners:	FTW Forschungszentrum Telekommunikation Wien GmbH	AT
	Università degli Studi di Firenze	IT
	ResilTech S.r.l.	IT
	Elbit Systems Ltd.	IL
	PROPRS Ltd.	UK
	Darmstadt University of Technology - Institute of Ergonomics	DE

ASPIS

Autonomous Surveillance in Public transport Infrastructure Systems

State of the art - Background

Prompt availability of critical information with the right people is the main factor in managing any emergency situation. However, despite the numerous investments in the domain of public safety and security, recent events demonstrate that, in both Europe and the USA, this is still an open issue.

The idea of small embedded sensor-based devices that could, upon a specific event, form an ad-hoc network to give an alarm and/or communicate the information has been around for some time. This is very appealing for in-situ surveillance for a number of reasons: low cost, low power, no central administration, redundancy, interception-free communication, etc. Such systems, although technically feasible, have not yet found their way into broad practical applications. The main reason is that the market cannot, by itself, drive the necessary product development that such highly innovative system applications require.

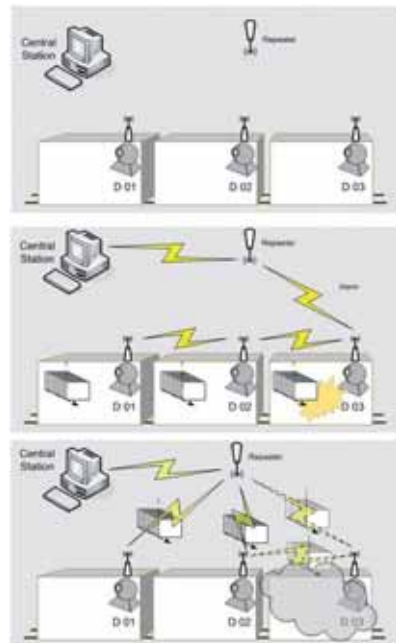
However, recent developments in consumer electronics have resulted in a range of components, protocols and standards that have narrowed the prototype-to-product gap considerably. Devices like ASPIS can be realised almost entirely from existing chipsets and chipset providers are now willing to invest in such devices because they are more confident that they can introduce the developed components into consumer markets.

Objectives

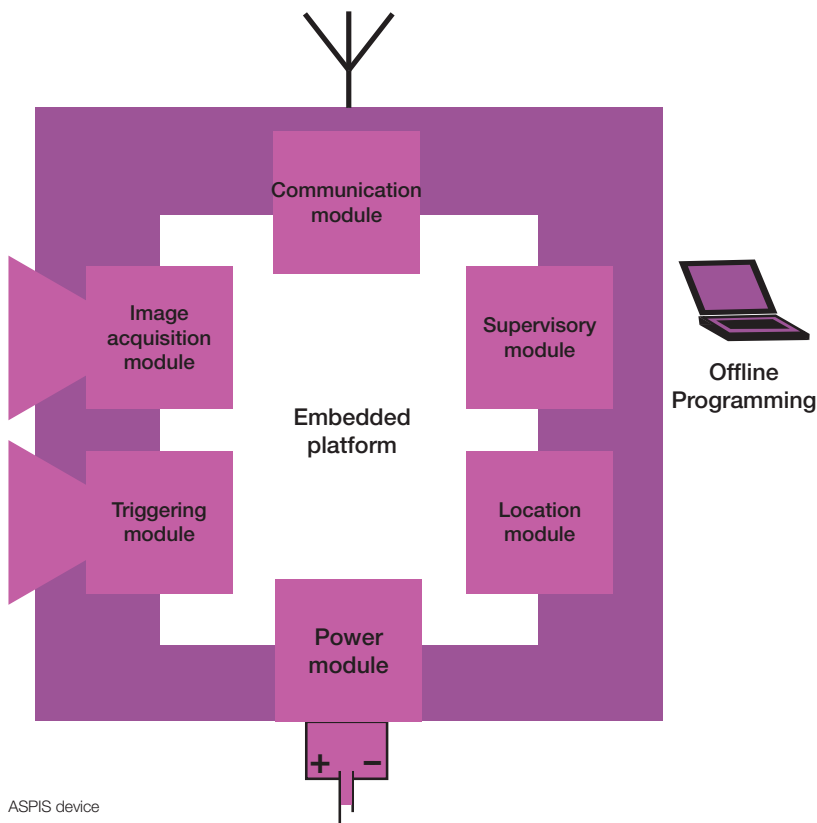
The ASPIS project aims at a scalable, unmanned surveillance/alarm system for public spaces, in particular for public transport systems. Having a modular system architecture, the system is expected to cover a wide range of applications both in terms of monitored spaces (buildings, trains, buses and other modes of public transport) and threats

to public safety (security incidents, accidental events, natural hazards). The concept will be developed, validated and demonstrated through the design and implementation of a complete prototype aimed specifically at public mass transport in the event of an explosion or fire, either accidental or intentional.

The system will operate in the harshest conditions, for example a severe accident. In the unlikely case of a device failing to communicate, it will remain in the debris and serve as a black box to be recovered and examined at a later stage.



ASPIS metro scenario: 1. normal conditions: no information is retained or transmitted; 2. explosion triggers device 03 which freezes its buffer, sends an alarm and activates the triggering; 3. an ad-hoc network is formed and all devices send their information to the central unit



ASPIS device

Description of Work

ASPIS is based on smart autonomous devices that:

- monitor their assigned spaces without recording or transmitting any information unless triggered by a potentially catastrophic event (such as an explosion);
- once triggered they freeze their cyclic buffer, thus keeping information on what happened well before the triggering event; in the case of an explosion, for example, a typical device could keep a complete record of the 30 minutes preceding the event;
- at the onset of triggering, the ASPIS device will send an alarm to a central station and activate the triggering in its neighbouring devices so as to provide a complete picture, time and space-wise;

- via an ad-hoc wireless network, the device uploads the information it has retained to a central station which becomes available for an on-demand real-time video link to the affected space.

Three distinct reference application scenarios have been defined by the ASPIS end-users (RATP and ANEK lines). For each application scenario, the user requirements were translated into functional specifications, which drive the system design.

A separate evaluation work package will define the acceptance criteria and testing procedures, and monitor the compliance of the technical work from the functional specifications and the user requirements. An Advisory Group of external specialists monitors and advises the project.

Expected Results

The final deliverable of the ASPIS project will be a pre-industrial prototype system responding to all the functionalities necessary to fulfil the aims of the project. It will include a number of devices, a central station and a simulator tool for demonstration and training purposes.

The functionality of the system will be tested on the RATP network (line 14), as well as on board a maritime ferry vessel, in conditions as close to reality as possible.

Acronym:	ASPIS	
Name of proposal:	Autonomous Surveillance in Public transport Infrastructure Systems	
Contract number:	218513	
Instrument:	CP – FP	
Total cost:	4 067 341 €	
EU contribution:	2 606 499 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.06.2008	
Ending date:	31.05.2011	
Duration:	36 months	
Website:	http://www.aspis-project.eu	
Coordinator:	Mr. Christian Fedorczak Thales Security Systems SAS 20-22 Rue Grange Dame Rose FR 78141 Vélizy-Villacoublay	
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EC Officer:	Asta Binkeviciute	
Partners:	Commission of the European Communities - Directorate General Joint Research Centre	BE
	Hellenic Aerospace Industry	GR
	Research Academic Computer Technology Institute	GR
	ITTI Sp.oz.o.	PL
	Shipping Company of Crete S.A.	GR
	Régie Autonome des Transports Parisiens	FR
	ANEK Lines	GR
	Athena - Research and Innovation Center in Information, Communication and Knowledge Technologies	GR

ASSESS

Assessment of Integrated Vehicle Safety Systems for Improved Vehicle Safety

State of the art - Background

Integrated vehicle safety systems that combine elements from primary and secondary safety have a high potential to improve vehicle safety due to their ability to influence crash conditions and/or to adapt to these crash conditions. The value of pre-crash sensing systems that employ remote exterior sensors (in combination with on board sensors) to detect dangerous situations and activate primary and secondary safety devices was clearly shown in projects like TRACE, APROSYS, eIMPACT and SAFETY TECHNOPRO. Joint R&D efforts (e.g. PReVENT, CHAMELEON, SAVE-U) have resulted in Pre-Crash Safety systems that are already on the market or close to market introduction.

In previous and current projects the development of test and evaluation procedures were considered only as a secondary objective. So far no procedures have been developed and implemented. Moreover, all the research into test procedures was based on research systems and not on commercially available systems.

Because of the above, a project specifically devoted to the development of assessment procedures is required to enable widespread introduction of integrated vehicle safety systems like pre-crash sensing systems into the vehicle fleet.

Objectives

1. To develop harmonised and standardised assessment procedures and related tools for commercially available pre-crash sensing systems. Procedures will be developed for:
 - Driver behaviour evaluation
 - Pre-crash system performance evaluation
 - Crash performance evaluation
 - Socio-economic assessment
2. To gain acceptance for the future implementation of test and assessment tools in regulatory or consumer rating procedures by extensive evaluation and validation.
3. To provide policy recommendations for enabling the implementation of the most important technologies
4. To provide an overview of legal barriers that obstruct the introduction of integrated vehicle safety systems
5. To analyse the potential socio-economic benefits of the selected integrated vehicle safety systems

The above objectives should contribute to:

1. The accelerated introduction of integrated vehicle safety systems (IVSS) and pre-crash sensing systems in particular that offer optimal protection in frontal collisions into the EU vehicle fleet to a level of over 60% of all new vehicles in 2020 (meaning within two new vehicle generations' time)
2. Improved survivability in frontal collisions

Description of Work

To realise the project goals, a structure of seven Work Packages (WPs) has been defined. WP1 deals with defining the test targets as well as the final evaluation of the developed assessment methods, WP2 with legal and socio-economic aspects, WP3-4 and 5 with the development of evaluation methods for the driver behaviour, the pre-crash performance and the crash performance respectively. Management and dissemination are performed in WP6 and 7.

Expected Results

Work package 1 "Definition of targets and Final Verification" will deliver:

- Specifications for the test scenarios in terms of test conditions (speeds, vehicle types, etc) as well as environmental conditions (road, weather, etc.)
- Definition of assessment criteria
- Verification of proposed test procedures based on testing conducted in ASSESS

Work package 2 "Economic Evaluation and Legal Aspects" will deliver:

- Integrated methodology framework for Socio-economic impact of safety systems
- Proposal on methodological approach to evaluate the legal and liability effects of Integrated Safety Systems.

Work package 3 "Evaluation of Behavioural Aspects" will deliver:

- Protocol for the assessment of behavioural aspects, including the results of the experimental studies.

Work package 4 "Pre-crash Evaluation" will deliver:

- Proposals of a test and assessment protocol for the pre-crash assessment of integrated safety systems, including limitations and suitability for regulatory testing and consumer assessment.

Work package 5 "Crash Evaluation" will deliver:

- Guide, including scenarios to be analysed and methods to test, for the evaluation of the crash performance of pre-crash systems and their development.

Work package 6 "Dissemination" will deliver:

The main results of WP6 will be the exchange of information between the research partners, industry partners and suppliers on one hand and the relevant stakeholders on the other, like OEM, EuroNCAP and EEVC WG19. As well as this, there will be a project website running for dissemination purposes.

Acronym:	ASSESS	
Name of proposal:	Assessment of Integrated Vehicle Safety Systems for Improved Vehicle Safety	
Contract number:	233942	
Instrument:	CP – FP	
Total cost:	5 812 165 €	
EU contribution:	3 643 648 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.07.2009	
Ending date:	31.12.2012	
Duration:	42 months	
Website:	http://www.assess-project.eu/	
Coordinator:	Mr. Paul Lemmen First Technology Safety Systems (Europe) Kleveringweg NL 2600JA Delft	
E-mail:	plemmen@ftss.com	
Tel:	+31 (0)15 219 20 42	
Fax:	+31 (0)15 219 20 50	
EC Officer:	Ludger Rogge	
Partners:	Bundesanstalt für Strassenwesen	DE
	Robert Bosch GmbH	DE
	Chalmers Tekniska Högskola AB	SE
	Daimler AG	DE
	Idiada Automotive Technology SA	ES
	Peugeot Citrën Automobiles S.A.	FR
	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek - TNO	NL
	Toyota Motor Europe	BE
	TRL Limited	UK
	TRW Automotive GmbH	DE
	Uniresearch BV	NL
	Technische Universität Graz GRAZ	AT
	Centre Européen d'Études de Sécurité et d'Analyse des Risques - C.E.E.S.A.R.	FR
	Universität zu Köln	DE

ASSET-Road

ASSET advanced safety and driver support for essential road transport

State of the art - Background

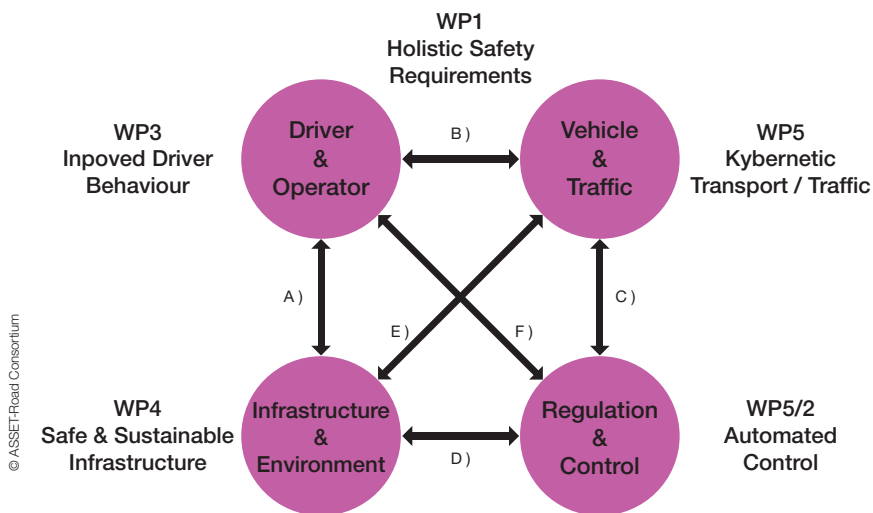
The EU enlargement, combined with globalisation and growing competition, is driving the need for a better use of resources in the expanding transport sector. With road traffic, there is considerable potential for increasing transport sustainability in terms of safety, traffic flow, efficiency, infrastructure protection and energy saving. The ASSET-Road project aims at substantially contributing to the improvement of safety and the protection of infrastructure in the field of sustainable road transport. The concept of this project comprises the following key aspects:

- developing a new 'Integrated system theory of traffic safety';

- deriving practical measures from this theory, necessary for an innovative integrated safety system;
- developing and integrating different technologies and architectures including a 'holistic system design', providing solutions to support drivers, road operators and police;
- integrating various important and useful safety and road protection applications, and setting up test sites;
- investigating functions, performances and operations, and optimising the systems for future use.

The consideration of multiple interactions between the aspects of traffic safety using the latest technologies will allow selective improvements.

Holistic Safety Concept (Dialectic Quadropol Road safety)



Dynamic Interactions Improving Road Safety

ASSET-Road key applications



ASSET-Road holistic safety concept

Objectives

ASSET-Road focuses on the development and implementation of a holistic approach to improve safety and to achieve higher efficiency in road transport. It combines the following elements of transport:

- driver and operator
- vehicle and traffic
- infrastructure and environment
- regulation and control

to form a complete system, featuring inter-dependencies between safety elements, networking and processes.

The approach includes the following key issues:

Driver behaviour: the understanding of and attitude towards traffic regulations and dangerous road conditions has a major impact on safety. Modern technologies allow for automated support and supervision.

Safe and sustainable infrastructure: defective road maintenance and repair is a significant factor of accidents and costs. Innovative measures for safe and sustainable infrastructure monitoring and management will be introduced.

Traffic control and cybernetics: new procedures will be developed to achieve better dynamics and more efficient traffic flow. Methods of enforcement for overloaded vehicles will be improved, the number of unsafe vehicles and road accidents reduced and there will be a more effective messaging system to emergency control centres.

This will be achieved through an advanced sensor/processing network providing assistance and information for drivers, traffic control authorities and infrastructure operators.

Description of Work

In ASSET-Road, the following technologies and innovations are applied or further developed:

- Tracking and tracing for traffic monitoring, driving analysis and enforcement of violations including video analysis of vehicles;
- Virtual driver agent system helping drivers drive economically and safely;
- Fully automated vehicle overload control with new WIM (Weigh-in-Motion) systems to protect road infrastructure and increase traffic safety, with integrated RFID (Radio Frequency Identification);

- Thermal imaging for vehicle status analysis and control for safety monitoring;
- GNSS and remote safety monitoring applications;
- Automated traffic regulations knowledge base to support drivers and the police;
- LISA (Live In-vehicle Smart Assistant) - an intelligent, interactive co-pilot driver-support system to facilitate safer driving;
- Accurate pavement life prediction models for life-cycle optimisation strategies for roads;
- Smart traffic data management and integration of emergency services for better response and rapid access to specific locations.

The following technologies and applications will be tested and operated on four test sites:

- integrated safety station (DE)
- test modules (AT)
- mobile safety applications (FI)
- remote safety monitoring (FR)

and will be supported by road users and administrations.

Expected Results

A practical, holistic approach to sustainable road transport focusing on traffic safety will be developed, leading to an overall safety theory to manage complex cybernetic interactions.

The analysis and better understanding of the different processes and chains of inter-dependencies will allow identifying critical parameters thus influencing safety.

The project results will have positive impacts on safety, security and the environment.

The developed integrated technical solutions, including electronic hardware and software for sensor systems and wireless communication/power supply technologies, will provide ample opportunities and enhance the possibilities of European industries to further develop their competence in these fields.

Efficient information dissemination will be established, including a user forum and two transcontinental co-operations with Tanzania and India.

Acronym:	ASSET-Road	
Name of proposal:	ASSET advanced safety and driver support for essential road transport	
Contract number:	217643	
Instrument:	CP – FP	
Total cost:	8 106 579 €	
EU contribution:	6 149 926 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.07.2008	
Ending date:	31.12.2011	
Duration:	42 months	
Website:	http:// www.project-asset.com	
Coordinator:	Dr. Walter Maibach PTV Planung Transport Verkehr AG Stumpfstrasse Kriegerstr. 15 DE 76131 Karlsruhe	
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EC Officer:	Ludger Rogge	
Partners:	Valtion Teknillinen Tutkimuskeskus	FI
	Statens Väg- och Transportforskningsinstitut	SE
	Università degli Studi di Modena e Reggio Emilia	IT
	Université de Technologie de Belfort-Montbéliard	FR
	Universität Stuttgart	DE
	University College Dublin	IE
	Gottfried Wilhelm Leibniz Universität Hannover	DE
	University of Nottingham	UK
	Gheorghe Asachi Technical University of Iași	RO
	Bayrisches Innenministerium - Polizeipräsidium Oberbayern	DE
	ROC Bernard GmbH	AT
	Kria S.r.l.	IT
	Manfred Hügel - Selektions- und Verfahrenstechnik	DE
	Emtele Oy	FI
	Clarity Consulting Information and Management Services Ltd	HU
	AfriDeut Consult Ltd	TZ
	National Institute of Transport	TZ
	MTEL-KTEI Teleinfra Company India Private Ltd	IN

CASPER

Child Advanced Safety Project for European Roads

State of the art - Background

CASPER fits into the continuing objective of further reducing the number of fatalities on EU roads, but will not address the legal and enhancement aspects. The activities are mainly supported by research addressing in-depth road accident data collection and analysis regarding children, the influence of the impact of societal behaviour of adults in transport situations, and technology-based solutions to improve the safety of children.

Objectives

The aim is to develop new technologies and systems to protect children, and to develop risk analysis methodologies for the design of better child restraint systems. Emphasis will be made on an integrative approach such as child-human modelling, passive and when possible active safety, and sociological aspects.

CASPER will address two main aspects:

- improving the efficiency of child protection through the development of innovative tools, such as sensors, dummies and child-human models, followed by test procedures in frontal and lateral impacts, with associated injury criteria, in order to provide child restraint system manufacturers with the possibility of developing and testing their products at a lower cost, with new methods, but with the same guarantee of efficiency;
- analysing the reasons and consequences of the misuse of child restraint systems and its influence on the conditions of transporting children, as compared to the certification test procedures.

Description of Work

CASPER is divided into work packages (WP).

WP1: tools for the dummy approach to child safety: dummy development and modelling, experimental testing and simulation, and determination of child injury tolerance;

WP2: child-human body modelling: geometrical and mechanical properties, development of human segments/whole body models, numerical accident simulations and numerical criteria;

WP3: diagnosis of child safety: understanding the real child-safety environment, road experience and other child-injury sources;

WP4: demands and applications: experimental and virtual test procedures, solutions for child restraint systems in terms of use, solutions for car safety devices and demonstration of feasibility;

WP5: dissemination and knowledge exchange, website and data storage, and co-operation with other groups on child safety.

Expected Results

The main deliverables will be improving the behaviour of dummies, associated with new sensors, as well as dummies and child-human numerical models, and improved test procedures to resolve the issues of protecting children. Reports on the conditions of use for child restraint systems and their consequences in accidents, including campaigns of information, will be made available.

Acronym:	CASPER	
Name of proposal:	Child Advanced Safety Project for European Roads	
Contract number:	218564	
Instrument:	CP – FP	
Total cost:	5 785 836 €	
EU contribution:	3 854 265 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.04.2009	
Ending date:	31.03.2012	
Duration:	36 months	
Website:	http://www.casper-project.eu	
Coordinator:	Mr. Philippe Lesire GIE de recherche et d'études PSA Renault 132 Rue des Suisses FR 92000 Nanterre	
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	IDIADA Automotive Technology SA	ES
	Institut National de Recherche sur les Transports et leur Sécurité	FR
	Loughborough University	UK
	Fiat Automobili S.p.A.	IT
	Medizinische Hochschule Hannover	DE
	Chalmers Tekniska Högskola AB	SE
	Bundesanstalt für Straßenwesen	DE
	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek	NL
	First Technology Safety Systems (Europe)	NL
	Verein für Fahrzeugsicherheit Berlin e.V.	DE
	Ludwig-Maximilians-Universität München	DE
	Centre Européen d'Études de Sécurité et d'Analyse des Risques	FR

CORFAT

Cost-effective Corrosion and Fatigue Monitoring for Transport Products

State of the art - Background

The background of this project is related to technical safety in conjunction with the competitiveness of EU industry. Corrosion damage and fatigue cracks are the main causes for structural failures of all surface transport products like ships, road tankers and railway tank cars. In order to prevent those structural failures, maintenance and inspection has to be carried out. These activities require high efforts and are usually performed while the transport product is out of service. This kind of maintenance is often referred to as 'preventive maintenance'. It is performed on a time-driven or routine basis. Despite these high efforts (costly) the risk of not detecting the onset of a defect is still implied in this maintenance process and thus failure within the next service period may occur.

Many examples have been experienced, where weakened structures have failed to withstand severe operating conditions. Accidents of oil tankers have led to tremendous pollution of the environment and subsequent economic loss in large coastal areas. The most well known have been those of the tankers "Erika" and "Prestige", but also bulk carrier and container ships have been involved in ship accidents, like the "Server" and the "Napoli".

In the last few decades, we have learnt that the transportation of water-polluting liquids, toxic fluids and compressed gases become hazardous for human life and the environment.

As an example, we will point out the oil spillage of tankers during accidents in the last years, like Erika, which lost more than 20.000 t of crude oil. Besides this, more corrosion caused accidents, and fatigue damages also led to fatal situations for the environment, especially the coast.

Objectives

It is proven that AE detects active cracks, and based on the results of the EU-funded project "corrosion detection of ship (EVG1-CT-2002-00067)", it is evident that AE is able to detect and evaluate active corrosion. Through the application of permanent AE sensors on pre-determined hot spots of ships and tank cars, the conventional maintenance and inspection can be replaced by a cost-effective and condition-based detection of defects and their follow-up in time. The result of the project shall be an overall strategy for maintenance and inspection, including the necessary AE-equipment for the different transport products. Reasonable follow-up NDT methods will be validated. By online measurement, the method also increases the safety of all transport products.

Description of Work

Corrosion damages and fatigue cracks are the main causes for structural failures of all surface transport products like ships, road tankers and railway tank cars. Examples are catastrophic ship accidents with tremendous pollutions of the maritime environment or fatal explosions during the use of transport vehicles.

Although evolving defects have to be identified in time to enable the appropriate repair, preventive maintenance activities are usually carried out on a time-driven basis. As an example, transport products for cargo like crude oil and pressurised gases have to be taken out of service for visual inspection and sub-sequent non-destructive tests (NDT). Findings must be repaired later on.

This procedure is time-consuming and expensive, especially the lost service time, which decreases the competitiveness of the European transport industry. Despite this high

effort the risk of not detecting the onset of a defect is still implied in this maintenance process and thus failure within the next service period may occur.

The maintenance process, being developed and studied during this project, is based on monitoring the status of the structural integrity in terms of developing fatigue cracks and active corrosion using the Acoustic Emission (AE) technology. The possibility of detecting the onset of defects is one important advantage, as it allows countermeasures to start much earlier, meaning that on the one hand there will be better safety and on the other hand, larger saving of resources.

Expected Results

The experience gained during the SMT project and during the following market introduction has been used to define another pressing research project based on corrosion detection. Recent ship disasters like the one caused by oil tanker Erika raised the question: "Is AE also applicable for corrosion detection ships?". The main idea was to use an intrinsically safe sensor to be immersed into the cargo tanks from the deck openings. Within the 5th framework programme the project "Detection and discrimination of corrosion attack on ships (crude oil tankers) with acoustic emission (AE)", contract no. EVG1-CT-2002-00067 was conducted and concluded successfully. Measurements onboard ships have shown that AE is capable of detecting corrosion inside ballast tanks as well as cargo tanks.

Acronym: CORFAT
Name of proposal: Cost-effective Corrosion and Fatigue Monitoring for Transport Products
Contract number: 218637
Instrument: CP – FP
Total cost: 4 188 921 €
EU contribution: 2 817 335 €
Call: FP7-SST-2007-RTD-1
Starting date: 01.11.2008
Ending date: 30.04.2012
Duration: 42 months
Website: <http://www.corfat.eu/>
Coordinator: Mr. Peter Tscheliesnig
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EC Officer: Grzegorz Domanski
Partners: Vallen Systeme GmbH DE
American Bureau of Shipping - Europe LTD UK
Bundesanstalt für Materialforschung und -prüfung DE
Aristotle University of Thessaloniki GR
Politechnika Gdanska PL
Instituto de Soldadura e Qualidade PT
Politechnika Krakowska PL
Nuclear N.D.T. Research & Services S.R.L. RO
Reneko AS EE
Stocznia Marynarki Wojennej S.A. PL

COVER

Coordination of Vehicle and Road safety initiatives

State of the art - Background

In 2005, around 41 600 people were killed and more than 1.7 million injured in European road accidents. Although the number of road fatalities has declined by more than 17% since 2001, greater efforts will have to be made if the European Commission's target of halving the number of deaths on the roads by 2010 is to be met. To realise the targets for road safety in the future, stakeholders indicate the necessity of integrating current and future research capacities as much as possible.

COVER is a Coordination and Support Action that brings together the coordinators of four Seventh Framework Programme initiatives that are dealing with impact biomechanics, namely THOMO, THORAX, CASPER and EPOCH. To maximise the benefits gained from the individual initiatives, synergies between the projects will be fully exploited by coordinating the exchange and usage of results, joining dissemination actions towards relevant stakeholders, and exchanging best practices and policies with respect to relevant aspects like test methods and deployment strategies.

Objectives

The general objectives are:

- to accelerate improvements in biomechanical tools for the design and evaluation of vehicle crash safety systems;
- to consolidate research and development activities related to biomechanics, providing tools and know-how to industry and governments for future enhancement of vehicle safety.

The specific objectives are:

- coordination of research activities dealing with human physical (biomechanics) aspects as identified by the coordinators and partners of the participating projects;
- collection and analysis of accident data;

- development of consistent sets of human data related to thoracic injuries;
- development of a consistent set of test procedures for child safety;
- joint dissemination towards relevant high-level stakeholders in order to provide clear messages, and obtain the necessary visibility needed for accepting new test and evaluation methods;
- organisation of workshops and combined meetings between the involved initiatives to exchange research findings.

Description of Work

Work package 1: Research coordination: a complete overview of joined activities will be made and plans of the involved projects harmonised. Special focus will be on the alignment of the activities' timing. At the end of this inception phase a summary and conclusion report will be written and the project plans for the involved initiatives will be updated accordingly.

Work package 2: Joint dissemination for harmonisation: a coordinated approach is important to facilitate providing a clear message and obtaining the necessary visibility.



The external dissemination task will develop a dissemination database of contact details, an overview of expected outcomes/results/deliverables related to testing and assessing the systems and, based on these results, a dissemination plan for relevant stakeholders. Identified dissemination actions include an invitation to (combined) workshops, events where the combined project results are presented, etc.

Internal dissemination between initiatives will establish an agenda for joint events for the exchange of best practices and project findings. Based on the planning of participating projects in terms of deliverables, events for the exchange of information will be established and communicated with participants.

Work package 3: Management: This area concentrates on the internal coordination issues and contact with the European Commission.

Expected Results

The expected results are:

- jointly executed research activities among participating projects (outcome WP1: research coordination and WP3: exchange of best practices);
- joint dissemination and communication of the research results of participating projects towards key stakeholders (outcome WP2: joint dissemination for harmonisation);
- increased technical and strategic information gained by partners of participating projects.

Acronym:	COVER	
Name of proposal:	Coordination of Vehicle and Road safety initiatives	
Contract number:	218740	
Instrument:	CP – FP	
Total cost:	454 579 €	
EU contribution:	454 579 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.04.2009	
Ending date:	31.03.2013	
Duration:	48 months	
Website:	http://www.biomechanics-coordination.eu/	
Coordinator:	Mr. Paul Lemmen First Technology Safety Systems (Europe) Kleveringweg NL 2600 JA Delft	
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Fax:	+31 (0)15 2192050	
EC Officer:	Grzegorz Domanski	
Partners:	Rheinisch- Westfälische Technische Hochschule Aachen	DE
	Uniresearch BV	NL
	Bundesanstalt für Straßenwesen	DE
	Centre Européen d'Études de Sécurité et d'Analyse des Risques	FR
	GIE de recherche et d'études PSA Renault	FR
	TRL Ltd	UK

DHergo

Digital Humans for Ergonomic designs of products

State of the Art - Background

In order to evaluate the ergonomics of a product or a workplace in its early stages of design, an engineer needs to first insert a digital human (or a group of digital humans) representing the critical target user(s) of the product in the computer-aided design (CAD) environment, then simulate critical postures or movements and evaluate this in terms of visibility, accessibility, ease of use, etc.

Ideally, the design engineer would also like to be guided by the recommendations of the Digital Human Models (DHM) simulation software for improving the design and reaching a compromise without degrading the ergonomic demand.

Since a product, like a car, can be used by thousands, even millions, of people, the design engineer has to consider the variability of the user population. People vary not only in body dimension and shape (anthropometry), but also in physical capacity (body strength and joint mobility). The variability in postural and motion control must also be considered in simulation. Often the design engineer has to decide what percentage of the whole target population is accommodated for regarding the specific task under consideration, like car ingress and egress for instance.

Currently available digital human simulation tools are still far from the designer's expectations, especially in terms of motion simulation and evaluation of motion-related discomfort.



Objectives

The digital human models used for the ergonomic design of products have to evolve towards dynamic and muscular ones. They must be able not only to have a realistic visual representation of the human body and movement but must also evaluate the muscular efforts associated with a task for a better understanding of human performance and perceived discomfort. The present project mainly focuses on the following scientific issues:

- to develop multi-body dynamic motion reconstruction in order to estimate joint motion and joint forces;
- to develop more realistic human digital models with a more accurate and detailed representation of the human body;
- to collect the necessary data for model developing and validation as well as the basic human functional data, such as joint strength and joint range of motion;

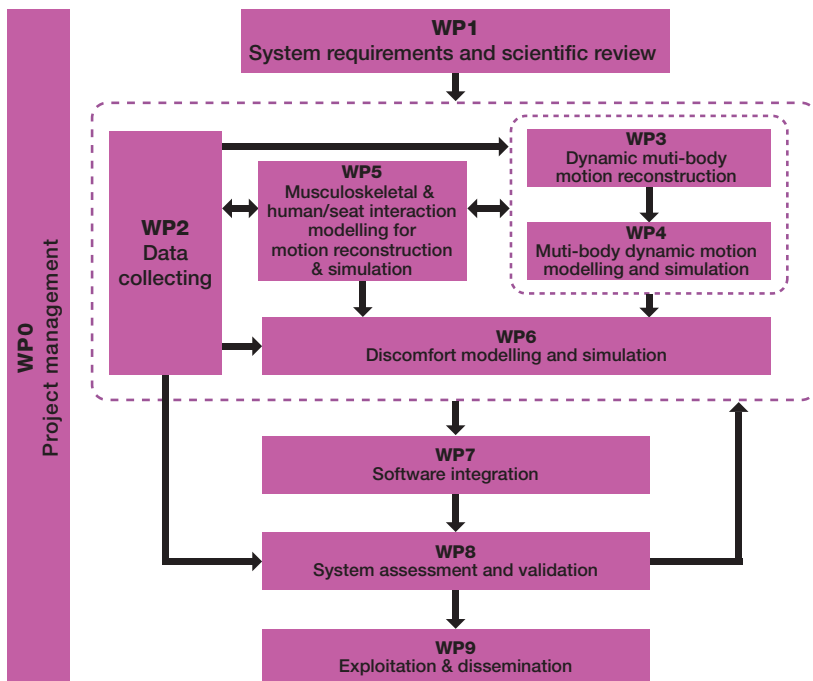
- to develop a hybrid optimisation/data-based complex motion simulation method;
- to develop a generic approach for evaluating motion-related discomfort;
- to study the effects of aging on movement and perceived discomfort.

Description of Work

The project is divided into eight technical work packages (WP), which are illustrated in Figure 1.

WP1 is mainly concerned with the end-user requirements and the state of the art of scientific and technological achievements on digital human models.

Work packages 2-6 are the main research core of the project. The main objective is to acquire the knowledge and to develop more advanced motion and discomfort simulation technology for ergonomic designs of products. WP2 collects all the data necessary for model development and validation.



Two almost parallel modelling approaches for motion reconstruction and simulation are employed in the project: dynamic multi-body modelling (WP3 and WP4) and musculoskeletal (MS) modelling (WP5). The final research results are integrated in a simulation tool (WP7). The simulation tool is evaluated and validated, mainly by the end-users, in WP8.

Expected Results

A software demonstrator will be realised by the end of the project, incorporating two different types of human models, one dynamic multi-body based, the other muscular skeletal capable of estimating muscle forces. In addition, physical interaction between a human and the environment (e.g. a seat) will be analysed in these two models. Both models will be validated by accurate and consistent anatomic data, as well as the human functional data to be collected. Their use for motion simulation and discomfort evaluation will be tested in three case studies (lower limb pedal depression, upper limb hand braking, whole body car ingress and egress). The results of DHErgo are expected to fill the gap allowing current kinematic digital human models to evolve towards dynamic and muscular models for motion simulation and discomfort assessment.

Acronym:	DHErgo	
Name of proposal:	Digital Humans for Ergonomic designs of products	
Contract number:	218525	
Instrument:	CP – FP	
Total cost:	4 903 504 €	
EU contribution:	3 572 227 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.09.2008	
Ending date:	31.08.2011	
Duration:	36 months	
Website:	http://www.dhergo.org	
Coordinator:	Ms. Janin Fabienne Europe Recherche Transport c/o INRETS- Case 24 25, avenue François Mitterrand FR 69675 Bron Cedex	
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EC Officer:	Grzegorz Domanski	
Partners:	Institut national de recherche sur les transports et leur sécurité	FR
	Université Libre de Bruxelles	BE
	Technische Universität München	DE
	Centro de Estudios e Investigaciones Técnicas de Gipuzkoa	ES
	Human Solutions GmbH	DE
	ESI Group S.A.	FR
	Renault S.A.S. represented by Gie Regienov	FR
	Bayerische Motoren Werke Aktiengesellschaft	DE
	Peugeot Citroen Automobiles S.A.	FR

EPOCH

Enabling Protection for Older Children

State of the Art - Background

Across most of Europe, the law requires children under three years old to use a child restraint system (CRS) appropriate for their weight in any vehicle (including vans and other goods vehicles). In vehicles where seat belts are fitted, the law now also requires children up to the age of 12 or up to 150 cm (135 cm in certain countries) in height to use an appropriate child restraint. Child restraints sold in the EU must conform to UN-ECE Regulation 44.

To date, the regulations in this field have relied on the 'P' series child dummies as restraint loading devices. CREST and CHILD projects have worked on the development of the 'Q' series of dummies, which have been recommended and are in use in the New Programme for the Assessment of Child-restraint Systems (NPACS). However, NPACS is unable to provide an assessment for children over the age of 6 as there is currently no appropriate 10/12-year-old dummy to use. This means that consumers will not be able to make informed decisions on the purchase of CRSs and hence provide the best protection for their older children, which is out of step with the recent changes in legislation.

The Q dummies could, in the future, also replace the P series dummies in regulatory testing if the family included a 10/12-year-old dummy. The P series of dummies are less sophisticated than the Q series and have not been designed to be biofidelic.

Objectives

The objectives of EPOCH are:

- to produce a 10/12-year-old prototype Q series dummy;
- to extend the NPACS testing and rating protocols to include assessments of child restraints for older children;
- to make proposals for pass/fail criteria that will allow the assessment of child restraints for older children in the ECE Regulation if the Q series dummies replace the P series in the future.

The concept of this project is to drive the improvement of safety for older children travelling in vehicles by extending the development of the necessary protocols, test procedures and measurement tools, in view of the recent changes in legislation, and to carry out impact tests for restraint systems designed to protect older and larger children in vehicle collisions.

This work will directly impact European and potentially worldwide testing and will specifically target the consumer assessment protocols of NPACS, which will feed into the UN-ECE Regulation.

Description of Work

The implementation plan is subdivided into five work packages (WP), each one characterised by specific aims corresponding to logical phases in the organisation of the work to meet the overall objectives.

WP1: Injury mechanisms associated with older children: Specification of the biomechanical and functional requirements will be developed for a new test dummy representing an older child. It will examine the injury mechanisms associated with impacts involving older children and develop injury risk functions for use with the dummy.

WP2: Dummy development and validation: Requirements and specifications developed in WP1 will be used to develop and validate a dummy representing an older child.

WP3: Development and assessment for test procedures: The dummy will be assessed for its appropriateness as a measurement tool both for consumer and regulatory dynamic testing.

WP4: Administration and management: this will cover the administration and management issues for the whole project, including liaison with the Commission, ensuring that delivery and cost targets are met.

WP5: Dissemination and exploitation: this will be carried out by all the partners and will cover formal reports, papers, presentations to international stakeholders, workshops and a project website.

Expected Results

The project will develop new procedures and measurement tools for the impact testing of CRSs that are designed to provide protection for older and larger children. This will include:

- specifications for a new test dummy;
- a new test dummy;
- appropriate instrumentation for the new dummy;
- required calibration procedures;
- validation of test dummy biofidelity;
- assessment procedures suitable for the older and larger child, both for NPACS front and side impacts and for the UN-ECE Regulation.

In addition, where possible, the results from EPOCH will also be disseminated with other Seventh Framework Programme projects as part of the COVER project, an EC FP7 Coordination Action.

The results of this project will actively promote the safety of older children to the consumer and contribute to reducing the number of fatally and seriously injured children.

Acronym:	EPOCH	
Name of proposal:	Enabling Protection for Older Children	
Contract number:	218744	
Instrument:	CP – FP	
Total cost:	2 211 194 €	
EU contribution:	1 400 000 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2009	
Ending date:	31.12.2011	
Duration:	36 months	
Website:	http://www.epochfp7.org	
Coordinator:	Ms. Maria McGrath TRL Ltd Crowthorne House Nine Mile Ride UK RG40 3GA Wokingham	
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Tel:	+44 (0)1344 770921	
Fax:	+44 (0)1344 770356	
EC Officer:	Grzegorz Domanski	
Partners:	First Technology Safety Systems (Europe)	NL
	IDIADA Automotive Technology SA.	ES
	University of Surrey	UK
	Dorel Netherlands (a trade name of Maxi Miliaan B.V.)	NL

ESTEEM

Enhancing Safety and security aspects in Transport rEsearch in the Euro-Mediterranean region

State of the Art - Background

ESTEEM aims at contributing to the coordination of research activities and policies between the European Union and its neighbouring countries on transport themes. As indicated in the 2007 European Neighbourhood and Partnership Instrument, one of the EU objectives lies in stimulating the co-operation between the EU and the neighbourhood countries, as well as their progressive economic integration.

In recent years, the Mediterranean partner governments have exerted significant efforts and introduced extensive reforms at a multitude of levels to improve the transport systems in their countries. The safety, security and environmental aspects of transport have been greatly improved. Several initiatives geared at increasing co-operation between the Mediterranean countries on transport issues are already in place at a regional or sub-regional level.

The EU has also increased its co-operation efforts with the Mediterranean countries in the field of transport. Under the Euro-Mediterranean Partnership, significant regional co-operation initiatives have been launched, for example the EuroMed Transport Project.

Despite the increased focus being given to transport issues in the Mediterranean region and the many advances that have taken place in terms of policy, economic, regulatory and infrastructure reforms, there is still a need for further improvement.

Objectives

The general objective of ESTEEM is to enhance and strengthen the links between the Maghreb transport-related research system and three neighbouring EU-Mediterranean

countries (Italy, France and Spain), focusing on the safety and security of transport.

In order to do this, it is deemed necessary to implement a strong coordination action among the relevant actors in the two regions, ensuring that their future research policies on transport are defined, not only at the level of the individual countries but also at the regional level.

Hence the specific objective of the project is to bring together partners to share the identification of common priority research themes, responding to identified needs, which should be investigated in future research actions to be carried out at the regional level. Thus the project will contribute both to the definition of the future research roadmaps for the Seventh Framework Programme (FP7) transport programme and the Mediterranean partner countries' governments, and to the coordination of high quality research and policies on transport in the countries involved in the project in the area of safety. The coordination between the organisations of the Mediterranean zone carrying out the above-mentioned research activities will be consolidated through the creation of an ad hoc network ensuring a long-lasting impact of the action in the region.

Description of Work

The project strategy is organised into four work packages (WP).

In WP1, the project participants identify and define thematic sub-areas to be investigated, which will be the basis for generating the roadmaps for research. The sub-areas of investigation cover themes such as Maritime Safety and Security, Road Safety, Safety of Transport Infrastructure and Information Technology Services.

WP2 entails the analysis of the sub-areas in the domain of transport safety and security in order to identify the specific needs of the region, existing best practices, viable technical solutions and priority research actions to be undertaken by policy-makers and the EU.

WP3 covers the organisation of two workshops about the survey to present and validate the project results. They contribute to the definition of research guidelines for the Mediterranean countries.

WP4 focuses on the creation of a network ensuring a long-lasting impact of the action in the region. The objectives of this network are to bring together, in the long run, a wide range of actors and stakeholders in the two regions so as to facilitate the coordination of the transport-related research policies and the participation of Maghrebian organisations in EU research activities and programmes.

Expected Results

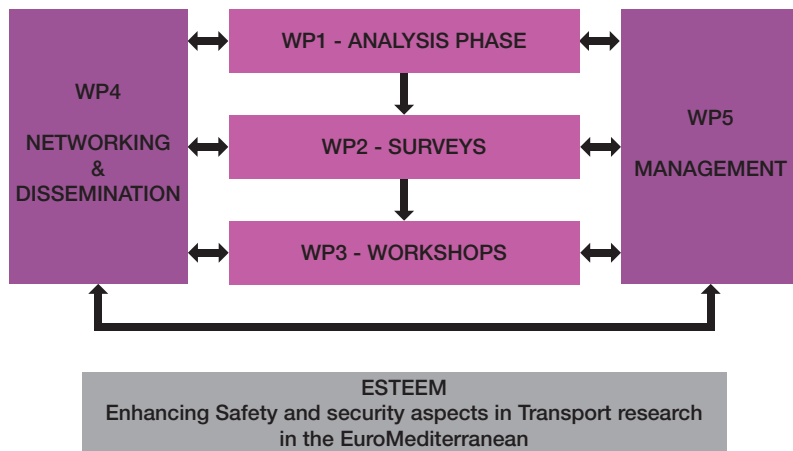
ESTEEM will identify strategic priorities and resources for high quality research on transport safety and security development in the West Mediterranean zone, closely linked to the expected outcomes in this sector.

It is expected that ESTEEM will provide guidance in formulating common policies and in improving performances in the transport sector in order to facilitate sustainable growth at social, environmental and economic levels. The ad hoc network created from ESTEEM's activities will then ensure a long-lasting impact of the achievements.

Specific project activities will be dedicated to the analysis of themes relating to the safety and security of transport that are considered of fundamental importance by the Maghreb's partners. The partners have the opportunity to individualise best practices, methodologies and possible solutions to improve the safety and security of transport.

The workshops will allow the identification of specific topics relating to the themes of FP7 on transport and the definition of possible research guidelines (roadmaps) for the West Mediterranean countries.

A central focus for a strategic surface transport network in the Western Mediterranean will be produced. It is expected that the project will contribute to creating the basis for reaching the impacts listed in the EC work programme by means of future specific actions.



Graphical representation of the project activities

Acronym:	ESTEEM		
Name of proposal:	Enhancing Safety and security aspects in Transport rEsearch in the Euro-Mediterranean region		
Contract number:	218584		
Instrument:	CSA – CA		
Total cost:	727 128 €		
EU contribution:	648 353 €		
Call:	FP7-SST-2007-RTD-1		
Starting date:	01.04.2208		
Ending date:	30.11.2009		
Duration:	20 months		
Website:	http://www.esteemproject.eu		
Coordinator:	Prof. Filippi Francesco Centro di ricerca per il Trasporto e la Logistica - Università degli Studi di Roma 'La Sapienza' via Eudossiana 18 IT 00184 Rome		
E-mail:	francesco.filippi@uniroma1.it		
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EC Officer:	Ludger Rogge		
Partners:	Istituto per il Mediterraneo	IT	
	Trakteplan S.L.	ES	
	Institut national de recherche en informatique et en automatique	FR	
	Université El Hadj Lakhdar Batna	DZ	
	Université Mohammed V-Agdal - Ecole Mohammadia d'Ingenieurs	MA	

EXTREME SEAS

Design for Ship Safety in Extreme Seas

State of the Art - Background

The risk for ships encountering dangerous sea states has been emphasized by news-media within the last few years with increasing frequency. Especially accidents with the subsequent pollution of large coastal areas (Erika, Prestige, MSC Napoli), ship damage (Caledonia Star, Bremen, Schiehallion, Explorer, Voyager, Norwegian Dawn) and human casualties (Norwegian Dawn) have highlighted the fact that improvements are needed to reduce the risk of these types of accidents. The recent hurricanes in the Gulf of Mexico have confirmed that extreme sea states can be dangerous for marine structures. It is likely that the significance of severe sea state conditions for ship traffic will grow in the future because of the expected increase of frequency and severity of extreme weather events associated with global warming.

The existing ship accident databases do not include sufficient information allowing identification of an extreme wave event and estimation of frequencies of casualties associated with loss or damage of life/vessels/cargo. The EXTREME SEA project will overcome these shortcomings by assessing the occurrence of extreme and extraordinarily large (rogue) waves in advanced numerical and physical simulation models as well as by studying ship behaviour in these waves.

EXTREME SEAS will contribute to the following progress beyond the state of the art:

- An improved understanding of extreme and rogue waves.
- New methodology as well as new generation simulation and response based design tools for wave-structure interaction allowing a more accurate determination of the impact of extreme waves on ships.
- Consistent approaches combining new information about extreme and rogue waves from a design perspective.

- Improved warning criteria for extreme sea states and rogue waves.
- Recommendations for revisions of current ship design procedures.

Objectives

The strategic objective of EXTREME SEAS is to enable the European shipping industry to improve the design of ship structures that are exposed to rough climates, by providing technology and methodology which needs to be a part of ship safety designs in extreme seas. The project will relate and adapt to safety regulations including the Classification Societies' Rules.

EXTREME SEAS will study physical and statistical properties of extreme waves, and develop advanced numerical and physical simulation models for wave-structure interaction. A further objective is to develop warning criteria for marine structures against extreme sea states and extraordinarily large waves, and to implement them in a marine weather forecasting system operated by a meteorological office belonging to the Consortium.

The developed methodology and tools will be generally applicable to different ship types. The case studies considered in EXTREME SEAS will be devoted to container vessels, to passenger ships, to LNG carriers and to product and chemical tankers. Weaknesses of the current design procedures for ship structures will be highlighted.

Description of Work

In the EXTREME SEAS project the work is organised in seven main inter-linked work-packages (WPs).

WP1 concentrates on non-linear wave modelling and the improved understanding of mechanisms generating extreme wave events.

WP2 deals with the probabilistic short-term description of waves for ship design. The wave models developed in WP1 will be used to generate wave records.

WP3 is dedicated to long term wave variations and the development of warning criteria for extreme and rogue waves using information from long-term statistics, extreme wave models and forecast uncertainty.

WP4 addresses numerical simulation methodology and tools for ships faced with extreme and extraordinarily large waves.

The sea surface and response of the ship models in extreme waves will be measured in WP5.

In WP6 probabilistic response-based design methodology and tools will be developed.

WP7 is dedicated to applications and the assessment of the impact of the EXTREME SEAS developments on current ship design procedures.

The wave WP1-3 are research activities that will provide the required input for the technology development carried out in the ship analysis WP4-6. Both groups of WPs will cooperate closely throughout the development of the project. Since the major source of uncertainty is knowledge about extreme waves, a significant part of the project will deal with improving this information.

Expected Results

Improved knowledge about severe waves, their impact on marine structures and their implication for marine structure operations and design developed in the EXTREME SEAS project will provide an important contribution to supporting safety at sea.

The major deliverables from the project will be technology and methodology that need to be a part of design for ship safety in extreme seas. The developed methodology and tools will be generally applicable to different ship types, although only four ship types will be studied by the project.

The project results will help Europe to remain in front of the development relating to rules for design and the operation of ships and marine structures. Furthermore, the project will contribute to the standardization of ship design practices all over the world as concerns about the way the extreme and extraordinarily large wave events are being considered is ensuring the safe design of ship structures.

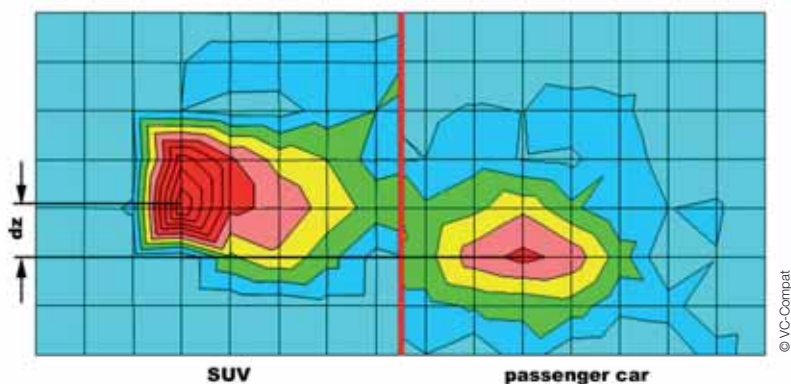
The developed warning criteria will be available for decision support systems for marine structures.

EXTREME SEAS will also account for the expected trends in storm intensities, helping the shipping industry to adapt to climate change.

Acronym:	EXTREME SEAS	
Name of proposal:	Design for Ship Safety in Extreme Seas	
Contract number:	234175	
Instrument:	CP – FP	
Total cost:	4 141 957 €	
EU contribution:	2 787 866 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.09.2009	
Ending date:	31.08.2012	
Duration:	36 months	
Website:	http://www.mar.ist.utl.pt/extremeseas/	
Coordinator:	Dr. Elzbieta Maria Bitner-Gregersen Det Norske Veritas AS Veritasveien 1 NO NO-1322 Høvik	
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EC Officer:	Grzegorz Domanski	
Partners:	Instituto Superior Técnico	PT
	Germanischer Lloyd AG	DE
	Technische Universität Berlin	DE
	Meteorological Institute	NO
	Università degli Studi di Torino	IT
	Institute of Applied Physics of the Russian Academy of Sciences	RU
	Canal de Experiencias Hidrodinámicas de El Pardo	ES
	MEYER WERFT GmbH	DE
	Estaleiros Navais de Viana Do Castelo	PT
	University Duisburg-Essen	DE

FIMCAR

Frontal Impact and Compatibility Assessment Research



Load path of different vehicles

State of the Art - Background

For the real life assessment of vehicle safety in frontal collisions, the compatibility (described by the self protection level and the structural interaction) between the opponents is crucial.

Based on previous research work towards compatibility, the main issues for improving compatibility are:

- Compartment strength and stability
- Global force level matching
- Structural interaction

Although several test approaches have been proposed, no final decision has been taken for an appropriate assessment of compatibility in Europe, Asia or North America.

Within the EC-funded VC-COMPAT project, two different tests have been developed to test a vehicle's compatibility performance. These are the PDB approaches using an off-set test against a deformable barrier and a full overlap test against the rigid wall and the FWDB approach with a full width test against a deformable barrier and an off-set test according to ECE R94. Both procedures are utilising an off-set test and a full overlap test.

An additional test candidate has been developed that promises to be a long term alternative for testing compatibility. Research towards the assessment of compatibility by a moveable deformable barrier test has been initiated and mainly supported by the Alliance of Automobile Manufacturers.

Objectives

The FIMCAR project aims at proposing an assessment approach for car-to-car frontal compatibility which could be accepted by European research organisations and industry, also taking the harmonisation with world-wide activities into account. This proposal will be a solid base for future regulation and would overcome the existing uncertainty that the European automotive industry has concerning vehicle-to-vehicle compatibility. This research project and resulting assessment approach would thus lead to a reduction of road accident casualties and would strengthen the position of the European car manufacturers as vehicle-to-vehicle compatibility is a world-wide concern.

The goals of this project are listed below:

- to harmonise guidelines and regulations within Europe as well as globally with the USA, Japan and other countries
- to assess different measures to achieve increased compatibility including numerical simulation and vehicle-to-vehicle and vehicle-to-barrier testing
- to develop assessment approaches for vehicle-to-vehicle taking into account overall safety in accident environment
- to identify critical injury mechanisms in frontal impacts
- to propose an assessment approach for car-to-car compatibility aiming at regulation processes
- to develop numerical models suitable for the assessment of compatibility
- to conduct a cost-benefit analysis for compatible cars.

Description of Work

In the past, the different test approaches (e.g. PDB or FWDB) were developed and presented within the same (work) package. Acceptance of the entire test approach by outside parties was difficult if one component (test procedure) was not acceptable to them. Within FIMCAR the different assessment procedures are further developed and assessed independently from the other test procedures. Therefore it is possible to select the best combination of the different procedures to define the assessment approach.

The aim of Work Package 1 (WP1) is to analyse up-to-date accident data. This data will be used for the selection of cars to be further analysed by testing and simulation as well as for the assessment of the cost benefit ratio.

WP2 aims to develop an off-set assessment procedure.

WP3 aims to develop a full overlap assessment procedure.

WP4 aims to develop a moving deformable barrier assessment procedure.

WP5 supports the other WPs by an extensive numerical simulation programme.

WP6 consists of all project results with the objective to define an appropriate assessment approach for vehicle-to-vehicle frontal compatibility.

WP7 is the management WP.

WP8 aims at the dissemination of the project results.



Car-to-SUV test

© Bundesanstalt für Straßenwesen

Expected Results

In the process of resolving compatibility test procedures, fundamental technologies and knowledge will be developed that have a life-time extending beyond the proposed project. These innovations include:

1. Accident analysis and cost benefit tools that will facilitate the introduction of new safety technologies.
2. Computer simulation tools for homologation: One activity within the project is anticipated to provide tools that can assess vehicle crash performance for several impact configurations.
3. Test methods to objectively assess vehicle compatibility: The main output of the project is also an exclusive aspect of current vehicle safety research. A methodology to assess complex phenomena like structural interaction can have applications in other areas of vehicle safety. In addition, a moving deformable barrier test and assessment method will be developed.
4. Test database: Although data collection and signal processing is a well-established discipline, the harmonised storage and analysis of crash data is not easily accomplished due to different practices at each test facility.
5. Crashworthiness design principles: Through the detailed investigation of compatible crash performance, a knowledgebase on vehicle designs will develop through the project, leading to more efficient structure designs.

Acronym: FIMCAR
Name of proposal: Frontal Impact and Compatibility Assessment Research
Contract number: 234216
Instrument: CP – FP
Total cost: 6 026 777 €
EU contribution: 3 804 598 €
Call: FP7-SST-2008-RTD-1
Starting date: 01.10.2009
Ending date: 30.09.2012
Duration: 36 months
Website: <http://www.fimcar.eu>
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	Daimler AG	DE
	FIAT Group Automobiles Spa	IT
	First Technology Safety Solutions Europe BV	NL
	IAT Ingenieurgesellschaft für Automobiltechnik mbH	DE
	IDIADA Automotive Technology SA	ES
	Adam Opel GmbH	DE
	Peugeot Citroën Automobiles SA	FR
	RENAULT s.a.s represented by GIE REGIENOV	FR
	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek	NL
	TRL Limited	UK
	Union Technique de l'Automobile, du Motorcycle et du Cycle	FR
	Volvo Car Corporation	SE
	Volkswagen AG	DE
	TÜV Rheinland TNO Automotive International BV	NL

FIREPROOF

Probabilistic Framework for Onboard Fire-Safety



State of the Art - Background

About 50 years ago, the design of the ocean liner *United States* by William Francis Gibbs demonstrated that certain design choices can facilitate and promote a fire-free design product. It is said that Gibbs was obsessed with a completely fireproof ship and, as a result, eventually only the piano and the butcher's block were made of wood. Although Gibbs focused extensively on the selection of materials, his revolutionary attitude towards conventional standards and regulations offers a valuable lesson. With today's technology, non-flammable materials can be extensively used, indicating that a truly fireproof ship is perfectly achievable as long as the appropriate regulatory framework can facilitate (and reward) imagination and design creativity.

The traditional fire-safety regulations that apply to ship design have been described as inadequate in two ways:

- they can impose constraints on novel designs;
- novel designs can have features that do not satisfy the premise of existing rules, thus making approval more difficult and potentially leading to unsafe ships.

Not surprisingly, fire remains the most frequent accident onboard ships (albeit not catastrophic), despite the progress in technology of materials, detection/suppression equipment, training and procedures, etc.

Objectives

FIREPROOF will develop a universally applicable regulatory framework for maritime fire safety based on probabilistic analysis and numerical models of ignition, growth and impact of fires. In principle, the framework will be similar to the well established probabilistic damage stability regulation.

The objectives of FIREPROOF can be summarised as follows:

- enhance the fire-safety regulations by developing a probabilistic framework for fire safety;
- present the framework to the International Maritime Organisation (IMO) and the Maritime Safety Committee for future enforcement.

The methodology of the proposed fire-safety regulation will consist of:

- a mathematical model for the generation of fire scenarios (with the appropriate probability distribution function for each involved parameter);
- numerical models for the consequence assessment of the generated scenarios.

For any given passenger ship (existing or new) a large number of scenarios will be generated and their consequences will be assessed. The results will be aggregated to suitable fire risk metrics, constraints which will serve as statutory regulations. In this way, design creativity and innovation will coexist with a higher level of safety.

The project will address fire risk on passenger ships only.

Description of Work

The project is in four work packages (WP).

The aim of WP1 is to develop a method for generating fire scenarios according to their probability of occurrence. As with probabilistic damage stability, a handful of scenarios will be identified and a large number of cases will be generated according to existing accident records and past experience. In addition to the frequency of ignition, factors like the probability of successful fire detection, fire containment, fire escalation, etc., will also be incorporated into these models.

The consequences of fire scenarios and their respective cases will be assessed with models that will be developed in WP2. This will be achieved by:

- the formulation of an integrated fire model;
- the development of a societal consequence model.

Risk quantification will be based on risk metrics.

The fire risk models developed in WP1 and WP2 will be integrated in dedicated software for benchmarking on a number of existing Ro-Ro and cruise ships in WP3. The partners will produce a reference implementation of the FIREPROOF framework using their existing tools with some additional software development.

WP4 will establish a set of regulatory criteria for fire safety based on the models specified by WP1 and WP2. This work package will elaborate on the preparation of a paper and its presentation to the IMO for future consideration in the fire-safety regulations.

Expected Results

FIREPROOF will contribute to the enhancement of fire-safety regulations in terms of improving the safety and freedom of choice it offers to the designers.

The project will conclude with a methodology that can positively quantify the fire risks of a passenger ship. Such an approach is expected to change the momentum in fire-safety provisions – especially for safety-critical ships like passenger and cruise ships.

Acronym:	FIREPROOF	
Name of proposal:	Probabilistic Framework for Onboard Fire-Safety	
Contract number:	218761	
Instrument:	CP – FP	
Total cost:	4 195 894 €	
EU contribution:	2 900 000 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	15.05.2009	
Ending date:	14.05.2012	
Duration:	36 months	
Website:	http://www.fireproof-project.info	
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	University College London	UK
	Bureau Veritas Registre international de classification de navires et d'aéronefs SA	FR
	Indian Register of Shipping	IN
	Color Line AS	NO
	Carnival plc	UK
	Instituto de Soldadura e Qualidade	PT
	ABS Corporate	US
	Maritime and Coastguard Agency	UK

FLOODSTAND

Integrated flooding control and standard for stability and crises management



Cruise passenger ships and a Ro-Ro passenger vessel

© Peikka Ruppunen

State of the Art - Background

There is always some risk involved if a passenger ship needs to be evacuated. About 95% of the risk of ship loss is due to flooding. Bottom-up and top-down approaches in safety assessments against cases where the watertight integrity of the ship is lost need to be updated. New, efficient methods to keep the situation under control are required in design and operation, the first and final frontiers to mitigate flooding in a crisis situation.

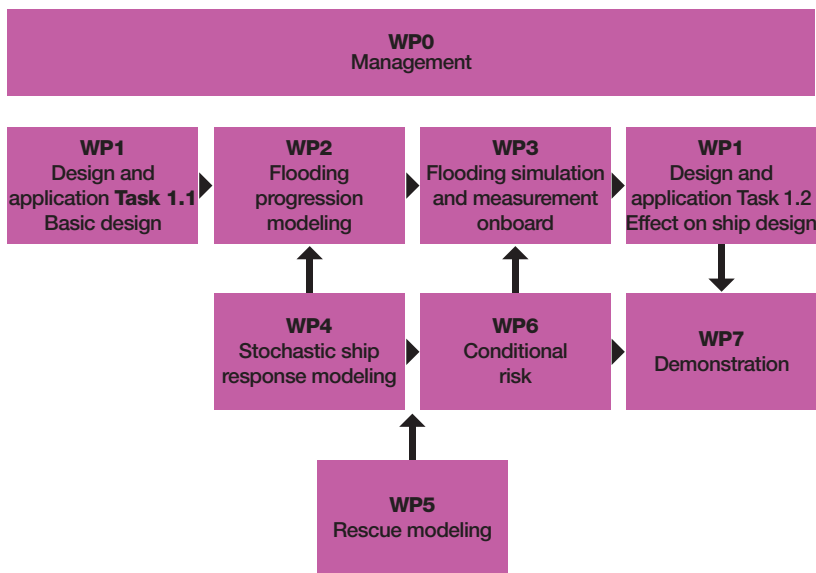
New tools are required to increase designers' and operators' options to assess a ship's capability to survive. Assessment of the time available in the case of progressive flooding is complicated, e.g. due to the layout and lack of data. Research is needed, and methods and guidelines to tackle the problems must be developed.

This project will derive most of the missing data for the validation of time-domain numerical tools for assessment of ship survivability and develop a standard for a comprehensive measure of damaged ship stability, addressing the flooding risk, without forgetting the stochastic effects in waves. The envisaged standard will be based on first-principles modelling and thus reflect the nature of foundering as a process comprising loss of flotation/stability, but also risk-based ultimate decision-making. It is expected that this approach will raise the safety level substantially from that enforced by current legislation.

Objectives

The objectives of FLOODSTAND are:

- to increase the reliability of flooding simulation tools in design and onboard use by:
- establishing guidelines for modelling leaking through closed doors and the critical pressure head for collapsing under the pressure of floodwater;
- simplified modelling of pressure losses in flows through typical openings;
- feasible and realistic modelling of compartments with a complex layout, such as cabin areas, for flooding simulation tools;
- use of flooding monitoring systems and time-domain simulation for assessing the damage and flooding extent onboard the damaged ship;
- and, secondly, to establish a method for instantaneous classification of the severity of ship flooding casualty, with the following key objectives:
- stochastic ship-response modelling: establish requirements and uncertainty bounds for methods for prediction of the time it takes a ship to capsize or sink after damage;
- rescue-process modelling: establish requirements and uncertainty bounds for models of mustering, abandonment and rescue operations;
- standard for decision-making in crises: establish a loss function and criteria for the integrated standard;
- develop an implementation system and test effectiveness of the standard in rat-



Work packages of FLOODSTAND

ing different decisions for various casualty cases, and test the approach in a design environment.

Description of Work

The work is carried out in seven work packages (WP).

WP1 produces two cruise ship designs, assesses the effects of new results on design and supports dissemination.

WP2 includes the experimental and numerical testing of typical structures by obtaining:

- extended knowledge on leaking/collapsing structures;
- easy-to-use criteria for the partitions in flooding simulation;
- data on water-flow characteristics through various openings;
- further insight in flooding of typical cabin arrangements;
- assessment of the sensitivity of flooding simulation tools to variations in the input data.

WP3 develops a flood sensor data interpreter and uncertainty assessment. Guidelines on

principles for the design of flooding monitoring systems compatible with numerical simulation tools will be developed.

WP4 develops requirements and uncertainty bounds on methods for predicting the time to capsize/sink after damage.

WP5 establishes requirements and uncertainty bounds for models of mustering, abandonment and rescue operations.

WP6 develops loss and likelihood functions for the integrated standard. The likelihood function will reflect the evaluation methods for the stability, evacuation and rescue process, including associated uncertainty.

WP7 tests the effectiveness of the standard in rating different decisions for various casualty cases for a series of hypothetical and real-life scenarios.

Expected Results

The major deliverables of the project include:

- new information and data on leaking and/or collapsing structures, on discharge coefficients of some typical openings and their combinations, and on flooding cabin areas in ships;
- modelling guidelines for improving the reliability of flooding simulation tools;
- the use of flooding simulation onboard a damaged ship;
- an analysis of the effects of the new data and information on ship design;
- the introduction of a simple, comprehensive and rational decision-making merit function;

- the introduction of the concept of uncertainty in a standard;
- a scheme for flexible integration of a set of first-principle tools for representing highly complex scenarios and decision-making problems;
- the introduction of a new holistic approach to quantifying stability.

Thus, the EU-project FLOODSTAND will develop new data and information, methods and tools, as well as guidelines, for deterministic (bottom-up) and probabilistic (top-down) approaches for improving the safety of passenger vessels.

Acronym:	FLOODSTAND	
Name of proposal:	Integrated flooding control and standard for stability and crises management	
Contract number:	218532	
Instrument:	CP – FP	
Total cost:	4 324 617 €	
EU contribution:	2 999 840 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.03.2009	
Ending date:	29.02.2012	
Duration:	36 months	
Website:	http://floodstand.tkk.fi/	
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	Det Norske Veritas AS	NO
	BMT Group Ltd	UK
	Stichting Maritiem Research Instituut Nederland	NL
	MEC Insenerilahendused	EE
	Meyer Werft GmbH	DE
	Napa Ltd	FI
	SSPA Sweden AB	SE
	SF-Control Oy	FI
	National Technical University of Athens	GR
	University of Strathclyde	UK
	Safety At Sea Ltd	UK
	Maritime and Coastguard Agency	UK
	Bureau Veritas Registre international de classification de navires et d'aéronefs SA	FR

GOALDS

GOAL Based Damage Stability

State of the Art - Background

The safety of ships from sinking/capsizing because of a loss of watertight integrity is of prime interest to society, as well as the international and national maritime regulatory bodies, the maritime industry and the scientific community. In the last decade, significant research has been carried out in the numerical prediction of the motions of damaged ships in waves area and in the assessment of a ship's damage stability by deterministic and probabilistic methods. The international scientific community kept developing and further improving numerical methods to closely match the findings of systematic physical model experiments. In parallel to this, significant progress was achieved in the international regulatory framework regarding the assessment of ship safety in damage conditions. Marine safety regulations have been developed in a mainly reactive way until now, with accident experience providing the feedback to improved regulations. This approach might have been satisfactory for some time, for large fleets of similar ships of a certain design, for which past experience has led to generally satisfactory standards of safety. However, it is less effective for unique and innovative designs, like the mega-ships of the cruise liner industry. In response to these needs, the International Maritime Organization (IMO) and the shipping industry have introduced improved methods to evaluate ship safety. Recently adopted harmonised regulations for the damage stability of dry cargo and passenger ships on the basis of the probabilistic concept can be considered as a significant step forward in the assessment of a ship's damage stability. However, the intention to provide a qualitative assessment of safety (a safety index) might have been enough at the time that the probabilistic framework for damage stability was conceived, but this is not the case anymore. With the advent of Design for Safety and of Risk-Based Design developed and promoted by the IP project SAFEDOR, the quantifica-

tion of safety, consistently and accurately, is today feasible and will be elaborated on in the GOALDS project.

Objectives

GOALDS key objectives are to:

- Develop an enhanced formulation for the survival factor "s" accounting for key design parameters of passenger ships, including the accumulation of water on the deck of ROPAX and for the time evolution of flooding scenarios.
- Develop a new survivability formulation for flooding following grounding accidents.
- Integrate collision and grounding survivability formulations into a single framework.
- Validate the new formulations by experimental and numerical analyses.
- Develop a new damage survivability requirement in a risk-based context.
- Evaluate the practicality of the new formulations by a series of ship concept design studies.
- Submit results for consideration by IMO upon completion.

Description of Work

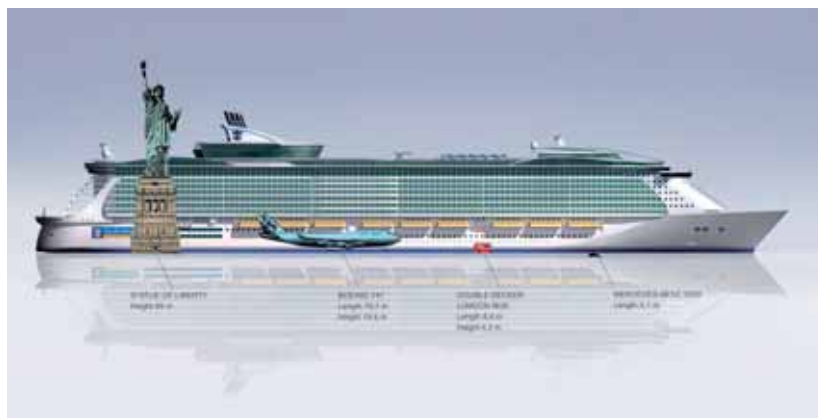
The GOALDS research project addresses the set objectives by:

- Improving and extending the formulation for the assessment of the probability of survival of ROPAX and mega cruise ships in a damaged condition, based on the extensive use of numerical simulations.
- Performing comprehensive model testing to validate theoretical models.
- Elaborating on damage statistics and probability functions for the damage location, length, breadth and penetration in case of a collision/grounding accident, based on a thorough review of available information regarding these accidents over the past 30-60 years worldwide.
- Formulating a new probabilistic damage stability concept for ROPAX and cruise ships, incorporating collision and grounding

- damages, along with an improved method for the calculation of the survival probability.
- Establishing new risk-based damage stability requirements of ROPAX and cruise vessels based on a cost/benefit analysis to establish the highest level for the required subdivision index.
- Investigating the impact of the new formulation for the probabilistic damage stability evaluation of passenger ships on the design and operational characteristics of a typical set of ROPAX and cruise vessel designs (case studies).
- Preparing and submitting a summary of results and recommendations to IMO for consideration (end of project, year 2012).

Expected Results

- A new formulation introduced for the assessment of the probability of survival of ROPAX and mega cruise ships in a damaged condition, based on the extensive use of numerical simulations.
- Comprehensive model testing to investigate the process of ship stability deterioration in damaged conditions and to provide the required basis for the validation of the numerical simulation results.
- The elaboration of damage statistics and probability functions for the damage location, length, breadth and penetration in case of a collision/grounding accident, based on a thorough review of available information regarding these accidents over the past 30-60 years worldwide.
- Formulation of a new probabilistic damage stability concept for ROPAX and cruise ships, incorporating collision and grounding damages, along with an improved method for calculation of the survival probability.
- Establishing new risk-based damage stability requirements of ROPAX and cruise vessels based on a cost/benefit analysis to establish the highest level for the required subdivision index.
- Investigation of the impact of the new formulation for the design and operational characteristics of a typical set of ROPAX and cruise vessel designs (case studies).
- Preparation and submission of a summary of results and recommendations to the IMO for consideration (end of project, year 2012).



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OASIS OF THE SEAS - WORLD'S LARGEST CRUISE SHIP BY STX FINLAND

Acronym:	GOALDS	
Name of proposal:	GOAL Based Damage Stability	
Contract number:	233876	
Instrument:	CP – FP	
Total cost:	4 406 909 €	
EU contribution:	2 951 883 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.09.2009	
Ending date:	30.08.2012	
Duration:	36 months	
Coordinator:	Prof. Apostolos Papanikolaou National Technical University of Athens-Ship Design Laboratory 9, Heroon Polytechniou GR -15773 Athens-Zografou	
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	Lloyd's Register	UK
	Hamburgische Schiffbau-Versuchsanstalt GmbH	DE
	Vienna Model Basin Ltd	AT
	Danish Maritime Authority	DK
	Maritime and Coastguard Agency	UK
	Dipartimento di Ingegneria Navale, del Mare e per l'Ambiente (DINMA) - Università degli Studi di Trieste	IT
	STX France Cruise SA	FR
	FINCANTIERI Cantieri Navali Italiani S.p.A.	IT
	MEYER WERFT GmbH	DE
	Color Line Marine A/S	NO
	Carnival PLC	UK
	RCL (UK) Ltd.	UK
	STX Finland Cruise SA	FI

HORIZON

Research into Effects on Cognitive Performance of Maritime Watchkeepers under Different Watch Patterns, Workloads & Conditions, with Reality Usage of Ships Bridge, Engine & Cargo Control Simulators



State of the Art - Background

Fatigue at sea and related issues such as stress and overload are highly important at present. Ships' crews are under pressure from schedules and economy, and have to handle their tasks with fewer crew members. Several incidents and accidents are attributable to fatigue, and the real number may be even larger, as a study performed by the Swedish Maritime Administration in 2006 indicates which supports the MAIB report, referred to above.

HORIZON will address the maritime setting which is far less well-researched than that for land transport. In a driving context, sleepiness and mental fatigue are the most relevant fatigue components. Sleepy driving accidents have been estimated to be involved in at least 15-20% of the accidents. Norwegian data of in-depth accident investigations showed that sleepiness was involved in 29% of the crashes, which was more than alcohol related accidents (11%). Sleepiness (particularly sub-

jective ratings) is to a large extent context-dependent. As a consequence, one may perceive oneself as being fairly alert because of masking. But when masking is removed, a dramatic and surprising increase in sleepiness will be experienced. Taking context related factors into account, driver sleepiness can be seen as the lack of ability to maintain a wakeful state of attention without the aid of the situational factors.

Results from two recent studies show that many factors in combination must be considered to understand fatigue at sea, such as poor quality sleep, environmental factors, high job demands and high stress (Smith et al., 2006), and that working more than 2x6 hours per 24 hours should be avoided since this leads to very high levels of sleepiness. There should always be two persons on the bridge during watch-keeping. Together, these conclusions indicate that there are serious difficulties with the continued use of the two-watch system on ships with only two nautical officers.

Objectives

The project will define and undertake scientific methods for the measurement of fatigue in various realistic seagoing scenarios using bridge, engine-room and liquid cargo handling simulators. The project will assess the impact of fatigue on decision-making performance and will determine optimal settings for minimising those risks to both ship and seafarer. Project Objectives are -

- To provide a realistic, high fidelity, voyage scenario in which watch-keeper cognitive performance can be measured.
- To provide various watch-keeping patterns which will lead to fatigue in the watch-keeping officers.
- To capture empirical data on the cognitive performance of the watch-keepers undertaking these watch-keeping patterns.
- To analyse this empirical data to determine the effect of fatigue on the cognitive performance of the watch-keepers.
- To develop a fatigue management toolkit for use by ship managers, maritime regulators, flag states, port states and the International Maritime Organisation.
- To derive a set of recommendations that maritime regulators and ship managers can use to improve the safety and reliability of vessels.

Description of Work

The project begins with a research, design development study, which will utilise literature on fatigue obtained from maritime and other relevant sources, a range of fatigue measurement tools and procedures will be examined

and selections made. Experimental scenarios will then be designed that will allow for the observation of certificated watch-keepers, undertaking watch-keeping routines, under realistic conditions in bridge, engine room and liquid cargo handling simulators. Data collected from these experiments will be analysed to determine the effects of fatigue on the cognitive performance of maritime watch-keepers under different watch patterns. The results of this data analysis will lead to the development of a fatigue management toolkit for use by interested parties such as ship managers, maritime regulators, flag states, port states and the International Maritime Organisation. Dissemination of the results of this research project will be enhanced by inclusion as partners of a major European Classification Society and the European Transport workers Federation.

The strategy is to replicate realistic seagoing conditions, with sufficient experiments and candidates to ensure statistical validity of the results. The science involved will be to take various means of measuring fatigue and the performance degradation it causes, and relate them to the operating circumstances



Ship's Bridge Simulator

© Warsaw Maritime Academy

of the candidates. Using mathematical and regression modelling techniques, the results will be analysed and causal factors revealed. This will enable the development of some fatigue prediction software, developing further, models previously produced for other sectors and different operating regimes.

Expected Results

The evaluation of results will take the form of regression analysis, based on the range of variables under study. It is expected that these will reveal useful data linking measurable fatigue to definable causes. Similarly, the extent of that measurable fatigue will also be correlated to levels of performance degradation. Applied to all of this will be the overlay of significance of operation, enabling an assessment to be made of the seriousness of impact of lost performance and whether it can be tolerated or mitigated. All these results will be gathered for exploitation within the management toolkit to be developed using a form of software used in other fatigue circumstances and which needs adapting and further developing for marine applications.

Acronym:	HORIZON
Name of proposal:	Research into Effects on Cognitive Performance of Maritime Watch-keepers under Different Watch Patterns, Workloads & Conditions, with Reality Usage of Ships Bridge, Engine & Cargo Control Simulators
Contract number:	234000
Instrument:	CP – FP
Total cost:	3 820 627 €
EU contribution:	2 841 469 €
Call:	FP7-SST-2007-RTD-1
Starting date:	01.06.2009
Ending date:	30.11.2011
Duration:	30 months
Website:	http://project-horizon.eu
Coordinator:	Mr. Graham Clarke Southampton Solent University - Warsash Maritime Academy East Park Terrace UK SO14 0YN Southampton
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	Stockholm University SE
	Charles Taylor & Co Limitd UK
	European Community Shipowners Associations BE
	International Harbour Masters' Association NL
	International Association of Independent Tanker Owners - INTERTANKO UK
	Marine Accident Investigation Branch UK
	Maritime & Coastguard Agency UK

IMVITER

Implementation of Virtual Testing in Safety Regulations

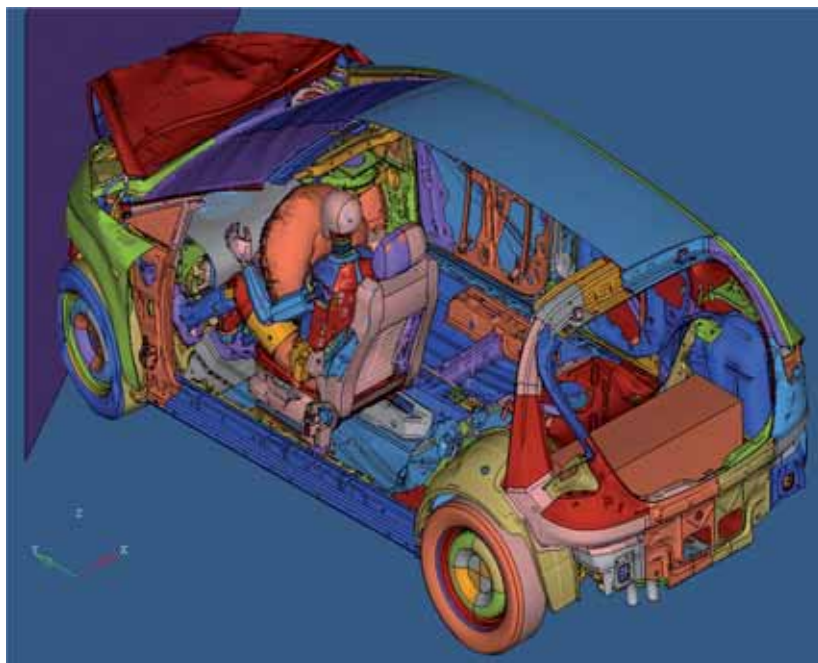
State of the Art - Background

Computer-aided engineering is a routinely used technology for the design and testing of road vehicles, including the simulation of their response to an impact and the prediction of the risk of injuries sustained by potential victims. Nevertheless, so far, the release of a vehicle on the market has still been dependent on the verification of the product compliance with safety standards through a series of type approval physical tests.

To increase car industry competitiveness by reducing the burden of this type of approval test system, and to improve road safety by raising the quality level of protection meas-

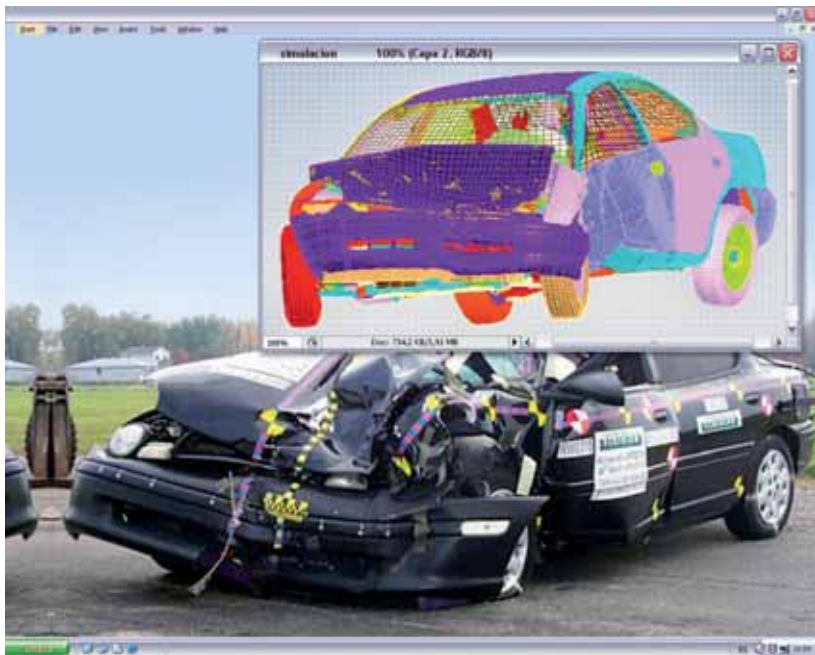
ures, recent initiatives have been taken by both industry and public authorities to promote the use of alternative ways (e.g. virtual tests through numerical simulation) to check vehicle compliance with safety standards. However the lack of standardization of virtual models and procedures is a major barrier to being able to compare and evaluate them independently of the code, platform or performing organization and possible product variability.

Thanks to the implementation of virtual testing in regulations and safety directives, full information about the behaviour of the tested component will be obtained, not only if the component complies with the criteria but also



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Frontal full vehicle impact simulation (30-degree rigid front barrier)



IMVITER Project

© CIDAUT Foundation

to what extent this component has reached its load limit. Then, regulatory bodies will be able to evaluate the behaviour of this component based on better regulation principles and minimize the costs due to the avoidance of performing so many hardware tests that used to be expensive.

Objectives

The main objective of the IMVITER project is the implementation of virtual (VT) procedures in existing safety standards by consolidating advanced VT technologies, analyzing the ensuing costs and benefits and looking for improvements in homologation procedures as well as setting the basis for the improvement of integrative safety.

This project is part of a long term process which should lead step by step to a complete electronic certification, including full scale vehicles as well as human models instead of crash dummies.

The achievement of this objective implies that the accuracy of the virtual models and procedures can be assured and rated independently of the code, platform and the performing organization. Therefore, one of the obstacles of the use of virtual testing in regulations can be solved: the lack of confidence in the simulation technologies from regulatory bodies and users.

Description of Work

The activities of this project can be divided into two main blocks: the implementation of virtual testing in current regulations and research and development of more accurate virtual testing tools and new advanced safety systems.

The project starts with an analysis of regulatory tests that are simulated today thanks to numerical models, and an evaluation of the quality of these simulations according to industrial standards in order to identify the most suitable physical tests and regulations to be replaced by virtual tests.

The second Work Package (WP) of the project is divided into two parts. The first one is focused on the definition of evaluation criteria of virtual testing (methods, models and tools) for homologation. The second part of this WP aims to improve predictability of numerical models according to the evaluation criteria requirements.

The procedure to implement VT in the selected regulations will be defined in WP3. These procedures should not be limited to the integration of the development procedure utilising numerical simulation, which is currently used by the industry in a VT homologation procedure.

In the WP4, the full process development of VT for homologation, with respect to existing regulations (selected in WP1), will be applied in order to investigate the feasibility of the procedure.

An important issue is to establish how VT can result in cost reduction and an increase in competitiveness for the car industry and result in benefits for the whole of society without increasing regulatory tests. All possible approaches will be investigated in WP5.

The WP6 includes the main activities aimed to research and develop more accurate and reliable virtual testing tools, including new advanced safety systems. Requirements and obstacles to the implementation of these kinds of VT procedures in current regulations and proposals will be analysed.

Then, WP7 has been specifically defined in order to assure the correct dissemination of the project outcomes among all stakeholders.

Expected Results

The development of more comprehensive test methodologies by introducing virtual testing in homologation/regulation is widely acknowledged as a driver for innovation and improvement in passive and active safety, in cars and other modes of transport.

The implementation of virtual testing in the industry and mainly in regulatory and customer test procedures will lead to:

- An enhancement of the competitiveness of the European industry by allowing car manufacturers and suppliers to create new vehicles in less time and at less cost but with a higher added value and better quality.
- An improvement of the protection capabilities and a reduction of the number of fatalities in our roads by extending the range of protection beyond the current regulations, covering a wider range of cases.

The IMVITER results will raise the quality of computer simulation tools by improving the accuracy and reproducibility (predictability) of the Computer Simulation Results related to the Experimental results.

Acronym:	IMVITER	
Name of proposal:	Implementation of Virtual Testing in Safety Regulations	
Contract number:	218688	
Instrument:	CP – FP	
Total cost:	4 767 318 €	
EU contribution:	3 199 630 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.04.2009	
Ending date:	31.03.2012	
Duration:	36 months	
Website:	http://www.imviter.com	
Coordinator:	Dr. María Teresa Fernández Fundación Cidaut Parque Tecnológico de Boecillo, Parcela ES 47151 Valladolid	
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	University of Patras	GR
	AUDI Aktiengesellschaft	DE
	RENAULT s.a.s. represented by GIE REGIENOV	FR
	Daimler AG	DE
	Adam Opel GmbH	DE
	Instituto Nacional de Técnica Aeroespacial	ES
	JÁFI-AUTÓKUT Engineering Ltd.	HU
	Bundesanstalt für Straßenwesen	DE
	ESI GROUP S.A.	FR
	DYNAMore Gesellschaft fuer FEM Ingenieurleistungen mbH Karlsruhe	DE
	Altair Development France	FR
	Autotech Engineering A.I.E	ES

INESS

INtegrated European Signalling System



State of the Art - Background

The European Union has been promoting the reformation of the Rail Traffic Management System since 1990 under the ERTMS programme, which is driven by the need for interoperability, opening procurement markets, increasing efficiency and harmonising safety in the European railway system. Huge and successful efforts have been made so far in the field of train control: European Train Control System (ETCS) and train communication: Global System for Mobile Communications - Railway (GSM-R). However, this does not cover the whole signalling system and its main component, the interlocking.

Interlockings, including line block systems, are the traditional instrument in the signalling sub-system for interconnecting information about the status of elements and commands towards various control devices. Over the decades these have evolved from manual towards automated functioning, from mechanical, electro-mechanical, relay-based to electronic computer-based technology. Extremely high safety and reliability have always been key requirements. In many European railway networks, there is a huge potential need for renewing signalling installations, including their interlockings. However, economic analyses of several railways show that a renewal at current cost levels for planning, procurement and implementation is now not feasible.

Objectives

The implementation of ETCS in conventional European rail networks could be hampered where interlockings need to be replaced if this cannot be carried out in an economically and technically efficient manner. As a result, railways are aiming for significantly reduced life-cycle costs of future interlockings and associated outdoor equipment. All possibilities for cost-reduction in the various implementation phases ranging from planning and site-specific engineering, procurement, commissioning (including safety approval) to maintenance (including adaptations to changes of the operational requirements) need to be explored. Standardisation, increased competitive tendering and significant reduction of implementation time are considered to be key requirements for the future. Consequently, railways are aware of the need for well defined strategies to achieve a migration from the present configuration towards a new harmonised interlocking system with efficient integration with the adjacent systems for Centralised Traffic Control, ERTMS and other relevant systems. All jointly developed specifications are to be placed in the public domain in the agreed version.

INESS will then define and develop specifications for a new generation of interlocking systems with interfaces towards adjacent sub-systems such as remote control, neighbour interlocking, outdoor equipment and, in particular, ETCS.

Description of Work

There are six major work streams.

Business model: the entire value chain in the signalling field will be re-engineered in order to gain cost reductions through highly efficient processes and scale effects due to rationalisation and standardisation.

System design: to harmonise data file formats, design tools, data transfer for production and data flows linked with system architecture, and to maximise the knowledge base of owned assets within the railway infrastructure.

Generic requirements: to produce the requirements database in a harmonised format and structure for the interlockings of each of the participating railways; to extract a common core of validated future functionalities and develop common methods and tooling for verification and validation.

Functional architecture and interfaces: to assess the current architecture of signalling installations with regards to their functional configuration and to propose an optimal one for ETCS compliant interlockings.

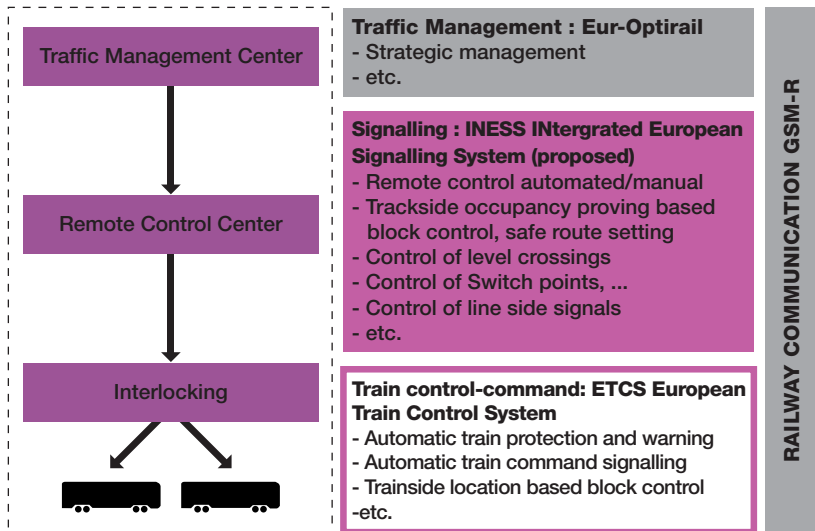
Testing and commissioning: to develop an optimised testing and commissioning process with methods and tools to facilitate the efficient integration of ERTMS applications into the various Member States.

Safety case process: to identify an efficient way to interpret the safety case process according to CENELEC and develop improvement strategies consistent with the National Safety Authorities.

Expected Results

The major project deliverables are:

- a technical roadmap towards interoperable, standardised interlocking platforms;
- harmonised data file formats, design tools, data transfer for production, data flows linked with system architectures and a maximised knowledge base of owned assets within the railway infrastructure;
- a common core of validated standardised functionalities for future interlockings, including the functionalities especially required by ERTMS levels 2 and 3;
- a common method and tooling for verification and validation of the functional requirements;
- standardised functional architecture, particularly for the interfacing with ETCS. The functional structure of ETCS shall essentially remain as currently specified with three application levels;
- test tools and techniques verified for safety to enable the testing and commissioning of signalling applications, including INESS-compliant products. Development of an optimised harmonised testing and commissioning process;
- reduced time and cost for the safety case.



INESS in the ERTMS context

Acronym:	INESS	
Name of proposal:	INtegrated European Signalling System	
Contract number:	218575	
Instrument:	CP – FP	
Total cost:	16 598 366 €	
EU contribution:	10 245 769 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.10.2008	
Ending date:	30.09.2011	
Duration:	36 months	
Website:	http://www.iness.eu	
Coordinator:	Mr. George Barbu Union internationale des chemins de fer Rue Jean Rey 16 FR 75015 Paris	
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Partners:	Administrador de Infraestructuras Ferroviarias	ES
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	ALSTOM Belgium SA	BE
	Ansaldo STS S.p.A.	IT
	AZD Praha sro	CZ
	Banverket - Swedish National Rail Administration	SE
	Baudis Bergmann Rosch Verkehrstechnik GmbH	DE
	Bombardier Transportation UK Ltd	UK
	DB Netz AG	DE
	Technische Universiteit Eindhoven	NL
	Nucleo de Comunicaciones y Control S.L.	ES
	Funkwerk Information Technologies GmbH	DE
	Westinghouse Brake and Signal Holdings Ltd	UK
	MER MEC S.p.A.	IT
	Network Rail Infrastructure Ltd	UK
	ProRail B.V.	NL
	Railsafe Consulting Ltd	UK
	Rete Ferroviaria Italiana S.p.A	IT
	Forschungsinstitut für Rationalisierung e.V.	DE
	Scheidt & Bachmann GmbH	DE
	Siemens AG	DE

University of Southampton	UK
Ingeniería y Economía del Transporte S.A.	ES
Thales Rail Signalling Solutions GmbH	DE
Technische Universität Braunschweig	DE
Universidad Politécnica de Madrid	ES
University of York	UK
Union des industries ferroviaires européennes	BE
Deutsches Zentrum für Luft- und Raumfahrt e.V.	DE

INTERACTION

Differences and similarities in driver INTERACTION with in-vehicle technologies

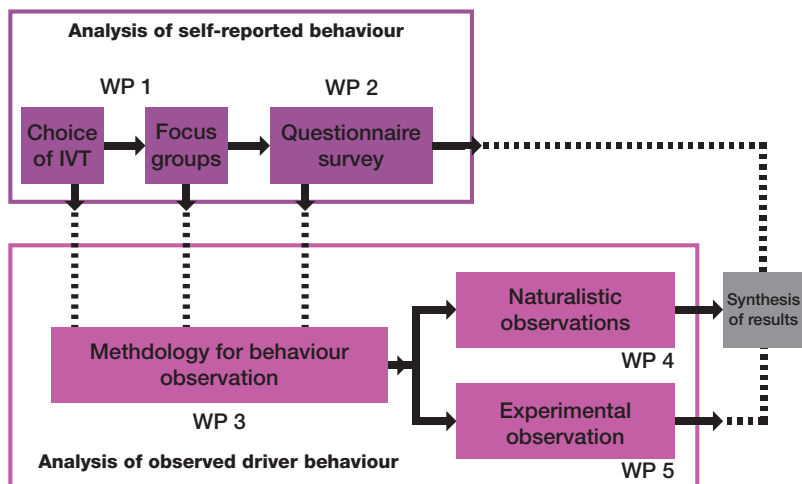
State of the Art - Background

The development of information and communication technologies in the field of road transport provides drivers with access to various functions and services which, if designed ergonomically and used appropriately, have the potential to significantly enhance driver safety, mobility, enjoyment and comfort. However, little is known about how drivers actually interact with most of these systems - where, when, how and why they interact with them - and about the effects of their long-term use on driver behaviour, performance and safety.

If poorly designed and used inappropriately, in-vehicle technologies (IVTs) have the potential to compromise safety. Several key safety issues are linked with IVT use:

- risk of distraction;
- over-reliance;
- knowledge of systems;
- awareness of system limitations;
- the controllability of the systems;
- negative behavioural adaptation;
- workload.

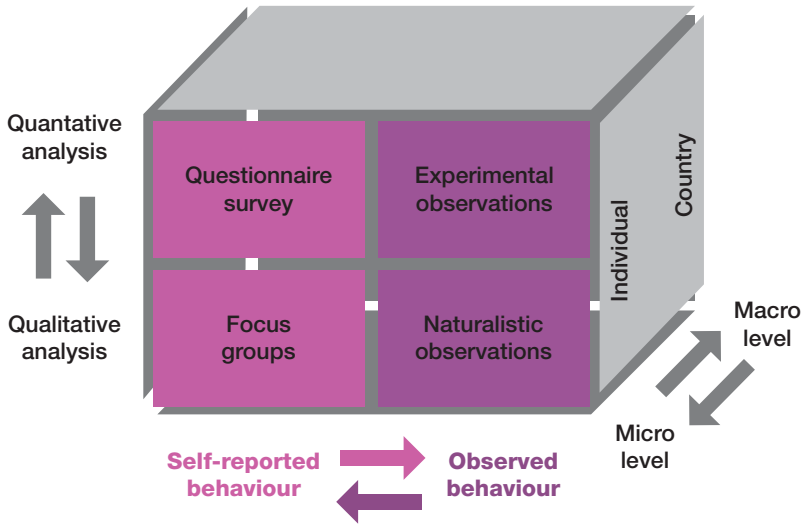
It is critical to understand how drivers interact with the emerging IVT in order to identify issues that have the potential to compromise driver safety and to develop countermeasures, for example better human-machine interface (HMI) design, training, education.



Dissemination, scientific coordination and project management

WP 7, WP 8, WP 9

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INTERACTION framework of investigation

Objectives

The general and long-term aim is to address the following issues in relation to drivers, car manufacturers, designers, people in charge of deploying new technologies and road safety professionals:

- to derive fundamental knowledge about driver IVTs, and the positive and negative by-products of this interaction in normal and emergency situations, and to use this knowledge to develop new and novel road safety countermeasures;
- to decrease the level of human error that occurs when drivers interact with IVT;
- to reduce the risk of system misuse by drivers;
- to promote the safe use of IVT by European drivers;
- to increase the benefits of IVT in enhancing road safety;
- to contribute to the reduction of road accidents;
- to stimulate further research on the topic.

Concretely, the main ideas behind INTERACTION are the following:

- to gain a better understanding of driver interactions with IVT;
- to focus on technologies already available on the European market;

- to identify patterns of use of these systems by European drivers in everyday life;
- to analyse their effects on drivers' behaviours and skills, in normal and emergency situations;
- to highlight individual and cultural differences that influence the nature of driver interactions with IVT, and the resulting outcomes of these interactions.

Description of Work

Four mature ICT functions that are already well adopted by European car drivers will be selected to understand the long-term effect of IVT. They will include informing and assisting functions.

The project will use a unique combination of approaches to understand driver interaction with these systems, and their impact on driver behaviour, performance and safety. Data will be gathered from:

- focus groups (WP1);
- a large-scale, pan-European web-based survey (WP2);
- a 'natural driving study' in which drivers will use ordinary vehicles fitted with equipment (e.g., video, GPS, sensors) to record their driving behaviour and performance when interacting with IVT (WP4);

- a behavioural observation technique, allowing trained observers to make judgements about the impact of IVT on a driver's ability to manage safety-critical situations (WP5).

Differences in driver interactions with IVT will be studied. The aspects looked at will include: gender, age, miles driven, orientation towards skills and safety, attitudes towards new technologies in the car, private or professional use of the car, characteristics of the road network driven.

Differences and similarities across Europe will also be investigated. The study will look at nine countries in three broad areas: Southern, Central and Northern Europe. A comparison will be made with an overseas country: Australia.

Expected Results

INTERACTION will have three main research and development outcomes:

- Scientific level: identification of the differences and similarities between drivers and countries in terms of IVT use and its effects on drivers' behaviours and skills in normal and emergency situations;
- Technical level: design and development of a behavioural observation platform relevant for the natural observation of IVT use;
- Methodological level: issuing of recommendations for carrying out studies of IVT use based on a comprehensive investigative framework.

Using the knowledge acquired during INTERACTION, the following recommendations will be made:

- the design and refinement of IVT in terms of ergonomics, usability and safety;
- the design of appropriate instructions and training for drivers who will use them;
- the customisation of systems to make them compatible with driver and driving characteristics in the country in which the systems are deployed.

These recommendations will strengthen public awareness on safe and unsafe uses of IVT. They will also increase the coherence between drivers' patterns of use of the technologies and the legislation. Finally INTERACTION's recommendations will stimulate greater demand for the IVTs which appear to show significant potential to enhance safety.

Acronym:	INTERACTION		
Name of proposal:	Differences and similarities in driver INTERACTION with in-vehicle technologies		
Contract number:	218560		
Instrument:	CP – FP		
Total cost:	3 577 307 €		
EU contribution:	2 499 963 €		
Call:	FP7-SST-2007-RTD-1		
Starting date:	01.11.2008		
Ending date:	30.04.2012		
Duration:	42 months		
Website:	http://interaction-fp7.eu/		
Coordinator:	Ms. Mathilde Bruyere Europe Recherche Transport Le Descartes 2 - 2 rue de la Butte Verte FR 93166 Noisy le Grand Cedex		
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	Centrum dopravního výzkumu v.v.i.	CZ	
	Fundación para de Galicia	ES	
	FACTUM Chaloupka & Risser OHG	AT	
	Intempora SA	FR	
	UNIVERSITAS, Cooperativa de Ensino Superior e Investigação Científica	PT	
	Institute for Road Safety Research	NL	
	TRL Ltd	UK	
	Valtion Teknillinen Tutkimuskeskus	FI	
	Monash University Accident Research Centre	AU	
	The George Institute for International Health	AU	

INTERAIL

Development of a Novel Integrated Inspection System for the Accurate Evaluation of the Structural Integrity of Rail Tracks



State of the Art - Background

The technological advances in train design during the last few years have enabled the construction of more high-speed rail lines and the broader use of high-speed trains as an alternative and environmentally-friendly means of travel, which offers fast and reliable transportation of passengers and goods between hundreds of cities across the European continent. The increasing trend for the industry's business is forecast to continue in the forthcoming years, since rail transport is steadily becoming a more attractive option over other means of transportation for the public. This is due to the fact that train travel is generally cheaper than using a car or an airplane, and very often the fastest option to reach a destination. It is also inherently safer and far more environmentally friendly in comparison to car travel, without compromising passenger convenience.

Today, rail networks across Europe are getting busier with trains travelling at higher speeds and carrying more passengers and heavier axle loads than ever before. The combination of these factors has put considerable pressure on the existing infrastructure, leading to increased demands in inspection and maintenance of rail assets due to the higher risk of catastrophic failure.

The successful implementation of the INTERAIL system will deliver a step change in rail inspection practices currently employed by

the rail industry through the development of a novel inspection approach integrating in a single vehicle, different advanced techniques, leading to higher levels of reliability and safety.

Objectives

The INTERAIL consortium will develop and implement an integrated high speed inspection system based on a modular design, which will enable a faster and more reliable inspection of rail tracks at faster speeds compared to the available ones.

INTERAIL presents the following major objectives:

1. To overcome the limitations of current inspection procedures of rail tracks through the successful implementation of an integrated high-speed inspection system based on automated visual, Alternated Current Field Measurement (ACFM) and ultrasonic techniques, combined in a single architecture as shown in the figure presented.
2. To develop advanced verification and evaluation procedures of the defects detectable by the high-speed system based on ACFM, ultrasonic phased arrays, and high-frequency vibration analysis equipment.
3. To achieve higher levels of PoD of rail defects leading to the substantial improvement in the actual reliability of the European rail network.
4. To decrease inspection times and associated costs by up to 75% through the integration of three different rail track evaluation techniques that will complement each other as part of a functional single high-speed NDE.

5. To develop the required software and intelligent control unit to enable automatic and real-time analysis of the defects detected and minimise human subjectivity during the interpretation and analysis of results.
6. To contribute to the harmonisation of inspection procedures and network reliability across Europe.

Description of Work

The total work content of the project is divided in five technical workpackages (WP) as follows:

WPA:Sample procurement and system specification. Within this WP, the consortium will collect and analyse data from the existing literature, rail infrastructure managers, rail track inspection providers, rail track maintenance companies and rail manufacturers in order to thoroughly evaluate the deficiencies that are currently associated with rail inspection and maintenance procedures and their effect on European rail transport.

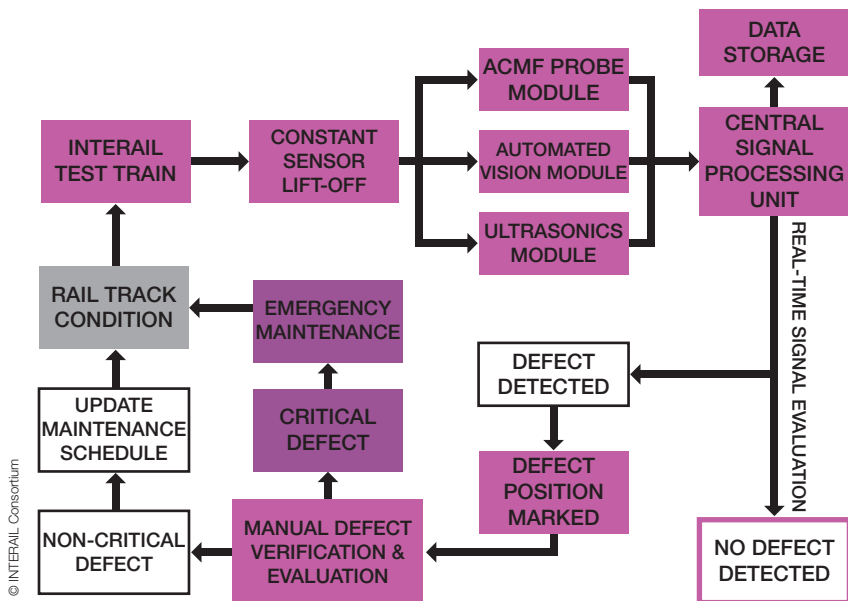
WPB:Novel high-speed inspection system. This WP consists in the development of the integrated inspection system combining three main modules based on three different non-destructive evaluation technologies: ACFM, Ultrasonics and Automated Vision.

WPC:Positioning, sensor adjustment and defect marking subsystem. In this WP the positioning, sensor adjustment and defect marking system will be developed.

WPD:Manual defect verification inspection techniques. Development of a special equipment will be developed for the verification and evaluation of rail defects which are detected with the high-speed system.

WPE:Integration and validation. The integration of the output of WPB and WPC will be carried out in a single high speed rail inspection system. The validation of the system and of the defect verification techniques will be the basis for the system assessment.

INTERAIL HIGH-SPEED RAIL INSPECTION AND DEFECT VERIFICATION SYSTEM CONCEPT



The successful integration and validation tests of the INTERAIL high-speed rail inspection system, defect verification and evaluation techniques will be followed by thoroughly planned field trials and demonstrations of the system's capability at the consortium railway operators.

Expected Results

The major results expected from the project are:

- High speed Automated Inspection equipment integrating several NDT techniques;
- Intelligent software and control unit;
- Manual equipment for faster and efficient inspections;
- Reduction of costs, time and accident probability;
- Increase of POD and reduction of POF;
- Training of operators and certification procedures.

Acronym:	INTERAIL	
Name of proposal:	Development of a Novel Integrated Inspection System for the Accurate Evaluation of the Structural Integrity of Rail Tracks	
Contract number:	234040	
Instrument:	CP – FP	
Total cost:	4 994 019, 6 €	
EU contribution:	3 281 750 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.10.2009	
Ending date:	30.09.2012	
Duration:	36 months	
Website:	http://www.interailproject.eu	
Coordinator:	Mrs. Margarida Pinto Maria Instituto de Soldadura e Qualidade Av. Prof. Dr. Cavaco Silva, 33 PT 2740-120 Porto Salvo-Oeiras	
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	Network Rail Infrastructure Limited	UK
	Envirocoustics ABEE	GR
	Feldman Enterprises Limited	CY
	Société des Transports Intercommunaux de Bruxelles	BE
	The University of Birmingham	UK
	TWI Ltd	UK
	Commissariat à l'Energie Atomique	FR
	National and Kapodistrian University of Athens	GR

ISi-PADAS

Integrated human modelling and Simulation to support human error risk analysis of Partially Autonomous Driver Assistance Systems

State of the Art - Background

Currently, Advanced Driver Assistance Systems (ADAS) allow human drivers to always remain in full control of the car. With this directive the means to correct errors of the driver by assistance systems are limited and certain types of accidents cannot be prevented by these systems. Partially Autonomous Driver Assistance Systems (PADAS) that take over full control of the car in certain cases are required to increase safety. To this aim, a design methodology is needed that allows proving that these partially automated systems always maintain a safe state of driving.

In the ISi-PADAS project we will focus on a time-saving driver-model-based evaluation of the effect of PADAS with the aim of proving that the actions of the system really prevent driver errors without introducing new ones. Up to now, in the industrial development process, and even in current research projects in the Sixth Framework Programme (e.g. PREVENT and AIDE), effects of assistance systems are investigated empirically by performing expensive and time-consuming tests in driving simulators or with prototypes on test tracks. Further effects are examined after market introduction based on field operational tests and accident reports. With these means it will cost too much time and effort to provide a strong argument for the safety of PADAS. To achieve this, a new methodology has to be developed.

Objectives

The main objective is to develop an innovative methodology to support risk-based design and approval of PADAS focusing on the elimination and mitigation of driver errors by an

integrated Driver-Vehicle-Environment modelling approach.

The main part of this Driver-Vehicle-Environment (DVE) modelling approach will be an effective and working simulation of driver behaviour, based on modelling driver cognitive processes. Driver models are a means of making psychological knowledge about driver behaviour readily available to system designers. Driver models when integrated with models of the vehicle and the traffic environment can be developed into computerised simulations that can be applied in early development stages to predict driver behaviour, including driver errors. In this way they can support decisions between design alternatives and can be applied for testing the need for specialised assistance systems.

Such a driver-model-based simulation of traffic scenarios can streamline the amount of simulator tests with human subjects by highlighting those scenarios that require more detailed investigation due to predicted potential hazards. This enables avoiding the bias of professional test drivers to unconsciously avoid scenarios with the highest possible risk. Both improvements will save effort and time during the development of safe driver-assistance systems.

Description of Work

The general plan of this project is to develop a model of driver behaviour based on a cognitive approach and to transform it into a software simulation integrated in a general platform (Joint Driver-Vehicle-Environment Simulation Platform) that simulates DVE models in an effective and consolidated way. This platform will allow rapid simulation of a vast number of



traffic scenarios to predict the probability and risk of driver errors for different PADAS design alternatives. In this way the platform will be used as a technical basis for a new methodology to support Human Error Risk Analysis during a risk-based design process.

In order to provide an empirical basis for the driver-model development, driving experiments will be performed with human drivers to investigate driver errors with regard to unassisted and assisted driving in real traffic and in car simulators. Using the results from these experiments, driver models will be developed which allow a prediction of driver behaviour on a computational basis. These driver models will be used in the second phase of the project to investigate the variation of human behaviour in the presence of driver-assistance systems. Knowing and modelling the driver behaviour with and without driver assistance systems will allow the development of systems that minimise errors in critical situations.

Expected Results

The project will produce key innovations on four complementary research dimensions:

- Improved risk-based design: development of a risk-based design process for designing advanced control systems, such as PADAS;
- Advanced driver modelling: development of models for predicting correct and erroneous driver behaviour, based on modern approaches and algorithms, capable of capturing the key aspects of human behaviour, and retaining the fundamental characteristics of cognition and decision-making;
- Joined Driver-Vehicle-Environment Simulation Platform: integration of the driver models into a DVE computerised, fast running, and simple simulation tool for predicting driver behaviour and driver errors as a technical basis for the risk-based design process;
- New knowledge about driver behaviour including errors: extensive empirical studies and experiments with human drivers in real traffic and car simulators will lead to new knowledge about sources of accidents and potential countermeasures. This knowledge will be the basis for the driver-model development, as well as the design of new PADAS systems which counteract driver errors and thus increase traffic safety.

The new design methodology followed in the ISI-PADAS project can offer the greatest potential to achieve the EC main goal of significantly reducing the number of road accidents.

Acronym:	ISi-PADAS	
Name of proposal:	Integrated human modelling and Simulation to support human error risk analysis of Partially Autonomous Driver Assistance Systems	
Contract number:	218552	
Instrument:	CP – FP	
Total cost:	4 462 733 €	
EU contribution:	3 276 151 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.09.2008	
Ending date:	31.08.2011	
Duration:	36 months	
Website:	http://www.isi-padas.eu/	
Coordinator:	Mr. Karl-Heinz Menke OFFIS e.V. Escherweg 2 DE 26121 Oldenburg	
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	Fundación para la Investigación y Desarrollo en Transporte y Energía	ES
	Centro Ricerche Fiat S.C.p.A.	IT
	Deutsches Zentrum für Luft- und Raumfahrt e.V.	DE
	Institut national de recherche sur les transports et leur sécurité	FR
	Kite Solutions s.n.c. di Dunne Catherine e C.	IT
	École Supérieure d'Electricité	FR
	Università di Modena e Reggio Emilia	IT
	Visteon Systèmes Intérieurs	FR
	Technische Universität Braunschweig	DE

ITERATE

IT for Error Remediation And Trapping Emergencies

State of the Art - Background

The development of driver models has been studied in previous projects such as AIDE, ROADSENSE, MODURBAN, MODTRAIN, UGTMS and reasonable progress has been made. Further research is needed, however, on modelling the dynamic driver-vehicle-environment (DVE) interactions in terms of:

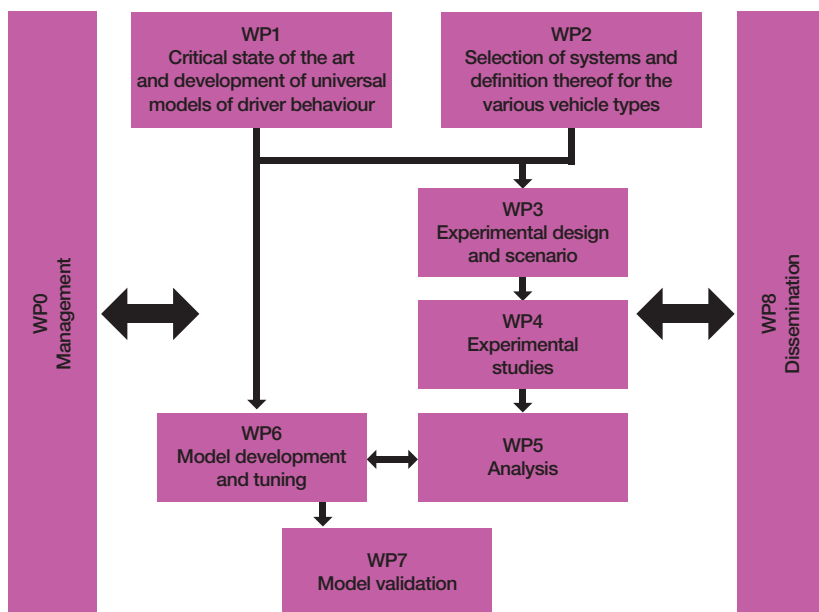
- theoretical architectures;
- adaptation and influencing factors;
- parameters and variables affecting behaviour in normal and emergency conditions;
- methods on how to implement a simulation platform and numerical algorithms to perform running software tools that enable the fast and reliable representation of DVE interactions.

Many of the innovative technologies that are available will affect driver behaviour. For instance, after an initial learning period, collision warning and headway warning systems are likely to affect the preferred headway of drivers. The effect these systems have on driver behaviour will vary, both in direction and in magnitude, depending on how the system is designed and the particular characteristics of the driver. These effects on driver behaviour can be studied by comparing experienced users of systems already on the market with novice users. This work has already started in the EU project AIDE where progress in this area has been made. Further work is however needed, especially on the experimental side where ITERATE will make a significant contribution.



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One of the driving simulators used in ITERATE



The work packages in the ITERATE project

Objectives

The objective of ITERATE is to develop and validate a unified model of driver behaviour (UMD) and driver interaction with innovative technologies in emergency situations. This model will be applicable to and validated for all surface transport modes. The drivers' age, gender, education, experience and culture (whether regional or company/organisational) are factors that will be considered, together with influences from the environment and the vehicle.

Such a unified model of driver behaviour will be of great use when designing innovative technologies, since it will allow for assessing and tuning the systems in a safe and controllable environment without actually putting them to use in real traffic. At the concept stage, the model could guide designers in identifying potential problem areas, whilst at the prototype stage the model could inform on the scenarios to be used in system evaluation.

Along the same lines, the model could be of use for authorities as a guide in assessing and

approving innovative technologies without performing extensive simulator experiments or large-scale field trials.

Description of Work

The ITERATE project consists of nine work packages (WP) including management and dissemination.

WP1 and 2 will set the framework of the project in terms of model design and systems included in the study.

WP3, 4 and 5 will build on this framework to carry out the experiments needed.

WP6 will run in parallel, based on the models determined in WP1, to develop the software needed for the UMD. When the first set of experiments in WP4 have been completed, WP5 and WP6 will work together to feed the model with the parameters produced from the experiments.

WP7 will critically review the model and compare the simulated UMD with real drivers of cars and trains, and navigators of ships.

Expected Results

The UMD can be used to improve the design and safety assessment of innovative technologies and make it possible to adapt these technologies to the abilities, needs, driving style and capacity of the individual driver.

The UMD can inform on the scenarios to be used in system evaluation identifying potential problem areas, even at the prototype stage. In this way the system will be adapted to drivers before being available on the market and will better support them in emergency situations.

The UMD will perform risk evaluation prediction by perceiving the current situation with respect to the driver, vehicle and environment, and then it will interpret what is going to happen next, including what the driver is likely to do.

The model will possibly run as a 'co-driver' or driver assistant, warning the driver when the risk level becomes too high, helping him to manage risk and workload, and even triggering an automatic system response when the situation is considered unmanageable.

Acronym:	ITERATE
Name of proposal:	IT for Error Remediation And Trapping Emergencies
Contract number:	218496
Instrument:	CP – FP
Total cost:	2 561 400 €
EU contribution:	1 985 040 €
Call:	FP7-SST-2007-RTD-1
Starting date:	01.01.2009
Ending date:	31.12.2011
Duration:	36 months
Website:	http://www.iterate-project.eu/
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UK
FR
IT
IL
SE
SE

MINOAS

Marine Inspection Robotic Assistant System

State of the Art - Background

Throughout history, ships and vessels have proven their value with the cost and time-efficient transportation of goods and humans. Higher and higher safety standards are continuously required. Currently, there is no other viable alternative for the transportation of bulk goods, therefore the optimization of the current technology should be considered. Nowadays, an assessment of the structural integrity is made through periodical inspections, carried out manually by surveyors who operate using well-established methodologies and techniques. The quality of the inspection results is also affected by both exogenous (exhaustion, stress, inaccurate judgement) and endogenous factors (different cultures, educational background, skills) whenever human intervention is used.

On the other hand, the financial burden that accompanies these tasks has an impact on the profit optimization of the ship owners and on international trade – with less available vessels to transport the goods, transportation takes longer, which increases the prices of the goods.

Objectives

MINOAS project proposes reengineering of the overall vessel-inspection methodology, by introducing an innovative system concept that incorporates state-of-the-art technologies, but at the same time formulates a new standardization of the overall inspection process. Through holistic approach, MINOAS proposes the development of a new infrastructure that substitutes human personnel by high locomotion enabled robots, and 'teleports' the human inspector from the vessel's hold to a control room with virtual reality properties. The human's perceptual abilities are enhanced through the utilization of high resolution tools (eg. sensors) and are augmented

through the parallel processing property provided by MINOAS. The proposed innovative system concept considers the assembly of a robot fleet with advanced locomotion abilities and sets of tools that are dedicated to the tasks attached to the inspection process, the development of control techniques and algorithms that provide a semi-autonomous nature to the operation of the robot-fleet and a hierarchical controller that realize the virtual environment for the human inspector and adds newly developed toolboxes enabling on-line processing of the harvested data and operate as a Decision Support System in the aid of the inspector.

Description of Work

MINOAS will adopt a user-centric approach for the analysis/design and implementation of complex systems based on the highly iterative approach introduced by the ISO 13407 standard. It is anticipated that MINOAS will be developed in four phases, as the schema below indicates:

- Phase 1 – Inception focus on users and stakeholders requirements review
- Phase 2 – Elaboration focus on platform architecture, design decisions & implementation of the basic mechanisms for robot movement, localisation, vision, and intercommunication
- Phase 3 – Prototype implementation focusing on individual components implementation (e.g. hierarchical and robot embedded controllers), choice of commercial of the self components and their integration into five distinct robotic platforms serving different survey requirements (as already discussed in section 'Project rationale')
- Phase 4 – Lab trials & field trials/system validation focused on design verification and user/stakeholder case-study-driven evaluation

Expected Results

The main expected results are the following:

- a more expedite inspection procedure, as the surveyor is relieved from the burden of covering long distances at the stage of visual survey of the vessel,
- the withdrawal of human personnel from hazardous areas, as there is no need for the surveyor to enter the hold or climb on staging with large height,
- the incorporation of advanced technological means will abolish the need for extensive staging and other temporary arrangements traditionally required, thus minimizing the costs of the overall inspection procedure,
- the modularity of the platform proposed by MINOAS will reduce the overall inspection cost for a specific vessel as it provides a repeatability property to the inspection,
- a more systematic inspection methodology, that will lead to the minimization of the inspection time
- the increase of the inspection quality, which will increase the safe operating conditions of the vessels and prolong their life-cycle,

- the minimization of trade costs due to the vessels increased lifecycle and operational time, and
- the increase of the environmental protection through the elevation of the inspection quality



Acronym:	MINOAS	
Name of proposal:	Marine Inspection Robotic Assistant System	
Contract number:	233715	
Instrument:	CP – FP	
Total cost:	3 027 429 €	
EU contribution:	2 102 035 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.06.2009	
Ending date:	31.05.2012	
Duration:	36 months	
Website:	http://minoasproject.eu	
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	Glafcos Marine Ltd.	GR
	Universitat de les Illes Balears	ES
	Rigel Engineering S.r.l.	IT
	Horama S.A.	GR
	Lloyd's Register	UK
	Marine Technical Group - DOLPHIN PLC	BG
	SYROS Shipbuilding and Industrial Enterprises SA	GR
	Neorion Shipyard	GR

PROLOGUE

Promoting Real Life Observations for Gaining Understanding of Road Behaviour in Europe

State of the Art - Background

The number of road fatalities in Member States is decreasing too slowly to meet EU targets. A new generation of measures is needed, underpinned by a new generation of research methods. Recent technology developments allow for this: naturalistic observations or naturalistic driving. The recently started European project PROLOGUE aims to prove the feasibility and usefulness of a large-scale European naturalistic driving study.

In a typical naturalistic driving study, traffic situations and drivers are studied in an unobtrusive way by using small cameras and other equipment, placed in drivers' own cars, during day-to-day trips, and without the presence of a test supervisor. Experiences in the US showed that this approach can give a reliable picture of the drivers' natural behaviour. The method enables the analysis of the interaction between road user, vehicle, road, and other road users under normal conditions, in conflict situations, and in crashes. Results will lead to a better understanding of the factors that affect road safety and will help to achieve an intrinsically safe road transport system by, for example, in-car technology, self-explaining roads, driver training, etc.

Objectives

The main objective is to prove the feasibility and usefulness of a large-scale European naturalistic observation study for various stakeholders and to assess the added value of the approach for transport related environmental issues and traffic management issues. PROLOGUE's detailed objectives are to:

- define relevant road safety research questions;
- assess its added value compared with other research methods;

- identify other areas of application and corresponding stakeholders;
- describe the technical possibilities for data collection and data analysis;
- define the methodological and organisational requirements in the identified application areas;
- show the current technical, methodological and organisational possibilities in a number of small scale trials;
- show the usefulness and value of naturalistic observation results for a number of identified application areas in a number of small scale field trials;
- create interest and commitment of identified stakeholders for the application of naturalistic observation studies;
- define the requirements for a large-scale European naturalistic driving study, combining the areas of interest of the identified stakeholders.

Description of Work

The work in PROLOGUE includes a number of small scale pilot studies in different research areas, including novice drivers, vulnerable road users and in-vehicle information systems, which we expect to provide interesting results in themselves. The work also includes the identification of potential application areas and research questions for which the naturalistic approach would have added value. It will use literature, existing international networks, and a user forum. In a similar way, the currently available technology for data collection, data storage and data analysis will be identified as well as methodological, organisational and legal requirements for naturalistic studies.

Communication and dissemination to all potential stakeholders are considered vital in gaining their support for and involvement

in a large-scale European study. As such, the project is not only aimed at road safety researchers, but also at stakeholders like the car industry, insurance companies, driver training and certification organisations, road authorities, and governments.

Expected Results

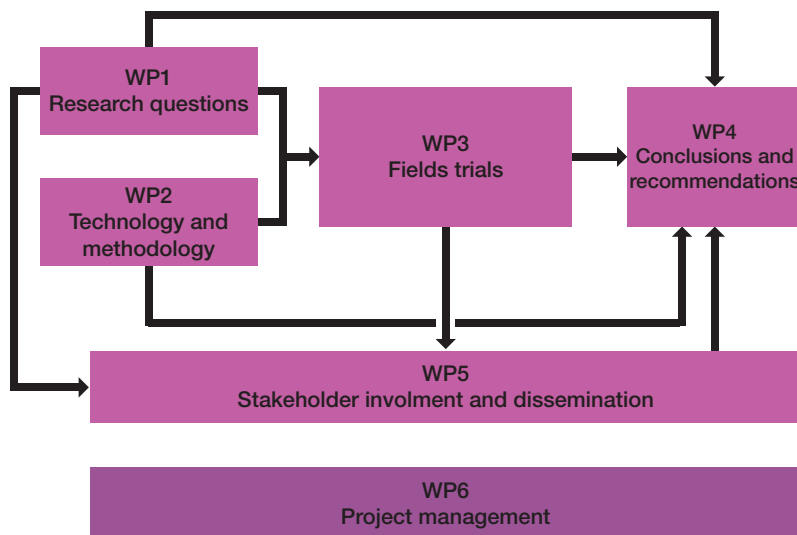
PROLOGUE will result in recommendations and an outline for a large-scale naturalistic study, specifying potentially interesting research questions, proper study designs and required technology. Whereas road safety is the main motive, the project will also look at the relevance for environmental issues - CO₂ emissions and traffic management.

In short, the main safety impacts of the large scale study are:

- The development of new measures to deal with fatigue, distraction, risk taking, impaired driving, human error etc.
- Concrete design standards for self-explaining or maybe even self-enforcing roads.
- Collision avoidance systems (CAS), in-vehicle information systems (IVIS) and advanced driver assistance systems (ADAS) that are designed for different driver groups or tailor made to the individual driver characteristics.
- Improved driver training and licensing.
- Insurance contributions based on driver behaviour as an incentive to behave safely.

The main environmental and road capacity impacts are:

- Improved fuel consumption through better motor management systems, new driver assistance and information systems and improved eco-driving (campaigns).
- Improved traffic modelling resulting in higher road capacities through improved (dynamic) traffic management.



Acronym:	PROLOGUE	
Name of proposal:	Promoting Real Life Observations for Gaining Understanding of Road Behaviour in Europe	
Contract number:	233597	
Instrument:	CP – FP	
Total cost:	2 462 556 €	
EU contribution:	1 999 228 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.08.2009	
Ending date:	01.08.2011	
Duration:	24 months	
Website:	http://www.prologue-eu.eu	
Coordinator:	Mr. G.B.I. Portena Stichting Wetenschappelijk Onderzoek Verkeersveiligheid Duindoorn 32 NL 2262 AR Leidschendam	
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	Kuratorium für Verkehrssicherheit	AT
	Loughborough University	UK
	Or Yarak association	IL
	Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek (TNO)	NL
	Transportekonomisk Institutt	NO
	Test & Training International	AT
	Universitat de València	ES

SAFEGUARD

Ship evacuation data and scenarios



State of the Art - Background

The collection of human performance data in full-scale ship trials is vital for the calibration and validation of ship-based evacuation models. The International Maritime Organisation (IMO) Fire Protection (FP) sub-committee in their modification of MSC Circ 1033 at the FP51 meeting in February 2007 invited member governments to provide '...further information on additional scenarios for evacuation analysis and full-scale data to be used for validation and calibration purposes of the draft revised interim guideline'.

Currently the IMO MSC 1033 evacuation analysis protocol specifies an assembly time and congestion criteria for safe evacuation in essentially four scenarios (day, night and one variation of each). SAFEGUARD will analyse if these four scenarios and two parameters are sufficient to specify an acceptable assembly process or if there are other parameters and other scenarios that should be considered. The nature of the scenarios to be considered will be linked to the nature of the vessel type and identify a range of scenarios that can be used to assess the evacuation performance of a vessel or class of vessel.

Objectives

The objectives of SAFEGUARD are to produce:

- six full-scale ship evacuation trials covering three vessel types (cruise ships, ferries with predominately passengers without berths and ferries with a mixture of passengers with and without berths), each repeated twice to provide repeatability, involving about 9,000 people in total;

- six datasets to define passenger response-time distributions used in evacuation analysis as specified in MSC Circ 1033, which will cover the three ship types described above;
- six datasets for evacuation model validation which will cover the same three ship types;
- a set of more representative benchmark scenarios than those currently used for evacuation certification. The new scenarios will investigate the incorporation of fire (with reduced visibility due to smoke in the range 4 to 20m) and angles of heel up to 20°;
- three information papers, which will be sent to the Fire Protection sub-committee of the IMO detailing the findings of the project, covering passenger response-time distributions, ship evacuation validation data and associated safety factors, and ship evacuation certification benchmark scenarios;
- the first comprehensive analysis of video and other data covering accidents which led to evacuations.

Description of Work

The project started with a set of sea trials covering the three types of large passenger vessels. The data collected will be analysed and form the basis of two information papers to be presented to the IMO.

The first information paper will address the passenger response-time distribution and provide recommendations to be used in evacuation certification analysis. These datasets will be based on actual measured data obtained from the full-scale trials.

The second information paper will provide datasets suitable for the validation of advanced ship evacuation models. The information paper will also include a discussion of recommended procedures to be used in the validation of advanced ship evacuation models, together with a set of safety factors to be used in the certification analysis.

The project will also conduct an extensive analysis of past accidents which have led to evacuation. On the basis of this analysis, the present scenarios used in design assessment will be reviewed and enriched, and new scenarios involving fire and heel will be proposed.

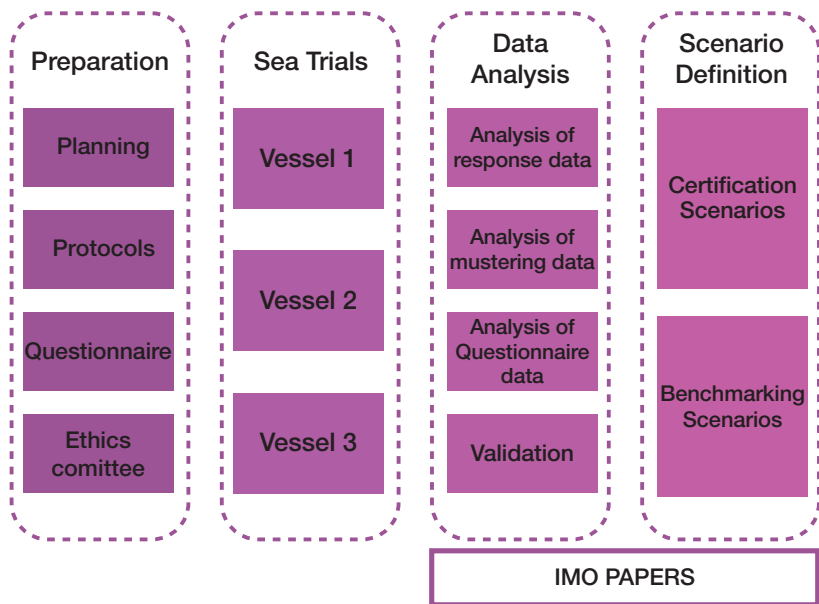
Benchmark data for the assessment of the new scenarios will then be created and performance metrics defined for assessment under the new scenarios.

A third information paper will be presented to the IMO with recommendations covering the new certification scenarios and the corresponding assessment procedures and criteria.

Expected Results

SAFEGUARD's objective of acquiring a large amount of sea-based data on passenger response times and assembly times during ship evacuations is in line with the European Union's approach of being an active participant in actions to improve maritime safety. In particular, it builds on the precedent of helping to frame International Maritime Organisation regulations, in this case the IMO evacuation analysis protocol MSC 1033.

It also extends the earlier research work conducted, in particular FIRE EXIT in the Fifth Framework Programme, which showed that the response-time data currently used in MSC Circ 1033 was not realistic. By assembling data on human performance, specifically passenger response times, SAFEGUARD will contribute towards a more accurate calibration and validation of ship-based evacuation models, and will facilitate improved analyses of evacuation from ships. It is proposed that the results of both these tasks will be reported to the IMO for possible incorporation into future modifications of the MSC Circ 1033.



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Acronym:	SAFEGUARD		
Name of proposal:	Ship evacuation data and scenarios		
Contract number:	218493		
Instrument:	CP – FP		
Total cost:	3 561 554 €		
EU contribution:	2 100 000 €		
Call:	FP7-SST-2007-RTD-1		
Starting date:	01.04.2009		
Ending date:	31.03.2012		
Duration:	36 months		
Website:	http://www.safeguardproject.info		
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	Color Line Marine AS		NO
	Royal Caribbean Cruise Line		UK
	Memorial University of Newfoundland		CA
	Bureau Veritas - Registre international de classification de navires et d'aéronefs SA		FR
	University of Greenwich		UK
	Principia Recherche Développement SA		FR
	Minoan Lines SA		GR

SAFER BRAIN

Innovative Guidelines and Tools for Vulnerable Road Users Safety in India and Brazil

State of the Art - Background

Walking and cycling are transport methods where relatively unprotected road users interact with mass high speed traffic. This makes pedestrians and cyclists vulnerable.

The trends for the number of fatalities among pedestrians and cyclists in Europe show that since 1980, both numbers have decreased by about 65 and 55% respectively.

Despite this significant improvement in Europe, the situation in the Emerging Economies (EE) is dramatically getting worse.

If we look at India, between 1995–2004, the number of accidents has increased by some 22%, while the number of fatalities has increased by some 31%. In India in 2004, 92 618 people died on the road, compared to the 43 400 died on the EU-25 road network. While India has only 1% of the world's road vehicles, 6% of the world's road accident deaths happen there.

If we look at Brazil in 2004, there were 185 road accident fatalities/1 millions of inhabitants and the 32.9% of the Brazilian road fatalities were vulnerable road users. In Europe, in 2005, there were 89 fatalities/1 millions of inhabitants and 25% were vulnerable road users.

This data shows the gaps between both India and Europe and Brazil and Europe suggest that Europe could contribute a strong effort in improving Vulnerable Road Users Safety in these two EE by transferring and adapting the results of the European research and experiences to the local context.

Objectives

The aim of the project is to increase the level of safety of the whole road transport system and its components, focusing the attention on vulnerable road users, thus contributing to the overall scope of reducing the number of fatalities and the severity of injuries caused by road accidents.

The main risk factors for vulnerable users in EE are deeply analysed and, based on European experience and best practice, developed at national and European level, innovative methodologies and tools for planning, designing and maintaining safe infrastructures in India and Brazil are developed. The transferability of these tools is evaluated and they will be further modified with the experiences of local stakeholders.

The project approach is comprehensive and systemic and all the necessary components are involved to be able to develop and implement potential solutions in a physical, management, institutional and educational way.

A structured road safety management process, similar to the guidelines in the ERSO and those developed by the World Bank, provides the framework for local implementation of the guidelines and procedures.

To assess the effectiveness and efficiency of the innovative methodologies and tools, two pilot projects, in India and in Brazil, will be implemented. Feedback from pilot projects will be used to refine the methodologies and tools developed within the project.

Description of Work

The project strategy foresees 7 steps.

WP1's objective is to gain a better understanding of requirements regarding the safety of vulnerable road users in EE. Local accident databases, local situation of road infrastructure, land-use configuration, planning and road safety management procedures will be analysed.

WP2 carries out the analysis of differences between EU and EE in terms of conditions of vulnerable road users, infrastructure design, land-use configuration, road safety management procedures. It identifies the barriers to transferability of methodologies, measures and tools.

WP3 defines suitable measures, methodologies and tools for improving vulnerable road users safety planning and managing in India and Brazil.

WP4 develops recommendations and guidelines for the road system infrastructure design to safely carry vulnerable road users and motorised vehicles in EE.

In WP5, the developed methodologies and tools are tested at two sites in order to verify the applicability and the results of the project and refine the developed methodologies, tools and recommendations.

WP6 produces the content to be disseminated. The main ways of informing partners and the public will be a website, 'Content Letters' and Brochures.

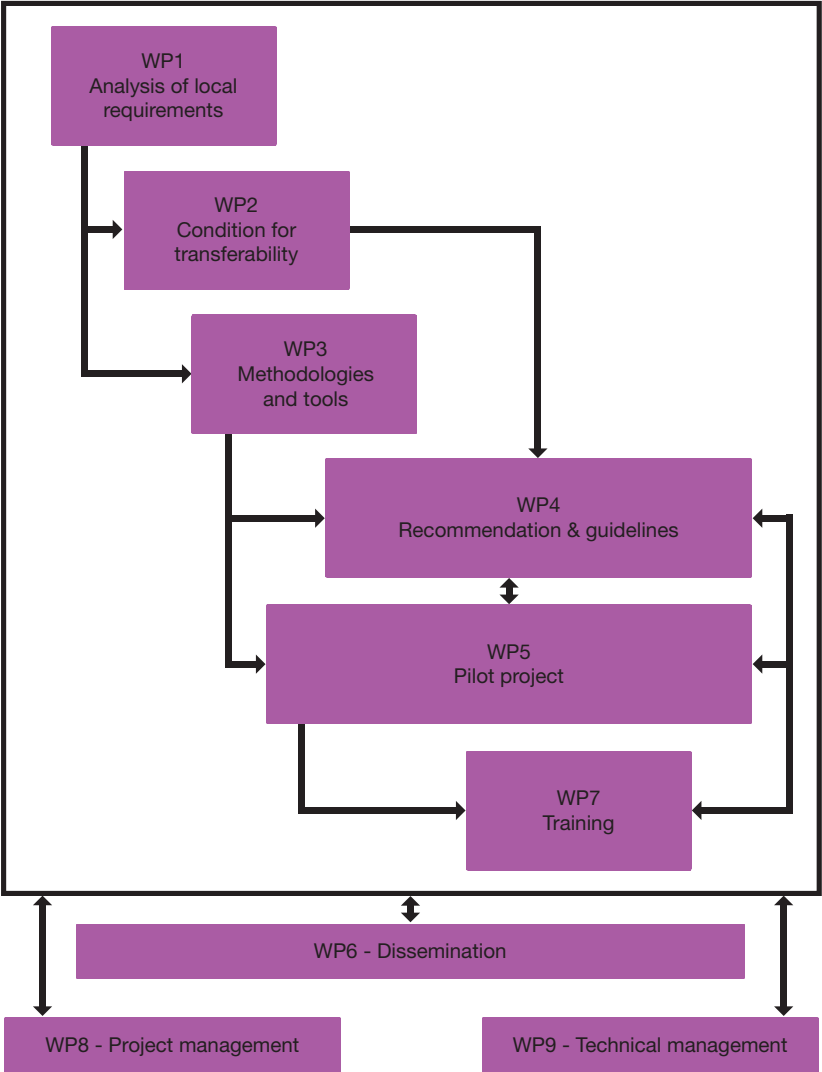
WP7 gives an initial start up in educating decision makers, stakeholders, local education institutes and practitioners, providing necessary tools, software and support.

Expected Results

According to vulnerable road user safety requirements and generalized transferability audit, it will be possible to:

- Define innovative methodologies to conceive and maintain road infrastructure, in order to ensure a high level of safety and requirements and tools for protecting vulnerable road users under consideration of infrastructure design and land use planning.
- Define functionalities and specifications of a decision support tool to be developed on the basis of the identified methodologies.
- Develop a DSS oriented towards vulnerable users for definition of the most suitable strategies and identification of the most effective/efficient countermeasures, supporting local technicians and decision-makers in accidents analysis, identification of causes, identification of countermeasures, choice of countermeasures on the basis of Cost-Benefit and Cost-Effectiveness Analysis, monitoring of results.
- Develop recommendations and guidelines for land-use and transport planning and for road safety management procedures, infrastructure design and road safety audit.

Once methodologies, measures and tools are defined, according to the developed guidelines, they will be tested on two sites. Feedbacks from the test sites will give information about how to refine and improve the transferability audit, the methodologies and tools developed in the project and the recommendations.



Graphical representation of the project work packages

Acronym:	SAFER BRAIN		
Name of proposal:	Innovative Guidelines and Tools for Vulnerable Road Users Safety in India and Brazil		
Contract number:	233994		
Instrument:	CP – FP		
Total cost:	2 474 880 €		
EU contribution:	1 872 081 €		
Call:	FP7-SST-2008-RTD-1		
Starting date:	01.10.2009		
Ending date:	31.03.2012		
Duration:	30 months		
Website:	http://www.saferbrain.eu		
Coordinator:	Prof. Luca Persia Centro di ricerca per il trasporto e la logistica (CTL) – 'Sapienza' Università di Roma Via Eudossiana 18 IT I-00184 Rome		
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	Master Plan BV	NL	
	Mobycon	NL	
	M/s Suncon Engineers Pvt. Ltd	IN	
	Innovation & Development Consulting	BE	
	Balancia	NL	
	IMR- Desenvolvimento Organizacional Ltda	BR	
	ITRoma - I.T. Ingegneria dei Trasporti srl	IT	
	FUSP – Foundation of Support to University of San Paulo	BR	

SAFERAIL

Development of Novel Inspection Systems for Railway Wheelsets

State of the Art - Background

Although severe rail accidents are relatively rare within the EU, they do unfortunately occur. The main causes are typically either human error or equipment failure, with the majority being equipment-related.

Within the equipment related figures, a significant proportion have been linked to failed train wheels and axles and, as the rail networks become busier and train speeds increase, this number is expected to continue to grow. Minimising wheelset failures also helps to reduce maintenance costs, and is a consideration for both train and light-rail vehicle operators.

Objectives

Working together over a three year period, the SafeRail consortium is seeking to minimise wheelset failures in two separate ways.

The first is implementing a novel on-line inspection system combining high frequency vibration analysis, acoustic emission, and thermography modules that would look for faults in currently operational trains. The system will be placed at pre-chosen strategic points on the rail network and will monitor faults in the wheels and axles of passing trains. It will look at a range of defects including flats in the wheels, defective wheelset bearings, significant cracks and wheel profile abnormalities. Each of these techniques complements the other and therefore increases the versatility of the overall integrated on-line system.

The second part of the project involves developing an inspection system for new and in-service wheelsets based on ultrasonic phased arrays and ACFM probes. The consortium aims to develop an innovative system that has higher resolution and speed of inspection operation, to identify surface breaking faults. Ultrasonic phased arrays and other techniques currently in use to inspect

in-service wheelsets have problems in finding small surface defects. The incorporation of ACFM probes will allow the accurate and fast inspection of wheelsets for any surface breaking faults.

Description of Work

The on-line system that will be developed will consist of three main modules, based on three different condition-monitoring technologies, in order to increase the versatility of the system and the probability of detecting a fault in a wheel set. The SAFERAIL system will incorporate: a) a high frequency vibration analysis module capable of detecting shells, cracks and severe profile abnormalities in wheel sets, b) an acoustic emission module capable of detecting wheel flats and defects in the wheel set bearing, and c) a thermography module capable of detecting cracks in wheels and axles, defects in the braking mechanisms and hot wheel set bearings. Each module developed as part of



Typical flat defect on wheel

© SafeRail - Photo courtesy of Joana Courinha

the SAFERAIL on-line system compliments each other and will be connected through a universal intelligent control unit which will use customised software. Inspection speeds >300 km/h are possible with the AE and thermography modules. An automated optical identification and speed measurement subsystem will be incorporated in the system in order to be able to automatically identify the type of trains passing by the inspection modules, type of wheel sets and train speed. Depending on the speed and on the type of train and wheel set that has been identified the sensing modules will recalibrate automatically in order to achieve maximum accuracy during the inspection procedure. The data obtained will be compared with the calibration spectra produced by defect-free wheel sets, thus permitting the evaluation and analysis of the spectra produced by passing wheel sets.

The combined ultrasonic-ACFM system will be used for the faster and more reliable inspection of new and old wheel sets during production and maintenance procedures. Novel ultrasonic phased arrays and ACFM probes with a much higher resolution and inspection speed than currently achieved by existing equipment will be developed. The incorporation of ACFM probes will allow a more accurate inspection of wheel sets for surface breaking faults, such as cracks, spalls, and corrosion, whilst ultrasonic phased arrays will enable the detection of deep bur-

ied defects. The off-line system will benefit from new encoders that will enable the accurate location and identification of any defects discovered by the system. Furthermore, the system will use an automated control unit and software capable of analysing and quantifying the size of the defects found.

Expected Results

Through the successful implementation of the SAFERAIL on-line system, it is estimated that 80% of all wheel set defects will be discovered in time to avoid any unnecessary damage being incurred on the rail network and the probability of catastrophic failure of a wheel set will be heavily reduced.

The successful delivery of the project deliverables should:

1. Improve maintenance strategies based on the information acquired through the on-line inspection system.
2. Minimise maintenance costs by reducing the time of inspection and increasing the reliability of the inspection process.
3. Maximise operational lifetime of rails by detecting wheel flats and shells at an early stage and avoiding the application of high impact stresses. The wider socio-economic impacts would be to increase safety and public confidence in rail transport across Europe.



High Frequency Vibration Analysis of passing wheel

© SafeRail - Photo courtesy of Joana Courinha

Acronym:	SAFERAIL	
Name of proposal:	Development of Novel Inspection Systems for Railway Wheelsets	
Contract number:	218674	
Instrument:	CSA – CA	
Total cost:	4 448 701, 2 €	
EU contribution:	3 000 000 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.10.2008	
Ending date:	30.09.2011	
Duration:	36 months	
Website:	http://www.saferail.net	
Coordinator:	Dr. Ian Nicholson	
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EC Officer:	Alexandra Gurau	
Partners:	Technical Software Consultants Ltd	UK
	Instituto de Soldadura e Qualidade	PT
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	Envirocoustics A.B.E.E	GR
	Alfa Products & Technologies	BE
	Vlaamse Vervoersmaatschappij De Lijn	BE
	Feldman Enterprises Limited	CY
	VTG Rail UK Ltd	UK
	EMEF, SA - Empresa de Manutenção de Equipamento Ferroviário, SA	PT
	Société Nationale des chemins de fer français	FR

SAFETRIP

Satellite Application For Emergency Handling, Traffic Alerts, Road safety and Incident Prevention

State of the Art - Background

SAFETRIP project's general objective is to improve the use of road transport infrastructures and to optimise the alert chain in case of incidents by offering an integrated system, from data collection to safety service provision. SAFETRIP directly contributes to the achievement of the EC objectives on road transport safety, road fatality reduction and environment protection.

SAFETRIP benefits from new satellite technology: the S-band supported by the W2A satellite that was launched in April 2009.

Opening new perspectives for European telecommunications, the S-band transmitter is optimized for content delivery and two-way communications for on-board vehicles units interoperable with Galileo and UMTS systems. This new satellite technology gives the opportunity to progress beyond the state of art allowing communication in both directions with mobile units. It presents determinant advantages, including global and full coverage on the European scale, multicast data transmission, quick and easy deployment, ecological energy as the satellite operates through solar panels.

Low price on-board-units (GREENBOX receiver) will be installed in vehicles to provide personalised safety and comfort services.

These customer-oriented applications dedicated to car drivers and passengers, bus/coach drivers and passengers and road operators will be tested in the field, by French and Spanish road operators, coach operators and car drivers.

Objectives

The SAFETRIP idea was born out of the future launch of an S-band satellite by Eutelsat, which constitutes a good opportunity to provide new safety services in the transport domain. This new W2A geostationary satellite is specially designed for providing DVB-SH broadcasting and 2-way data communication services in S-Band, with the ability to use small omni-directional antennas on the mobile unit.

The satellite will enable the development of a range of applications which will improve safety and mobility for road users, using satellite positioning as well as satellite two-way communications. The satellite is of great added value for travellers as it will ensure a pan-European and permanent communication.

The SAFETRIP project also includes the development of a low cost in-vehicle receiver (On-Board Unit: OBU), which is called the 'GREENBOX' (referring to the black box in planes). The GREENBOX will be developed in a family of receivers, covering all sectors of the market. The target price of this low segment product is around 100€, which will be made possible through mass market production and after market distribution. The GREENBOX receiver that will be installed in vehicles will provide a large range of personalised services, including emergency calls, incident/accident warnings, optimised navigation, vehicle monitoring, driver behaviour monitoring, traffic and incident data collection, etc.

Description of Work

The SAFETRIP project is split into 8 Work Packages (WPs):

WP1 deals with project management activities. It includes EC Reporting, Cost & Quality control, and Progress meetings.

WP2 will gather user and system requirements, assessments of market prospects and analyses of legal issues. It will provide a consolidation of requirements and a first definition of services.

WP3 deals with the realization of the functional and architectural design of the SAFETRIP system, based on the services definition and the derived system requirements identified during WP2.

WP4 will design and develop the different system components as defined in WP3, it includes all communication components: broadcasting, bi-directional communication, messaging and data collection systems. Also it deals with the integration of sub-systems for mobile communication and localization, development of the GREENBOX, and the service enabling platform.

WP5 is concerned with the integration of the system modules developed in WP4 and to carry out laboratory testing, with the aim of validating and qualify the developments for the test bed. This will include the innovations with regard to the transmission technology.

WP6 will experiment, in real conditions with real users, on the services specified and developed in previous WP. The experimentation plan will define the experimentation conditions, the profile of users, the test area or corridor, the parameters and data to be collected, and the test methodology.

WP7 will carry out activities related to commercial and rollout aspects assessment and impact evaluation of the SAFETRIP device and services on safety, security and environment protection.

WP8 is concerned with dissemination of project results, information exchange with other stakeholders and training of researchers. It includes design and operation of a project Website.

Expected Results

SAFETRIP will conduct field experiments with real users. 3 test sites will be implemented in France, Spain and in the road corridor Paris-Brussels-Amsterdam. The first two sites will involve passenger car users, whose car will be fitted with a GREEN-BOX. The third site will involve long distance coaches provided by Eurolines.

The following deliverables will be made public:

- Technical note: integration of satellite and terrestrial networks
- OBU user guide, service platform user guide
- Trial results, commercial & roll out aspects, safety impact analysis
- Dissemination plan
- Yearly project reports, final project report
- Brochures, newsletters, posters, video, website
- Tutorials & workshops.

The consortium will organise workshops with interested parties at different stages of the project: user requirements, test programme, trial assessment.

Acronym:	SAFETRIP	
Name of proposal:	Satellite Application For Emergency Handling, Traffic Alerts, Road safety and Incident Prevention	
Contract number:	SCP8-GA-2009-233976	
Instrument:	CP – IP	
Total cost:	11 250 269 €	
EU contribution:	7 890 199 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.10.2009	
Ending date:	30.09.2012	
Duration:	36 months	
Website:	http://www.safetrip.eu	
Coordinator:	Mr. Guy Fremont SANEF Le Crossing 30 boulevard Gallieni FR 92130 Issy les Moulineaux	
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EC Officer:	Mr. Ludger Rogge	
Partners:	Eutelsat SA	FR
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	Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.	DE
	Industrial Research Institute for Automation and Measurements	PL
	University College London	UK
	Abertis Autopistas España, S.A.U.	ES
	Autopistas, Concesionaria Española, S.A. (Unipersonal)	ES
	Budapest University of Technology and Economics	HU
	Deutsches Zentrum fuer Luft-und Raumfahrt e.V.	DE
	Fondazione Ugo Bordon	IT
	Inter Mutuelles Assistance	FR
	MAIF	FR
	MACIF	FR
	M.B.I. S.r.l.	IT
	Quantum SPA	IT
	MASTernaut	FR
	RETEVISION I S.A.	ES
	VEOLIA EUROLINES Group	FR
	ALGOE	FR

SAFEWAY2SCHOOL

Integrated System for Safe Transportation of Children to School



State of the Art - Background

Between 1994 and 2001, 361 children were injured or killed during transportation to/from their school in Sweden, whereas 455 were killed or injured in Austria only in 2007 and 97 were killed in Italy in 2005. In a single school bus accident in Greece in 2003, 20 children lost their lives. Other studies confirm that school children are frequent accident victims ((Kostyniuk, 2003); (Newman, Catchpole, Tziotis, & Attewell, 2002); (Scottish Executive Central Research Unit, 2004)), as they use buses to travel to and from school on a daily basis, and are usually less cautious than adults ((Carson, Holick, Park, Wooldridge, & R., 2004)).

According to data provided by the National Statistics Institute (ISTAT), road accidents are the primary cause of death for children in Italy. According to ASAP (Association of Friends of Road Police), 9 924 children were injured in road accidents in 2005. Among them, 17.3 percent was hit while crossing the street. In 2005, 97 children lost their lives in road accidents. Of the fatally injured children, 20 were pedestrians (20.6%).

As varied as the above numbers may be, they all tell us one thing: crashes involving school buses and crashes involving children travelling to and from school are far from negligible and require further efforts to be drastically reduced.

Objectives

The project aims to combine a wide range of technologies on localization, route planning, route guidance, vehicle to infrastructure and on-board systems and sensors, short-range

and GPRS communications, etc; in order to solve holistically the issue of safe transportation of children from their door to the school and vice-versa.

Description of Work

SAFEWAY2SCHOOL will design, develop, integrate and evaluate technologies for providing a holistic and safe transportation service for children, from their home door to the school door and vice-versa, encompassing tools, services and training for all key actors in the relevant transportation chain. These include optimal route planning and rerouting for school buses to maximize safety, on-board safety applications (i.e. for speed control and seat belts), 'intelligent' bus stops, effective warning and information systems for bus drivers, children, parents and the surrounding traffic; as well as training schemes for all actors. The project innovative systems, services and training schemes will be tested in four sites across Europe, including North (Sweden), Central (Austria), South (Italy) and Eastern (Poland) Europe; to evaluate their usability, efficiency, user acceptance and market viability; taking into account the very different children's transportation to/from school systems across the different European regions as well as key cultural and socio-economic aspects. The SAFEWAY2SCHOOL concept is based on a holistic approach with a door-to-door perspective. To ensure safe quality of school transportation, several stakeholders need to be involved.

Expected Results

The project's scope includes both software and hardware development. A new sign for school transport will be developed to display on buses that ensure safe school transport. An HMI profile in relation to all situations will be developed – from support systems for the bus drivers to arrival notifications, training schemes and municipality's office.

Acronym:	SAFEWAY2SCHOOL		
Name of proposal:	Integrated System for Safe Transportation of Children to School		
Contract number:	233967		
Instrument:	CP – FP		
Total cost:	3 668 737 €		
EU contribution:	2 764 638 €		
Call:	FP7-SST-2008-RTD-1		
Starting date:	01.09.2009		
Ending date:	31.08.2012		
Duration:	36 months		
Website:	http://www.safeway2school.eu/		
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EC Officer:	Mr. Ludger Rogge		
Partners:	Center for Research & Technology Hellas		GR
	French national institute for transport and safety research		FR
	Amparo Solutions AB		SE
	Fleetech AB		SE
	Swedish Road Administration		SE
	Kuratorium fuer Verkehrssicherheit (Austrian Road Safety Board)		AT
	Università degli Studi di Modena e Reggio Emilia		IT
	Universitaet Stuttgart		DE
	Mizar Automazione SpA		IT
	Instytut Transportu Samochodowego (Motor Transport Institute)		PL
	International Institute for Information Design		AT
	Conncept Swiss		CH
	The Rehabilitation Medicine Clinic, Department of Neuroscience and Locomotion, IKE, Faculty of Health Sciences, Linköping University, Sweden.		
	SE		
	Mälardalen University		SE

SAFEWIN

Safety of winter navigation in dynamic ice

State of the Art - Background

Oil tanker traffic is increasing greatly in the Baltic and winter conditions add to the navigational risks. Most of the damage to ships occurs in moving ice cover. If ships get stuck in dynamic ice, large compressive forces can act on the ship's hull and hull damage or even ruptures can occur. Dynamic ice and compressive ice are the two most important hazards for ships navigating in ice. Figure 1 shows a vessel that has been stopped in compressive ice in the Baltic.

In order to aid ship navigation and reduce risks, ships navigating in sea areas where compression in the ice cover may be expected should be forewarned. The basic ice charts are too general for use in ship operations; these are to be used for planning voyages.

The present operational models provide daily forecasts of ice motion, ice thickness, concentration and ridging. However, there is still a large gap between the needs of the tactical navigation and safety of the shipping and the products provided by the operational sea-ice models.

The target of this research project is to develop information and methods that can be used in predicting the compressive ice, and which can be used operationally. Studies so far have highlighted the risk of dynamic and especially compressive ice but the behaviour of ships in these kinds of ice is not well known.

Objectives

The objectives of SAFEWIN are:

- to develop methods to predict the compression in ice. This objective is related to sea-ice dynamics models that have been developed and which are further developed so as to be suited for operational tasks;
- to develop quantities that can be applied to describing a ship's progress and loading in ice, which can be obtained from ice dynamics predictions;

- to verify the accuracy and applicability of the ship-scale quantities obtained from meso-scale ice dynamics models;
- to develop an operational procedure to describe ice compression in broadcasts to shipping;
- to apply the developed ice compression forecasting procedure to Arctic waters for oil exploration/production facilities.

This project contributes directly towards increasing the safety and efficiency of winter navigation.

Description of Work

The project is divided into eight work packages of which the first and the last are dealing with project management. The remaining six work packages can be divided broadly into four categories (observations, sea-ice modelling, operative forecasts and applications). The links between the different work packages are shown in Figure 2.

The theoretical research work on the sea-ice dynamics models is carried out by AARI, FMI, SMHI and TUT.

Research on the quantities related to ships in dynamic and compressive ice is mainly carried out by TKK, ILS and AS2CON.

The operational forecasting of ice dynamics and compression in ice cover will be made by the ice services participating in the project (AARI, FMI and SMHI).

The applications of the project include the use of operational forecasts of ice conditions, as well as the use of knowledge on ice dynamics and compression on the development of risk control methods for winter navigation and ice management schemes. Here the role of maritime authorities (FMA, SMA) and ship owners (TALLINK, STENA) is crucial. The administrations and ship owners give the scientists in the project access to ships that are operating in ice.

Overall, the partners in SAFEWIN complement each other well in that the whole span of research is covered: from theoretical research via applied research to applications in normal practical operations.

Expected Results

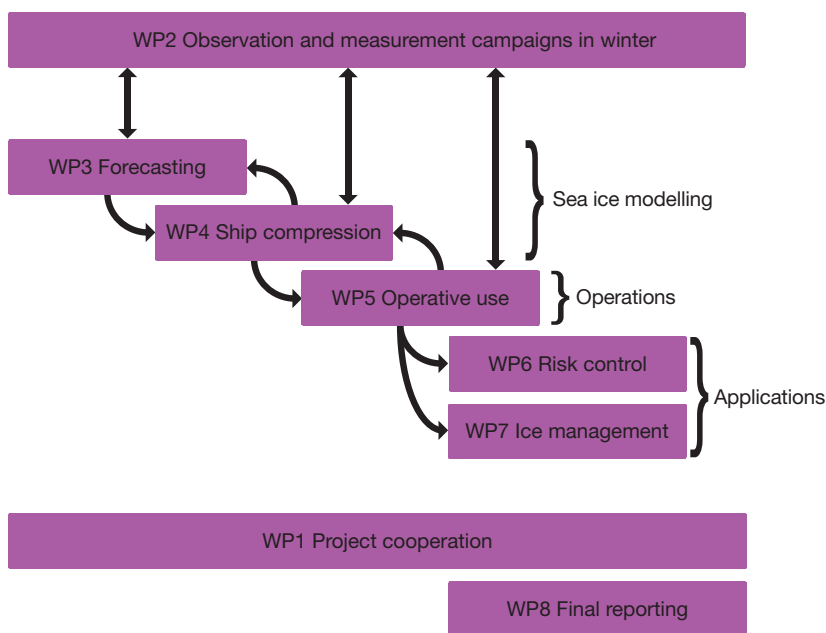
The SAFEWIN project will develop an operative forecasting system for dynamic and compressive ice. The elements of this system include the description of compression – magnitude and direction – in terms of quantities that can be applied to ship operations. Furthermore, the system will include an assessment of the risk of damage for different ice-class vessels and also an estimate of how much the compression in ice cover will impede ship navigation. The use of these forecasts enables the merchant vessels to select safer routes, while

the assisting icebreakers can determine the waypoints for the merchant ship routes based on the most efficient and safe passages. Thus the development of an operative tool for forecasting the hazardous areas of ice compression will improve the overall safety and efficiency of the winter navigational system.

The warning system planned to be developed as one part of SAFEWIN will have a large impact and significantly decrease the risk of ships getting stuck in ice.

Once the real risks are known, these can be taken into account for future ship designs. The risk analysis results can also be utilised when future ice rule requirements are developed.

The technology developed from Baltic Sea models could easily be transferred to any relevant region of the world.



The organisation of the project and links with different work packages

Acronym: SAFEWIN

Name of proposal: Safety of winter navigation in dynamic ice

Contract number: 233884

Instrument: CP – FP

Total cost: 3 826 689 €

EU contribution: 2 923 734 €

Call: FP7-SST-2008-RTD-1

Starting date: 01.09.2009

Ending date: 31.08.2013

Duration: 48 months

Website: <http://www.safewin.org>

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ILS Oy FI
Stena Rederi AB SE
Swedish Maritime Administration SE
Swedish Meteorological and Hydrological Institute SE
Tallinn University of Technology EE
Tallink EE

SAVE ME

System and Actions for VEHICLES and transportation hubs to support disaster Mitigation and Evacuation

State of the Art - Background

Recent events have raised concern among public transit agencies and facility operators regarding the potential for disaster events in tunnels and subways. In essence, the problem is that subway systems are unprepared for the accurate detection of physical disaster incidents and terrorist attacks, as well as quick and optimal mass evacuation. Uncontrolled crowds and poor management of crowds have been known to lead to emergency and panic situations, often resulting in death and injury.

Tools and models are required to study behaviour in emergency and panic situations. A well-prepared system can significantly reduce the impacts of an attack and may discourage such attacks from taking place.

The project will utilise state-of-the-art 'synthetic environment' simulations to realistically model transport facilities, detect incidents and initiate effective evacuation procedures. Arrays of wireless-enabled sensors will deliver a pervasive monitoring capability to existing facilities, and both infrastructure-based and personalised information and guidance systems will be developed and tested in simulation and on-site trials.

Objectives

SAVE ME aims to develop a system that detects natural (e.g. earthquake, fire, etc.) and man-made (e.g. terrorist attacks) disaster events in public transport terminals/vehicles and critical infrastructures (e.g. tunnels and bridges) and supports quick and optimal mass evacuation guidance, thus saving the lives of the general public and the rescuers, and giving particular emphasis to the most vulnerable travellers.



© SAVE ME Project

Location of SAVE ME case studies and trial sites

The proposed project entails important innovations in the area of surface transport systems that are expected to impact greatly on the transportation of the general public. Solutions will be developed for evacuating passengers quickly from large vessels, trains, congested tunnels and terminals, paying attention to the psychological aspects in panic situations. New technologies and innovative solutions will address the improvement of safety and security in transport operations and the protection of vulnerable users such as the elderly, disabled, illiterate and children. The research on completely novel approaches is expected to increase the level of protection for the transport system's users.

All project developments will be thoroughly and repeatedly tested and optimised by lab tests as well as at two pilot sites: a metro station in Newcastle (UK) and the Gotthard Tunnel (CH).

Description of Work

To achieve the above, the project is developing a common ontological framework for hazard recognition, classification and mitigation, innovative algorithms on human behaviour under stress, panic and strong emotions, standardised interface elements for intuitive human guidance, a holistic disaster mitigation strategy and intelligent agent algorithms for guidance personalisation. It employs a Wireless Sensor Network for emergency detection, environmental awareness and travellers' position and movement monitoring, as well as a fault tolerant communication network infrastructure. It integrates simulator model data with real-time data from these sensors in order to obtain enhanced crowd-behaviour models and uses them in a Decision Support System (DSS) to supervise the overall disaster mitigation operation. Thus, it supports the infrastructure operator, guides the rescue teams using personal digital assistants (PDAs) and guides the trapped travellers by environmental displays and audio systems, as well as personalised guidance on their mobile phone, to the nearest safe and clear exit, taking into account their profile (e.g. disability, agility, language, etc.). It also develops appropriate training curricula, and content and tools for operators, rescuers and the general public.

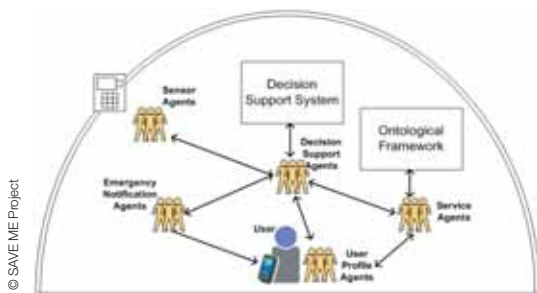
Expected Results

The project will deliver an advanced system for detection and protection.

SAVE ME will develop solutions for the best use of detection technologies in subway systems. Detection, warning and response could be the keywords for every novel technological or research innovation as they are critical for saving the lives of the general public, building on advanced sensor research which has evolved over many years.

SAVE ME is expected to have a major strategic impact in the area of evacuation systems considering the innovations below:

- the standardisation and automation of communication and key actor interfaces, through the use of the ontological framework, will minimise errors and response times;
- the rapid and accurate response in case of disaster, facilitated by the detection and communication infrastructure, will minimise casualties;
- rescue teams will be better prepared and coordinated through the SAVE ME DSS and its much improved dynamic simulation model, thus optimising disaster mitigation and operator control of the situation;
- its individualised guidance (for some users) will avoid panic reactions and help people to remain calm and thus escape the danger;
- the proposed training, guidelines and policies will lead to improvements in the security level of public transport hubs, vehicles and critical infrastructure.



SAVE ME decision support tool concept

Acronym:	SAVE ME	
Name of proposal:	System and Actions for VEhicles and transportation hubs to support disaster Mitigation and Evacuation	
Contract number:	234027	
Instrument:	CP – FP	
Total cost:	3 898 975 €	
EU contribution:	2 914 534 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.10.2009	
Ending date:	30.09.2012	
Duration:	36 months	
Website:	www.save-me.eu	
Coordinator:	Prof. Philip Thomas Blythe University of Newcastle upon Tyne Kensington Terrace UK NE1 7RU Newcastle upon Tyne	
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EC Officer:	Alexandra Gurau	
Partners:	Università di Modena e Reggio Emilia	IT
	Simudyne Ltd	UK
	Ministero dell'Interno – Dipartimento dei Vigili del Fuoco, del Soccorso Pubblico e della Difesa Civile	IT
	Intelligence for Environment & Security - IES Solutions Srl	IT
	Universidad Politécnica de Madrid	ES
	University of Basel - Department of Psychiatry, Center of Applied Technologies in Neurosciences	CH
	Gotthard-Strassentunnel	CH
	Mizar Automazione S.p.A.	IT
	Universität Stuttgart	DE
	Centre for Research and Technology Hellas	GR

SECUREMETRO

Inherently secure blast resistant and fire safe metro vehicles

State of the Art - Background

The aim of SecureMetro is to increase the safety and security of metro vehicles from terrorist attacks by explosives and firebombs through material choices and design, thus increasing resilience and reducing the impact of attacks on people, infrastructure and property.

Rail operation and its infrastructure is critical because, in addition to the human and psychological costs, the economic impacts of a terrorist attack extend to the business and the wider economy.

Specific issues fall into three areas: the cost of replacing lost assets, the loss of revenue/cost of delays and closure during repair to infrastructure, and an impaired reputation as a safe and secure transport system.

There is currently no definitive design guidance for vehicle response to protecting people during a terrorist attack. SecureMetro will address this in three ways:

1. The rail vehicle industry needs input on materials and technologies which can contribute to vehicle security through design.
2. Analysis of previous attacks plus metro-system operator input will be used to draw up design criteria for how a vehicle should behave to protect passengers and staff during a terrorist attack.
3. Project outputs will contribute to EU standardisation and interoperability of vehicles via new issues on standards for the structural integrity of rail vehicles and guidelines for interior performance.

Objectives

The goal of this research project is to develop validated materials selection and design strategies for building metro vehicles with intrinsic security features. The SecureMetro project will consider threats from conventional explosives and firebombs. The four project objectives are:

1. To increase metro vehicle resilience to terrorist bomb blast through the selection of vehicle materials and structural design.
2. To increase security against a firebomb attack through design of fire barriers and fire-suppression technology while also contributing to passenger safety from accidental or vandalism fires.
3. To increase the resilience of vehicles to blasts in order to speed up recovery following attack, allowing the rail system to return to normal operation quickly.
4. To reduce the attractiveness of metro systems as a target for attack by reducing deaths and injuries, increased resilience, reducing economic impact and making recovery faster.

Description of Work

A design methodology will be validated by lab. and larger-scale tests for building a metro vehicle able to cope with blast and firebomb attacks. It will use innovative solutions to integrate and exploit existing technologies, materials and systems to increase vehicle safety and security. Key components:

- Scenario definition: quantification of types of attack, based on previous attacks and forecast of future ones. Risk analysis for such threats will target the most productive ways to 'design-out' attacks.
- Design solutions for intrinsic security: choice of materials for vehicle body, interior and glazing to minimise and contain damage. Innovative materials not currently used in rail vehicles will be tested, and their behaviour under high strain considered. Design of vehicle systems to minimise the chance of derailment, loss of lighting, power, communications or control after an attack will be considered.
- Use of fire and blast modelling software will simulate the effects of terrorist attacks on current state-of-the-art vehicles and those with SecureMetro design solutions.
- Testing materials and vehicle sub-systems to validate design solutions, and modelling predictions.
- Exploitation and development: input in EU guidelines, standards and regulatory environment to integrate inherently more secure vehicle design. Publication and dissemination of literature.

Expected Results

- An appraisal of state-of-art design practices with respect to rail vehicle security.
- Identification of relevant blast and firebomb attacks to be used throughout the project.
- Specification of the desired vehicle performance for the attack cases identified for study in the project.
- Design specification for blast mitigation to protect occupants and rail vehicle structure.
- Design specification for firebomb mitigation to protect occupants, rail vehicle structure and surrounding infrastructure and stations.
- Recommendations for TSI and CEN: relevant technical data will be identified in order to propose additions to standards in vehicle structural integrity and vehicle performance in fire.

Acronym:	SECUREMETRO	
Name of proposal:	Inherently secure blast resistant and fire safe metro vehicles	
Contract number:	234148	
Instrument:	CP – FP	
Total cost:	3 756 628,8 €	
EU contribution:	2 710 714 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.01.2010	
Ending date:	31.12.2012	
Duration:	36 months	
Coordinator:	Mr. Conor O'Neill University of Newcastle Upon Tyne Kensington terrace UK NE1 7RU Newcastle Upon Tyne	
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	INASMET-TECNALIA	ES
	Bombardier Transportation	DE
	Explosivos Alaveses S.A	ES
	STAM S.r.l.	IT
	Istituto Affari Internazionali	IT
	Regie Autonome des Transports Parisiens	FR
	Fundación de los Ferrocarriles Españoles	ES
	Metro Warszawskie Sp. z o.o.	PL
	SUNCOVE SA	ES

SKIDSAFE

Enhanced Driver Safety due to Improved Skid Resistance

State of the Art - Background

Vehicle accidents, where the state of the road surface plays an important role, account for at least 25% of all European road fatalities. The main reason is low levels of friction at the interface between the pavement and car tyres. Depending on the rotational speed of the wheel and the road surface characteristics, once the maximum friction level is reached, the wheel may start skidding. A direct consequence of this is a dramatic loss of the vehicle's braking power and steering capability leading to damage of the pavement and possibly human casualties.

Skid resistance originates primarily from the interaction of road surface asperities with the morphological characteristics of the car tyre. It is an important requirement in the design of safe pavements. Unfortunately, with time and traffic, road surface asperities diminish and consequently skid resistance diminishes, too.

Moisture on the road surface also contributes largely to diminishing skid resistance, because it can act as a lubricant at the tyre-pavement interface. Larger amounts of water (puddles) can also cause the partial or complete separation of the tyre from the pavement due to hydrodynamic stresses. These counterbalance part of the tyre load and result in significant reduction of steering and braking forces. This is known as hydroplaning and its likelihood increases as the pavement surface deteriorates.

Objectives

Recently, several significant developments have been made in tyre design and manufacturing, aiming at improved performance. At the same time, the advent of computational techniques has enabled the development of powerful algorithms which enable simulation of interfacial contact phenomena. Nevertheless, in the vast majority of studies on the topic of tyre-pavement interaction, the pavement has been simulated as either a rigid substrate or by means of very simplistic constitutive assumptions, and emphasis has been placed on the response of the tyre. Yet, it is common knowledge in interfacial science that interfacial response is determined by the characteristics of both contacting bodies.

The SKIDSAFE project aims to examine at a fundamental level the processes taking place at the interface between the pavement surface and the tyre, and the development of laboratory and computational tools for their evaluation. Its main objective and the novelty of the approach is the development of a micro-mechanical, multi-physics computational tool for prediction of the progressive loss of skid resistance at the tyre-pavement interface as a function of the composition of the pavement surface and the deterioration of its characteristics with traffic loading.

Description of Work

In phase 1, the microtextural, geometric and mineralogical properties of typical European aggregates will be measured experimentally. A new interface testing device (ITD) will be developed to measure contact frictional characteristics of various aggregate to rubber interfaces, and

data will be used to develop friction constitutive models for aggregate-rubber friction. Asphalt mix surface texture measurements will be taken to create a realistic finite element (FEM) mesh for 3D FEM simulations of asphalt-mix surface.

Interrelation between asphalt-mix design and in-time development of pavement surface skid resistance will be investigated in the field, supplemented by dynamic non-linear finite element simulations of the interaction between a rolling tyre and the underlying pavement. Such analyses will enable identification and quantification of processes and mechanisms to the in-time development of the recorded skid resistance.

In phase 2, focus will be on the extreme case of skidding due to hydroplaning. An instrumented vehicle will collect data for calibrating an FEM model to simulate hydroplaning.

Based on the computational, laboratory and field studies, pavement management tools will be developed along with protocols to enable users to perform tests, process the results and determine the necessary input parameters for materials outside the SKIDSAFE range.

Expected Results

The SKIDSAFE project will create fundamental knowledge, computational tools, new laboratory testing equipment and pavement management tools. More specifically:

- for the pavement construction industry: design guides for the optimum choice of asphalt-mix components to maximise the overall asphalt-mix skid resistance and minimise in-time degradation.
- for the European road authorities: design guides for safe driving speed limits taking into account the in-time degradation of pavement skid resistance as a function of asphalt-mix characteristics, tyre characteristics and pavement geometry, and the prediction of maintenance intervals.
- for the European Community at large: pavement management tools which will contribute to increased safety and drive comfort on highways.
- for the tyre industry: an operational, fully calibrated computational model for skid resistance evaluation of tyres which can be used for improved tyre design.

Acronym:	SKIDSAFE	
Name of proposal:	Enhanced Driver Safety due to Improved Skid Resistance	
Contract number:	234303	
Instrument:	CP – FP	
Total cost:	4,880,699.00 €	
EU contribution:	3,267,000.00 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.11.2009	
Ending date:	31.10.2013	
Duration:	48 months	
Website:	http://www.skidsafe.org	
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EC Officer:	Ludger Rogge	
Partners:	Laboratoire Central des Ponts et Chaussées	FR
	Aggregate Industries UK Limited	UK
	National Technical University of Athens	GR
	Autostrade per l'Italia S.p.a.	IT
	Geotecnia y Cimientos S.A.	ES
	Ooms Nederland Holding B.V.	NL

SMART RRS

Innovative Concepts for Smart Road Restraint Systems to Provide Greater Safety for Vulnerable Road Users

State of the Art - Background

Recent figures from WHO and ETSC reveal frightening statistics on road traffic accidents

- 1.2 million people worldwide are killed in road crashes every year with up to 43,000 dying in Europe
- Up to 50 million are injured, with at least 600,000 hospital admissions at a European level directly attributed to road traffic accidents. This costs Europe approximately 160 billion euro and uses up 10% of all health care resources.
- These figures will increase by about 65% over the next 20 years unless there is new commitment to prevention.
- This would mean that by 2020 road traffic injuries will be the third leading contributor to the global burden of disease and injury.

Many injuries and deaths are a result of impacts with current road restraint systems

especially in the case of vulnerable road users such as motorcyclists, cyclists and passengers where impacts with supports or edges usually result in amputations or sectioning of torsos in a guillotine effect.

Furthermore, once an accident has occurred, the time between the impact and receiving immediate initial first aid can be crucial, delays in alerting emergency services or incorrect location information given to emergency services can waste potentially life saving minutes for injured people.

This project develops a new smart road restraint system (RRS) that will reduce the number of deaths and injuries caused in road traffic accidents by integrating primary and tertiary sensor systems in a new RRS system: providing greater protection to all road users, alerting motorists and emergency services of danger so as to prevent accidents happening,



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and alerting them of accidents as they happen to maximise response time to the exact location of the incident.

Objectives

The General Objective of this project is to reduce the number of injuries and deaths caused by road traffic accidents to vulnerable road users through the development of a smart road restraint system. This smart restraint system shall:

- reduce the number of accidents through better information on the actual state of the road and traffic flow
- eliminate dangerous profiles from road restraint systems that currently endanger vulnerable road users
- optimise road safety by providing exact information of where and when accidents happen in real-time

The specific objectives of the Smart RRS project are:

To produce systems that are capable of:

- Providing a safe road restraint system free of cutting or dangerous profiles/fixing posts

- Developing this new RRS using new materials and fixations to absorb crash energy in accidents detaining moving objects, vehicles and persons safely
- Providing timely and useful information to road users that will assist in preventing road incidents (Primary safety)
- Providing timely and useful information to emergency services, road authorities and other road users in the event of a road incident (Tertiary safety)

Description of Work

Phase 1: Development of the Intelligent Road Restraint System (IRRS) concept

Analysing the characteristics of Road Traffic accidents, in particular those affecting vulnerable road users, current Standards for RRS and the existing state of the art for these systems.

Phase 2: Development of the IRRS components

On one hand, WP3 focuses on the development of the new barrier structure, focusing on new materials and profiles that will provide



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greater secondary safety protection to all road users, but especially to those who are most vulnerable. These will include the development of finite models for the analysis of the new profiles and components.

At the same time, WP4 and WP5 will focus on the development of the smart systems that will be integrated in the barriers and provide the primary and tertiary safety for road users.

Phase 3: Integration, demonstration and validation of the new Intelligent Road Restraint System

WP6 aims to integrate the components of the new IRRS, demonstrate its efficacy and validate it against the criteria drawn from the conclusions of Phase 1.

Apart from the three technological phases, WP7 will address the "Dissemination and exploitation plan" and WP8 will address the Management of the Project.

Expected Results

The smart rrs project is a complex project with more than 50 intermediate deliverables showing the achievements of the project. Some of them are reports and some prototypes.

But the final result of the SMART RRS project is the development of a smart road restraint system integrating primary and tertiary sensor systems in an innovative profile design barrier.

Other additional expected results of the project will be the development of the management system associated with this system and also new testing methods for evaluating RRS, updating current testing procedures and result in the retrieval of new data which will assist in the research and development of improved RRS.

Our final desired result is the improvement of road safety.

Acronym:	SMART RRS	
Name of proposal:	Innovative Concepts for Smart Road Restraint Systems to Provide Greater Safety for Vulnerable Road Users	
Contract number:	218741	
Instrument:	CP – FP	
Total cost:	3 420 974 €	
EU contribution:	2 193 662 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	03.11.2008	
Ending date:	02.11.2011	
Duration:	36 months	
Website:	http://smarrrs.unizar.es	
Coordinator:	Dr. Juan J. Alba López Universidad de Zaragoza - I3A C/ María de Luna 3 ES 50018 Zaragoza	
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	Essex County Council	UK
	TRW LIMITED	UK
	Federation of European Motorcyclist's Associations	BE
	Università degli Studi di Firenze	IT
	MOUCHEL LTD.	UK

SUSY

Surfacing System for Ship Recovery

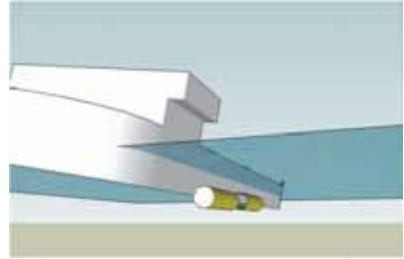
State of the Art - Background

Currently specialist submarine rescue systems are used by salvage and rescue teams to recover stricken vessels, but by the time these bulky systems arrive at disaster scenarios, such as collision, sinking and capsizing of merchant vessels, the environmental and economic damage is often already done.

The aim of the project is to develop a modular rescue system which can be deployed easily to stabilise a vessel for a significant amount of time, allowing measures to be taken to rescue life and avoid polluting the sea. The essential idea is for gas generators to rapidly blow out water from ballast tanks and inflate balloons to provide buoyancy while preventing more structural damage. Therefore the existing technology needs to be further developed: firstly, existing gas generators and high pressure air devices need to be smaller and the gas production needs to be adaptable to different scenarios; secondly, air lift balloons need to be improved by developing new combinations of materials to withstand the stresses involved in deployment and operation; thirdly, prototypes and methods of deployment should be created so as to work within the limitations of divers and underwater vehicles. Finally, SuSy will produce the first simulator with commercial potential that is capable of modelling the impact by using buoyancy systems to stabilise or resurface ships.

Objectives

The main idea of the proposed project SuSy is to take well known submarine rescue technology and develop it for systems to be used for merchant ships in emergency situations. The submarine system is based on satellite booster technology which uses liquid or solid fuel to blow water out of the ballast tanks in a very short time to provide additional buoyancy to stop an uncontrolled diving process. This technology provides the means to generate



Underwater air lift bags

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up to 500 cubic meters of gas within 15 seconds under atmospheric pressure. The combination of this technology with air pressure systems and balloon technology will be used to create a multipurpose modular system for ship rescue purposes.

In order to apply these technologies to ship stabilisation and rescue scenarios it will be necessary to not only develop and test the system based on liquid or solid fuel boosters combined with air pressure for gas generation, but also to find the right materials for balloons so that they can cope with the pressure of the temperature and the dynamic loads of a rescue scenario.

Different system configurations and fitting technologies will be evaluated using life-cycle cost analysis, mathematical models of the system, lab-based experiments and open-water demonstrations.

Description of Work

The project is divided into five work packages (WP).

WP1 will define the types of accidents where the buoyancy rescue concept is suitable and will clearly define the cases where it is not appropriate. The typical scenarios where it is useful will be analysed further so as to define the system concept specification and select scenarios for further research where the impact is expected to be greatest.

WP2 will define the technical requirements related to the different technologies and selected scenarios and specify a system concept based on the system boundaries and requirements of the users.

WP3 aims to produce integrated prototypes of the buoyancy devices and the gas generators on the basis of laboratory testing and simulation. In addition, a simulation will be developed to address a ship's structural behaviour and stability during stabilisation. WP4 will demonstrate the system in open water using a pontoon to simulate a semi-submerged distressed ship or a shipwreck lying on the seabed.

WP5 will produce a life-cycle cost model. This model will be able to include the costs for design, assembly and maintenance of the SuSy equipment. The model results will be used to evaluate the technical and economic feasibility of the concept.

Expected Results

The project is expected to produce a ship-surfacing system based on a combination of advanced technologies as well as simulations to significantly assist distressed ships and reduce loss of life, oil spills and ship losses. The results will include improvements to the underlying technology components and to methods for using them in specific scenarios:

- gas generators;
- high-pressure air devices;
- high-tech textiles;
- underwater vehicles;
- simulation technologies;
- tactics for deploying stabilisation technologies.

Acronym:	SUSY	
Name of proposal:	Surfacing System for Ship Recovery	
Contract number:	234151	
Instrument:	CP – FP	
Total cost:	4 015 891 €	
EU contribution:	2 650 000 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.09.2009	
Ending date:	31.08.2012	
Duration:	36 months	
Website:	http://www.bmt.org	
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EC Officer:	Michal Klima	
Partners:	Astrium GmbH Bremen	DE
	bfa-Augsburg Ballonfabrik See- und Luftausrüstung GmbH & Co. KG	DE
	BALance Technology Consulting GmbH	DE
	Bureau Veritas - Registre international de classification de navires et d'aéronefs SA	FR
	DCNS	FR
	University of Strathclyde	UK

THOMO

Development of a Finite Element Model of the Human Thorax and Upper Extremities



State of the Art - Background

In the European Union (EU) in 2004, there were 42 193 road fatalities and 1 213 300 accidents involving injuries. The socio-economic cost of road crashes to the EU 15 is twice the EU's annual budget. The number of casualties is so big that it should be reduced by all available ways: public regulation, prevention/education of road users, road infrastructure, compatibility between vehicles, and active, passive and tertiary safety devices.

With the rapid advances being made in finite element modelling and computational technology, human body models could become the mainstream tool for assessing vehicle safety designs.

To date, several numerical models of human body coexist. The major issues are the validation of injury mechanisms, their associated criteria, taking into account the inter-individual variability.

Because the assessment of occupant safety is a worldwide problem, a consortium of American, Asian and European car manufacturers and suppliers (GHBMC) decided in 2006 to combine their efforts for the sake of a "single global effort to create and maintain the world's most biofidelic human body models."

In 2007, the THOMO partners decided to contribute to this ambitious program, through the University of Virginia, which is the center of expertise for the thorax and upper extremities.

* GHBMC stands for Global Human Body Model Consortium

Objectives

The main objective of THOMO is to develop a finite element model of thorax and upper extremities, exhibiting the hard tissue injury mechanisms. The baseline CAD's and meshed models of the GHBMC will be used in order to implement THOMO and to disseminate the THOMO results.

The scientific and technological objectives are as follows:

- The identification of all necessary anatomical details in the models to be developed in order to reproduce body kinematics, mechanical responses, and all targets of induced injuries during the dynamic loading of crash events on computer.
- The creation of new validation targets, appropriate to numerical modelling and exhibiting the rib fracture mechanisms.
- The analysis of geometrical rib properties by acquisition of μ -CT scan data on PMHS.
- The assessment of the contribution of personalization methods in relation to the refinement of soft tissues' material properties.
- The assessment of usual scaling methods regarding the biofidelity targets.

Description of Work

The project is divided into four technical Work Packages (WPs):

WP1 aims to develop a baseline template thorax model for the male 50th percentile. For a "biofidelic" description of the rib fracture mechanisms, a modelling strategy will be defined with:

- A better description of the shoulder complex through an autopsy.

- A numerical pre-study in order to use the most appropriate modelling options.
- The most relevant data regarding the material properties from the literature.

WP2 aims to set up a database of post-mortem human subject (PMHS) tests coming from:

- a review of existing data,
- a new dataset of geometrical rib properties by using a μ -CT-scan,
- a new dataset of global geometry by using a standard CT-scan, and
- a new dataset of dynamic realistic PMHS tests with more than 100 strain gages on the ribcage, whose goal is to define typical rib strain patterns depending on the thorax loading.

WP3 is dedicated to the validation of the template thorax model. Two main objectives are carried out:

- the validation of kinematics with existing data, and
- the validation of rib strain fields with data created in the WP2. At first, the baseline template model will be geometrically adapted to the tested post-mortem human subject using a scaling method. Subsequently, an optimization process on the personalized thorax models will be used in order to stress the range of acceptable material values.

WP4 is dedicated to the development of a family of thorax and upper extremities models, with the use of scaling methods. The validation includes numerical robustness and biofidelity targets. A comparison with usual scaled targets will be performed.

Expected Results

The main deliverables are:

New biomechanical data:

- A dataset of 18 dynamic PMHS tests fully instrumented with more than 100 strain gages, pressure sensors, accelerometers on the ribcage, for typical loadings (including seven tests on the 5th percentile female).
- A set of 18 global CT-scan data for each tested PMHS.
- A set of μ -CT scan data of the PMHS ribs with an analysis of the most relevant parameters.
- A dataset on the rib material properties.
- An in-depth autopsy of the shoulder complex.
- Strain fields' corridors for different loadings (belt, harness, airbag, hub).

Thorax and upper extremities FEM model(50th percentile male):

- the validation of kinematics and global behavioral mechanics,
- the exhibition of rib fracture mechanisms, and
- numerical robustness.

A set of personalized thorax FEM models:

- the comparison of numerical mechanical and injury results/physical results, and
- a range of acceptable material values, especially for the soft tissues.

A family of thorax models (different percentiles, male and female):

- the assessment of existing scaling methods regarding the biofidelity targets.

The dissemination of results through publishing activities and participation in the FP7th COVER project.

Acronym:	THOMO	
Name of proposal:	Development of a Finite Element Model of the Human Thorax and Upper Extremities	
Contract number:	218643	
Instrument:	CP – FP	
Total cost:	2 655 175 €	
EU contribution:	2 065 269 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2009	
Ending date:	30.06.2013	
Duration:	42 months	
Website:	http://www.thomo.eu	
Coordinator:	Mr. Pascal Baudrit Centre Européen d'Études de Sécurité et d'Analyse des Risques (C.E.E.S.A.R.) Rue des Suisses FR 92000 Nanterre	
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	University of West Bohemia	CZ
	Politechnika Warszawska	PL

THORAX

Thoracic Injury Assessment for Improved Vehicle Safety

State of the Art - Background

Recordings from trauma centres worldwide indicate that thoracic injury directly accounts for 20-25% of traffic deaths due to trauma. Previous projects, including EC Framework projects such as FID, PRISM and VC Compat have examined the frequency of thoracic injuries in road accidents in Europe. The FID project (2000) clearly showed that the head, and especially the thorax, were the bodily regions most severely and most frequently injured. In accidents with airbag deployment, the injury severity of head injuries decreased considerably, while the percentage of severe thorax injuries remained almost unchanged. The results from FID were updated by the PRISM project (2003), which confirmed that thorax injuries were a major factor in accidents involving serious injury or fatality. Also, accident analysis of the VC Compat project showed that females are at a higher risk than males, which attributed to the fact that vehicle crash performance is evaluated using crash dummies that represent the average male only. Various studies have shown that the human thorax is subject to large biometric variations and changes in injury tolerances over age due to geometry and material changes in bones.



Computed tomography reconstructed lateral views of the thoracic cage (bone window) of a 17 year-old female (left) and a 64 year-old male (right) illustrating age-related change (Kent et. Al.).

Objectives

A) General objectives

A.1) To address thoracic injuries under real world loading conditions for a wide variety of occupants (age, gender, size) by providing improved biomechanical knowledge and tools for usage in restraint optimization.

A.2) As such, to contribute to the introduction of new restraint technologies that further reduce road fatalities and injuries.

B) Specific project goals:

B.1) The identification of the two most relevant thoracic injury types for car occupants in view of societal relevance, taking into account user diversities like age, gender and size (M6).

B.2) The characterization of injury mechanisms and governing parameters for these two injury types, quantifying effects of user diversities like age, gender and size (M12).

B.3) The definition of injury mechanisms and related physical parameters based on PMHS test data and advanced HBM simulation for use in supplementary virtual testing procedures that take into account a wider range of biometric and biomechanical criteria than those recorded on dummies (M24).

B.4) A mechanical demonstrator consisting of a new dummy thorax and shoulder design capable of representing the identified injury mechanisms under real world loading conditions developed and implemented in a THOR NT frontal crash test dummy (M30).

B.5) Derived injury risk functions specific to the developed numerical and hardware demonstrators, differentiating between genders, age, groups and sizes (M30).

B.6) The sensitivity of the demonstrator to modern vehicle safety systems and usability in safety system optimization evaluated by industry partners (M42).

Description of Work

To realise the project goals, while taking into account results from previous projects, a structure of six Work Packages (WPs) has been defined. WP1 dealing with accident analysis, WP2 with detailed biomechanical studies into injury mechanisms and governing parameters, WP3 with the development of demonstrator hardware and WP4 with the assessment of the demonstrator, evaluating its sensitivity to modern vehicle safety systems. Management and dissemination are performed in WP5 and 6 respectively.

Expected Results

The main output of WP1 "Accident Analysis":

- An inventory of serious thoracic injuries by occupant characteristics (age, gender and size) and their statistical relevance based on an analysis of real world accident data.
- An overview of differences between real-world accident data and crash test outcomes in terms of thoracic injuries and occupant characteristics.
- An estimation of injury reduction potential for different occupant sizes and ages, and total benefit expected to arise from the project.

The main output of WP2 "Biomechanics":

- Biomechanical requirements for enhanced shoulder thorax complex in frontal crash test dummies related to different genders, ages and sizes (hence also other sizes than an average male will be considered).
- Design concepts for an improved dummy thorax/shoulder complex to be developed in WP3.
- The definition of injury mechanisms and related physical parameters for different ages, genders and sizes based on data-sets from PMHS tests and advanced HBM simulations.
- Thoracic injury risk curves for the developed human body models and dummies.

The main output of WP3 "Demonstrator development and evaluation":

- A validated demonstrator dummy with improved upper torso complex.
- A Related Finite Element Model to be used in data analysis of WP4 test results.

The main output of WP4 "Assessment of potential for restraint optimization":

- The evaluation of demonstrator dummy w.r.t. its potential for optimising settings in modern restraint systems.
- Optimised restraint settings for real world load cases based on the latest biomechanical know-how related to thoracic injuries.

Acronym: THORAX

Name of proposal: Thoracic Injury Assessment for Improved Vehicle Safety

Contract number: 218516

Instrument: CP – FP

Total cost: 5 052 546 €

EU contribution: 2 968 850 €

Call: FP7-SST-2007-RTD-1

Starting date: 01.02.2009

Ending date: 31.07.2012

Duration: 42 months

Website: <http://www.thorax-project.eu/>

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Partnership for Dummy Technology and Biomechanics GbR DE
Continental Safety Engineering International GmbH DE
Uniresearch BV NL
Universidad Politécnica de Madrid ES
Institut National de Recherche sur les Transports et leur sécurité FR
TRL LIMITED UK

TRANSFEU

Transport fire safety engineering in the European Union

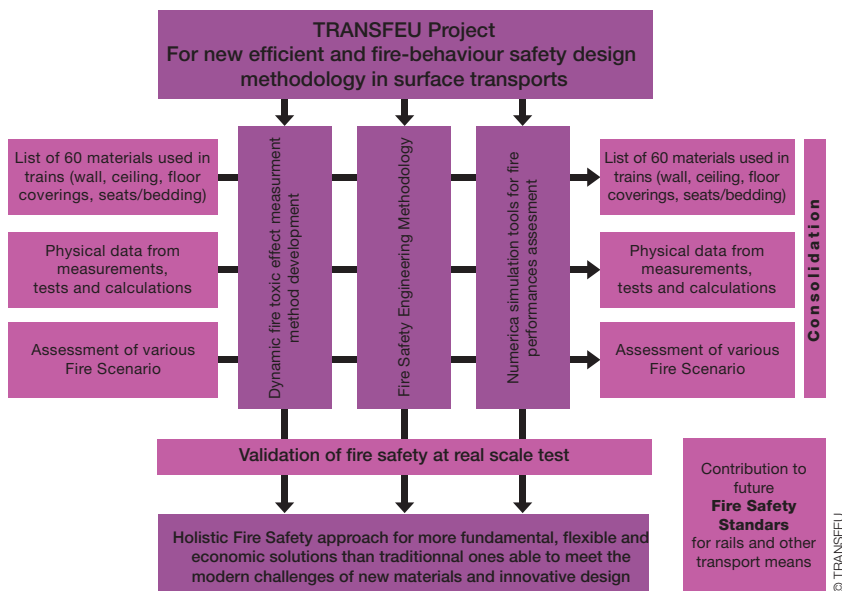
State of the Art - Background

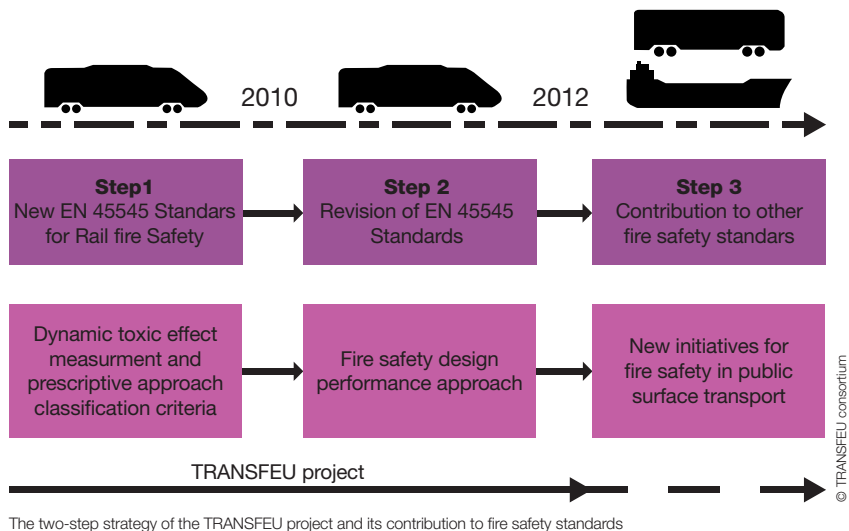
Public surface transport methods are relatively safe but there is still a risk of fire. It can be very dangerous for passengers, especially with toxic fire effluents from various materials which prevent people from evacuating the transport vehicle in time. The level of toxic effects in materials and their toxicity classification is very important but also difficult to assess in order to estimate safe evacuation conditions for passengers.

In railway vehicles, the current test method of toxic evaluation and classification of products are described in the Technical Specification 45545-2. However there is no harmonised measurement method so there is a lack of confidence in the robustness of the existing

classification and no method of comparing different national requirements for toxicity.

In order to improve European fire safety standards in railway and other surface transport, a new prescriptive classification of products based on dynamic measurements of effects from various toxic materials is needed. TRANSFEU will provide a realistic classification system for assessing toxic gases from fires in trains and support the European standardisation and harmonisation. It will also extend the principles of Fire Safety Engineering (FSE) to railway vehicles and other surface transport, providing many clues which go far beyond the state of the art regarding the simulation tools.





The two-step strategy of the TRANSFEU project and its contribution to fire safety standards

Objectives

TRANSFEU is developing a Fire Safety Engineering methodology adapted to surface transport that includes innovative fire numerical simulation tools and toxic gas tests. In order to attain this, a new accurate tool for measuring toxic gas from fire effluents under dynamic conditions for transport applications will be developed. The programme will collect all the necessary data for the mathematical models, as well as data for about 40 products that are used in the building and fitting of trains regarding the release of heat to predict the temperature, the optical density of smoke to predict the visibility level, the critical flux and the time to achieve it. TRANSFEU will define the EN 45545-2 standard for conducting the measurements and classifying the products. Models will then be realised to predict the fire behaviour and growth in the transport scenario. The accuracy of these predictions has to be validated either by tests on real scale, when possible, and/or by scale models, when necessary. These tests, methods and tools will contribute substantially to the future standards of the European railway and waterborne vessel industries for enhanced safety based on a performance approach.

Description of Work

The work is divided into work packages (WP).

WP1 concerns the project management and follow-up of all the activities of the project.

WP2 focuses on the development of a small-scale test method using a dynamic procedure to measure the type and quantity of toxic gases produced during the combustion of products used in transport. This method will be used for the classification of products that reach the incapacitation and lethality thresholds in the specific scenarios in WP4.

WP3 deals with the development of a classification system for the toxicity of fire effluents from products on railway vehicles, which will be based upon a conventional prescriptive approach that will be included in the future European norm.

WP4 develops a holistic FSE methodology with special regard to evacuation, rescue, structural integrity and tenability conditions inside the transportation system.

WP5 is dedicated to the development of numerical simulation tools for fire performance and evacuation of people, and a decision tool for the train design.

WP6 addresses the validation of the conventional pragmatic toxicity classification system (VWP3) and the simulation tools (WP5).

WP7 monitors the progress in the project and integrates the research activities as well as disseminating and exploiting the research results to the community.

Expected Results

TRANSFEU addresses fire prevention problems and the safety of passengers and crew, and its results will be used to finalise the EN 45545-2 standard, thus completing the CR TSI, SRT TSI and HS TSI. TRANSFEU will define the EN standard for conducting measurements and classifying products. Models will be realised to predict the fire behaviour and growth in the transport scenario.

The safety levels will be calibrated according to the operation category of train in relation to the risk to be considered for passengers. This will allow using products and materials from new generation systems.

The project gathers leading European railway manufacturers, research organisations and standardisation bodies who offer a realistic alternative to American standards in these large European projects.

More precisely, the expected results are:

- a new generation of realistic dynamic measurement methodology for the emission of toxic fumes in the event of fire;
- cost-effective methods and modelling tools for fire safety design able to predict realistic fire behaviour and the time to reach unbearable conditions within a passenger rail vehicle or in a vessel. Simulation tools will provide fire guidance on the design, fire safety measures and ways of exploring alternative designs;
- significant contribution to future fire safety standards for all means of surface transport.

Acronym:	TRANSFEU	
Name of proposal:	Transport fire safety engineering in the European Union	
Contract number:	233786	
Instrument:	CP – FP	
Total cost:	5 547 813 €	
EU contribution:	3 658 183 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.04.2009	
Ending date:	30.09.2012	
Duration:	42 months	
Website:	http://www.transfeu.eu	
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Partners:	L.S. Fire Testing Institute Srl	IT
	Association of the European Railway Industry	BE
	Secretariat of CEN/TC 256 'Railway Applications' Hold by DIN FSF	DE
	Bombardier Transportation UK Ltd	CH
	Exova Warringtonfire	UK
	CURRENTA GmbH & Co. OHG	DE
	Valtion Teknillinen Tutkimuskeskus	FI
	SP Technical Research Institute of Sweden	SE
	Bergische Universität Wuppertal	DE
	BRE Global Ltd	UK
	Siemens Aktiengesellschaft	DE
	Centrum Naukowo-Techniczne Kolejnictwa	PL
	Fundación Cidemco	ES
	Deutsche Bahn AG	DE
	Trenitalia S.p.A.	IT
	Régie Autonome des Transports Parisiens	FR
	Société Nationale des Chemins de Fer Français	FR
	Alstom Transport SA	FR
	AnsaldoBreda S.p.A	IT
	Alma Consulting Group SAS	FR

TULCS

Tools for Ultra Large Container Ships



State of the Art - Background

The increase in world trade has largely contributed to an increase in sea traffic. As a result, the market demand is leading towards Ultra Large Container Ships (ULCS), which have a capacity of up to 14,000 TEU and a length of up to 400 m., without any changes to the operational requirements (speed around 27 knots). The particular structural design of the container ships leads to open midship sections, resulting in increased sensitivity to torsional and horizontal bending loads which are much more complex to model numerically. At the same time, due to their large dimensions, the ULCS become much 'softer' and their structural natural frequencies become significantly lower so that the global hydro-elastic structural responses can become a critical issue in the ship design and should be properly modelled by simulation tools. But it appears that the existing simulation tools do not provide the definite answer to all these design issues and there is a clear need for their improvement.

Due to their inherent properties, ULCS experience quite high elastic deformations. Their structural natural frequencies are low enough for sea waves to transfer enough energy for hull girder vibration/excitation. In such cases, a complete study of the interaction between the hydrodynamic environment and the elastic structure needs to be undertaken.

Objectives

The ultimate goal of the present project is to deliver clearly validated design tools and guidelines, capable of analysing all hydro-structure interaction problems relevant to ULCS. In order to achieve this, a combination of numerical developments, model experi-

ments and full-scale measurements will be used.

Three main physical problems are identified and for each of them a dedicated work package (WP) is created:

- global quasi static wave loading and responses;
- global hydro-elastic wave loading and responses;
- local hydrodynamic loading and responses.

Depending on the complexity of the considered physical phenomena, the degree of validation required for the existing tools varies considerably. Within this project, the modelling work will mainly consist of coupling and validating integrated modules rather than actually developing new models from scratch. This will significantly reduce the technical risk of this project.

Description of Work

The TULCS project will consist of nine inter-dependent work packages for the technical work.

The consistency of the technical activities, towards the achievement of the primary and secondary objectives, will be ensured by starting the project by specifying the end-user requirements (WP2), which will be further used to specify the details of the technical developments in WP3 to 7.

The core of the project is in WP3 to 7, where numerical models of quasi static and hydro-elastic loads and responses will be developed and validated thanks to model tests and full-scale measurements.

The results from the technical models will be integrated into tools in WP8. The project coordination will continuously monitor the consistency of the work and the interfacing between the modules developed in WPs 3 to 5, and the validation of the modules and their integration with respect to measurements in

WP6 and WP7. Finally, the performance and robustness of the integrated tools will be assessed in WP9.

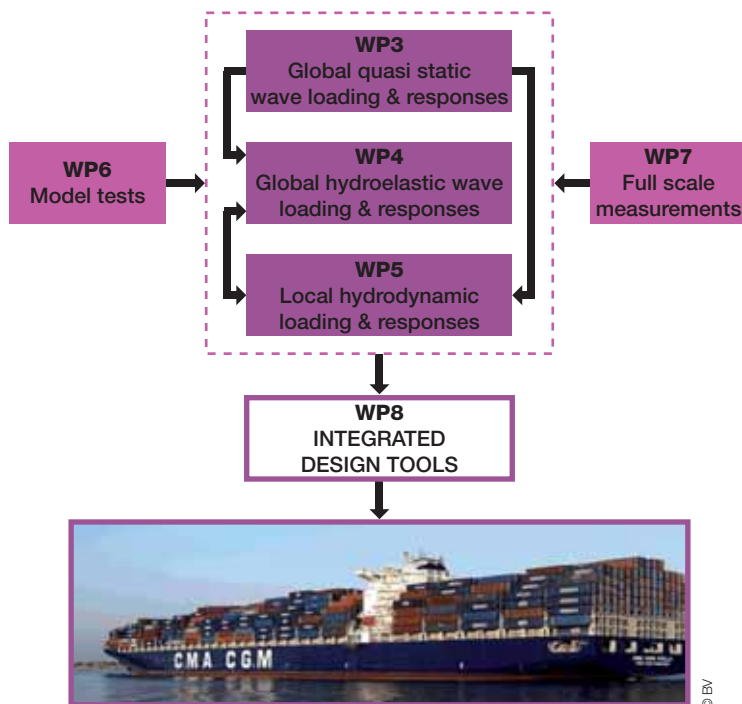
Expected Results

This proposal aims at providing design tools to prevent risks associated with extreme ship motion and the structural issues of Ultra Large Container Ships.

At the end of this project, an integrated design tool prototype will be available, which will provide the designer with accurate information on the ship structural deformation and strains. This tool will be an open and modular platform, which will allow future replacements or upgrades to the various calculation modules. Demonstration of the tool applicability and user guidance will also be produced in the project.

The tools developed in this project could have many applications:

- building the operator guidance manuals which can be used by ship crews in order to avoid dangerous operating situations, which are likely to lead to the structural failure or to reduce the fatigue life of the ship;
- allowing the designer to account for the hazards specific to ULCS at the beginning of the design phase;
- modifying the tool prototypes accounting for the lessons learned in this project;
- defining the use of the integrated design tool within the current regulatory framework. Bureau Veritas will incorporate the tool in its internal process for rule and approval making for ULCS.
- commercialisation of the tools;
- training.



General work plan scheme

Acronym:	TULCS	
Name of proposal:	Tools for Ultra Large Container Ships	
Contract number:	234146	
Instrument:	CP – FP	
Total cost:	4 048 192 €	
EU contribution:	2 718 482 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.06.2009	
Ending date:	30.05.2012	
Duration:	36 months	
Coordinator:	Dr. Malenica Sime	
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	Odense Steel Shipyard Ltd	DK
	Canal de Experiencias Hidrodinámicas de El Pardo	ES
	Ecole Centrale Marseille	FR
	Technical University of Delft	NL
	Faculty of Mechanical Engineering and Naval Architecture	HR
	Technical University of Denmark	DK
	University of East Anglia	UK
	SIREHNA	FR
	Wikki Ltd	UK
	HydrOcean	FR
	Brže Više Bolje d.o.o.	HR

TYROSAFE

Tyre and Road Surface Optimisation for Skid Resistance and Further Effects

State of the Art - Background

Drivers need grip between their tyres and the road to accelerate, decelerate or change the direction of a moving road vehicle. Grip is provided by the skid resistance properties of the road surface in combination with the friction characteristics of the tyre.

This combination is critical for safe driving and many European countries have investigated the correlation of a low skid resistance level with accident hot spots. With a sufficiently high value of skid resistance the safety of roads can be improved and the number of accidents can be reduced.

Therefore skid resistance is a very important characteristic of the road surface influencing safety particularly because it can be improved by the design of the road surfacing. Yet a harmonized European scale for the measure-

ment and assessment of skid resistance still remains to be developed.

Today, when environmental questions like noise, air quality and consumption of energy are becoming more and more important, any consideration of the safety benefits of improved skid resistance needs to focus on rolling resistance and noise emissions as well. Currently the properties of road surfaces and tyres are not optimised to balance all of these properties evenly. Knowledge of how they interact with each other is very limited, especially in the case of road surfaces.

Moreover, the policies and standards of individual countries relating to skid resistance, rolling resistance and noise emissions vary considerably across the EU. Despite some previous activities there is a need to bring ideas together and establish what scope there is for developing a harmonised approach for the future.



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Skid resistance measurement devices in Europe

Objectives

The first objective of the TYROSAFE project is to raise awareness of the importance of research into the three key road surface parameters: skid resistance, rolling resistance and noise emission by taking stock of what has already been achieved.

The second objective is the coordination and preparation for European harmonisation and optimisation of the assessment and management of essential tyre/road interaction parameters.

A third objective is the improved understanding of the interactions among the road surfaces properties including the identification of knowledge gaps and needs for future research.

The fourth objective is to raise awareness of the importance of these road surface properties and their impact on safety and the environment.

The final and overall objective is to increase European road safety and support the green- ing of European road transport.

Description of Work

The TYROSAFE project is organized in six Work Packages (WPs).

In WP1 the policies of EU countries concerning skid resistance, rolling resistance and noise emissions are investigated and analysed, and recommendations for the future development of policies are derived. This work package also provides basic information for the other work packages.

WP2 deals with the harmonisation of skid-resistance test methods including a review of previous projects and activities concerning skid resistance measurements. The partners are working out roadmaps and an implementation plan for the harmonisation of measuring methods. A common European scale for this critical road surface property will be a great step forward to promoting road safety.



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Tyre-pavement interaction

WP3 looks more at the scientific knowledge concerning how parameters of road surfaces and tyres influence the target properties skid resistance, rolling resistance and noise emissions. It also identifies the interdependencies and optimisation potentials for each of the properties as well as still existing knowledge gaps. This work packages supplies information to work packages 2 and 4.

WP4 investigates the environmental effects and the impact on climatic change of pavement properties.

WP5 supports the other work packages with activities aimed at dissemination and raising awareness. These activities include a website presenting the project activities and results, newsletters, papers and presentations at international conferences, consultations with stakeholders, linking to other projects and experts groups, and supporting any EU activities to highlight the importance of research in this field.

WP6 is concerned with the overall project management.

The project will use expert and stakeholder workshops and groups as its main techniques of gathering external input. The partners themselves will also draw on their own substantial expertise to achieve the project goals.

Expected Results

The TYROSAFE project will create synopses of previous activities, compile the available expertise into reference documents, design recommendations, guidelines and roadmaps for future activities and projects and identify knowledge gaps. The most important deliverable documents are:

- the recommendations for future policies concerning road surface properties,
- the roadmaps and implementation plan for skid resistance measurement harmonisation,
- the report on the influence of road surface properties on skid resistance, rolling resistance and noise emissions and their interdependencies, and
- the investigation of their interaction with climate change.

Together with the awareness created among stakeholders, experts and the wider public through the dissemination activities, the project results will help to shape future policies concerning road surface properties, which in turn will support both an increased level of road safety as well as the greening of European road transport.

Acronym:	TYROSAFE	
Name of proposal:	Tyre and Road Surface Optimisation for Skid Resistance and Further Effects	
Contract number:	217920	
Instrument:	CSA – CA	
Total cost:	1 165 359 €	
EU contribution:	1 165 359 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.07.2008	
Ending date:	30.06.2010	
Duration:	24 months	
Website:	http://tyrosafe.fehrl.org	
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EC Officer:	Grzegorz Domanski	
Partners:	Bundesanstalt für Straßenwesen (BASt)	DE
	Rijkswaterstaat Dienst Verkeer en Scheepvaart (RWS)	NL
	Laboratoire Central des Ponts et Chaussées (LCPC)	FR
	TRL Limited (TRL)	UK
	Zavod Za Gradbenistvo Slovenije (ZAG)	SI
	FEHRL AISBL (FEHRL)	BE

ARIADNA

Maritime Assisted Volumetric Navigation System

State of the Art - Background

ARIADNA deals with the following concepts:

Inland waterway navigation: River Information Services (RIS) are harmonised information services supporting traffic and transport management in inland navigation. The present tracking and tracing functionality does not support any risk assessment and collision avoidance functionality.

Sea navigation: The International Association of the Marine Aids to Navigation and Light-house Authorities (IALA) does not include ship support tools to be developed in ARIADNA.

Channel navigation systems: Navigation in channels represents problems, i.e.: wind, current and waves. Local and transit traffic complicates the control of navigation as both transport types have different navigation/communication equipment.

Collision avoidance: The manoeuvring performance of a big, single screw, non CPP ship (extreme case) depends on the ship design, the turning ratio at different speeds, as well as winds and currents. Work published by IMO Collision Regulations, IALA and national administrations address routing recommendations for specific "hot spots".

Route planning: The ARIADNA concept does not focus on the whole ship route but just on the critical part of it: the port or dam access, approaching of straits, course changes, cape turns, addressing the optimal use of maritime and river infrastructures, channels, port accesses, and congested routes.

Objectives

The objective of the project ARIADNA is to design a new concept and build a new series of navigation support systems to allow optimisation of the maritime infrastructures, the navigation on dense traffic in ports and



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access areas, rivers, channels, lock access areas, and traffic separation areas as well leading to efficient (in terms of capability and economic terms) and environmentally-friendly operations.

ARIADNA is based on the implementation of the Volumetric Navigation System (VNS) concept. A Volumetric Navigation System (VNS) defines 3D volume dimensions used to define the position of an associated volumetric envelope in a certain time. In the maritime navigation the "volume" of the ship is the envelope of the ship after a given time. Horizontal dimensions of this ship's envelope will consider his current speed and also from his extreme stopping and manoeuvring capabilities from the given speed and load, and correction for the drift due to local measured wind and mapped currents. The vertical dimension in navigation at sea is the water distance below the keel at fore and the aft of the ship and the sea bottom as given by cartography and tide. The display may overlap the Electronic Chart Display and Information System (ECDIS) screen. VNS is a human error avoiding tool for collision avoidance, manoeuvring and navigation in low separation traffic lines and channels, crossings, port traffic, and congested shallow waters.

Description of Work

The main objective of WP1 is to define the baseline of the work to be performed by the ARIADNA project by defining the state of the art, and the analysis of the current situation of navigation systems in shipping in Europe. The necessary requirements for an ARIADNA System, both from the functional and technical point of view will be defined.

WP2 will define and manage general, functional and technical requirements based on the analysis of the user new functionalities versus state of the art. System design from the system specification and analysis of alternative physical solutions will be obtained. The WP will also define a system assembly, integration and validation plan.

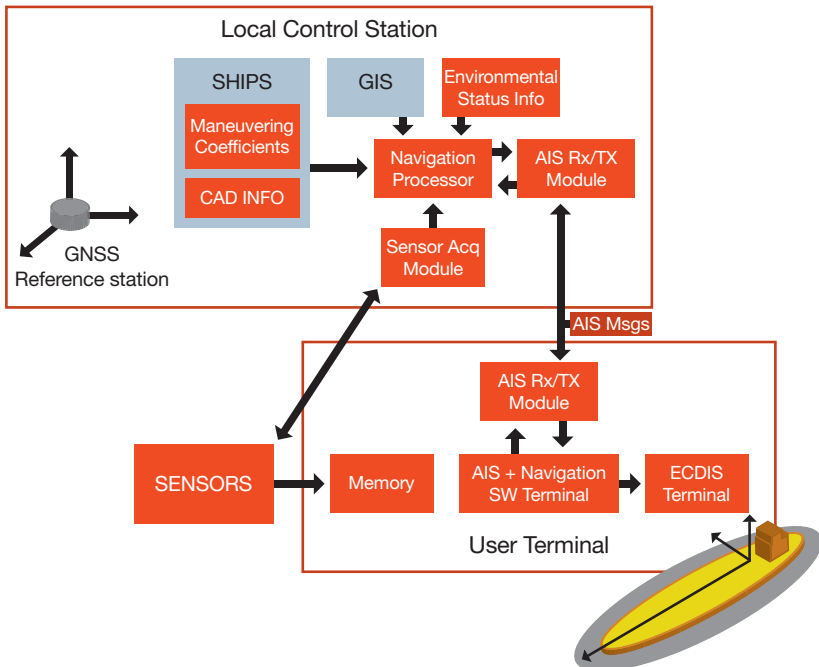
The objective of WP3 is to carry out the complete design and development cycle of an ARIADNA prototype with the previously designed architecture comprising each sub-

system of ARIADNA system (GIS & Volume Geo-referencing, Communications, Data Filtering and Representation, Navigation & Traffic Management and User Terminal). One Local Control Station (LCS) and two User Terminals (UT) will be developed.

The objective of WP4 is to test and validate the ARIADNA system performance by means of a field test in a real-life environment under normal operations conditions.

The general objective of the WP5 is to assess and facilitate the implementation of ARIADNA results on products and services, assessing economic potential, anticipating possible gaps, and facilitating administrative and customer acceptance.

And finally, the objective of WP6 is to disseminate and exploit the knowledge generated by the project.



Expected Results

State of the art and user requirements deliverables: State of the Art document, Functional and Technical Requirements

System engineering deliverables: System Specification, preliminary and detailed designed and, integration and test plan

System development and Integration deliverables: ARIADNA Local Control System (LCS) design, integration and validation, ARIADNA User Terminal (UT) design, integration and validation and, ARIADNA prototype system integration and validation

System validation deliverables: Test and Validation Plan, Field Test Report, Validation of system performance

System Implementation deliverables: Report on integration of ARIADNA on navigation systems and regulations, Standard service and interoperability specifications, Acceptance, gaps and limitations and, Road map to extend the full acceptance and implementation of ARIADNA systems

Acronym: ARIADNA

Name of proposal: Maritime Assisted Volumetric Navigation System

Contract number: 234167

Instrument: CP – FP

Total cost: 3 412 584 €

EU contribution: 2 504 758 €

Call: FP7-SST-2007-RTD-1

Starting date: 01.11.2009

Ending date: 31.10.2012

Duration: 36 months

Website: <http://www.ariadna-fp7.eu>

Coordinator: Ms. Ana Gomez-Arche

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Consorzio Armatori per la Ricerca srl

Istanbul Teknik Universitesi

True Heading AB

Hamburgische Schiffbau-Versuchsanstalt GmbH

Grupo Mecánica del Vuelo Sistemas S.A.

Consultores Investigacion Tecnologica S.L.

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BESST

Breakthrough in European Ship and Shipbuilding Technologies



State of the Art - Background

European shipbuilders are facing tough competition due to worldwide shipbuilding over capacity. In addition, climate change and increased public awareness call for reduced environmental impact and the increased safety of shipping.

The project BESST was initiated by Euro-Yards, an EEIG representing leading European shipyards, with the strategic goal of developing ships with substantially improved Life Cycle Performance (LCP), compensating higher initial costs. The main impact factors on LCP are cost, environmental impact, safety and societal needs.

The challenge of the project is to ensure optimal interaction and integration of all sub-systems at ship level, by applying sophisticated process skills, technological innovations for specific ship systems and available research results. This requires, along with technical innovations, to develop a holistic approach for life cycle performance assessment.

Focus is put on the market segment of high value added, complex, one-of-a-kind ships, in particular cruise vessels, passenger ships, ferries and mega yachts. However, the involvement of eight shipyards, 20 research institutes and universities, 5 classification societies and 31 industrial companies (17 of the SMEs) will make sure that results can also be applied to other types of ships.

Objectives

The strategic objective of BESST is to secure and improve the competitive position of European shipyards in a sustainable way, looking into the medium and long term future. Having in mind the comparatively high labour cost in Europe, the goal is to increase the competitiveness of European built ships through decreased life cycle cost, drastically reduced environmental impact and improved safety.

The technical objectives of BESST are two-fold:

- To develop holistic life cycle performance assessment methods and tools comprising LC cost, environmental impact, safety and societal needs;
- To develop innovative technical solutions for the most important ship systems and to combine them in an optimal way at ship level.

The results of the project will be demonstrated in three virtual show cases, representing close-to-reality complex ships.

In the medium and long term, the project will contribute to the competitiveness of European shipbuilding and shipping, as well as to the reduction of emissions and the environmental footprint of ships.

Description of Work

The technical part of the BESST project comprises two Horizontal Actions which primarily take care of the integration of technical innovations at ship level. Horizontal Actions develop methods and tools for a holistic life cycle performance assessment and demonstrate the project results and achievements in three virtual prototype ships.

Based on a careful analysis of ship systems contributing to the largest extent to the LCP of the ship as a whole, technical innovations will be developed and assessed in eight System Groups, which again comprise a total of 19 technical sub-projects following specific innovative ideas. The following key System Groups have been included in the work plan of BESST:

- Space Optimisation and Easy Maintenance
- Improving Payload to Gross Tonnage Ratio
- Cost Efficient Building Processes and Refurbishment
- Improved Energy Efficiency and Reduced Emissions
- Noise and Vibration
- Improved Reliability through Condition Monitoring
- Optimization of Logistic Chains
- Improving Safety and Security

Expected Results

BESST aims to achieve a breakthrough effect, i.e. to ensure that customers will get added value over life time from European shipyards even with a higher initial price.

A first detailed analysis of the potential life cycle benefits through the implementation of project results has shown cost reductions per ship of around 120 M€ over a 30 years life time.

Referring to the environmental issues, another project goal, evaluated in connection with the foreseen ship energy saving, is the reduction of 12 % of the CO₂ emissions, i.e. approx. 12.000 CO₂ t/year per ship.

The main expected results are:

- On the Greening of Surface Transport level: the reduction of emission of CO₂, compounds (coatings) and noise in production and repair; the reduction of fuel and water consumption.
- On Safety and Security: the application of risk-based design, the increase of reliability of structures and availability of key ship systems, and the overall security management and tools.
- On Competitiveness: an increased number of passenger cabins, improved energy efficiency and reduced emissions; reduced ship weight and crew number; reduced costs for repairing, maintenance and refitting, and costs of production.

Acronym:	BESST	
Name of proposal:	Breakthrough in European Ship and Shipbuilding Technologies	
Contract number:	233980	
Instrument:	CP – FP	
Total cost:	29 026 517 €	
EU contribution:	17 457 500 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.09.2009	
Ending date:	28.02.2013	
Duration:	42 months	
Website:	http://www.besst.it	
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EC Officer:	Mr. Joost de Bock	
Partners:	MEYER WERFT GmbH	DE
	KOCKUMS AB	SE
	BALance Technology Consulting GMBH	DE
	Chalmers Tekniska Högskola AB	SE
	CS Systemes d'Information SA	FR
	D'APPOLONIA SPA	IT
	Teknologisk Institut	DK
	Det Norske Veritas AS	NO
	FORCE Technology	DK
	Germanischer Lloyd AG	DE
	Teknillinen Korkeakoulu	FI
	Ingenieurtechnik und Maschinenbau GmbH	DE
	Laboratorio di Scienze della Cittadinanza - LSC	IT
	Stichting Maritiem Research Instituut Nederland	NL
	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek - TNO	NL
	Sener Ingenieria y Sistemas SA	ES
	Swerea SICOMP AB	SE
	Technischen Universität Hamburg-HarburgDE	
	Técnicas y servicios de ingeniería, s.l.	ES
	TRUMPF GmbH + Co. KG	DE
	Università degli Studi di Trieste	IT
	University of Strathclyde	UK
	Université de Liège	BE

University of Southampton	UK
Valtion teknillinen tutkimuskeskus	FI
WARTSILA FINLAND OY	FI
SP Sveriges Tekniska Forskningsinstitut AB	SE
Center of Maritime Technologies eV	DE
Blekinge Tekniska Högskola	SE
Centre International de Méthodes Numériques en Enginyeria	ES
GENESIS S. A.	FR
TechnoFirst	FR
Bureau Veritas - Registre International de Classification de Navires et d'Aéronefs SA	FR
CETENA S.p.A. Centro per gli Studi di Tecnica Navale	IT
Future Shape GmbH	DE
KEZIA	FR
IMAWIS - Maritime Wirtschafts- und Schiffbauforschung GmbH.	DE
Rhebergen Composites BV io	NL
RINA S.p.A.	IT
Safinah Limited	UK
Schweißtechnische Lehr- und Versuchsanstalt SLV Mecklenburg-Vorpommern	DE
Flensburger Schiffbau-Gesellschaft mbH & Co KG	DE
FUCHS Fördertechnik AG	DE
Grand Port Maritime De Nantes Saint-Nazaire	FR
Damen Schelde Naval Shipbuilding B.V.	NL
Shipbuilders & Shiprepairers Association	UK
C.T.M. AMBIENTE SRL	IT
Becker Marine Systems	DE
PAULSTRA	FR
ENMM	FR
01DB-METRAVIB SAS	FR
STX FRANCE SA	FR
TKMS Blohm + Voss Nordseewerke	DE
Vulkan-DMR S.r.l.	IT
Esarc Hi-Tech srl	IT
STX Finland Cruise Oy	FI
Sanitrade s.r.l.	IT
Université de Nantes	FR
Fronius International GmbH	AT
EMS PreCab GmbH & Co. KG	DE
Lloyds Register ODS A/S	DK
Lödige Systems GmbH	DE
Maritime Information Technologies EUROPE GmbH	DE

CASMARE

Coordination Action to Maintain and Further Develop a Sustainable Maritime Research in Europe



State of the Art - Background

Under CA ACMARE, the European Technology Platform (ETP), WATERBORNE (WB) has completed its initial phase and has established itself as a key adviser to, and a strategic partner of, the European Commission for the generation of consensus views relating to maritime research policy. After three years, the CA ACMARE has developed and published the WB Research Strategy in three key documents: the Vision 2020, the WB Strategic Research Agenda and the WB Implementation Route Map (WIRM). The Coordination Action CASMARE aims to provide support to the maritime community so that the ETP WB can move forward to its next objective, the implementation and delivery of the WB Research Strategy. By using the successful consultation processes established within the ETP, CASMARE will continue to raise awareness of the WB Research Strategy and to broaden the consensus among the stakeholders, with a special emphasis on engagement with national programmes and industry activities.

CASMARE will inform stakeholders to stimulate and mobilise the maritime research resources so that the WB Research Strategy will find wide acceptance and the potential

outcomes will be realised. CASMARE will assess RDI results from EU and national programmes and monitor the progress against the WIRM. CASMARE will expand the platform's horizons within and beyond maritime transport by linking with other transport ETPs, ERANETs and other relevant research grouping outside transport such as the ETP MANUFUTURE.

Objectives

Building on the results of CA ACMARE, CASMARE will also make use of and further improve the successful consultation processes established within the ETP to continue to raise awareness of the WATERBORNE Research Strategy and to broaden the consensus among, and commitment of, the stakeholders, with a special emphasis on engagement with national programmes and industry activities. The objectives of CASMARE are the following:

1. RDI Coordination, Cooperation and Commitment to implementing the WSRA.
2. Monitoring research programmes and mapping against the WIRM 2007 to measure coherence and progress.
3. Exploring new opportunities to meaningfully expand the platform's horizons.
4. Maritime Knowledge, Education and Training.
5. The ongoing development of waterborne RDI Policy and of Consensus base.
6. Continuous Updates of the WATERBORNE Research Strategy documents.
7. Administrative support

Description of Work

To achieve its objectives, which in turn fulfil WATERBORNE's, CASMARE has been structured into five Work Packages (WPs): two supporting workpackages WP2 - R&D Policy Route Map - and WP3 - Implementation of the WSRA -, both feeding from inputs and results from WP4 - Analysis and impact of Critical Enablers) and WP5 (Update of Waterborne Strategic Agenda). A fifth work package (Project Management - WP1) steers and supports all the activities.

The aim of WP2 is to contribute to the coordination of RDI policy at EU and National level. The main purpose of this work package is to strengthen and develop relationships with the relevant deciders at EU and national level and provide recommendations and procedures for a better coordination between the WATERBORNE Strategic research Agenda and the EU and national research agendas and work programmes.

WP3 will focus on the concrete implementation of the WATERBORNE Research Strategy. One of the key actions is to develop and implement consistent approaches to monitor the real impact of the WATERBORNE Research Strategy on EU and national research programmes and on the other hand the progress of the state of the art to be mapped against the WIRM 2007.

The main objective of WP4 is to analyse the "critical enablers", including the human factors, IPR issues and regulations. Whereas the aim of WP5 is to update the 3 documents of the WATERBORNE Strategy: WIRM, WSRA, Vision 2025.

Expected Results

CASMARE, through WATERBORNE, will impact on the following five FP7 Activities under the Sustainable Surface Transport Priority:

- 7.2.5. Strengthening competitiveness
 - 7.2.1. The greening of surface transport
 - 7.2.4. Improving safety and security
 - 7.2.2. Encouraging modal shift and decongesting transport corridors
 - 7.2.6. Cross-cutting activities for the implementation of the sub-theme programme
- CASMARE will help define and implement the RDI steps necessary to achieve the following targets:
- the improvement of the competitiveness of the European Waterborne Industry,
 - the improvement of safety, environmental friendliness and security of the waterborne transport,
 - to help manage the growth in trade volumes and the changes in trade patterns and support the modal shift (from road/rail to water) and decongestion of transport corridors
 - to help Europe in developing the adequately educated and trained human resources, in tackling key issues for the technological future of Europe like IPR or level playing field issues.
 - to ensure involvement of new partners in research projects (e.g. SME's, Member States)
 - to identify, analyse and stimulate lead markets and other cross-cutting activities
 - to link RTD with the implementation of results in industrial application.

Acronym:	CASMARE	
Name of proposal:	Coordination Action to Maintain and Further Develop a Sustainable Maritime Research in Europe	
Contract number:	234252	
Instrument:	CP – FP	
Total cost:	976 200 €	
EU contribution:	870 445 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.03.2009	
Ending date:	31.08.2011	
Duration:	30 months	
Website:	http://www.waterborne-tp.org	
Coordinator:	Ms. Willem Laros Community of European Shipyards Associations asbl rue Marie de Bourgogne, 50 BE 1000 Brussels	
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EC Officer:	Dominique Ramaekers-Jørgensen	
Partners:	European Marine Equipment Council/Conseil Européen de l'équipement naval	BE
	Lloyd's Register EMEA	UK
	European Council for Maritime Applied R&D Association	BE
	Foundation Wegemt - A European Association of Universities in Marine Technology and Related Sciences	NL
	European Community Shipowners' Associations	BE
	International Council of Marine Industry Associations	BE
	Europese Binnenvaart Unie	BE

CO-PATCH

Composite Patch Repair for Marine and Civil Engineering Infrastructure Applications



State of the Art - Background

The basic concept of the present work is the definition of a new effective repair and/or reinforcement method for large steel structures with defects. Two basic steel structural types will be dealt with in this work, namely marine structures (mainly ships) and steel civil engineering structures (e.g. bridges). Composite patch repairs and/or reinforcements overcome many, if not all, the disadvantages of the traditional methods. They do not involve hot works in any way and, therefore, existing deadweight loading or proximity to explosive environments has no particular consequences. Patches can be applied directly on corroded steel members by performing a simple surface preparation, thus removing the need for replacement. Therefore, they can be completed faster, exhibit good fatigue resistance, do not cause stress concentrations and result in low added weight. All these innovations reduce significantly the cost and the time of the repair or reinforcement. However, there are some parameters of the procedure that still need further investigation, the most crucial among them being the uncertainty about the long-term performance of a steel-to-composite adhesive joint. There is a lack of knowledge in the current literature regarding the evaluation of composite materials from this perspective. The scope of the work proposed here includes not only an evaluation of the composite patches themselves, but an evaluation of the repaired system as a whole and its continued performance over time as it is subjected to external environmental conditions.

Objectives

The objective of this project is to demonstrate to all stakeholders that composite patch repairs or reinforcements can be environmentally stable and, therefore, can be used as permanent repair measures. This objective will be mainly achieved by:

- Studying and demonstrating through theoretical analyses, numerical simulations and experimental testing that the use of fibre reinforced composite patch repairs leads to the reinforcement of a steel structural member.
- Establishing a stakeholders forum to discuss and agree the business and regulatory implications of introducing composite patch repairs.
- Determining, evaluating and quantifying the efficiency of composite patch reinforcements, in both the short and long term.
- Developing proper numerical modelling procedures for modelling a composite patch reinforced structure.
- Developing a generalized procedure for the design of composite patch reinforcements.
- Evaluating existing or developing new, practically applicable and sensor-based monitoring techniques of the patch.
- Providing pre-designed, ready-made composite patch solutions.
- Demonstrating the effectiveness of the developed design tools and procedures through full-scale tests.
- Developing an internationally recognised training programme for personnel.

Description of Work

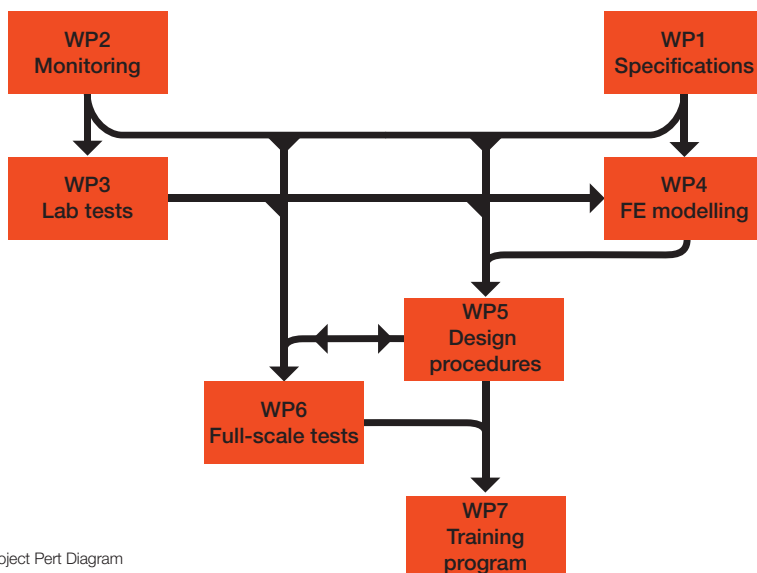
The project starts with WP1 "Specification of application cases", within which candidate repair and reinforcement cases are identified and specified. All stakeholders are called to agree on what a permanent repair must be and document the business case for using com-

posite patch repairs. In parallel to WP1, WP2's "Monitoring methods and procedures" will start at project commencement. All the work associated with the evaluation of existing, or the development of new, sensor-based monitoring techniques of the patch repair is performed in this WP. Two types of tests have been planned, namely laboratory and full-scale on-site tests. The former are included in WP3 "Laboratory testing" and initially concern material characterization tests of the composites that will be used in all tests. Then, the testing activities of actual patch repaired structures are gradually deployed, starting from mid-scale arrangements (patched cracked plates and beams) and continuing with large-scale laboratory tests of patched real world structural details. Extensive finite element modelling will be performed, aiming at defining procedures for the accurate FE modelling of patch repaired structures. Numerical modelling guidelines will then be developed, as a major deliverable of the project. All this work will be performed in WP4 "Development of numerical simulation procedures". WP5 "Development of guidelines and design procedures" is the central and most important work package of the whole project. Here, based on the experience acquired so

far, best practice patch design and application procedures are developed, which are used to design patch repair solutions for some standard problem cases. These procedures constitute one of the most important deliverables of the project and are used in WP6 "Full-scale on-site tests" too for the design of the patches that will be applied on the actual full-scale tests to be performed. Dissemination and exploitation actions of the project are planned in WP7. Finally, all management activities of the project are included in WP8.

Expected Results

The proposed composite patch repair technology is an innovative and highly competitive product that caters to the needs of marine vessels and civil engineering infrastructures, the latter in the form of steel bridges. It reduces quite significantly the maintenance costs of many large steel structures, and in the case of metallic bridges it prolongs their design life. The proposed technology creates a new market and it gives the partners the capability of providing high technology and high added value services worldwide, thus improving Europe's competitiveness in specialized and advanced repair works.



Project Pert Diagram

Acronym:	CO-PATCH	
Name of proposal:	Composite Patch Repair for Marine and Civil Engineering Infrastructure Applications	
Contract number:	233969	
Instrument:	CP – FP	
Total cost:	5 284 790 €	
EU contribution:	3 550 559 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2010	
Ending date:	31.12.2012	
Duration:	36 months	
Website:	http://www.co-patch.com	
Coordinator:	Prof. Nicholas Tsouvalis National Technical University of Athens Heron Polytechniou 9 GR 15773 Zografos	
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Tel:	+30 (0)21 077 214 13	
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EC Officer:	Michal Klima	
Partners:	Asociación de Investigación Metalurgica del Noroeste	ES
	FRANCISCO CARDAMA, S.A.	ES
	CETENA S.p.A.	IT
	Estaleiros Navais de Peniche, S. A.	PT
	Hellenic Register of Shipping	GR
	Instituto de Soldadura e Qualidade	PT
	METTLE SARL	FR
	Norwegian University of Science and Technology	NO
	Shipbuilders & Shiprepairers Association	UK
	TWI Ltd.	UK
	Alveus d.o.o.	HR
	The University of Surrey	UK
	Umoe Mandal AS	NO
	Bureau Veritas	FR

ComPair

Continuous health monitoring and non-destructive assessment of composites and composite repairs on surface transport applications



State of the Art - Background

The use of advanced composite materials in transport applications has drastically increased over the last two decades and this trend is expected to continue. The economic and environmental drivers for using composites in transport applications are huge as the use of advanced composites can realise a weight reduction in excess of 20%. Advanced composites have the potential to replace an even greater proportion of traditional materials in transport. Unfortunately these composites suffer from defects, which vary considerably from those suffered by traditional materials used in transport. The vast array of current non-destructive testing (NDT) techniques that exists for defects in traditional structures are not available to the manufacturers and operators of technological composites, as the increase in the use of composites has not been matched by developments in NDT techniques.

For this reason, the consortium proposes to develop advanced and novel non-invasive NDT tools for qualitative and quantitative inspection of advanced composites in transport. Various NDT and health monitoring techniques will be developed to inspect composites at the manufacturing, assembly, maintenance and repair stages. Although the project will focus on the composites used for

rail applications, the results of this research could be used in other industries, such as aerospace, automotive and marine.

Objectives

The aim of ComPair is to build a new and original way for continuous health monitoring and non-destructive assessment of composites and composite repairs on surface transport applications. The three main technical objectives of the ComPair project are:

- to develop quantitative non-invasive NDT approaches for prompt assessment of composites during the manufacturing and assembly stages of composite materials and structures. In particular, the technologies developed will include transient thermography, 3D laser micro-topography and phased array ultrasonic techniques. All these developed techniques will assess the level of damage on the composite by quantitative means;
- to develop a health monitoring approach for the composite components on full-scale structures. This will include real-time techniques such as long range ultrasonic and acoustic emission techniques;
- to develop a robotic scanner that will accommodate the NDT approach for the in situ testing of the structures during inspection and maintenance. The scanner will offer flexibility and customisation options.

The project will also establish a certificated procedure and guidelines on these applications, in order to generate a cost-effective manufacturing and maintenance procedure.

Included in the project is a major dissemination programme to present the findings to industry via a network of events and seminars.

Description of Work

Different work packages (WP) cover the project objectives.

WP1 will define the specifications for the NDT techniques and systems to be developed during the project.

WP2 will investigate, select and develop the NDT techniques for the inspection of composite materials in the manufacturing and assembly stages.

WP3 covers the development of a NDT technique for the health monitoring of composite materials used for transport applications.

WP4 will be dedicated to the development of a multi-axis generic robotic scanner for the in-service inspection of composite materials using transient thermography techniques.

WP5 covers the field trials, testing and demonstrations, which will allow the project consortium to validate the technologies developed in the ComPair project.

WP6 is to develop procedures and specific guidelines for the NDT of composite materials for transport applications.

WP7 will ensure an adequate level of dissemination of all research results and to raise awareness of the main issues dealt with in the project.

The consortium includes knowledge producers in the fields of non-destructive technologies, composites manufacturing and technology, transport applications, research and development, software development, robotic sensors deployment and integration of technological components in automated systems.

Expected Results

The results of ComPair will promote the transfer of innovative technical knowledge in the health monitoring of surface transport applications in real time, as well as in the NDT inspection in manufacturing, assembly and maintenance of composites and composite repairs, which can be used in different industrial sectors (e.g. rail, automotive, marine and aerospace).

The expected impacts of the project are:

- reducing the manufacturing, construction and maintenance costs for the surface transport sector;
- creating new skills and improving working conditions;
- the promotion of start-ups and the emergence of new high-tech SMEs in activities specific to transport processes.

The rail sector, which is the main application of the ComPair project, is currently going through a composite revolution. A few years ago, manufacturers were reluctant to use composites because of their inexperience; today structures are being designed to fit with composite materials. The rail industry is still far behind the aerospace industry in terms of knowledge of composites; inspection techniques could be a real asset for the rail industry to gain in assurance and credibility. Monitoring the behaviour of the composite structures in-service would give more confidence to train manufacturers. ComPair's new technologies would be an ideal support for the builder and designer.

Acronym:	ComPair	
Name of proposal:	Continuous health monitoring and non-destructive assessment of composites and composite repairs on surface transport applications	
Contract number:	218697	
Instrument:	CP – FP	
Total cost:	3 493 986 €	
EU contribution:	2 672 002 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.09.2008	
Ending date:	31.08.2011	
Duration:	36 months	
Website:	http://www.compairproject.com	
Coordinator:	Mr. Craig Coghill TWI Ltd Granta Park, Great Abington UK CB21 6AL Cambridge	
E-mail:	craig.coghill@twi.co.uk	
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EC Officer:	Grzegorz Domanski	
Partners:	Kauno Technologijos Universitetas	LT
	Valtion Teknillinen Tutkimuskeskus	FI
	AtoutVeille	FR
	National Technical University of Athens	GR
	Centre for Research and Technology - Thessaly	GR
	G-Tronix Ltd	UK
	Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile	IT
	Hexcel Composites Ltd	UK
	Envirocoustics A.B.E.E.	GR
	Kingston Computer Consultancy Ltd	UK

ENABLE

Stimulate Sustainable Freight Transport Systems with Latin American countries

State of the Art - Background

Many of the needs and priorities of the Latin American countries are similar to the European ones, such as the shift of cargo flows from road to rail, the revitalization of railways and the gaining of capacity constraints in the road networks. This means that the European innovation could be carefully examined in the direction to transfer and potentially replicate some of the European experience to the Latin America region. Nevertheless, the majority of the freight transport problems and needs are global and the various regions worldwide could learn from each other.

The primary aim of the FP7 topic "SST 2008 6.5 Stimulating International Cooperation with Latin American countries in developing sustainable freight transport systems", addressed by ENABLE, is to contribute to the external relations of EU with Latin American countries, specifically Argentina and Brazil, in the area of co-modal and intermodal freight transport. This falls in the general policy of the EC to strengthen its external relations with other areas, such as Asia (see EuropeAid programmes), Africa (Interreg and FP7 programmes) etc.

Objectives

The project aims to perform the necessary actions that will enable an active awareness building of the recent European advances and innovations of surface transport research addressing the specific area of intermodality of freight transport in Argentina and Brazil. By transferring European competences, it aims to ameliorate freight transport performance in these two countries and to develop a common understanding and knowledge base. Although many of the current problems, barriers and needs of the freight transport systems

in Argentina and Brazil are known, ENABLE will go one step further in order to gain a deep understanding of the existing situation (causes of problems) in these two countries in order to serve the project objectives.

Another objective is to examine the EU-LA transport corridors. This study will concentrate on the specifications of the main corridors and the key problems and needs that are associated with them, as for example damages/theft, delays, punctuality, legislative issues.

Finally, ENABLE will establish strong communication links that will enable the transfer of know-how between the European and Latin American freight transport societies, and provide a common framework for the continuation of such actions in the future.

Description of Work

The starting action entails the local and regional needs, problems, requirements, constraints and priorities of the freight transport environment in Argentina and Brazil. This survey will also include economic constraints and growth, population growth, environmental conditions, etc.

Coming to the European side, the technological solutions, innovations and best practices available in the area of co-modality and intermodality in freight transport that could better respond to the identified needs of the target areas will be defined. This activity will lead to a grid organization of the European best practices to be transferred to the target regions.

The identified needs, problems, etc. and the best practices and innovations will lead to the elaboration of a series of roadmaps including concrete actions and strategies that will enable the further development of these results

in full scale applications and their effective deployment to the target areas towards a sustainable freight transport environment. The core element of this activity will be the operational plans for the future implementation of sustainable intermodal and/or co-modal freight transport systems based on the European experience (best practices).

A Forum will be created at the beginning of the project bringing together all local stakeholders of the target countries and some additional ones from the greater region. Finally, a series of dissemination actions will be implemented in order to ensure wide visibility of the project results not only in the target countries but also in the greater area.



The target area of ENABLE project

Expected Results

1. ENABLE will strengthen the dialogue between Europe and Latin America in the field of intermodal freight transport, and facilitate the transport and trade relations between the two regions.
2. Based on the efforts made by the European Union over the last years to encourage the interoperability of existing transport modes and the use of intermodal systems, the quality and technological upgrade of freight transportation in Latin America will be improved, while competition will be stimulated between transporters and not between transport modes only.
3. Research will be advanced in the particular topic of co-modal and intermodal freight transport, particularly in Latin America.
4. The cooperation will be strengthened between the Latin American stakeholders and their European counterparts.

Acronym:	ENABLE	
Name of proposal:	Stimulate Sustainable Freight Transport Systems with Latin American countries	
Contract number:	233910	
Instrument:	CSA – SA	
Total cost:	503 702 €	
EU contribution:	503 702 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.09.2009	
Ending date:	31.08.2011	
Duration:	24 months	
Website:	http://www.enable-project.net/	
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EC Officer:	Joost De Bock	
Partners:	Technical Research Centre of Finland (VTT)	FI
	Fundación Valenciaport (FV)	ES
	Universidad de Buenos Aires (UBA)	AR
	Ricardo Franco Foundation (RFF)	BR

ERRAC-ROADMAP

ERRAC Road Map

State of the Art - Background

ERRAC-ROADMAP addresses the broad coordinating challenges of STT.2008.5.2.2 'Competitive transport operations'. It is a Level 1 Coordination and Support Action aiming at the very important area of coordinating rail research activities. This project is an essential coordination tool to ensure that the ERRAC 2020 Vision can be turned into a reality. Without effective coordination to ensure the relevance and applicability of the rail research activities it is impossible to prioritise the innovative methodologies and technologies for more competitive rail transport operations. ERRAC-ROADMAP will deliver roadmaps to guide the rail research in order to provide a rail option that is reliable, environmentally friendly, efficient and economic to customers. The project will fully integrate the work done so far by ERRAC and its working groups and will further develop this.

Objectives

ERRAC-ROADMAP will have a direct impact and influence on enhancing interoperability on existing infrastructure and developing new interoperable rail equipment, which means that the research themes and priorities proposed will contribute directly towards SST.2008.2.5.1 'Interoperable rolling stock'. It will evaluate the project's research results and will assist in standardisation at different levels, particularly those related to new Technical Specifications for Interoperability (TSIs). The roadmap will propose actions aimed at providing interoperability and safety requirements that evolve from new business, operational and technical needs, and reduce migration time for the implementation of new interoperable solutions.

ERRAC-ROADMAP will also liaise with and exchange rail research results with FP7-SST.2008- 6.4 'Analysis and dissemination of key national and regional transport research results'. There is a clear alignment with the

objective of this topic to promote transport research results. ERRAC-ROADMAP will provide inputs for the rail mode at the national level and – where feasible – also at the regional level. ERRAC-ROADMAP is undertaking the synthesis, analysis and collation of rail research results from across Europe, and will provide a large input with regard to 'Identify gaps in existing knowledge and mechanisms for filling these gaps'.

Description of Work

ERRAC-ROADMAP is structured around five work packages, supported by a Management and Coordination work package and two further coordination work packages – Evaluation and Knowledge Database, and Dissemination and Communication.

WP1: The greening of surface transport

WP2: Encouraging modal shift and decongesting transport corridors

WP3: Ensuring sustainable urban transport

WP4: Improving safety and security

WP5: Strengthening competitiveness

Expected Results

The most valuable contribution made by ERRAC-ROADMAP is that it provides an environment for the stakeholders in rail research to reach a valuable consensus. ERRAC-ROADMAP creates the foundation and provides the focus for joint research priorities that will make the investment in research even more worthwhile and effective in bringing solutions to the market.

Acronym:	ERRAC-ROADMAP	
Name of proposal:	ERRAC Road Map	
Contract number:	234255	
Instrument:	CP – FP	
Total cost:	1 540 994 €	
EU contribution:	1 540 994 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.06.2009	
Ending date:	31.05.2012	
Duration:	36 months	
Website:	http://www.errac.org/	
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EC Officer:	Peter Crawley	
Partners:	European Rail Infrastructure Managers asbl	BE
	Community of European Railway and Infrastructure Companies	BE
	Union internationale des transports publics	BE
	Network Rail Infrastructure Ltd	UK
	EURNEX e.V.	DE
	Bombardier Transportation Sweden AB	SE
	Banverket - Swedish National Rail Administration	SE
	MER MEC S.p.A.	IT
	Société Nationale des Chemins de Fer Français	FR
	University of Newcastle Upon Tyne	UK
	Trenitalia S.p.A.	IT
	Italcertifier S.C.p.A.	IT
	Ansaldo STS S.p.A.	IT
	European Federation of Railway Trackworks Contractors	FR
	Instituto Superior Técnico	PT
	Corus UK Limited	UK
	Knorr-Bremse Systeme für Schienenfahrzeuge GmbH	DE
	Union des industries ferroviaires européennes	BE

EXCITING

Exact Geometry Simulation for Optimized Design of Vehicles and Vessels



State of the Art - Background

In industrial manufacturing processes it is quite common to simulate the expected behaviour of a product, e.g. the deformation of a car component under stress or its robustness under some acting forces. This enables the component to be modified and adjusted during the design process.

Traditionally, the design process is carried out with the help of CAD (Computer Aided Design) and then transferred to a format which can be handled by a numerical simulation tool (e.g. an FEM (Finite Element Method) solver). Unfortunately, for free-form shapes such as hydroelectric turbine blades, ship hulls or certain car components, this transfer cannot be done exactly, but introduces some error. This is due to the fact that a free-form shape has to be approximated by simple geometric primitives such as tetrahedral or hexahedral elements. For the simulation of free-form shapes, however, it is important to represent the object which is to be simulated as accurately as possible, since geometric errors may falsify the simulation results. Summing up, for free-form shapes there is still a great discrepancy between the processes of geometric design and numerical simulation of technical parts.

Objectives

EXCITING focuses on Isogeometric Analysis (IGA), which provides a new approach for the design and simulation of free-form shapes. In particular, the project is concerned with the application of IGA in the design process of vehicles and vessels. Typical applications under investigation are ship hulls and propellers, turbochargers and vehicle frames for the railway and automotive industries.

In this context, IGA makes it possible to use an enhanced CAD model directly for numerical simulation. This approach offers two main advantages. First, the numerical simulation of behaviour of a physical object produces more accurate results when it is represented exactly by the geometric model. Secondly, the time-consuming transfer between different descriptions of a geometric object can be eliminated. Those effects become even more dramatic if the simulation step is part of an (automated) design loop, e.g. in order to optimise the shape of a ship hull.

Description of Work

The project consortium, comprising five academic and four industrial partners, provides a firm theoretical background and encompasses a wide range of applications.

The project leader is Johannes Kepler University, located in Linz, Austria. The other academic partners are the Technical University of Munich (Germany), SINTEF

(Norway), INRIA (France) and the National Technical University of Athens (Greece). The industrial partners are Andritz Hydro (Austria), Siemens (Germany), Det Norske Veritas AS (Norway) and Hellenic Register of Shipping (Greece).

The project is divided into six technical Work Packages. Each of the 1 to 5 packages is linked to a specific application of IGA, i.e. propellers and turbochargers, ship hulls, car components and frames, fluid structure interaction, and design optimisation. Work Package 6 aims at the development of an Isogeometric Toolbox. More precisely, this will establish and support a common software package that incorporates all the developments achieved throughout the project. Furthermore, it will ensure close co-operation between the project partners and simplify the interaction between the individual work packages.

Expected Results

In the first period of the project we achieved the following goals on the way to bridging the gap between CAD and numerical simulation methods. They can be

classified roughly as basic research and direct applications.

The results that have been achieved in close cooperation with the industrial partners are:

1. Design of an enhanced CAD model for blades that is suitable for numerical simulation.
2. Development of a CAD tool, creating a parametric ship-hull model with respect to principal dimensions and other integral parameters.
3. IGA of vehicle components based on small displacement theory.

In addition, the project has also enabled us to gain a deeper theoretical insight into certain problems which will clear the way for future applications that will be tackled in the second period of the project.

1. Isogeometric BEM wave-resistance calculations of an immersed spheroid.
2. Solution of a 2D test problem with isogeometric technology: pipe and deformable wall.
3. Proof of concept for isogeometric design optimisation in structural mechanics.

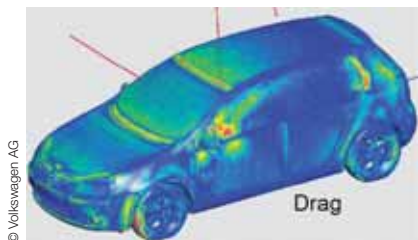
During the remainder of the project, these results will be applied to further real-world examples. These are, for instance, simulation of rotating turbine and propeller blades under the impact of bypassing water or the stress of a certain vehicle component under external forces.

The benefit for the involved industrial partners is clear. The optimised design process enhances the competitiveness of the products as better results can be obtained in a shorter time.

Acronym:	EXCITING	
Name of proposal:	Exact Geometry Simulation for Optimized Design of Vehicles and Vessels	
Contract number:	218536	
Instrument:	CP – FP	
Total cost:	3 822 957.00 €	
EU contribution:	2 493 226.00 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.10.2008	
Ending date:	30.09.2011	
Duration:	36 months	
Coordinator:	Mr. Willi Voigt Universitaet Linz Altenbergerstrasse 69 AT 4040 Linz	
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EC Officer:	William Bird	
Partners:	Stiftelsen SINTEF	NO
	SIEMENS AG	DE
	National Technical University of Athens	GR
	Hellenic Register of Shipping S.A.	GR
	Technische Universität München	DE
	Institut National de Recherche en Informatique et Automatique	FR
	VA TECH HYDRO GMBH	AT
	Det Norske Veritas AS	NO

FLOWHEAD

Fluid Optimisation Workflows for Highly Effective Automotive Development processes



© Volkswagen AG

Adjoint sensitivity of drag on a VW Golf

State of the Art - Background

The automotive industry has recently seen a paradigm shift from design processes based on physical prototypes to a computationally aided product development process (PDP) based on virtual prototypes. To maintain the competitiveness of European car manufacturers, a significant reduction of development lead time is required. The main potential for improvement lies in further exploitation of virtual development, especially in further automation of these virtual processes through optimal design techniques.

Optimal design techniques are mature and are being used in structural mechanics in the automotive industry, as well as in computational fluid dynamics (CFD) in the aeronautics industry. However, the potential for CFD in the automotive industry has not yet been realised. To integrate these methods into workflows within routine PDP, the project will make advances with adjoint sensitivity methods, mesh-based and computer-aided design (CAD)-based shape optimisation, and high-Reynolds number topology optimisation. Complete CFD optimisation workflows (i.e. chains of optimisation techniques adapted to the automotive processes) for the early as well as later stages of development will be integrated into the PDP.

Objectives

FlowHead4s objectives are to:

- significantly reduce development lead time via the integration of fluid optimisation workflows into the product development process (PDP);
- strengthen the competitiveness of new high-tech European small and medium-sized enterprises (SMEs) in the field of optimisation;
- develop new approaches for numerical optimisation techniques for fluids in automotive development processes;
- reduce the environmental impact of automotive designs by using goal-based optimal design techniques for CFD;
- encourage higher customer satisfaction and environmental impact reduction by improving and accelerating automotive development processes;
- enable higher modularity and incorporation of additional design criteria into the PDP by goal-orientated robust design considerations and flexible optimisation systems.

Description of Work

The work is divided into work packages (WP). The key areas of research are:

WP1: Linking the optimisation workflow into the product development and management (PDM) environment.

- constraints, design space, flow parameters.

WP2: Integration of fast gradient-based optimisation tools into an industry standard workflow environment:

- modularity of components, using a range of solvers;
- demonstration on industrial test cases.

WP3: Development of adjoint flow solvers for fast gradient-based optimisation:

- open-source adjoint solver based on OpenFOAM;
- commercially supported flow solvers;
- discrete flow solvers using automatic differentiation software techniques.

WP4: Large-scale shape optimisation using adjoint sensitivities:

- node-based parametrisations;
- morphing-based parametrisations;
- CAD-based parametrisations.

WP5: Industrial application of topology optimisation:

- application of fluid-topology optimisation to the Navier-Stokes equations.

WP6: Robust optimisation:

- solution-adaptive multi-level methods for flow, adjoint and design;
- robust optimisation using adjoint-enhanced response-surface methods;
- robust optimisation using second derivatives.

Expected Results

The most important results will be;

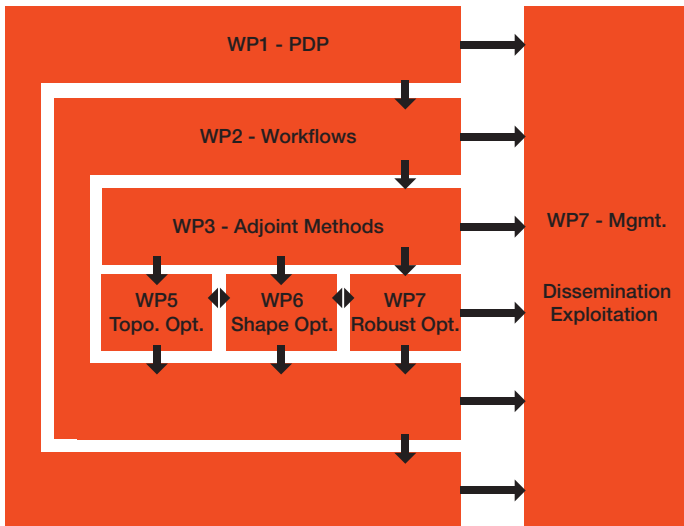
- a reduction of development lead time;
- establishing a robust, user-friendly and modular workflow of CFD optimisations;
- generating a general pre-/post-processing for optimisation workflows;

- the development of sensitivity analysis methods for CFD based on discrete and continuous adjoint methods;
- the development and implementation of gradient-based shape and topology optimisation techniques;
- the development of robust optimisation methods that exploit efficient adjoint sensitivities.

Advanced methodologies for automotive design will become available in the EU automotive industry, which allow for the development of better products (in terms of energy consumption, emissions and comfort) within shorter development times (via more efficient workflows). This will improve the competitiveness of the European automotive industry and help to preserve and increase its high quality employment.

These methodologies will create a strong demand for their maintenance, continuous improvement and further development, which will lead to the emergence of highly specialised SMEs providing that service.

The tools developed will typically increase productivity and creativity in the design office and the increased competitiveness of the resultant products should have a beneficial effect on the market share of European car producers.



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Work package structure of Flow-Head

Acronym:	FLOWHEAD	
Name of proposal:	Fluid Optimisation Workflows for Highly Effective Automotive Development processes	
Contract number:	218626	
Instrument:	CP – FP	
Total cost:	4 492 166 €	
EU contribution:	3 214 677 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.02.2009	
Ending date:	31.01.2012	
Duration:	36 months	
Website:	http://flowhead.sems.qmul.ac.uk/	
Coordinator:	Dr. Jens-Dominik Müller Queen Mary and Westfield College, University of London Mile End Road UK E1 4NS London	
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EC Officer:	William Bird	
Partners:	CD-adapco France	FR
	Danmarks Tekniske Universitet	DK
	ESI Group S.A.	FR
	FE-DESIGN Gesellschaft zur Herstellung von Analysesoftware mbH	DE
	Icon Computer Graphics Ltd	UK
	Renault S.A.S. represented by Gie Regienov	FR
	Technische Universität München	DE
	Technical University of Sofia	BG
	Volkswagen AG	DE
	Politechnika Warszawska	PL

IceWin

Innovative Icebreaking Concepts for Winter Navigation

State of the Art - Background

The ice cover of the Baltic Sea Motorway varies considerably from year to year. The northern parts freeze every winter and in a hard ice winter it freezes completely. Traffic conditions were difficult in the ice winter of 2002-03, even though it was classified as average. In the worst case, merchant vessels bound for Russian ports of the Gulf of Finland, which were stuck in the ice, had to wait for icebreaker assistance for up to two weeks. Despite climate change, hard ice winters occasionally occur in the Baltic Sea, especially in the Gulfs of Finland and Bothnia.

Hard ice conditions markedly increase the risk of a sea transport accident. The situation is especially worrying in the narrow shipping channels of the Gulf of Finland. When waiting for icebreaker assistance, a vessel stuck in the ice may drift away from the route in the moving ice field with potentially catastrophic consequences, especially for oil tankers.

Even the current icebreaker fleet in the Baltic Sea cannot provide a satisfactory level of service in a hard ice winter. A combination of growing traffic volumes and hard ice winter conditions means serious difficulties for industrial and commercial transport.

Some of the current icebreaker fleet will reach the end of its lifespan in the 2010s. It is evident that replacement investments will not yield a satisfactory level of service in hard ice winter conditions. Considering the growing traffic volumes, a satisfactory level cannot be reached even in an average ice winter. A large oil tanker, for instance, requires simultaneous assistance from two conventional icebreakers which, together, are capable of breaking a sufficiently wide channel through the ice.

The above-mentioned means that in order to arrange icebreaking assistance, innovative

solutions are required in addition to replacement investments. These can include:

- A new type of agreement system, and/or
- new technical solutions.

The new agreement system to be developed would be based on the utilisation of the icebreaking capability of independent ice-going merchant vessels (based on Double Acting technology, see image). It is important that jointly accepted rules could be enforced for cases where the capacity of conventional icebreakers is insufficient.

New technical solutions may be innovations that alone are also capable of opening a sufficiently wide channel for overwide merchant vessels, e.g. oil tankers. Such innovative concepts include:

- Oblique icebreaker,
- Icebreaker for B-Max Tankers,
- Trimaran icebreaker,
- A pair of icebreakers (conventional and low-price tug icebreaker).

The solutions enable a service concept whereby it is possible to avoid the simultaneous need for two conventional icebreakers to assist overwide vessels.

Objectives

The objective is to define the possible benefits at the service level of icebreaking assistance, in logistics, and regarding environmental emissions and risks, by:

- utilising the new type of agreement system, and/or
- adopting innovative concepts and operations.

The indirect objective is of course to promote, if supported by the benefits, the launch of the new technical icebreaking solutions on the market, thereby enhancing European marine technology production to address the needs of the Baltic Sea and other freezing maritime areas.

Another indirect objective is to contribute to the introduction of a new agreement system that would secure the level of service of ice-breaking assistance in cases where traditional icebreaker resources prove insufficient.

Description of Work

Transport in the Baltic Sea will grow mainly in the Gulf of Finland. Most of this growth will take place in oil transports. Variation in ice winter conditions, changes in the dimensioning, and other technical properties of ships, new ports, increasing traffic volumes and port calls and other such factors lead to a typical "what if" situation. For instance, how will the level of service of icebreaking assistance, supply chain costs and environmental emissions change if:

- nothing is done, and/or
- conventional icebreaker resources are increased, and/or
- the new technical icebreaking innovation is adopted, and/or
- a new type of agreement system is adopted?

The alternatives can only be tested through simulations based on system modelling. A comparison of the simulation results provides a good picture of these alternatives.

System modelling and simulations are the main methods used in the project.

Expected Results

Based on possible observed benefits the recommendations concerning technical innovations and agreement systems will be introduced.

An additional objective is to encourage co-operation in icebreaking issues between Baltic Sea coastal states.

In the Gulf of Bothnia, the need for icebreaking assistance is managed in co-operation with Finland and Sweden. The experiences gained from the co-operation are valuable. Other international co-operation on the Motorway of the Baltic Sea is almost non-existent. In this case each of the coastal states, Finland, Estonia and Russia, manages the icebreaker assistance for merchant vessels navigating to and from the ports of each state.

Previous research has demonstrated the advantages of co-operation. Thus, is it also possible to use the icebreaker resource more effectively when assistance is managed in co-operation with the coastal states, as opposed to separate assistance system? If so, then this project will lay the foundation for developing co-operation in winter navigation, enabling insufficient icebreaking resources to be used more effectively.

Acronym: IceWin
Name of proposal: Innovative Icebreaking Concepts for Winter Navigation
Contract number: 234104
Instrument: CP – FP
Total cost: 729 528 €
EU contribution: 540 995 €
Call: FP7-SST-2008-RTD-1
Starting date: 01.06.2009
Ending date: 31.05.2011
Duration: 24 months
Website: <http://www.vtt.fi/sites/icewin/>
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MID-MOD

Mid-frequency vibro-acoustic modelling tools / Innovative CAE methodologies to strengthen European competitiveness



State of the Art - Background

Noise and vibration play a large part in the choice of vehicle, not only driven by increasing customer demand for vibro-acoustic comfort, but also by the tightening of legal regulations regarding noise and vibration creation and reception. Since noise and vibration, as functional performance attributes, often conflict with other attributes, such as weight and CO₂ emissions, concurrent design and analysis procedures are required. Such processes involve multi-attribute optimisation and are facilitated by the use of Computer Aided Engineering (CAE) tools. Also, there is an increasing trend towards virtual prototyping to reduce costs and development times. As a result, good CAE tools are essential in modern vehicle design.

Ideally CAE tools would be applicable in the whole frequency range of interest - the audio-frequency range. In practice, specific methods are applicable in a limited frequency region. A class of deterministic low-frequency methods is both well developed and well established.

At high frequencies, energy-based methods are valuable, but less well established. There is, however, a mid-frequency gap in current modelling capabilities: it is too high for deterministic technologies and too low for energy-based tools. This is important, since it strongly affects product performance and competitiveness.

Objectives

The objectives of this project are fully in line with the objective of the 'competitive product development' topic (SST.2007.5.1.1) to strengthen the global competitiveness of transport industries through innovative and cost-effective processes and to develop new skills and job opportunities for European citizens.

A first objective of the project is the development of innovative solutions for the modelling and simulation of vibro-acoustic transport problems in the mid-frequency range, by filling crucial gaps in the state of the art and the use of vibro-acoustic modelling.

Secondly, these innovative methodologies will be validated extensively with respect to component level, subsystem level and, finally, full vehicle-level validations. The industrial partners will be trained in applying these novel methodologies to increase their competitiveness.

A third important objective is the dissemination of the innovative mid-frequency research results within the broad European engineering community. This dissemination will be a crucial point in training a sufficient number of people with the proper vibro-acoustic skills.

Description of Work

Despite the many research efforts aimed at finding the ultimate mid-frequency prediction technique, one has still to be developed that can be applied to an industrial transportation context. Therefore, this project aims at further developing the most promising current mid-frequency methodologies.

Mid-frequency research in the EU is currently fragmented and no mature modelling solution for mid-frequency issues has emerged so far. This project will bring together world-leading teams with common mid-frequency interests in order to stimulate cross-fertilisation and to come up with analysis methodologies for mid-frequency applications. The close co-operation with industrial partners, who are eager to learn and apply innovative solutions, will make sure research developments are steered in the right direction.

Robust CAE tools, which are applicable for the analysis of mid-frequency noise and vibration problems, will be developed. In a second stage, these tools will be applied to industrial problems, filling the currently existing gap. A third important aspect of the project is the dissemination of mid-frequency analysis and modelling skills throughout the EU engineering community to spread crucial knowledge and skills in strengthening EU transportation competitiveness.

Expected Results

Milestone 1 involves a profound comparative study between five deterministic technologies (Wave-based Method, Fast Multipole Method, Domain Decomposition Method, Stabilised Method and Higher Order Wave-based Integration Schemes), which are currently the most promising with respect to their applicability for industrial vibro-acoustic problems in the mid-frequency range. MID-MOD research activities involve studies to determine what is needed to lift these technologies out of their academic environment and apply them to real-life engineering problems in the transportation industry.

Milestone 2 involves a similar comparative study, but instead of approaching the mid-frequency range from below, using deterministic approaches, five high-frequency probabilistic methodologies are being studied (these are Stochastic Boundary Elements, Wave-based Finite Elements, Component Modal Approach, Spectral Finite Elements and Point Mobility Approach).

Milestones 7 and 8 relate to project reporting. The mid-term and final reports will provide a valuable overview of both the technological innovations and industrial validation studies carried out in MID-MOD, which will form a reference work for the consortium partners with respect to mid-frequency vibro-acoustic issues.

Acronym:	MID-MOD	
Name of proposal:	Mid-frequency vibro-acoustic modelling tools / Innovative CAE methodologies to strengthen European competitiveness	
Contract number:	218508	
Instrument:	CP – FP	
Total cost:	3 817 865 €	
EU contribution:	2 477 612 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2009	
Ending date:	31.12.2012	
Duration:	36 months	
Website:	http://www.mid-mod.eu	
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	Università degli Studi di Firenze	IT
	University of Southampton	UK
	Kungliga Tekniska högskolan	SE
	Rheinisch-Westfälische Technische Hochschule Aachen	DE
	Politechnika Warszawska	PL
	Bombardier Transportation Sweden AB	SE
	Kompetenzzentrum - Das virtuelle Fahrzeug Forschungsgesellschaft mbH	AT

MoDe Maintenance on Demand



State of the Art - Background

Currently, many concepts for 'condition monitoring' are being developed and validated for the detection and diagnosis of premature damage in a structure or failures in electronic components, and for the prevention of hazardous failures in the case of damage.

These methods, indicated as 'health' monitoring methods, aim at controlling and reducing the life-cycle costs in safety-critical components of cars, commercial vehicles, trains (such as wheels, brakes, powertrains) and civil structures (such as cable-stayed bridges). An improvement in life-cycle costs is achieved by reducing product maintenance costs and improving product availability and reliability.

The basis for the development of such systems are integrated sensor and partly actuator systems, which are also being developed for smart structure technologies. At the same time, methods and procedures from the structural durability point of view are currently being developed allowing an even more accurate prediction of the remaining lifetime of damaged or aged structures. Combining these fields would allow 'maintenance on demand' and bring down the overall life-cycle costs of a product.

Objectives

Innovative technologies will be implemented in MoDe in order to increase the competitiveness of commercial vehicle users. With a better knowledge of the component's lifetime, it will be possible to follow up on its useful life in

order to replace components at the 'optimal' time and also to obviate a wrong use which causes some environmental damage (i.e. more CO₂ emission when engine oil is used which does not follow the specifications).

MoDe will promote the use of wireless sensor networks. It aims to increase competitiveness and vehicle status follow-up whatever its life cycle, which will allow optimised and tailored customer offers based on uptime.

MoDe will also demonstrate an efficient repair process in the case of unforeseen events. A mobile workshop's functionality deals with decreasing downtime. If a component needs to be repaired, the mobile workshop and the vehicle will meet each other at the optimal location to replace the failed component. In this case, condition monitoring and remaining lifetime assessment algorithms play an important role in getting a relevant overview of the event. Telematic systems will finally communicate the relevant information to a central system available to concerned stakeholders, thus increasing the decision-process accuracy while decreasing the global time needed for the vehicle to be back on the road.

Description of Work

The work plan has been divided into nine technical work packages (WP). Their number and sequence reflect the natural and logical structure of the work.

Enabling technologies will be assessed against the state of the art with respect to life-cycle impact and costs. The output serves as a starting point for the adaptation of enabling technologies. Sensor technologies (WP2), wireless communication (WP3), data management (WP4), logistics (WP5) as well as condition monitoring and life-time predictors are identified as needed for Maintenance-on-Demand concepts.

Maintenance-on-Demand (WP8) is a service offered to the vehicle end-user which interacts

with all previous WPs. The main objective is to evaluate the Maintenance-on-Demand concept implementing all the concepts described above. Increasing uptime shall also lead to improved competitiveness since a minimum level of vehicle availability, whatever its life cycle, can be guaranteed.

Maintenance-on-the-Fly (WP9) is the emergency variation of the Maintenance-on-Demand service. It will be developed jointly with WP8, focusing particularly on identifying solutions for vehicles which are already immobilised (Repair-on-the-Fly) or vehicles which require urgent maintenance to avoid breakdown (Maintenance-on-the-Fly).

The management activities (WP10) will provide a professional, technical and administrative support for all partners.

Expected Results

The MoDe proposal will improve transport competitiveness by increasing vehicle uptime (availability). Proposing a global uptime-based transport solution will help to maintain vehicles at their optimal condition.

Vehicle uptime also depends on the ability to decrease the 'failure' time. Even if part of the 'failure' time is dedicated to service work done by the technicians, the remainder mainly concerns wasted time (waiting for a diagnostic technician, for parts, for payment procedures, etc.). Providing the right information (i.e. describing the problem, the vehicle location) will suppress a major part of this wasted time. Moreover, indirect consequences could be the reduction of congestion and accidents (by avoiding long periods of immobilisation on the roadside).

MoDe will contribute to CO₂ emission reduction by a more relevant monitoring of the health status of vehicles' components and their remaining lifetime. This obviously includes some important engine and transmission items.

Due to the development of early breakdown detection based on powerful vehicle monitoring abilities, MoDe will also reduce the contribution of commercial vehicles to road congestion, especially in the case of an incident, by finding a safer and more appropriate place to repair the vehicle.

Acronym:	MoDe	
Name of proposal:	Maintenance on Demand	
Contract number:	233890	
Instrument:	CP – FP	
Total cost:	5 916 374 €	
EU contribution:	3 776 260 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.09.2009	
Ending date:	31.08.2012	
Duration:	36 months	
Website:	http://fp7-mode.eu/	
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	DHL Worldwide Express Logistics NV/SA - Global Customer Solutions	BE
	Avonwood Developments Ltd	UK
	LMS International NV	BE
	Valtion Teknillinen Tutimuskeskus	FI
	Technische Universität Darmstadt	DE
	Université de Technologie de Troyes	FR
	Mobisoft Oy	FI

NAVTRONIC

Navigational system for efficient maritime transport

State of the Art - Background

Maritime sail planning is usually aided by traditional means such as the Radiofax/Maritex (or weather fax), which broadcasts graphic weather maps and other graphic images via high frequency radio. They typically also have historical and statistical means to help understand how to plan voyages. One of the tools frequently used is routing charts from national hydrographic offices which provide historically and monthly averaged ocean current speed/direction, wind speed/direction, ice limits, load lines, weather ships positions, etc. Due to the limited information available onboard a ship, the sea masters are relying primarily on their own observations and experience. This can cost a day or two more in, for example, transatlantic crossings due to non-feasible metocean conditions. Another aspect of the problem is that high fuel costs, consequences of delays in ship passages, reduction of SO₂/CO₂/NO_x and similar emissions and other constraints are now putting more pressure on the maritime industry. The sea masters and planners now have to integrate more parameters to optimise their sail plan, and will need more accurate and reliable information and better decision-making tools.

Objectives

There is a strong interest in the maritime community to optimise sailing times, reduce fuel consumption and greenhouse gas emissions, and minimise maintenance cost. The objective of this project is to develop a sail-planning system to help sea masters optimise these criteria.

The proposed solution mimics the current human sail-planning process. It will use ship-specific data collection and real-time local and remote observations combined with several state-of-the-art nowcast and fore-

cast numerical models. It will monitor actual ship performance and assimilate this information in the sail plan optimisation process. The access and systematic exploitation of this ground-truth information will provide the unique capability of building 'system experience', constantly improving the performance of different sub-models used in the sail-plan optimiser. This will also reduce the sensitivity to ocean and weather forecast errors. The system will automatically and continuously compute and communicate optimised sail plans to a vessel. All relevant information justifying the results will be sent simultaneously.

The execution of the Navtronic system requires a central information centre that will be realised for exchanging ship-relevant information and providing optimised real-time sail plans. The central information centre will be part of the GRID distributed processing reciprocity.

Description of Work

The project work is structured in work packages (WP).

WP1: The overall strategy of the Navtronic work plan is to assess all types of real-time information capable of improving the sail-plan operation.

WP2: Work here will develop a new generation of sail-plan models that include real-time local and remote observations, and a sophisticated way to improve the reliability of metocean models and those for reducing fuel consumption and emissions.

WP3: This capability is developed here and implemented in an OnShore Control Centre (OSCC) and in a decision-making aid.

WP4: Work here will install, run and tune the Navtronic system on each of the end-user partners' vessels.

WP5: Sensitivity and performance analysis is conducted in real operations and the end-users are asked to evaluate the usefulness, quality and performance of the system.

WP6: The last work package will focus on project management and dissemination and exploitation of the results, including the correlation with certification and approval strategies under the International Maritime Organisation (IMO), particularly under navigation and safety at sea.

Acronym: NAVTRONIC

Name of proposal: Navigational system for efficient maritime transport

Contract number: 234372

Instrument: CP – FP

Total cost: 5 394 242 €

EU contribution: 3 577 210 €

Call: FP7-SST-2008-RTD-1

Starting date: 01.09.2009

Ending date: 31.08.2012

Duration: 36 months

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Forsvarets Forskningsinstitutt NO
European Space Agency FR
Marine & Remote Sensing Solutions Ltd UK

PMnIDEA

Predictive Maintenance Employing Non-intrusive Inspection & Data Analysis

State of the Art - Background

The environmental, societal, and economic drivers of an efficient urban transport system are almost universally acknowledged and are reflected in the local transport plans of all major urban areas of the community. Thus, the overall concept of the project is to facilitate the achievement of this goal by generating solutions to some of the currently identified barriers. In particular, the project is focussed on the adoption of novel inspection and sensor technologies whose technical principles have been well established or those that have been successfully employed in other industry sectors. Therefore, the project is driven by commercial principles to lower the risk of development and reduce the period of the implementation of developed solutions.

A key challenge in meeting projected growth in demand of urban transport is to maximise the availability of the track at the required integrity for the running of passenger carrying vehicles. The proposed project has been designed to contribute towards the achievement of this goal by addressing the two factors that can have an adverse effect on track availability.

1. Unplanned renewal and maintenance enforced by unpredictable break down, and
2. Intrusive inspection to ensure the integrity of the system.

It should also be emphasized that the asset condition of a number of the older tramways, particularly those in the new member states, is poor and since renewal is both costly and time consuming, it is essential that a scientifically valid basis of prioritisation of renewal and maintenance be developed.



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Track Monitoring

Objectives

The project has two key drivers:

1. To contribute towards the realisation of a 24 x 7 railway by minimising the disruption caused by activities of inspection, remedial and reactive maintenance, and track renewal. This has direct and positive impacts on reducing the cost of public transport.
2. The introduction of novel sensor, vision, and inspection technologies that focus on the monitoring of degradation by measuring the deviation from an identified 'signature tune'.

This will enable a move from the "find and fix" approach to a truly preventative maintenance with visibility of residual life and future investment requirements.

The project will address the key requirement of minimising manual inspection ("track walking") for urban transport systems although the technologies developed are likely to be applicable to main line railways. Such developments will be communicated to the industry through a "Mainline User Interest Group". The project will focus on the degradation of key components of the track system such as insulated block joints and stretcher bars

whose integrity is fundamental to meet the objective of 24 x 7 railway and the associated increase in duty conditions. It will also bridge the current gap in standards for the definition and assessment of the structural integrity of grooved rail.

The project will deliver new component designs and maintenance processes that are aimed at improving the integrity of urban rail transport networks through the deployment of intelligent design and sensor technologies into cost-effective products and targeted non-intrusive monitoring processes. In particular, the monitoring systems will combine objective automatic visual inspection with examination of internal integrity and the assessment of system and component degradation from a defined datum.

Description of Work

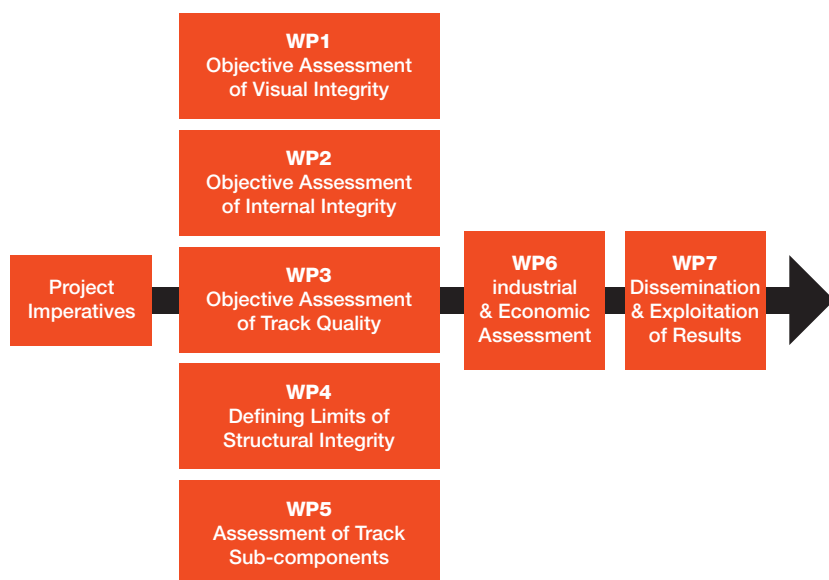
WP1 is focused on the development and deployment of novel image acquisition and intelligent image analysis techniques which will provide a consistent and objective measure of the degradation of every segment of the infrastructure.

WP2 involves the selection, development and validation of a suitable inspection method for the assessment of the structural integrity of embedded rails.

WP3 will implement a system for the measurement of track quality developing condition monitoring techniques and instrumentation.

WP4 will establish sustainable operational and upper boundary limits of vertical, gauge corner, and side wear for grooved and light section flat bottomed rails for a range of appropriate track loading conditions.

WP0 - PROJECT MANAGEMENT



Overall Project Structure

WP5 will deliver a methodology for the assessment of the in-service performance for a range of track components.

WP6 will assess the industrial and economic viability of the different product and technology solutions proposed in the previous WP by comparison with the existing methods. In addition, maintenance strategies will be proposed.

WP7 will manage Tramway and Mainline 'User Interest Group's (UIGs) to gather needs and inputs from the end-users and serve as a targeted outlet for the dissemination and exploitation of results.

Expected Results

The major deliverables from the project are:

- Development and application of image acquisition and analysis techniques for as much of the track system and its environment currently inspected by manual means, this will provide more comprehensive and objective inspection.
- Development of an inspection system to assess internal integrity of street running grooved rail sections.
- Development of methodologies to measure the deviation of track quality from benchmark data identified as a "signature tune" of the segments.
- Establishing the criteria for assessing the structural integrity of grooved rail sections embedded in street running sections of tramway networks.
- Development of techniques for the automatic assessment of degradation and integrity of fish plated, insulated block, expansion joints, switchblades, and stretcher bars.

Acronym:	PMnIDEA	
Name of proposal:	Predictive Maintenance Employing Non-intrusive Inspection & Data Analysis	
Contract number:	234299	
Instrument:	CP – FP	
Total cost:	4 940 007 €	
EU contribution:	3 199 725 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.06.2009	
Ending date:	31.05.2012	
Duration:	36 months	
Website:	http://www.pmnidea.eu	
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	MER MEC S.p.A.	IT
	TSTG Schienen Technik GmbH & Co. KG	DE
	Dynamics, Structures & Systems International	BE
	Bytronic Automation Limited	UK
	Manchester Metropolitan University	UK
	Cranfield University	UK
	Technische Universiteit Delft	NL
	Politecnico di Milano	IT
	Stagecoach Group plc	UK
	Société des Transports Intercommunaux de Bruxelles	BE
	ATAC S.p.A.	IT
	D'Appolonia S.p.A.	IT
	Tramwaje Warszawskie Sp. z o.o.	PL

PROMARC

Promoting Marine Research Careers

State of the Art - Background

Europe has a strong maritime economy in a high global position. The strength of the European maritime industry is based on its entrepreneurship and ability to innovate. The European maritime companies can only maintain their position to produce innovative products if they can attract highly qualified RTD personnel. In order to remain at the cutting edge of green, competitive, safe and secure advanced maritime product knowledge, technology and operations, naval architects, offshore and marine engineers, maritime scientists, marine transport economists and financiers as well as other related science and engineering graduates, have to be attracted to undertake research and development in the maritime sector.

Objectives

The call under SST.2007.6.3 Raising Awareness of potential job opportunities in the Surface Transport sectors aims at:

"Raising awareness of opportunities offered by surface transport research in job creation and future prospects for young people.

The following activities are included:

1. Encouraging young people to seek high skilled jobs in sectors related to surface transport with special focus on science, research and innovation.
2. Evaluating and demonstrating the potential of research outputs, outcomes and impacts to create and maintain jobs, with special consideration given to opportunities for young people and gender balance.

3. Extensive and broad communication and stimulation campaigns targeting young people of different ages (from early school to university). These could be travelling workshops, special and public events, competitions, animations and broad media directed to different audiences etc.

Proposals will focus on all major research priority lines defined for surface transport: greening, mobility, safety and security, competitiveness of surface transport activities and will involve all major research stake holders from industry, academia and society."

Market leadership is based on competency, know-how, innovation capability and collaboration. It is strongly dependent on the ability to foresee future needs and to forestall problems. This is true across the whole waterborne sector and is essential to the development of a knowledge-based society in the EU. People are the main assets and attracting young and new researchers and innovators to the Marine Technology sector is key if the EU is to maintain and expand its capabilities in advanced maritime technologies research, development and innovation, laying the foundations for future market leadership in the sector.

Advanced maritime knowledge in research, design, manufacturing and the operation of ships is a fundamental factor to fuel the EU economy. Therefore the maritime sector needs to be perceived as offering reliable, safe workplaces for highly qualified people and an attractive and challenging career in science research and innovation at all levels. This requires appropriate communication and education strategies for young pupils, within and beyond the waterborne sector. These requirements have been recognized in the VISION 2020 document produced by the WATERBORNE Technology Platform and by the current call.

Description of Work

In order to meet the primary objective of the call, and in looking at how to encourage people into the sector, two separate groups are catered for in PROMARC:

- School-age children looking to decide on a degree program, and
- University students and recent graduates deciding on a career path

For school-age children, the focus will be on demonstrating how exciting and dynamic the marine technology sector is, focusing on innovative developments and research as well as bringing them into contact with organisations involved in research and innovation. This will include arranging visits and excursions to Research Institutes, Classification Societies, Modern Vessels and Ports.

To stimulate interest in, and attract university graduates to, careers in research and innovation, one of the objectives will be to demonstrate to the target group that there are exciting, challenging careers available in a sector where there are skills in long term demand, focusing on key technology areas, including green vessel design and operations, innovative vessels and floating structures, innovative marine equipment systems and enhanced marine safety and security.

Expected Results

The need for intangible investments in RTD and RBE (Research Based Education) to preserve the technological advantage between Europe and its competitors are recognised and supported in the EU VISIONS 2020 Masterplan for the Maritime Industry which also stresses the importance of research and training, highlighting specific gaps. In this context, PROMARC can be considered as a continuation of the FP6 Coordination Activity CAREMAR of WEGEMT, and aims to support activities of the marine sector under the FP7 and beyond that. Quite simply, there will be a requirement to preserve, update and extend skills of practising engineers involved in research, and, moreover, involved in the implementation and exploitation of research, but also to enhance their numbers considered insufficient for the future needs of the European marine industry. This must be done in a coordinated way and will require a systematic approach that can be manifested through the implementation of PROMARC as a strategic platform for promoting careers in marine research.

Acronym:	PROMARC	
Name of proposal:	Promoting Marine Research Careers	
Contract number:	218590	
Instrument:	CSA – SA	
Total cost:	800 620 €	
EU contribution:	644 300 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.10.2008	
Ending date:	30.09.2010	
Duration:	24 months	
Website:	http://www.wegemt.org/promarc/	
Coordinator:	Mr. George Smyrnakis	
	Foundation Wegemt - A European Association of Universities in Marine Technology and Related Sciences	
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	Maritime Plymouth	UK
	National Technical University of Athens	GR
	Gdansk University of Technology	PL
	University of Rostock	DE
	European Council for Maritime Applied R&D Association	BE
	Community of European Shipyards Association	BE
	European Marine Equipment Council	BE
	GE Oil and Gas	IT

RISPECT

Risk-based expert system for through-life ship structural inspection and maintenance and new-build ship structural design

State of the Art - Background

Structural failures of ships are, relative to onshore structures, very common and these contribute to the personal risk levels of mariners, and high pollution and economic costs.

Ships operate in a severely corroding and (metal) fatiguing environment that reduces the strength of the ship structure, which can only be kept safe by regular inspection and repair of paint coatings, excessively corroded plate and fatigue cracks.

Present inspection planning is based on long-term experience with usually no account taken of the needs of any specific ship. Reliability or risk-based methods, applied in other industries, are not good at using information from large numbers of ships to improve the inspection planning of any given ship. A system for collecting, analysing and making use of ship structural inspection data is required in order to improve ship safety.

Objectives

This project will provide a better methodology that will (on an ongoing basis) combine detailed analysis of long-term experience from large numbers of ships and the reliability/risk-based methods to provide useful and justifiable risk-based inspection plans. This will lead to better inspections, more important defects being found and repaired, fewer pollution incidents and the saving of lives.

The project has evolved partly from a recognition that integrating two apparently different methods for inspection planning should allow better decisions to be made.

Description of Work

Inspection, timing and method for ships have traditionally been based on experience and are essentially determined by class rules, having the advantage that they are based on an overview of ship-related structural problems, but they cannot deal well with ship-to-ship variations in construction or use.

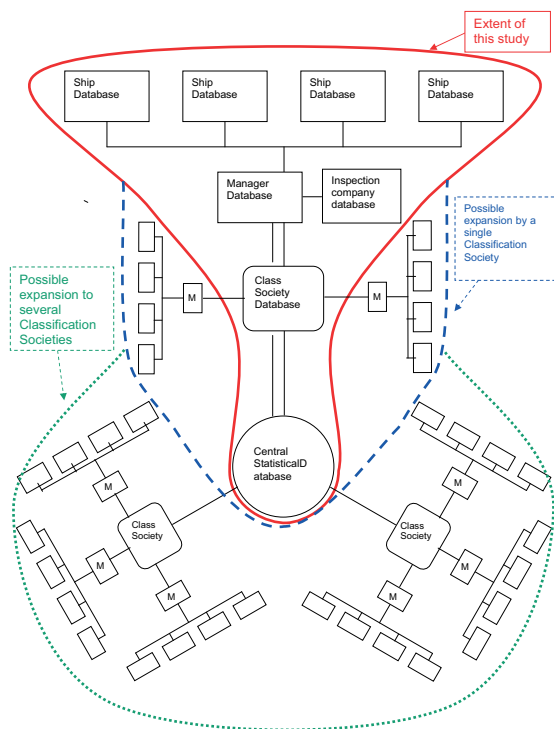
Very occasionally, first-principles, reliability-based methods have also been used to determine ship reliability and the required inspection levels. These have generally been applied to individual component parts of individual ships and can deal reasonably well with the individual part but they do not give a good estimate of the overall reliability of the ship and, crucially, they lack the large personal awareness 'experience database' that the traditional, experience-based methodology uses, so the reliability methods are not calibrated by reality.

RISPECT will combine the above two methods, and develop and demonstrate an improved method based on a combination of experience based on first principles and statistical analysis for safe, cost-effective structural inspection and repair of existing ships. Within the proposed primary methodology the experience base will be handled statistically but, in parallel, classification society experience will also be tapped, using an expert system approach, to try and provide a 'common-sense' check on the purely statistical analysis.

Expected Results

The final deliverable is a RISPECT Software System that will perform the following functions:

1. A database for individual ship structural data, ship voyage data, calculated ship structural degradation and measured ship structural degradation from inspections.
2. A structural assessment system for calculating the ship's structural degradation, comparing this with the measured degradation and outputting calibration data: ratios of calculated/measured structural degradation data in a non-attributable, non-commercially sensitive, sanitised form to the Central Statistical Database.
3. A Central Statistical Database will be provided with calibration data from large numbers of ship managers. This data will be automatically analysed so that mean and standard deviation of any calibration factors for any type of degradation can be calculated.
4. A structural reliability assessment system for the ship manager or classification society will use the calibration factors to calculate an improved assessment of the structural degradation of parts of the ship not recently inspected, and will determine the future reliability of the ship for a given inspection plan or a cost-optimised inspection plan.
5. Interfaces to ship builders, ship inspectors, ship repairers, owners and other authorities, which may require structural data or will provide structural data input to the system.



Overall diagram of the RISPECT system

Acronym:	RISPECT	
Name of proposal:	Risk-based expert system for through-life ship structural inspection and maintenance and new-build ship structural design	
Contract number:	218499	
Instrument:	CP – FP	
Total cost:	4 386 079 €	
EU contribution:	3 248 111 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.10.2008	
Ending date:	30.09.2011	
Duration:	36 months	
Website:	http://www.rispect.eu	
Coordinator:	Mr. Gregory Martin	
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EC Officer:	Michal Klima	
Partners:	Atlantec Enterprise Solutions GmbH	DE
	Bureau Veritas	FR
	Consorzio Armatori per la Ricerca Srl	IT
	Politechnika Gdanska	PL
	Instituto de Soldadura e Qualidade	PT
	Instituto Superior Técnico	PT
	University of Newcastle upon Tyne	UK
	Ship Builders and Ship Repairers Association	UK
	TWI Ltd	UK
	Services for Maritime Managemet Srl	IT

VISIONS-OLYMPICS

The next generation of products and procedures for vessels and floating structures

State of the Art - Background

VISIONS-OLYMPICS focuses on the need to develop innovative maritime products incorporating knowledge, design and manufacturing procedures that meet future market needs, and to evaluate their feasibility and analyse the needs for further research and development. Many stakeholders - industry, universities, research institutions and organisations - need to collaborate to achieve this goal of making 'innovative ideas happen'. Support from relevant industrial partners is also required to make the market success of these products real. The bridge between universities, industry and organisations needs to be built once again to guarantee success.

In order to meet the primary objective of the call, 'supporting the development of transport specific innovations that could deliver step changes into efficiency and cleanliness in the next 20 years and beyond', a systematic approach has been adopted using existing appropriate communication platforms and strategies within and outside the waterborne sector. During VISIONS-NoE the commission's position was that 'these kinds

of activities are an essential cornerstone of an innovative European waterborne sector'.

Objectives

VISIONS-OLYMPICS aims to increase the European competitive advantage by tapping into the unspoiled/unbiased creative minds of the young generation. It will:

- offer out-of-the-box concepts and ideas for the future of European maritime transport;
- develop these ideas within an environment where purpose-driven innovation is cultivated and performed in a risk-free environment;
- build bridges and enhance coordination between EU research networks and strengthen the partnership between research universities and industry.

Students will be asked to target towards:

- increasing market volume;
- increasing European market share;
- minimising production costs and operational costs;
- minimising life-cycle costs;
- applying paradigms of advanced technologies used successfully in disciplines other than the maritime sector.

The aim is to think in categories of Systems-Solutions and Systems-Optimisation instead of single products, even if a contribution is only considering components. This also includes the optimisation of the entire supply chain that deals with non-maritime parts according to the principle of door-to-door transportation.

Experts from all industries will be asked to propose similar solutions based on technologies applied to other transportation disciplines and to perform a sensitivity analysis on how the new concepts could be proved feasible in the future.



Visionary concept



© Visions N&E

Visionary concept

Description of Work

The project is divided into five work packages (WP).

The main objectives of WP1 are to set the business frame within which new, innovative product and process ideas and concepts can be generated. Special attention will be given to the interdisciplinary approach.

The main objectives of WP2 are to generate new and innovative concept ideas that will potentially address the future market needs of the European maritime industry, with a special focus on the trans-disciplinary issues. The market focus, which will be defined in task 1-1, will need to be translated into technical requirements that will be used in the development of the academic contest guidelines and in the subsequent outline concepts that will be developed.

WP3 will select the concept ideas submitted during the academic contest initiated under T2.3 that are to be further evaluated. This work package will also formulate the critical evaluation tasks and select the appropriate experts who will perform the evaluations.

The main objective of WP4 is to make industry aware of the results of the contest and the subsequent evaluation of the ideas, thus increasing the awareness of the contest and its degree of fame to a level where sustainable sponsorship could be achieved.

WP5 deals with management and administrative tasks.

Expected Results

The target will be to introduce the most promising evaluated concept ideas to industry, investors and scientists for further development into market-ready products.

European shipbuilders currently have a competitive advantage in building complex and technologically advanced ships. Continuous improvements and market-orientated concepts will be a good approach for strengthening Europe's competitive advantage.

Nevertheless it is a 'common secret' in the European shipbuilding industry that the culture for developing visionary and holistic concepts are much less developed here than in other industrial countries. This will assist the

European shipbuilding industry in overcoming the current advantages of competitors, which are low labour costs and advanced holistic concepts and processes covering the ship's life cycle.

Innovation in European shipbuilding mostly occurs spontaneously and is driven by technology. VISIONS-OLYMPICS will provide the industry with a new structured procedure that

covers all aspects of new products and allows creative thinking. This process currently does not exist, either due to a lack of resources or a lack of 'skills'; staff are usually overloaded with the competitive daily struggle and their minds are biased by the continuous 'problem solving thinking' in which they are very good but which makes out-of-the-box thinking much harder.

Acronym:	VISIONS-OLYMPICS		
Name of proposal:	The next generation of products and procedures for vessels and floating structures		
Contract number:	234199		
Instrument:	CSA – SA		
Total cost:	696 200 €		
EU contribution:	563 525 €		
Call:	FP7-SST-2008-RTD-1		
Starting date:	01.09.2009		
Ending date:	30.11.2011		
Duration:	27 months		
Website:	http://www.visions-olympics.eu		
Coordinator:	Mr. Willem Laros Community of European Shipyards Associations rue Marie de Bourgogne BE 1000 Brussels		
E-mail:	wl@cesa.eu		
Tel:	+32 (0)2 282 03 53		
EC Officer:	Dominique Ramaekers-Jørgensen		
Partners:	European Marine Equipment Council		BE
	Western European Graduate Education in Marine Technology		UK
	University of Rostock		DE
	Balance Technology Consulting GmbH		DE

B2B LOCO

Baltic - To - Balkan Network for LOfistics COmpetence



State of the Art - Background

The B2B LOCO project is based on the experiences of the CENTRAL LOCO project (FP6 SSA), which aimed to promote the dissemination and exploitation of RTD project results of the 5th and 6th Framework Programmes among the enterprises and research units operating in logistics and transport. The past project's area of influence covered four Central-European New Member States: Czech Republic, Hungary, Poland and Slovakia.

The revised and expanded concept of the B2B LOCO project is that local market-oriented research units - collaborating in an international network aimed at experience exchange - can substantially increase the participation of SMEs in the Framework Programme projects by demonstrating and actively promoting the most business practice-oriented results of past and current RTD projects of the Framework Programmes among the enterprises. The dramatically increased project area includes 15 countries now, including old and new Member States and two Candidate Countries, covering most of the East of the continent and beyond, from Estonia to Israel.

It is widely known that companies are often 'FP-ready', yet do not realise their potential because the FPs are much better communicated to the research community. Therefore, B2B LOCO consortium groups research organisations with considerable experience in FPs and a track record in talking directly to SMEs, in their own language and by identifying what drives them in everyday operations.

Objectives

With the above concept in mind, throughout its 24-month duration, B2B LOCO will provide the SME community with two international conferences, two practical workshops and three brokerage events, supplemented with permanent communication mechanisms (www, newsletters) and other media campaigns.

The concept of the network is three-fold:

- Most of the real work involving SMEs must take place at the national level, communicating in national languages, and taking into account local specificity, proliferation levels and attitudes – in this sense the B2B LOCO network forms a forum for the exchange of research unit experience, copying the best approaches and mutually seeking solutions to problems.
- In some aspects, a pan-European approach is required – in this sense the network will provide a critical mass and a good communication channel to, and between, hundreds of European SMEs.
- Regional dimension and local specificity will be ensured by co-operation with regional industrial clusters and their coordinators, making reaching 'FP-ready' SMEs easier.

The content of the events and other mechanisms will focus on issues which are perceived by European SMEs as paramount to their competitiveness, thus forming a real example of applied FP efforts and a magnet for future participation in the Framework Programmes. This approach is complementary to the existing National Contact Point and Enterprise Europe Network networks, which dedicate a lot of effort to enhancing general knowledge and participation in European programmes.

Description of Work

The work plan consists of 6 WPs:

WP1 Project Management

WP2 International Conferences

WP3 Practical Workshops

WP4 Brokerage events for regional industrial clusters and SMEs

WP5 Dissemination and Mutual Learning

WP6 Alumni Networking

Since it is a network building and maintenance effort, most partners are involved in all WPs, although with different levels of responsibility. All activities are geared towards SME-oriented RTD units and/or directly towards SMEs listed below, gathered within regional clusters:

- transport and logistics companies that benefit from applying FP projects results directly in their daily activity,
- manufacturing and retail companies whose competitive position has been strengthened by application of transport and logistics technologies developed during FP projects and their subsequent commercial exploitation,
- hi-tech companies that take part in the demonstration and further exploitation of FP project results by taking solutions to the market, often investing their own money in the most advanced S&-based products,
- green technology companies that are of a particular focus of this call.

The WPs are highly interconnected and work in parallel throughout the entire project, without any majorly distinguishable phases. Each WP individually follows a logical chain of events with connection points (such as an e-brokerage tool developed in WP6, which is to assist WP4) secured by careful overall project planning.

Expected Results

The main aim of the B2B LOCO project is the transfer of knowledge, exchange of good practices and results, and the stimulus for further research, without reinventing the wheel. B2B LOCO will provide the SME community with two international conferences, two practical workshops and three brokerage events, supplemented with permanent communication mechanisms (www, newsletters). Apart from communication tools created exclusively for B2B LOCO, partners will disseminate materials through their own channels and via the regional industrial clusters that gather SMEs. Mutual learning, mentoring and consultation will be achieved by extensive communication and contributing to public and internal documents. Commercialisation of FP project results is the subject of B2B LOCO, although the project has no commercially exploitable results.

Our project is designed to put FP on the map of many SMEs' owners/managers by presenting research results which could be of interest in their business practice. It will show them the way such projects are developed and encourage linking with RTD units in order to propose new projects.



© B2B LOCO Project

B2B LOCO Charts

Acronym: B2B LOCO

Name of proposal: Baltic - To - Balkan Network for LOGistics COmpetence

Contract number: 234106

Instrument: CSA – SA

Total cost: 939 294 €

EU contribution: 849 576 €

Call: FP7-SST-2008-RTD-1

Starting date: 01.09.2009

Ending date: 31.08.2011

Duration: 24 months

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Partners: Univerza v Mariboru, Fakulteta za gradbenistvo SI
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University of Rousse BG
Vyskumny ustav dopravný, a.s. SK
Wyższa Szkoła Logistyki PL
Centrum dopravního výzkumu, v. v. i. CZ
PROMETIS d.o.o. HR
Aristotle University of Thessaloniki GR
Technion- Israel Institute of Technology IL
Tallinna Tehnikakõrgkool/ University of Applied Sciences EE
Akdeniz University TR
AFP MKT Ltd RO
Transport and Telecommunication Institute LV
STAR IT

CETRRA

Actions to Stimulate Participation of Cooperation Partners in Surface Transport Research

State of the Art - Background

In an integrating Europe, the transport of freight and passengers is increasing rapidly. Cross border transport has already outbalanced inland needs and will grow further in an international scenario.

The European transport research landscape has been a very fragmented one up to now. E.g. the harmonisation of rail systems in Europe needs harmonised research applications and facilities. Implementing knowledge from rail operators, industry and researchers will be the instrument to overcome the friction losses caused by fragmentation. It will provide harmonised requirements, priorities for efficient use of resources and a joint program of activities up to

completion. In particular the challenge of inter-modal competition and co-modality requires multi-disciplinary research cooperation throughout Europe and with neighbouring regions.

Objectives

Harmonisation, standardisation and interoperability in rail transport are major drivers for an innovative ecological and economical co-modal transport environment. It is up to the overall transport system with operators and transport providers, industrial system integrators, SME and researchers to tackle this challenge.

A new culture of cooperation within the system has emerged recently, where researchers took on a high burden to start overcoming fragmen-



© TSB

CETRRA project partners along the Eurasia landbridge

tation, to ease cooperation and foster harmonisation and standardisation. It is the objective of CETRRA to build upon this momentum by further integrating international scientists and researchers as well as innovative SMEs, both supporting added value to intermodal competitiveness and co-modality by multidisciplinary research cooperation throughout Europe and with neighbouring regions.

Description of Work

The work plan of CETRRA is divided into integrating activities and collaboration activities.

- The integrating activities provide the basis for the collaboration activities.

A detailed survey of the competencies, experiences, and fields of interest for the participating SMEs and non-EU-researchers is performed. In integration conferences, contact seminars and via a virtual meeting point in the web, an atmosphere of trust and a platform for the exchange of topics and ideas is provided for SMEs and researchers.

- Collaboration activities

Product Qualification Methods (PQM)

The transferability and application of PQM in different countries along the EU-Asia-Landbridge are evaluated. Therefore, missing testing and assessment methods for new technologies in the EC, Russia, and Asia will be identified too. The work aims at the achievement of a commonly agreed set of test and simulation procedures and methods, from a neutral, scientific point of view.

The identification of joint research topics and projects

Based on previous work, the matching of potential collaborating research partners and facilities and the identification of research topics of mutual interest will be performed. Identified research projects will be submitted to the EURNEX Scientific Board and to the Clients Advisory Board for advice on methodology, priority and funding.

WP6 – The assessment of training courses and public awareness

An evaluation and awareness campaign of existing training opportunities in the surface transport sector for junior scientists, researchers and engineers will be undertaken. This also includes e-training programmes.

Expected Results

The European transport industry is active in a worldwide market and innovation is essential to maintain its position and success in evolving markets. Consequently, the railway industry is modernising its products and processes in order to keep its worldwide competitiveness. This implies the application of innovative technologies and new lower cost manufacturing processes. New challenges of trans-continental transport projects - such as the EU-Asia Landbridge - require new forms of collaboration on a global level. International cooperation beyond the EU borders is essential to understand the specific challenges and conditions of the transport systems in other regions of the world. In particular, improved knowledge about the conditions in terms of transport related pollution, traffic congestion, safety and mobility needs are important to provide a European contribution to more efficient, economic and environmental friendly transport systems in neighbouring regions. The research activities in trusted partnerships will be identified by CETRRA in close connection with the stakeholders and its exploitation policy of the innovations will strengthen the European competitiveness in the transport sector.

The CETRRA activities will foster the European surface supply chain by developing an interoperable and harmonised European transport system contributing to co-modality and a strong internationally competitive European transport industry. This will be based on integrating the SME, the transport industries' associations and researchers, sharing knowledge and co-ordinating current research through:

- the building of reliable, sustainable strategic partnership of SMEs with transport industry, operators, authorities, and bodies,
- the better use of resources (integration of researchers with expanded knowledge basis, multidisciplinary cooperation),
- targeted benchmarking within the transport modes and other branches to perform reasonable and efficient knowledge/technology transfers for the transport sector, and
- the strengthening of the competitiveness of involved SMEs as an integral part of international R&D partnership.

Acronym:	CETRRRA	
Name of proposal:	Actions to Stimulate Participation of Cooperation Partners in Surface Transport Research	
Contract number:	218730	
Instrument:	CSA – SA	
Total cost:	505 622 €	
EU contribution:	505 622 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.06.2008	
Ending date:	30.09.2010	
Duration:	28 months	
Website:	http://www.cetrra.eu	
Coordinator:	Mr. Thomas Meissner TSB Innovationsagentur Berlin GmbH FAV Berlin Fasanenstrasse 85 DE 10623 Berlin	
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Tel:	+49 30 46 302 563	
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EC Officer:	Alexandra Gurau	
Partners:	Instituto Superior Técnico	PT
	Ceské vysoké uení technické v Praze	CZ
	State unitary enterprise Russian Research and Design Institute for Information, Automation and Communication of Russian Ministry of Railways	RU
	Moscow State University of Railway Engineering	RU
	Petersburg State Transport University	RU
	Omsk State Transport University	RU
	Urals State University of Railway Transport	RU
	Siberian Transport University of Railway Engineering	RU
	Irkutsk State University of Railway Engineering	RU
	Hong Kong University of Science and Technology	HK
	Tongji University	CN
	Chinese Academy of Meteorological Sciences	CN
	Eidgenössische Technische Hochschule Zürich	CH
	ANCHORAGE	IN
	RTCA Rail Technology Cluster Austria – Eisenbahntechnologiecluster Österreich	AT
	ASCI SYSTEMHAUS GMBH	DE
	CSA COMPUTER & ANTRIEBSTECHNIK GMBH	DE
	Human-Factors-Consult GmbH	DE
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TRENMO, Engenharia Lda	PT
Witt IndustrieElektronik GmbH	DE
EURNEX e. V.	DE

EMAR²RES

Support Action to initiate cooperation between the Communities of European MARine and MARitime REsearch and Science



State of the Art - Background

EMAR²RES will provide a forum for Europe's marine and maritime research communities, so that they can collectively work towards enhanced capability in the field. This is essential to ensure that Europe's capability is of internationally acknowledged excellence, and of sufficient scale and critical mass to facilitate, promote and sustain intellectual interchange in international research.

Specific project objectives:

- To support interaction between marine and maritime research communities to assist in creation of the marine component of the European Research Area (ERA), facilitating the creation of an internal market and quantifying the existing European marine and maritime research capacity.
- To facilitate networking among EU marine and maritime research communities leading to a more cost-effective and efficient use of Member State resources including scientific personnel, specialist infrastructures and planned investments.
- Contribute to the evolution of a European Marine Research Strategy, identifying challenges and opportunities and priority inter-

disciplinary research programmes needed to address/benefit from them.

- Provide a basis for sharing resources to address those priority issues beyond the capacities of individual Member States.
- Advance the inter-awareness and collaboration between Member State and EU marine and maritime RTD programmes.

Objectives

EMAR²RES aims to support and contribute to the research and maritime policies, including the European Maritime Policy and the European Research Area; to identify possible synergies between those policies while addressing areas of common interest to both communities, with an underlying emphasis on global challenges such as climate change, strengthening competitiveness, greening surface transport (mainly waterborne transport) and improving safety. EMAR²RES intends to provide a forum for interaction between Europe's Marine and Maritime research communities, so that they can collectively work towards enhanced capabilities. This is essential to ensure internationally acknowledged excellence, and should be of sufficient scale and mass to facilitate, promote and sustain international intellectual interchange and discourse, fundamental to the Lisbon Agenda and the ERA.

Description of Work

1. Inventory and analysis: linking medium- and long-term visions of the two communities, to identify developmental strategies for climate change and the relevance of

co-operation for the ERA and the Knowledge-based Economy, and to identify key stakeholders;

2. Identifying areas of common interest – towards a holistic approach and integration: organising workshops for experts from both communities and brainstorming common interests, research needs and possible synergies focused on, but not limited to, climate change, impacts on the marine environment and European competitiveness;
3. Formulating cooperation: building on analysis and improved understanding plus findings from the workshops; formulating co-operation between the two communities and proposing the most effective and long-lasting approach, taking into account public and private funding at national and European level;

4. Validation of findings: of paramount importance for the project's impact. Building on previous experience, a Policy Interface Panel of representatives will be set up from the WATERBORNE Strategy and the Post Aberdeen Marine Interest Group to draw recommendations and encourage the widest support from both communities;

5. Dissemination of findings: using all the appropriate media channels, the originality of this strategy is use of the WATERBORNE and Post Aberdeen Marine Interest Group networks.

Expected Results

EMAR²RES will take the first steps towards the integration of the marine and maritime science and research communities, for the benefit of European competitiveness. This would strongly support both the European Research Area (ERA) and the European Maritime Policy.

Acronym: EMAR²RES

Name of proposal: Support Action to initiate cooperation between the Communities of European MARine and MARitime REsearch and Science

Contract number: 234359

Instrument: CSA – SA

Total cost: 748,650.00 €

EU contribution: 748,650.00 €

Call: FP7-SST-2008-RTD-1

Starting date: 01.11.2009

Ending date: 01.02.2012

Duration: 28 months

Website: <http://www.waterborne-tp.org>

Coordinator: Mr. Willem Laros
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EC Officer: Dominique Ramaekers-Jørgensen

Partners:	Fondation Européenne de la Science	FR
	European Maritime Equipment Council	BE
	European Council for Maritime Applied R&D	BE
	Western European Graduate Education in Marine Technology	UK

FUTURAIL

Job opportunities for the railway community of tomorrow

State of the Art - Background

The railways and their staff are facing crucial changes that will determine the future of this important sector. These changes have wide implications on technological, demographic, structural, legal and regulatory domains. Their urgency is justified by the current situation in the sector, and also by a recent widespread and intense impetus towards leveraging railways in Europe.

'The European railway and urban mass transit operators generate an annual turnover of around € 90 billion with a workforce estimated at 1 000 000 people. In addition, the European rail supply industry employs more than 130 000 people and generates an annual turnover of around € 35 billion. European suppliers devote more than € 500 million to research every year.' The strength of this sector is revealed not only through its dimension but also from the potential for change and innovation.

The structure of the railway sector involves a complex interaction between agents that are all contributing to customer satisfaction and to the prominence of the railway sector within the transportation system. This can be summarised as:

- government to provide clear strategic directions,
- regulatory bodies to enforce the highest levels of safety, and
- the private sector offering innovation and customer-focus products and services.

Objectives

The purpose of FUTURAIL is to foster a better match between the human resources available and the need to make the railways a more competitive and innovative sector to face the challenges of the 21st century. The more competitive a sector is envisaged to become, the more focus is needed on training and educational programmes to support it. FUTURAIL

will act by matching demand and supply of the required skills and competencies to foster the development of the sector.

The FUTURAIL objectives are:

- disseminate the social, economic and industrial benefits of education and research in the railway sector and promote the idea that advanced technologies and further education are required for a highly innovative and technologically developed sector;
- identify and develop actions promoting and supporting the participation of women within railway transport research.

Description of Work

The project is structured into three technical work packages (WP).

The objective of WP1 is to disseminate the social, economic and industrial benefits of education and research in the railway sector, and promote the idea of advanced technologies and further education to develop the railway sector into a leading industry. It is structured around the following tasks:

- identification of target population;
- identification of innovation efforts;
- short-term summer schools;
- a comprehensive dissemination programme.

WP2 will define and implement a set of actions and events addressing enhanced participation and contribution of women in the railway research domain, a field where gender balance is far from being the average in the technical/scientific sector in Europe.

WP3 targets a win-win situation, bringing together 'offer and demand' for job opportunities in the railway sector. On the one hand, this work package serves to improve knowledge about the necessary skills for future jobs in the railway sector (industry and operators), and on the other hand it will attract young people and so direct their education for employment in this industry.

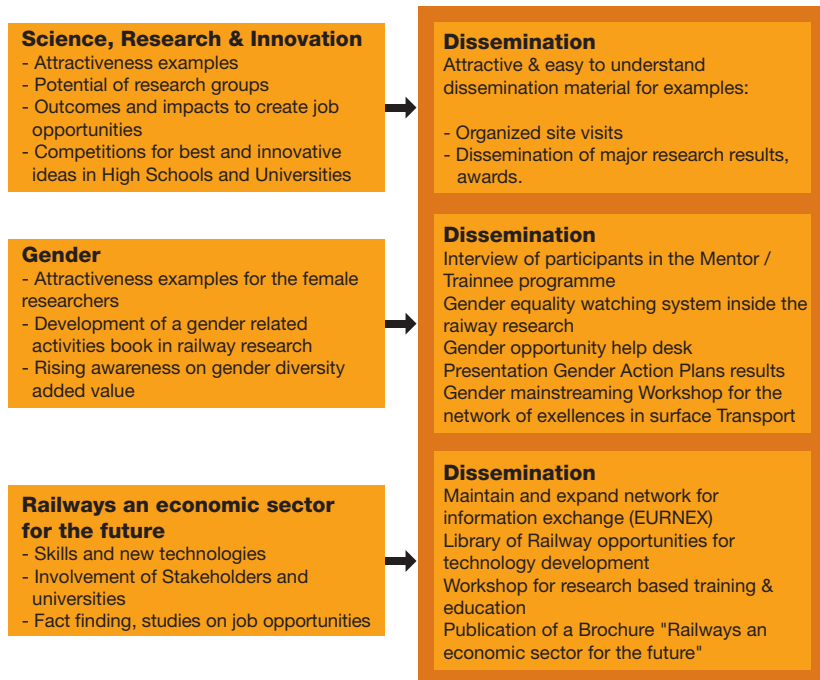
Expected Results

A number of impacts are expected:

- disseminate the railways' vision and the intense ongoing change process, aiming to contribute towards changing the public image of railways;
- disseminate good practices in the sector with the double effect of transmitting practical knowledge and also motivating the staff involved by highlighting the positive outcomes of those practices;
- highlight the social and industrial benefits accruing from rail to further develop the European Union, which is largely dependent on a sustainable transport sector;
- demonstrate and disseminate the need for advanced high technology railway engineering in the future;

- demonstrate and disseminate the need for additional domains of knowledge that should complement engineering, such as economics, management and sociology;
- more job opportunities in the sector resulting from the transfer of knowledge from the research domain to the different companies.

FUTURAIL RATIONAL



Acronym: FUTURAIL
Name of proposal: Job opportunities for the railway community of tomorrow
Contract number: 218596
Instrument: CP – FP
Total cost: 262 080 €
EU contribution: 262 080 €
Call: FP7-SST-2007-RTD-1
Starting date: 01.01.2009
Ending date: 30.06.2010
Duration: 18 months
Website: <http://www.futurail.eu>
Coordinator: Prof. Manuel Pereira
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 TSB Innovationsagentur Berlin GmbH
 Union Internationale des Chemins de Fer
 EURNEX e.V.

IT
 DE
 FR
 DE

MARPOS

MARitime POLicy Support



State of the Art - Background

Maritime transport has been a catalyst for economic development and prosperity in Europe throughout its history, with seaborne freight trade now representing almost 90% of the EU export freight trade. Developments on the international scene have been rather rapid, with the financial crisis affecting key areas of the global economy such as maritime transportation and international trade. The competitiveness of Europe's maritime industries, and their ability to meet the environmental, energy, safety and human-factor challenges they face, are influenced to a large degree by research and innovation efforts, which should be further encouraged.

In 2007 the European Commission launched the Seventh Framework Programme (FP7) with a central objective - in relation to transport research - to develop safer, 'greener' and 'smarter' pan-European transport systems that will benefit all citizens, respect the environment and increase the competitiveness of European industries in the global market.

The EU maritime industries, to enhance competitiveness, should build on the significant RTD efforts and results from the research activities carried out under successive Framework Programmes, so that Europe becomes a world leader in maritime transport research.

Objectives

The specific objectives of MARPOS include the following:

- identify and evaluate the results and information from past maritime transport research in FP5 and FP6 projects, and interact with the ongoing work of FP7 projects;
- organise and execute consultation workshops with the relevant maritime stakeholders, aiming to capture the experts' point of view and provide useful input to the evaluation of the maritime transport research results;
- provide the opportunity for all interested parties to be informed on the results of past and current research work in the maritime transport area;
- identify future maritime transport research needs to support the Commission's objectives and targets for maritime policy, which occur in maritime transport considerations;
- disseminate the project results and outputs (publications, a searchable Internet database for maritime transport-related research work, etc.) through the organisation of a large conference in Brussels at the end of the project. This event will bring together maritime transport stakeholders, provide the opportunity for discussions on the future of maritime transport, and also for networking and promoting new co-operation in the area of maritime transport research.

Description of Work

The strategy of the work plan aims at exploiting the knowledge and expertise of the consortium and individuals for the benefit of the project. To cover its objectives MARPOS includes four work packages (WP) for the analyses and dissemination/networking activities, and one for the overall project management.

WP2: Maritime transport system analysis in European research.

WP3: Development of a European maritime transport research database.

WP4: Future maritime transport research priority lines.

WP5: Dissemination - consultation activities.

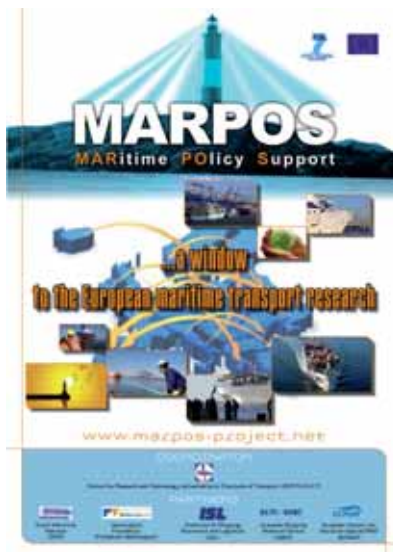
The work in each work package will proceed both 'vertically', in terms of five maritime transport-related 'themes', and 'horizontally', in terms of the input used for the analysis, which is based on two main sources: the current implemented research in the European maritime transport context, and the contribution of experts' groups to the analysis of the selected material for the preliminary identification of needs and priorities that future European maritime transport research should follow.

In parallel, dissemination/consultation activities centred on a series of events will take place, along with the exploitation of the Internet through the development of the project website and a dedicated e-tool.

Expected Results

1. A concise, thorough and well documented review of the maritime transport research of FP5 and FP6 in the form of thematic project reviews and summaries of their related recommendations. The review will also cover ongoing FP7 projects. The results of this work will be included in a full report that will be published in the form of a book.
2. The development of a searchable database, available on the project website. This e-tool will present the results of MARPOS to a wide audience and provide the opportunity for identifying the research results of all EC programmes in the field of maritime transport, covering all five themes and providing links with additional sources of information.

3. A series of 'public consultation and information' events will be organised with a view to disseminating information, providing a forum for interaction between experts and authorities in the fields of maritime transport, and drawing on the project's recommendations for future research. These events will include eminent speakers from all over Europe who are specialised in one or more maritime transport themes.
4. Concise, thorough and well documented recommendations about the needs and priorities for future maritime transport research in the coming FP7 calls will be made as a result of the above analyses and activities, and in close co-operation with the WATERBORNE Platform.



MARPOS poster

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Acronym:	MARPOS	
Name of proposal:	MARitime POlICY Support	
Contract number:	218522	
Instrument:	CSA – SA	
Total cost:	479 820 €	
EU contribution:	479 820 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.12.2008	
Ending date:	30.11.2010	
Duration:	24 months	
Website:	http://www.marpos-project.net	
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EC Officer:	Dominique Ramaekers-Jorgensen	
Partners:	Dutch Maritime Network	NL
	Fundación de la Comunidad Valenciana para la Investigación, Promoción y Estudios Comerciales de Valenciaport	ES
	Institute of Shipping Economics and Logistics	DE
	Klaipeda Shipping Research Centre	LT
	European Council for Maritime Applied Research & Development	BE

PRESS4TRANSPORT

Virtual Press Office to Improve EU Sustainable Surface Transport research Media Visibility on a National and Regional Level

State of the Art - Background

The transport sector is considered to be one of Europe's strengths. While the air transport sector contributes to 2.6% of the EU Gross Domestic Product, with 3.1 million jobs, the surface transport field generates an even more significant 11% of the EU GDP, employing 16 million people.

There is a need for a better understanding of the positive impacts of transport on modern society, as well as policy measures and research actions needed to mitigate the negative impacts of enhanced mobility.

One of the central roles in awareness-raising within a dissemination strategy revolves around the involvement of the media: the communication of research results via the relevant media sources (newspapers, general and specialised magazines, websites and portals, blogs, etc.).

Research results, news and developments in the surface transport industry must be given large and appropriate visibility to have an impact on the public.

Therefore, a link between research, industry and the media is essential for achieving positive results and promoting the most relevant transport research so that nothing is neglected or improperly communicated, creating misconceptions of major European surface transport research progress.

The project PRESS4TRANSPORT will serve as a stimulus of promotion of regional and national transport research programmes and their respective projects.

Objectives

Project objectives:

- To offer selected key national and regional transport projects an electronic, easy to access, online tool (Virtual Press Office) for increasing the visibility of the project achievements and products on national and international media.
- To exploit accessible SST research, with a specific thematic focus on urban transport, Intelligent Transport Systems (ITS), freight/logistics and maritime transport via VPO platform and its corresponding services in conjunction with the Transport Research Knowledge Centre in effectively uncovering and promoting research results that are under covered, or not discussed at all in the media.
- To offer the mainstream and specialized press a critical mass of news coming from results achieved by projects that do not currently reach them, by introducing a new channel that is able to collect, sort and prepare this specific universe of information in a professional 'ready-to-use' format.
- To identify gaps in existing knowledge coming from the national and regional level transport research by using survey tools and to identify how these gaps could be filled, applying a communication-oriented approach.
- To provide selected SST consortia with an online tool that helps to refine their overall communication strategy.

Description of Work

PRESS4TRANSPORT offers a user-friendly online tool that allows the coordinators/managers of national, regional and, if necessary, EU level transport research projects to receive full access to professional journalists to edit their news into a media-friendly press release or article to be disseminated to the relevant media.

The benefits of PRESS4TRANSPORT:

- PRESS4TRANSPORT journalism and scientific experts can turn any relevant news from a project into a dynamic, journalistic article to communicate the results of national and regional transport programmes to reach the relevant audience.
- PRESS4TRANSPORT provides an additional advantage to national and regional transport entities which do not maintain the resources or have time to perform a thorough dissemination and media strategy plan.
- The central PRESS4TRANSPORT services are flexible so as to create synergies with the TRKC to create cross-fertilisation between the two platforms. The VPO will be accessible from TRKC with cross-linking.
- It integrates the dissemination efforts already set up by national and regional project consortia or staff, adding an easily accessible powerful media tool.
- Overall, the dissemination of major research news coming from national and regional level programmes creates a transnational and international discussion on SST and research partnerships.

Expected Results

PRESS4TRANSPORT intends to:

- Exploit a Virtual Press Office platform in which consortia from national and regional transport projects can have free access to an editing team of professional journalists capable of transforming their dissemination and communication needs into a professional, ready-to-use format.
- Over the first six months, contact at least 90 project consortia validated by the Transport Programme Committee and TRANSPORT ERA-NET, analyse their communication needs and define a dedicated media plan for each of them.
- Create, over the 24 months of the project, 80 press releases and 60 articles on international, national, local and specialized press (according to the requests of the projects' consortia) about the achievements and results of Sustainable Surface Transport projects.
- Identify the appropriate media (newspapers, magazines – both general and specialised, websites, etc.) to serve as targets for the PRESS4TRANSPORT elaborated press releases.
- Offer national consortia a new way to approach media for their dissemination needs.

PRESS4TRANSPORT will help and assist, through the experience of its professional editors and communication experts, on how to transform the information by the consortia in something that can be used by media with much larger readerships they are currently used to.

Acronym: PRESS4TRANSPORT

Name of proposal: Virtual Press Office to Improve EU Sustainable Surface Transport research Media Visibility on a National and Regional Level

Contract number: 234258

Instrument: CSA – SA

Total cost: 740 247.00 €

EU contribution: 740 247.00 €

Call: FP7-SST-2008-RTD-1

Starting date: 01.09.2009

Ending date: 31.08.2011

Duration: 24 months

Website: <http://www.press4transport.eu>

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European Journalism Centre	NL
Budapest University of Technology and Economics - Department of Highway and Railway Engineering	HU
Maritime Development Center of Europe	DK
Polo per la mobilità sostenibile	IT
Association Europeenne Des Fournisseurs Automobiles Aisbl	BE

SAFIER

Support Action for Implementation of ERTRAC's Road Transport Research Priorities



State of the Art - Background

ERTRAC, the European Road Transport Research Advisory Council, is the European Technology Platform responsible for the road transport sector. Since 2002, ERTRAC members have increasingly recognised both the need for, and benefit of, a shared vision and strategic agenda for research, innovation and development in the road transport sector. Although ERTRAC's 2004 Vision provided a strong basis for developments in the sector, changes in the sector and increased recognition of some of the key challenges have demanded an urgent and fundamental rethinking, and reshaping, of the core strategies. For example, the European Commission's Transport Advisory Group (TAG) recently highlighted the need for the greater sense of urgency on matters of climate change expressed by the European Council to be reflected in the shaping of the FP7 Transport priorities. They further recommended that the European Commission should be more demanding of the transport-related Technology Platforms to provide solutions to achieve EU policy objectives. ERTRAC has proposed five priority areas: Urban mobility (including electric vehicles), long distance transport, road transport safety, energy, resources and climate change, and global competitiveness. These align with the key EU policy areas for transport.

Objectives

The global objectives of SAFIER are to develop the scenarios and research road maps through which: greenhouse gas emissions throughout Europe's road transport system could be reduced to 30% of 1990 levels by 2020; optimised and sustainable urban mobility and long-distance transport would be achieved, with fatalities and serious injuries reduced to 25% of 2001 levels by 2030; development lead time would be reduced by 30%; manufacturing and construction costs would fall by 40%; maintenance of road infrastructure would be reduced by 10%.

All objectives will be considered holistically and any inherent conflicts between the objectives addressed.

The key objectives will be to achieve consensus amongst a broad range on stakeholders represented in ERTRAC and other relevant bodies. These objectives will be achieved within the course of the project, communicated to all relevant transport and energy stakeholders, and presented widely at TRA2010, the Transport Research Arena Conference held at Brussels in 2010. Through this activity, SAFIER will make a tangible contribution, through the alignment of public and private research activities, to the step changes & radical technology changes that are urgently needed to address the challenges facing Europe today and in the future.

Description of Work

The project is divided into three Work Packages (WPs).

WP1: The Implementation of Strategic Road Transport Research Priorities.

The main objective of this WP is the creation of integrated scenarios for future road trans-

port in Europe. These scenarios will then be used to define the needs and priorities for road transport research in the future.

WP2: Research Cooperation, Education and Training.

The second WP deals with supporting activities that are of utmost importance for European road transport research.

Mapping: This task includes mapping of relevant European research programmes, funded by the EU and national programmes.

Integration: This task will provide recommendations to European and national services responsible for road transport research planning. It will consider how to improve the integration of different research actions in EU's research landscape and reduce fragmentation.

International research collaboration: In a global competitive environment international collaboration will play an essential role for all research activities. Specific actions complement existing European competences in order to achieve goals, join forces to establish critical mass when needed, and pave the way for future markets by supporting research in emerging nations.

Education and Training: It is widely agreed that the younger generations will shape our

future in transport; therefore specific actions for education and training are envisaged.

WP3: Awareness Raising, Project Management and Administration.

This WP supports the coordination and integration of the different tasks of WP1 and WP2. It is responsible for organisational and administrative issues including links to the European Services and a proper report according to the contractual provisions. It is also responsible for events, publications and online information.

Expected Results

The major results will be research strategies, scenarios and R&D recommendation reports on the ERTRAC priorities in context of the European Green Cars Initiative (EGCI) including the Private Public Partnership (PPP) approach.

At a later stage, reports will be provided on the mapping of national road research activities in Europe. There will also be an assessment of European and national road transport research projects. Further reports will be produced on international orientation & co-operation strategies of European road transport research, education & training concepts and on various conferences as well as brochures about the outcome in leaflet and digital form.



Acronym:	SAFIER	
Name of proposal:	Support Action for Implementation of ERTRAC's Road Transport Research Priorities	
Contract number:	234161	
Instrument:	CSA – SA	
Total cost:	1 500 000 €	
EU contribution:	1 500 000 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.02.2009	
Ending date:	31.01.2012	
Duration:	36 months	
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	Delphi Automotive Systems Luxembourg S.A.	LU
	European Road Transport Telematics Implementation Coordination Organisation S.C.R.L.	BE
	Forum des Laboratoires Nationaux Européens de Recherche Routière	BE
	POLIS - Promotion of Operational links with Integrated Services, association internationale	BE
	Rheinisch-Westfaelische Technische Hochschule Aachen	DE
	Union internationale des transports publics - UITP	BE
	VALEO SA	FR
	VOLKSWAGEN AG	DE
	VOLVO TECHNOLOGY AB	SE

SIMBA II

Strengthening Road Transport Research Cooperation between Europe and Emerging International Markets II



State of the Art - Background

Serious transport issues worldwide are affecting the environment, road safety, mobility and efficiency. Every year, more than 1.17 million people die and over 10 million are injured in road accidents around the world. Road accidents cost approximately 1% to 3% of a country's annual GDP. Improvements in safety applications or support systems in vehicles and the infrastructure can contribute to reducing crashes and casualties. Economic growth in ICPCs coupled with demographic growth creates pressure on the transport system, which must respond to the challenge of the increasing number of vehicles, travel and urban sprawl. Most countries have not matched the growth of vehicle ownership with expanded infrastructure, leading to severe congestion that affects the flow of goods and people. The environment is also affected: the WHO estimates that urban air pollution (mainly from motor vehicles) causes 800,000 premature deaths worldwide each year. The transport sector accounts for over 18% of global CO₂ emissions.

The first SIMBA project (2006-2008) initiated road transport cooperation between the EU, Brazil, China, India and South Africa and addressed the establishment of contacts with local stakeholders. It strengthened cooperation in the areas of ITS, infrastructure and

automotive development, and mapped the national RTD activities, policies and future requirements. It also created a transport research network of research institutions, industry and government that can address transport mobility, safety, efficiency and environmental problems. A networking model was developed that can lead to full demonstration and implementation of technologies.

Objectives

SIMBA II aims to increase RTD cooperation between the EU and Brazil, China, India, Russia and South Africa. It will look at how to increase road safety, mobility and transport efficiency, and research appropriate pavement design while at the same time improving levels of transport-related pollution. This will support emerging markets in their efforts to improve transportation and also enhance European industrial competitiveness via transfer of technologies. Attention will be paid to mobility and road management, urban traffic issues and public transport, leading to an assessment of the development of new infrastructure and of policy-led ITS solutions through sustainable urban transport planning. ICPC will benefit from the EU' experience and move forward to integrated transport network management.

Expert groups will work on the priorities defined in the first SIMBA project. Stakeholders will engage in preparatory technical work and/or feasibility studies for the development and/or implementation of new ITS and infrastructure technologies in the ICPC.

Description of Work

The project is divided into four Work Packages (WPs):

WP1–Project Management includes the technical and administrative coordination of all project activities.

WP2–ITS Development will create a report of ITS National research and development priorities for Russia and establish a SIMBA II network in the country. WP2 will also run expert groups to work on different priority areas and engage in the preparatory technical work in all countries.

WP3–Infrastructure Development will produce a report on national research and development priorities for Russia and establish a SIMBA II network in the country. A range of issues have been identified: road management systems, safety, environmental impact and the development of appropriate technology. SIMBA II will develop the technical content and the ‘scaling up’ process needed for taking the research programme in India, Russia and South Africa further.

WP4–Dissemination: The distribution of results is a key issue and several instruments will be used for this purpose. The website will be the focal dissemination point. All partners will be asked to disseminate project information at a local level.

Expected Results

Stakeholders will acquire knowledge on the set up and conduct of research/business in the expanding ICPCs transport market. Participants will have the opportunity to establish contacts with ITS and infrastructure players, enabling the forming of consortia to supply comprehensive transportation solutions. The networking activities will allow good practice exchanges.

Impact:

Financial level: The results will be part of a permanent effort by the consortium to strengthen EU-ICPC co-operation. Participants will have direct business related incentives to continue the work by means of their own resources. SIMBA II’s networking activities will undoubtedly continue after the project’s completion.

Institutional level: SIMBA II will be embedded in the involved organisations, thus securing a lasting effect of the project outcomes. Institutional sustainability will be secured through the partners, providing a permanent platform for the activities initiated during the project. Furthermore, the combined involvement of public authorities provides the possibility for organisations to continue to work together, develop new cooperation between local authorities and apply the developed methodology to other cooperation areas.

Policy level: Defining a common approach to standardisation issues and political strategies for transport technologies will strengthen the European industry position in the emerging market and more importantly, help the local societies to develop an infrastructure which will improve their quality of life and make transport safer. The years spent in Europe to discuss, for example, standardisation of ITS applications, can be largely avoided.

Acronym: SIMBA II

Name of proposal: Strengthening Road Transport Research Cooperation between Europe and Emerging International Markets II

Contract number: 218567

Instrument: CSA – SA

Total cost: 499 925 €

EU contribution: 499 925 €

Call: FP7-SST-2007-RTD-1

Starting date: 01.05.2008

Ending date: 28.02.2010

Duration: 22 months

Website: <http://www.simbaproject.org>

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Partners: Forum des Laboratoires Nationaux Européens de Recherche Routière (FEHRL) BE
POLIS - Promotion of Operational links with Integrated Services, association internationale BE
Tongji university CN
Society of Indian Automobile Manufacturers (SIAM) IN
Associação Brasileira de Engenharia Automotiva (AEA) BR
Council for Scientific and Industrial Research (CSIR) ZA
Professional Association in vehicle Risk Prevention (PAIRP) RU
Central Road Research Institute (CRRRI) IN
National Center of its Engineering & Technology, Research Institute of Highway, M.O.C CN

SKILLRAIL

Education and Training Actions for high skilled job opportunities in the railway sector

State of the Art - Background

Rail transport in Europe is a future-oriented industry and is striving to offer an even more attractive, affordable, safe, clean, competitive and reliable transport mode. Innovation is a key success factor for European railways and the supply industry.

To strengthen the competitiveness of the European rail sector effective results are to be achieved on:

- Enhanced environmental advantages of the rail mode: reducing emissions and noise and exploring energy-efficient technologies and alternative energy sources.
- Improved performance of rolling stock: new vehicle concepts using innovative materials and production, and reductions in the complexity and diversification of currently available products.
- Improved performance of infrastructure: targeting new interoperability requirements around improvements in safety and security, reliability, maintainability
- Enhanced competitiveness: increasing the performance of products and improving the overall attractiveness of the rail transport mode; freight and passenger services, improved accessibility and availability.
- Anticipating economic, institutional and social changes that might affect the future of the rail sector in Europe so as to enable decision-makers to establish long-term sustainable guidance and policies.

Objectives

The purpose of the current project is to build the necessary conditions, namely in training programmes, to develop the appropriate scientific and technological skills for the railway sector of the future taking into account the needs of individual stakeholders by means of:

- Disseminating the social and industrial benefits of training and education in the different surface transport modes (including logistics) and developing new and innovative forms for further co-operation with industry.
- Supporting and disseminating the idea that railway transport needs advanced engineering education connected with research and technological development and that therefore appropriate support has to be given to such education.
- Providing access to a range of professional and academic groups in Europe active in surface transport-related research and education activities.
- Identifying key thematic areas for training and education activities.
- Designing and promoting selected T&E initiatives targeted to well-defined industry audiences.

Description of Work

The project is divided into three technical Work Packages (WP):

WP1 is organised to prepare the foundations for establishing the EURAIL concept. This concept involves dissemination of the social and industrial benefits of training education in the railway sector and the development of new and innovative forms for further co-operation with industry. Many institutions participating through the EURNEX Association have unique expertise and sophisticated laboratory and testing facilities which can enhance the quality and effectiveness of training and education in this sector.

WP2 targets training offer improvements in the railway sector, starting from the assumption that advanced training courses matching the evolving needs of stakeholders are key for implementing the continuous learning process of highly skilled personnel:

- bridging higher education preparations with the specificity of the new working environment;
- coping with changes in state of the art;
- providing instruments for the transition between responsibilities, roles, tasks, etc.

WP3 will raise awareness of training and education courses. Involved parties will be told of the advantages of the courses that have been and will be prepared to meet rail sector needs. Workshops will be organised for exchange of information and getting customer feedback on demands for and available range of educational courses.

Expected Results

A number of impacts are expected in fulfilling the SKILLRAIL mission:

- Disseminate the railway vision and the intense ongoing change process with the aim of contributing to a change in the public image of railways.
- Highlight the social and industrial benefits accumulated from rail to further develop the European Union which is largely dependent on a sustainable transport sector.
- New concepts and skills will be provided for young people across sectors by offering disciplines based on basic sciences and recent research results.
- Demonstrate and disseminate the need for advanced high-technology engineering in the future of railways and additional knowledge areas that should complement engineering, such as economics, management, sociology, and human factors.
- Show (foster and disseminate) that new job opportunities will be open in the railway and other transport sectors as a result of the transfer of knowledge from the research area to different technical industrial applications with strong innovative potential.

The involvement of EURNEX guarantees access to a fully fledged association of well-recognised research experts in the various railway domains.

By deploying research information where it is most needed in the industry, SKILLRAIL will help bridge the past and future of Europe's railways sector, between generations of staff and between industry and academia.

Acronym: SKILLRAIL

Name of proposal: Education and Training Actions for high skilled job opportunities in the railway sector

Contract number: 233649

Instrument: CP – FP

Total cost: 454 525 €

EU contribution: 454 525 €

Call: FP7-SST-2008-RTD-1

Starting date: 01.12.2009

Ending date: 30.11.2011

Duration: 24 months

Website: <http://www.skillrail.eu/>

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BV SE
ALSTOM FR
UNIFE BE

SMART

Services for SMEs in collaborative Transport research projects



State of the Art - Background

SMART develops services to support SME participation in RTD research projects in the Transport Work Programme in order to address the main needs expressed by SMEs willing to take part in European collaborative projects. For example:

- awareness of EU RTD mechanisms;
- help in selecting the right research idea;
- help in finding useful partners;
- training on EU matters and proposal preparation;
- help with joining partnerships of proposals under preparation;
- help in preparing a successful proposal;
- help in contract negotiation and project management.

The involvement of SMEs in transport research is realised through a twofold action:

1. Involving SMEs in RTD projects led by large organisations, particularly in fields such as 'Competitive surface transport products and services' with the objective to 'develop innovative products and systems concepts'. The SMART approach provides large organisations with a simple method of involving SMEs belonging to regional clusters, as well as managing meta-clusters of SMEs around a set of research and market themes related to the regional needs, and promoting the participation of SMEs in such research themes.

2. Supporting SMEs whilst they are creating innovative services and products and then developing the planned innovation in partnership with RTD organisations and large industries, specifically through EU funding programmes.

Objectives

SMART focuses on the provision of services to SMEs belonging to regional clusters and/or supply chains of large enterprises, facilitating their integration in European collaborative projects on surface transport which are led by large enterprises, as well as supporting SMEs in developing their own innovation through RTD funding proposals.

The specific SMART objectives of the project are:

1. Connecting regional clusters of SMEs to facilitate the creation of partnerships within R&D projects on transport, and increase the possibilities for SMEs to be involved in R&D projects;
2. Creating a database of pre-qualified SMEs and analysing their projects/needs.
3. Engaging large-sized organisations and supporting SME involvement in R&D projects led by such organisations;
4. Supporting SMEs in submitting proposals for their own project ideas;
5. Creating awareness of SMART and training SMEs on EU funding mechanisms;
6. Networking and brokerage events: six events will be realised, both in the involved regional clusters as well as at international level aiming at a broader audience (in synergy with the annual international conference 'Driving Sustainability', to be held in Reykjavik, Iceland), so as to target all the relevant stakeholders operating in transport research.

Description of Work

The project is divided into seven work packages (WP).

WP1 - Project management: includes management activities for both the economical and technical aspects. It also manages the interactions between the EC and the consortium partners.

WP2 - Engaging regional clusters and large organisations: engages other regional clusters of SMEs and large organisations within the SMART network.

WP3 - SME support actions: direct contact with SMEs for the definition of technology development needs and/or of gathering SME research/engineering competences, the set-up of a high-value database of SMEs (able to establish sub-groups of SMEs matching the research interests of large organisations), and the support provided to SMEs in being involved in European RTD projects.

WP4 - Development of the SMART web portal.

WP5 - Awareness creation, dissemination and training: creates awareness of EU funding mechanisms concerning transport research, networking activities to match projects and large organisations, training sessions and participation in international events for dissemination purposes.

WP6 - SMART events: there will be four intra-cluster events and two international workshops.

WP7 - Evaluation and exploitation: monitoring and evaluating project results, establishing the exploitation plan to keep the SMART services ongoing after the end of the EC contribution.

Expected Results

SMART activities will achieve the overall objective of spreading excellence throughout Europe. SMART becomes a centre of reference for organisations involved in transport research, where information on projects, project ideas and competences can be shared and promoted.

The organisations involved in SMART will create a network of organisations where it is easy to share knowledge and thus increase the overall research excellence in the sector. The SMART partners intend to launch a specific call for actions, for example stimulating the exchange of researchers between SMEs and research centres, maybe also through the support of the Seventh Framework Programme's People Programme, to share knowledge and create the basis for possible propositions, from the side of SMEs, and of RTD projects looking beyond the current state of the art.

The SMART portal, other than being able to facilitate the participation of SMEs to RTD transport programme, becomes a reference point in the sector for research activities. It is likely that researchers are interested in promoting their research results through the SMART network, thus supporting the dissemination of RTD results throughout Europe.

Acronym:	SMART	
Name of proposal:	Services for SMEs in collAborative tRansporT research projects	
Contract number:	234041	
Instrument:	CSA – SA	
Total cost:	742 568 €	
EU contribution:	479 872 €	
Call:	FP7-SST-2008-RTD-1	
Starting date:	01.11.2009	
Ending date:	31.10.2011	
Duration:	24 months	
Website:	http://www.smartransport.eu	
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	INNOSTART National Business and Innovation Centre	HU
	Distretto Tecnologico sull'Ingegneria dei Materiali polimerici e compositi e Strutture	IT
	Fundación para o fomento da calidade industrial e o desenvolvemento tecnolóxico de Galicia	ES
	Elsag S.p.A.	IT
	Framtíðarorka ehf / FTO Sustainable Solutions	IS

Star-net Transport

European Network to support the sustainable surface transport SMEs



State of the Art - Background

European small and medium-sized enterprises (SMEs) are facing huge difficulties being competitive in a global economy, particularly in such a dynamic sector as surface transport where energy and environmental problems are forcing huge changes in the near future.

During the Sixth Framework Programme (FP6), the European Commission recognised that there were a number of financial and legal barriers to SME participation in FP7. Many of these have now been removed, including an increase in funding to 75%, and removal of both the bank guarantee requirement and of 'joint and several' financial liability. However, there are also non-financial barriers and this can be due to the perception of large companies and research organisations that coordinate or lead in the preparation of the majority of proposals.

Although it is widely believed that European SMEs have significant technological capabilities and can even lead in introducing innovations within the transport sectors, there is a perception that SMEs are incorporated into proposals to satisfy evaluation criteria, rather than for what they can contribute positively to the project. Consequently, although the 15% targets are met within this sub-priority, much of this participation is by way of providing services to the project, rather than as valuable research collaborators or end-users capable of exploitation.

Objectives

The strategic objective of the Star-Net Transport project is to increase the participation of surface transport-related SMEs in the Sustainable Surface Transport Programme (SST) of the European Commission (EC). The project intends to take the first step towards the design and development of a consolidated structure to support European SMEs participation in SST activities, building on the knowledge, tools and services developed by the consortium on some of the most relevant FP6-SUSTDEV support actions over recent years.

The project addresses the objective 'SST.2007.6.1 Stimulating participation of small and medium-sized enterprises'. Concrete actions will be taken to stimulate, encourage and facilitate the participation of SMEs and their clusters in the research activities of the programme, particularly in projects addressing activity 7.2.5 of Sustainable Surface Transport – 'Strengthening Competitiveness'.

The specific objectives of this project can be summarised as follows:

- identify the barriers to SME participation in SST collaborative projects;
- identify potential co-operation partnerships through technological audits;
- build SME profiles to involve them on the supply chains of key transport players;
- implement a full range of services and tools for SMEs;
- facilitate the participation of SMEs in FP7;
- analyse and disseminate existing RTD results.

Description of Work

The approach taken by Star-Net Transport to stimulate SME participation was to build a supporting network to provide value-added services to the surface transport SMEs. The network includes 16 experienced partners from 14 European countries that have participated actively on previous FP6 projects. These are from transport associations, consulting firms, EU national contact points, universities and industrial clusters. Their different backgrounds and experiences in previous projects (along with the lessons learned and tools developed) will be merged into a consolidated framework of services to support the process from partner search to proposal writing and submission. The project activities are built upon the knowledge, tools and services developed within some of the most relevant FP6-SUSTDEV support actions over the last years, namely on SURFACE NET, TranSMEs, AUTOIN, EURO-TRANS and HUN-POL-TRANS.

The support action will rely on:

- the organisation of 14 national events in partner countries to involve SMEs from the transport field;
- the organisation of three European-level events with special focus on the EC-SST work programme;
- company visits to assess their technological potential and build profiles for dissemination;
- the identification of project ideas and support on proposal writing.



Traffic

Expected Results

The project will have a direct impact on 'Strengthening Competitiveness' of transport SMEs in the European Union by stimulating and supporting their participation in FP7 and therefore contributing to increasing the rate of participation of these SMEs in European programmes.

Through the consortium's partners extensive experience in providing services related to innovation and technology transfer, this project will contribute to the innovation competitiveness of European organisations by:

- identifying perceptions and experiences on SME participation in the framework programme;
- raising the knowledge about ongoing research activities in the SST domain;
- promoting the establishment of strong technological RTD links;
- connecting companies with similar or complementary needs.

The project will reach the following quantifiable results:

- 16 local workshops
- 420 company visits
- 420 advice sessions with the SMEs
- 70 proposal ideas identified
- 100 technology assessment reports
- 100 SST SME profiles built and disseminated.

The project will build a network of professional support agents, carrying out their own innovation business in their region, but linked together within a network that has as a main goal the promotion of SST knowledge and the continuous provision of assistance to innovation users and observers.

Acronym:	Star-net Transport	
Name of proposal:	European Network to support the sustainable surface transport SMEs	
Contract number:	218605	
Instrument:	CSA – SA	
Total cost:	1 116 540 €	
EU contribution:	923 720 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.05.2008	
Ending date:	30.10.2010	
Duration:	30 months	
Website:	http://www.starnet-transport.eu	
Coordinator:	Mr. Pedro Soutinho	
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EC Officer:	Alexandra Gurau	
Partners:	Fundación CIDAUT	ES
	Instytut Podstawowych Problemów Techniki Polskiej Akademii Nauk	PL
	Adam Mickiewicz University Foundation	PL
	Cliff Funnell Associates	UK
	Agenzia per la Promozione della Ricerca Europea	IT
	Uniunea Romana de Transport Public Asociatiei	RO
	Türkiye Bilimsel ve Teknolojik Arastirma Kurumu	TR
	Applied Research and Communications Fund	BG
	Gospodarsko interesno zdruzenje ACS, Slovenski avtomobilski grozd	SI
	Viešoji įstaiga 'Socialinės ir ekonominės plėtros centras'	LT
	Zilinska Univerzita v Ziline	SK
	Nemzeti Kutatási és Technológiai Hivatal	HU
	European Marine Equipment Council/Conseil Européen de l'équipement naval	BE
	Comité de Liaison de la Construction d'Equipements et de Pièces d'Automobiles Clepa aisbl	BE

TECH-CLINIC SST

Setting-up of Effective Technological Clinics to Address Real Knowledge Needs of Surface Transport Industry



State of the Art - Background

The transport industry is a major employer, with more than 10 million jobs in transport-related sectors of the economy (services, equipment, infrastructure), mostly in the road sector. Maintaining and strengthening the competitiveness of transport operators is the best guarantee for lasting high employment. After a long period of restructuring, employment levels are now stabilising, but are still insufficient.

In some sectors, such as rail and road transport, shortages of qualified personnel have appeared; in the maritime sector, a lack of EU candidates has contributed to an increase in foreign labour.

Given the high level of unemployment in most EU countries, this indicates a serious mismatch between educational output and employers' needs, most acutely in engineering and technical skills.

Objectives

TECH-CLINIC SST will contribute to changing young people's attitude towards STI by showing them that STI is an innovator industry, very active technologically and with stimulating opportunities for research and development on it. It is also essential to make transport SMEs more attractive and more interesting for young people.

The main operational objectives of the TECH-CLINIC SST initiative are:

- To give senior students some practical work experience and the opportunity to work closely with STI by solving 9 specific knowledge needs of this sector. A total of 90 senior students and 9 Surface Transport SMEs (from Germany, Hungary and Sweden) will be involved in this specific objective.
- To raise awareness of young people about the importance of surface transport in our society through the organisation of five young 'Cafes Scientifiques' addressed to young students from early school to university in Portugal, Spain, Germany, Hungary and Sweden.

Description of Work

The TECH-CLINIC SST supporting action proposes to enrol a pioneering method of communication and perform stimulating campaigns on Surface Transport Research results by targeting young people for the first time.

A general overview of the work plan:

1. Mapping of STI knowledge needs in terms of human skills and competencies in meeting their research and innovation needs in rail, road and water (WP1)
2. Creation of Technological Clinics (Tech-Clinics), which consist on gathering senior students from different majors to address and resolve the knowledge needs of STI (WP2). The Tech-Clinics will allow Industry and young people to meet and stimulate their cooperation at an early stage before students step into work market.
3. Organisation of informal debate sessions named 'Cafes Scientifiques' in order to raise awareness of young people of different ages (from early school to university) on

surface transport current 'burning issues' (WP3).

4. Extensive dissemination work will have a key role throughout all Work Packages of the project and a final conference will be held to disseminate project's results (WP4).

Technological Clinics (Tech-Clinics)

The project intends the formation of 9 Tech-Clinics in Germany, Hungary, and Sweden, with the goal of solving knowledge needs from STI. The Tech-Clinics will be composed of multidisciplinary teams of senior students. These will be devoted to work closely and actively with the surface transport SME. Students from different areas of expertise will integrate those teams contributing to a high diversity of ideas, methods and perspectives leading to solutions to be effectively implemented in the targeted SME.

'Cafes Scientifiques'

The objective is to raise awareness of young people about the importance of surface transport in our society. During these events,

stakeholders from industry, academia and society will also have the opportunity to spread key messages to the young public, raising their awareness on the benefits and importance of Surface Transport in our 21st century society, in not only technological, but also in social, environmental and ethical issues. These events will be organized in five countries: Portugal, Spain, Germany, Hungary and Sweden.

Expected Results

1. To encourage young people to seek high-skilled jobs in sectors related to Surface Transport with a special focus on science, research and innovation by showing students the major challenges of STI in terms of science, research and innovation and how they can contribute to the sustainable growth of this industry.
2. Evaluate and demonstrate the potential of research outputs, outcomes and impacts to create and maintain jobs, giving special consideration to opportunities for young people by assuring that Tech-Clinics



Metro over Douro river in Porto, Portugal

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are composed by young people of both genders.

3. At the end of the project, a final booklet will be published with detailed reports on the Tech-Clinics to disseminate not only the methodology used but also the solutions found for the knowledge needs of the SMEs and the experience of working with senior university students.

5. A European level conference will be organized with special focus on the TECH-CLINIC SST results and working methodology. This event will be organised in the last month of the project during the "European Transport Conference" (ETC 2009) that will be held from 5 to 7 October in the Netherlands.

In short, TECH-CLINIC SST will generate a deeper awareness and knowledge concerning science and research impact on society's welfare, strengthening the European Research Area and the implementation of the EU Framework Programme.

Acronym:	TECH-CLINIC SST	
Name of proposal:	Setting-up of Effective Technological Clinics to Address Real Knowledge Needs of Surface Transport Industry	
Contract number:	217980	
Instrument:	CSA – SA	
Total cost:	530 174 €	
EU contribution:	365 029 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.04.2008	
Ending date:	30.10.2009	
Duration:	19 months	
Website:	http://www.techclinic.eu/	
Coordinator:	Mr. José Pedro Soutinho Inovamais Servicos de Consultadoria em Inovacao Tecnologica, S.A. Rua Dr. Afonso Cordeiro, Sala 201 PT 4450-007 Matosinho	
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Partners:	Fundación CIDAUT	ES
	Technische Universität Dresden	DE
	Budapesti Műszaki és Gazdaságtudományi Egyetem	HU
	Lunds universitet	SE

TRANSBONUS

Transport EU-Western Balkan Network for Training, Support and Promotion of Cooperation in FP7 research activities



State of the Art - Background

The 3 surface transport modes – road, rail and water-borne – are critical to driving Europe's employment, prosperity and global exports. Aside from stimulating innovation and knowledge, technological advances in transport will have a positive impact on Europe economic and social integration. The EU has targeted 4 objectives in surface transport research to meet the challenges:

- Improve the competitiveness of surface transport manufacturers, operators and infrastructure managers;
- Improve the safety and security of transport operations and services;
- Reduce the environmental impact of transport, including emissions and noise;
- Increase the mobility of people and goods via a better balance between all three surface transport modes.

The opening of ERA to third countries is a strategic objective of EU. As the Western Balkan Countries have been offered the perspective of EU membership, their future integration into the ERA is seen as a key priority. Few initiatives have been implemented in Transport research. The "EU-Balkan Countries Action plan in S&T" identifies Human Potential as a key priority and there is a need to stimulate co-operation in this area. This is the overall objective of the project TransBonus, focused on Albania, Bosnia and Herzegovina, Serbia and the Former Yugoslav Republic of Macedonia.

Objectives

The overall objective of the project is to improve and promote closer Scientific and Technological cooperation opportunities between Europe ('old' MSs – Greece, The Netherlands, Malta and EU's convergence region – Bulgaria) and the Western Balkan Countries Albania, Bosnia and Herzegovina, Former Yugoslav Republic of Macedonia and Serbia).

O1: Identifying the existing capacities and specific researcher needs in the Western Balkan countries in terms of RTD (incl. FP7) funding opportunities;

O2: Training and support in FP7 knowledge and best practices for academic personnel, Ph.D. students and post-doctoral researchers. Enhance the readiness of Balkan transport research community to prepare cooperative activities and joint RTD proposals in European RTD programmes (FP7);

O3: Setting up a matching tool - 'Project Lab', supporting the creation and preparation of efficient and innovative project proposals. Stimulate partnering schemes and facilitate knowledge transfer at National and European level;

O4: Implementing expert study visits between the WBC partners and EU partners in order to expand the scientific relationships and networking between the two regions;

O5: Stimulate partnering schemes and national collaboration between researchers and industry in transport sector in the Balkan region.

Description of Work

The proposed project, altogether, aims at stimulating the participation of partners from the WBCs into European RTD activities in the area of surface transport research, and more specifically activities envisaged within FP7. This stimulatory effect will be achieved through a series of inter-related and mutually reinforcing actions including: training, exchange of know-how and experiences among the partners, stimulation and collection of innovative transport RTD ideas through 'Ideas generation events' and upgrade their EU RTD awareness and networking activities. The work envisaged in the project is organised in 6 Work Packages covering a preparatory action to identify resources (WP1); targeted training of WBC partners in transport (WP2); setting up of an idea-generation and partnering tool – "Project Lab", supporting the creation and preparation of efficient and innovative project proposals under FP7 (WP3), 'Research Bonus' services – publishing PR research profiles, Expert study visits between the WBC partners, Bulgaria and winners from the Open call, and the more experienced consortium partners from the EU Member States, 5 national events – networking and promotion events between the transport researchers and industry (WP4), promotion and stimulation of international cooperation within the WBCs (WP5) and management of the project activities (WP6).

Expected Results

Expected activities and tangible results will include, among others, Roadmap for research capacities and funding opportunities in WBC transport research, 150 researchers informed and stimulated towards FP7, 10 national Ideas generation events, 50 new project proposal ideas and 5 events in the Balkan countries linking transport researchers and industry, publishing of 25 PR research profiles.

Acronym:	TRANSBONUS	
Name of proposal:	Transport EU-Western Balkan Network for Training, Support and Promotion of Cooperation in FP7 research activities	
Contract number:	218699	
Instrument:	CP – FP	
Total cost:	482 848 €	
EU contribution:	482 848 €	
Call:	FP7-SST-2007-RTD-1	
Starting date:	01.01.2009	
Ending date:	31.12.2010	
Duration:	24 months	
Website:	http://www.transbonus.net	
Coordinator:	Ms. Zoya Damianova Applied Research and Communications Fund Alexander Zhendov Street No 5 BG 1113 SOFIA	
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EC Officer:	Natascia Lai	
Partners:	Ss. Cyril and Methodius University	MK
	Higher school of Transport 'Todor Kableshkov'	BG
	Automotive center – Centar za vozila, Sarajevo	BA
	Polytechnic University of Tirana	AL
	Foundation for Research and Technology Hellas	GR
	NL Agency, NL Innovation - Department EG-Liaison	NL
	Integrated Resources Management Company Ltd.	MT
	University of Kragujevac	RS

YEAR

Young European Arena of Research

State of the Art - Background

YEAR-2008 was a postgraduate research student competition in a format similar to the Olympic Games that complemented the goals of the Transport Research Arena conference, TRA 2008, held in Ljubljana, Slovenia. The goal was to stimulate interest among the young researchers in the conference and contribute towards establishing it as the premier transport event in the world. This activity directly supported the TRA event and reinforced its profile as a major European and internationally important conference.

There are many young transport researchers in Europe that are funded from non-transportation sources or national sources, who are not familiar with the European transport community and its objectives and goals. Many researchers can find themselves isolated and, apart from their supervisor, find they may be alone or one of only a few persons in their very specialist field in their institution. Such people can benefit greatly from meeting others with

similar interests and getting the opportunity to mix with representatives of the European Commission, ERTRAC, CEDR and other stakeholders in European Road Transportation.

The YEAR concept was to have an 'Olympics' for young transport researchers to promote their interest and involvement in the strategic objectives of the TRA stakeholders – CEDR, ERTRAC and the European Commission.

Objectives

The objectives of YEAR-2008 were as follows:

- to have a strong participation of young transportation researchers at the TRA 2008 conference;
- to identify the top performing young researchers and acknowledge their achievement;
- to develop this conference as the premier series in its field in the world;
- to build a vibrant community of young transport researchers in Europe and neighbouring states;
- to stimulate the imagination of delegates at the TRA-2008 conference and generate discussion on the future of road transport.

The science and technology objectives were to nurture the best young transport researchers in Europe, promote the alignment of their interests with those of transport stakeholders, encourage them to participate in the conference and celebrate their achievements. The process was two-way: young researchers would be impressed by the presentations at the main conference and mature researchers would be impressed by the research and vision of the young researchers.

Description of Work

The competition had two stages, with complementary objectives.

In the first stage, a large number of young researchers from across the European Union, the Accession States and neighbouring countries submitted abstracts to the competition,



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Tommy Hinks receiving his gold medal from Commissioner Janez Potočnik during TRA-2008



YEAR-2008 Gold Medal

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giving a short summary of their research or future vision and the expected deliverables. The abstracts were vetted and then published in the YEAR pages on the TRA website. This collection of abstracts represented a showcase of European research and was available for viewing by all those interested in this topic.

The abstracts were reviewed by a judging panel of European transportation experts and the best 50 were selected.

These finalists then came to the TRA-2008 conference in Slovenia for the second stage of the competition, which was based on an exhibition of the young researchers' work in a dedicated hall at the conference. Each finalist displayed their research or vision.

Judges reviewed the young finalists' displays at the conference and, on the basis of both the display and the abstract, awarded gold, silver and bronze medals in each of the pillar areas. All of the finalists' displays were on view throughout the period of the conference.

Expected Results

YEAR-2008 had several benefits:

- all the eligible entrants had their abstracts displayed on the YEAR-2008 website. This provided them with the opportunity to view their abstract in the context of what others

were doing, to compare their work and to make contact with those working in similar fields. They were also contactable by stakeholders or industries interested in the deliverables;

- the finalists gained a more prominent forum to display their work to up to 1400 delegates at TRA 2008. They also had the opportunity to meet each other and to discuss their work with researchers from all over Europe;
- the finalists were introduced to TRA 2008. They saw research presented by mature researchers from all over Europe and had the opportunity to participate in discussions between researchers, stakeholders and commission officials;
- the delegates benefited from being exposed to the enthusiasm and innovation of Europe's young researchers. They had the opportunity to view the exhibition showing a great variety of research approaches to many different problems – both new and 'traditional' and perhaps getting a glimpse of the future of transport.
- the general public and the media (journalists) benefited from an opportunity to see the work of young transport researchers and possible future visions, presented in the context of the ERTRAC vision.

Acronym: YEAR
Name of proposal: Young European Arena of Research
Contract number: 218742
Instrument: CSA-SA
Total cost: 272 569 €
EU contribution: 272 569 €
Call: FP7-SST-2007-RTD-1
Starting date: 01.10.2007
Ending date: 31.07.2008
Duration: 10 months
Website: <http://year.fehrl.org/>
Coordinator: Mr. Donal Doolan
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 Forum des Laboratoires Européens de Recherche Routière BE
 Siemens VDO Automotive SAS FR

YEAR-2010

Young European Arena of Research - 2010

State of the Art - Background

YEAR-2010 will continue to build on the success of the YEAR-2008 competition in which 47 students from all over Europe were brought to the TRA-2008 conference in Slovenia and 18 were presented with gold, silver or bronze medals by the Commissioner for Research & Science at the opening ceremony.

The format of the YEAR student competition in 2010 will again be analogous to the Olympic Games. It will complement the goals of the Transport Research Arena conference, TRA-2010, held in Brussels (BE) in June of that year. The goal is to stimulate interest among young researchers in the conference and contribute to establishing it as the premier transport event in the world. This activity will directly support the TRA event and reinforce its profile as a major European and internationally important conference.

Objectives

The objectives of the YEAR-2010 proposal are:

- to have a strong participation of young transportation researchers in the TRA-2010 conference;
- to identify the top performing young researchers in all modes of surface transportation and acknowledge their achievement;
- to further develop the TRA conference as the premier series in its field in the world;
- to build a vibrant community of young transport researchers in the European Union, in EU candidate and potential candidate countries, and in the European Economic Area;
- to promote an interdisciplinary approach, linking basic science, socio-economics and applied sciences/engineering;
- to stimulate the imagination of delegates at the TRA-2010 conference and generate discussion on the future of surface transport;

- to promote interaction between young transport researchers working in different modes.

The Science & Technology objectives are to nurture the best young transport researchers in Europe, promote the alignment of their interests with those of transport stakeholders, encourage them to participate in the conference and celebrate their achievements. The process will be two-way: young researchers will be impressed by the presentations at the main conference and mature researchers will be impressed by the research and vision of the young researchers.

Description of Work

The YEAR-2010 competition has five scientific pillars, as well as a category for future vision in which students will be asked to present their vision of the future for transport.

In the first stage, a large number of young researchers from across Europe will submit abstracts to the competition, giving a short summary of their research or future vision and the expected deliverables. The abstracts will be published on the YEAR-2010 website. This collection of abstracts will represent a showcase of European research and will be available for viewing by all those interested in this topic. As part of this first stage of the competition, the abstracts will be reviewed by a judging panel of European transportation experts. Fifty finalists will be brought to the TRA-2010 conference in Belgium for the second stage of the competition.

The second stage will be based on an exhibition of the young researchers' work in a dedicated area of the conference. Pillar leaders will review the finalists' displays at the conference and, on the basis of both the display and the abstract, will select gold, silver and bronze medal winners in each of the pillars. The medals will be awarded during the open-

ing ceremony of the conference in front of an estimated 1,500 delegates.

Expected Results

All eligible entrants will have their abstracts displayed on the YEAR-2010 website. This will provide them with the opportunity to view their abstract in the context of what others are doing, to compare their work to that of others and to make contacts with those working in similar fields. They may be contacted by stakeholders or industry with an interest in the deliverables.

The finalists will gain a more prominent forum by displaying their work to up to 1,500 delegates at TRA-2010. They will also have an important opportunity to meet each other and to discuss their work with researchers from all over Europe.

The finalists will be introduced to TRA-2010. They will see research presented by mature researchers from all over Europe and will have the opportunity to participate in discussions between researchers, stakeholders and Commission officials. They will benefit greatly from this exposure to the expanding European community of transport researchers in the European Research Area.

The delegates will benefit from being exposed to the enthusiasm and innovation of young researchers in Europe.

The general public and the media (journalists) will benefit from an opportunity to see the work of young transport researchers and possible future visions. Many journalists spent time talking to the student finalists during YEAR-2008.



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Prof. Eugene O'Brien, project coordinator for YEAR-2010 (left), with Commissioner Janez Potočnik (right) at the launch of the project, joined by three YEAR-2008 gold medalists (from left to right): Kristoffer Lidström - Centre for Research on Embedded Systems, Halmstad University, Sweden; Caroline Marchal - Energy Systems Research, University of Orléans (CNRS), France; Tommy Hinks - Computer Science and Informatics, University College Dublin, Ireland.

Acronym: YEAR-2010
Name of proposal: Young European Arena of Research - 2010
Contract number: 234122
Instrument: CSA-SA
Total cost: 300 000 €
EU contribution: 300 000 €
Call: FP7-SST-2008-RTD-1
Starting date: 01.01.2009
Ending date: 31.08.2010
Duration: 20 months
Website: <http://year2010.fehrl.org/>
Coordinator: Prof. Eugene O'Brien
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 Rheinisch-Westfälische Technische Hochschule Aachen DE
 Zavod za gradbeništvo Slovenije SI
 Gheorghe Asachi Technical University of Iași RO
 Vlaams Gewest BE

Index by Acronyms

Acronym	Project name	Grant Agreement	
2-BE-SAFE	2-Wheeler Behaviour and Safety	218703	215
2020 INTERFACE	Tailoring of Tribological Interfaces for Clean and Energy-Efficient Diesel and Gasoline Power Trains	234324	23
ACCESS 2 ALL	Mobility schemes ensuring accessibility of public transport for all users	218462	149
ADSEAT	Adaptive Seat to Reduce Neck Injuries for Female and Male Occupants	233904	219
ADVISE	Advanced Dynamic Validations using Integrated Simulation and Experimentation	218595	222
AEROTRAIN	Aerodynamics: Total Regulatory Acceptance for the Interoperable Network	233985	123
ALARP	A railway automatic track warning system based on distributed personal mobile terminals	234088	225
ARGOMARINE	Automatic Oil-Spill Recognition and Geopositioning Integrated in a Marine Monitoring Network	234096	26
ARIADNA	Maritime Assisted Volumetric Navigation System	234167	357
ASPIS	Autonomous Surveillance in Public transport Infrastructure Systems	218513	228
ASSESS	Assessment of Integrated Vehicle Safety Systems for Improved Vehicle Safety	233942	231
ASSET-Road	ASSET advanced safety and driver support for essential road transport	217643	234
B2B LOCO	Baltic - To - Balkan Network for LOGistics COmpetence	234106	409
BB GREEN	Battery powered Boats - Greening, Reduced resistance, Electric, Efficient and Novel	234142	29
BEAUTY	Bio-Ethanol engine for Advanced Urban Transport by light commercial vehicle and heavy duty	218512	32
BESST	Breakthrough in European Ship and Shipbuilding Technologies	233980	360

Acronym	Project name	Grant Agreement	
BIKE INTERMODAL	THE INTERMODAL BIKE - Multi-modal integration of cycling mobility through product and process innovations in bicycle design.	234374	152
CASMARE	Coordination Action to Maintain and Further Develop a Sustainable Maritime Research in Europe	234252	364
CASPER	Child Advanced Safety Project for European Roads	218564	238
CATS	City Alternative Transport System	234341	156
CETRA	Actions to Stimulate Participation of Cooperation Partners in Surface Transport Research	218730	413
CITYHUSH	Acoustically Green Road Vehicles and City Areas	233655	159
CITYLOG	Sustainability and Efficiency of City Logistics	233756	162
CITYMOVE	CITY Multi-role Optimized VEHICLE	233996	165
CITYNETMOBIL	City Network for Fair Mobility	217941	168
CLEANER-D	Clean European Rail - Diesel	234338	35
CO-PATCH	Composite Patch Repair for Marine and Civil Engineering Infrastructure Applications	233969	367
CO2NTROL	Integrated Solutions for Noise and Vibration Control in Vehicles	233764	38
ComPair	Continuous health monitoring and non-destructive assessment of composites and composite repairs on surface transport applications	218697	370
CONDUITS	Coordination Of Network Descriptors for Urban Intelligent Transportation Systems	218636	171
CORFAT	Cost-effective Corrosion and Fatigue Monitoring for Transport Products	218637	240
COVER	Coordination of Vehicle and Road safety initiatives	218740	243
DELTA	Concerted coordination for the promotion of efficient multimodal interfaces	218486	174
DHErgo	Digital Humans for Ergonomic designs of products	218525	246

Acronym	Project name	Grant Agreement	
DIRECT-MAT	DISmantling and RECYcling Techniques for road MATerials - Sharing knowledge and practices	218656	41
DIVEST	Dismantling of Vessels with Enhanced Safety and Technology	218695	44
DYNOTRAIN	Railway vehicle dynamics and track interactions: Total regulatory acceptance for the interoperable network	234079	127
EBSF	European Bus System of the Future	218647	177
ECOQUEST	Efficient Cooling systems for Quieter Surface Transport	233541	47
EE-VERT	Energy Efficient Vehicles for Road Transport	218598	50
EIRAC II	EIRAC 2008-2010	218693	131
EMAR2RES	Support Action to initiate cooperation between the Communities of European MARine and MARitime REsearch and Science	234359	417
ENABLE	Stimulate Sustainable Freight Transport Systems with Latin American countries	233910	373
EPOCH	Enabling Protection for Older Children	218744	250
ERRAC-ROADMAP	ERRAC Road Map	234255	376
ESTEEM	Enhancing Safety and security aspects in Transport rEsearch in the Euro-Mediterranean region	218584	253
EU-CARGOXPRESS	Greening of Surface Transport through an Innovative and Competitive CARGO-VESSEL Concept Connecting Marine and Fluvial Intermodal Ports.	233925	53
EURECOMP	Recycling thermoset composites of Sustainable Surface Transport	218609	57
EXCITING	Exact Geometry Simulation for Optimized Design of Vehicles and Vessels	218536	378
EXTREME SEAS	Design for Ship Safety in Extreme Seas	234175	256
FIMCAR	Frontal Impact and Compatibility Assessment Research	234216	259
FIREPROOF	Probabilistic framework for onboard fire-safety	218761	263

Acronym	Project name	Grant Agreement	
FLOODSTAND	Integrated flooding control and standard for stability and crises management	218532	266
FLOWHEAD	Fluid Optimisation Workflows for Highly Effective Automotive Development processes	218626	381
FUTURAIL	Job opportunities for the railway community of tomorrow	218596	419
GOALDS	GOAL Based Damage Stability	233876	270
HCV	Hybrid Commercial Vehicle	234019	181
HEATRECAR	Reduced energy consumption by massive thermoelectric waste-heat recovery in light duty trucks	218541	60
HELIOS	High Energy Lithium-Ion Storage Solutions	233765	63
HERCULES-B	Higher efficiency engine with ultra-low emissions for ships	217878	66
HORIZON	Research into Effects on Cognitive Performance of Maritime Watch-keepers under Different Watch Patterns, Workloads & Conditions, with Reality Usage of Ships Bridge, Engine & Cargo Control Simulators	234000	273
HOSANNA	Holistic and sustainable abatement of noise by optimized combinations of natural and artificial means	234306	69
HOVERSPILL	Multi-environment air cushion oil spill fast response and post-emergency remediation system	234209	72
HYMAR	High efficiency hybrid drive trains for small and mediumsized marine craft	233718	75
I-TOUR	i-TOUR: intelligent Transport system for Optimized URban trips	234239	184
IceWin	Innovative Icebreaking Concepts for Winter Navigation	234104	384
IMVITER	Implementation of Virtual Testing in Safety Regulations	218688	277
INESS	INtegrated European Signalling System	218575	281
INFRAGUIDER	Infrastructure guidelines for environmental railway performance	218662	79

Acronym	Project name	Grant Agreement	
INGAS	Integrated gas powertrain - Low-emission, CO ₂ -optimised and efficient CNG engines for passenger cars and light duty vehicles	218447	82
INTEGRITY	Intermodal global door-to-door container supply chain visibility	218588	134
INTERACTION	Differences and similarities in driver INTERACTION with in-vehicle technologies	218560	285
INTERAIL	Development of a Novel Integrated Inspection System for the Accurate Evaluation of the Structural Integrity of Rail Tracks	234040	289
ISI-PADAS	Integrated human modelling and Simulation to support human error risk analysis of Partially Autonomous Driver Assistance Systems	218552	293
ITERATE	IT for Error Remediation And Trapping Emergencies	218496	296
KITVES	Airfoil-based solution for vessel onboard energy production destined to traction and auxiliary services	218691	86
LESSCCV	Large-Eddy and System Simulation to predict Cyclic Combustion Variability in gasoline engines	233615	89
MARPOS	MARitime POlicy Support	218522	422
MEDIATE	MEthodology for Describing the Accessibility of Transport in Europe	218684	187
MID-MOD	Mid-frequency vibro-acoustic modelling tools / Innovative CAE methodologies to strengthen European competitiveness	218508	387
MINOAS	Marine Inspection Robotic Assistant System	233715	299
MoDe	Maintenance on Demand	233890	390
MODSAFE	Modular Urban Transport Safety and Security Analysis	218606	190
NAVTRONIC	Navigational system for efficient maritime transport	234372	393
NICHES+	New and Innovative Concepts for Helping European transport Sustainability - Towards implementation	218504	193

Acronym	Project name	Grant Agreement	
PANTOTRAIN	PANTOgraph and catenary interaction: Total Regulatory Acceptance for the Interoperable Network	234015	137
PICAV	Personal Intelligent City Accessible Vehicle System	233776	196
PMnIDEA	Predictive Maintenance Employing Non-intrusive Inspection & Data Analysis	234299	395
POSE²IDON	Power Optimised Ship for Environment with Electric Innovative Designs ON board	218599	92
POWERFUL	POWERtrain for FUTure Light-duty vehicles	234032	96
PRESS4TRANSPORT	Virtual Press Office to Improve EU Sustainable Surface Transport research Media Visibility on a National and Regional Level	234258	425
PROLOGUE	Promoting Real Life Observations for Gaining Understanding of Road Behaviour in Europe	233597	302
PROMARC	Promoting Marine Research Careers	218590	399
PUBTRANS4ALL	Public Transportation - Accessibility for All	233701	199
QUIESST	Quieting the Environment for a Sustainable Surface Transport	233730	99
RE-ROAD	Re-road – End of Life Strategies of Asphalt Pavements	218747	102
RISPECT	Risk-based expert system for through-life ship structural inspection and maintenance and new-build ship structural design	218499	402
SAFEGUARD	Ship evacuation data and scenarios	218493	305
SAFER BRAIN	Innovative Guidelines and Tools for Vulnerable Road Users Safety in India and Brazil	233994	308
SAFERAIL	Development of Novel Inspection Systems for Railway Wheelsets	218674	312
SAFETRIP	Satellite Application For Emergency Handling, Traffic Alerts, Road safety and Incident Prevention	233976	315
SAFEWAY2SCHOOL	Integrated System for Safe Transportation of Children to School	233967	318

Acronym	Project name	Grant Agreement	
SAFEWIN	Safety of winter navigation in dynamic ice	233884	320
SAFIER	Support Action for Implementation of ERTRAC's Road Transport Research Priorities	234161	428
SARTRE	Safe Road Trains for the Environment; Developing strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety and comfort benefits	233683	106
SAVE ME	System and Actions for VEHicles and transportation hubs to support disaster Mitigation and Evacuation	234027	323
SECUREMETRO	Inherently secure blast resistant and fire safe metro vehicles	234148	326
SILENV	Ships oriented Innovative soLutions to rEduce Noise & Vibrations	234182	109
SIMBA II	Strengthening Road Transport Research Cooperation between Europe and Emerging International Markets II	218567	431
SKIDSAFE	Enhanced Driver Safety due to Improved Skid Resistance	234303	329
SKILLRAIL	Education and Training Actions for high skilled job opportunities in the railway sector	233649	434
SMART	Services for SMEs in collABorative tRansporT research projects	234041	437
SMART RRS	Innovative Concepts for Smart Road Restraint Systems to Provide Greater Safety for Vulnerable Road Users	218741	332
SMART-CM	SMART Container Chain Management	218547	141
STADIUM	Smart Transport Applications Designed for Large Events with Impacts on Urban Mobility	234127	202
Star-net Transport	European Network to support the sustainable surface transport SMEs	218605	440
STORAGE	Composite Structural Power Storage for Hybrid Vehicles	234236	112
STREAMLINE	Strategic Research For Innovative Marine Propulsion Concepts	233896	115
SUSY	Surfacing System for Ship Recovery	234151	336

Acronym	Project name	Grant Agreement	
TECH-CLINIC SST	Setting-up of Effective Technological Clinics to Address Real Knowledge Needs of Surface Transport Industry	217980	443
TelliBox	Intelligent MegaSwapBoxes for advanced intermodal freight transport	217856	145
THOMO	Development of a Finite Element Model of the Human Thorax and Upper Extremities	218643	339
THORAX	Thoracic Injury Assessment for Improved Vehicle Safety	218516	342
TIFFE	Thermal SystemsIntegration for Fuel Economy	233826	118
TRANS-AFRICA	Promoting Public Transport in Africa	218225	205
TRANSBONUS	Transport EU-Western Balkan Network for Training, Support and Promotion of Cooperation in FP7 research activities	218699	446
TRANSFEU	Transport fire safety engineering in the European Union	233786	345
TULCS	Tools for Ultra Large Container Ships	234146	349
TURBLOG_WW	Transferability of urban logistic concepts and practices from a worldwide perspective	234061	208
TYROSAFE	Tyre and Road Surface Optimisation for Skid Resistance and Further Effects	217920	352
VIAJEO	International Demonstrations of Platform for Transport Planning and Travel Information	233745	211
VISIONS-OLYMPICS	The next generation of products and procedures for vessels and floating structures	234199	405
YEAR	Young European Arena of Research	218742	449
YEAR-2010	Young European Arena of Research - 2010	234122	452

Index by Instruments

CP – FP

2-BE-SAFE	2-Wheeler Behaviour and Safety	215
2020 INTERFACE	Tailoring of Tribological Interfaces for Clean and Energy-Efficient Diesel and Gasoline Power Trains	23
ADSEAT	Adaptive Seat to Reduce Neck Injuries for Female and Male Occupants	219
ADVISE	Advanced Dynamic Validations using Integrated Simulation and Experimentation	222
AEROTRAIN	Aerodynamics: Total Regulatory Acceptance for the Interoperable Network	123
ALARP	A railway automatic track warning system based on distributed personal mobile terminals	225
ARGOMARINE	Automatic Oil-Spill Recognition and Geopositioning Integrated in a Marine Monitoring Network	26
ARIADNA	Maritime Assisted Volumetric Navigation System	357
ASPIIS	Autonomous Surveillance in Public transport Infrastructure Systems	228
ASSESS	Assessment of Integrated Vehicle Safety Systems for Improved Vehicle Safety	231
ASSET-Road	ASSET advanced safety and driver support for essential road transport	234
BB GREEN	Battery powered Boats - Greening, Reduced resistance, Electric, Efficient and Novel	29
BEAUTY	Bio-Ethanol engine for Advanced Urban Transport by light commercial vehicle and heavy duty	32
BESST	Breakthrough in European Ship and Shipbuilding Technologies	360
BIKE INTERMODAL	THE INTERMODAL BIKE - Multi-modal integration of cycling mobility through product and process innovations in bicycle design.	152
CASMARE	Coordination Action to Maintain and Further Develop a Sustainable Maritime Research in Europe	364
CASPER	Child Advanced Safety Project for European Roads	238
CATS	City Alternative Transport System	156
CITYHUSH	Acoustically Green Road Vehicles and City Areas	159
CITYLOG	Sustainability and Efficiency of City Logistics	162
CITYMOVE	CITY Multi-role Optimized VEHICLE	165
CLEANER-D	Clean European Rail - Diesel	35

CO-PATCH	Composite Patch Repair for Marine and Civil Engineering Infrastructure Applications	367
CO2NTROL	Integrated Solutions for Noise and Vibration Control in Vehicles	38
ComPair	Continuous health monitoring and non-destructive assessment of composites and composite repairs on surface transport applications	370
CORFAT	Cost-effective Corrosion and Fatigue Monitoring for Transport Products	240
COVER	Coordination of Vehicle and Road safety initiatives	243
DHErgo	Digital Humans for Ergonomic designs of products	246
DIVEST	Dismantling of Vessels with Enhanced Safety and Technology	44
DYNOTRAIN	Railway vehicle dynamics and track interactions: Total regulatory acceptance for the interoperable network	127
ECOQUEST	Efficient Cooling systems for Quieter Surface Transport	47
EE-VERT	Energy Efficient Vehicles for Road Transport	50
EIRAC II	EIRAC 2008-2010	131
EPOCH	Enabling Protection for Older Children	250
ERRAC-ROADMAP	ERRAC Road Map	376
EU-CARGOXPRESS	Greening of Surface Transport through an Innovative and Competitive CARGO-VESSEL Concept Connecting Marine and Fluvial Intermodal Ports.	53
EURECOMP	Recycling thermoset composites of Sustainable Surface Transport	57
EXCITING	Exact Geometry Simulation for Optimized Design of Vehicles and Vessels	378
EXTREME SEAS	Design for Ship Safety in Extreme Seas	256
FIMCAR	Frontal Impact and Compatibility Assessment Research	259
FIREPROOF	Probabilistic framework for onboard fire-safety	263
FLOODSTAND	Integrated flooding control and standard for stability and crises management	266
FLOWHEAD	Fluid Optimisation Workflows for Highly Effective Automotive Development processes	381
FUTURAIL	Job opportunities for the railway community of tomorrow	419
GOALDS	GOAL Based Damage Stability	270
HEATRECAR	Reduced energy consumption by massive thermoelectric waste-heat recovery in light duty trucks	60
HELIOS	High Energy Lithium-Ion Storage Solutions	63

HORIZON	Research into Effects on Cognitive Performance of Maritime Watch-keepers under Different Watch Patterns, Workloads & Conditions, with Reality Usage of Ships Bridge, Engine & Cargo Control Simulators	273
HOSANNA	Holistic and sustainable abatement of noise by optimized combinations of natural and artificial means	69
HOVERSPILL	Multi-environment air cushion oil spill fast response and post-emergency remediation system	72
HYMAR	High efficiency hybrid drive trains for small and mediumsized marine craft	75
I-TOUR	i-TOUR: intelligent Transport system for Optimized URban trips	184
IceWin	Innovative Icebreaking Concepts for Winter Navigation	384
IMVITER	Implementation of Virtual Testing in Safety Regulations	277
INESS	INtegrated European Signalling System	281
INGAS	Integrated gas powertrain - Low-emission, CO ₂ -optimised and efficient CNG engines for passenger cars and light duty vehicles	82
INTEGRITY	Intermodal global door-to-door container supply chain visibility	134
INTERACTION	Differences and similarities in driver INTERACTION with in-vehicle technologies	285
INTERAIL	Development of a Novel Integrated Inspection System for the Accurate Evaluation of the Structural Integrity of Rail Tracks	289
ISI-PADAS	Integrated human modelling and Simulation to support human error risk analysis of Partially Autonomous Driver Assistance Systems	293
ITERATE	IT for Error Remediation And Trapping Emergencies	296
KITVES	Airfoil-based solution for vessel onboard energy production destined to traction and auxiliary services	86
LESSCCV	Large-Eddy and System Simulation to predict Cyclic Combustion Variability in gasoline engines	89
MID-MOD	Mid-frequency vibro-acoustic modelling tools / Innovative CAE methodologies to strengthen European competitiveness	387
MINOAS	Marine Inspection Robotic Assistant System	299
MoDe	Maintenance on Demand	390

MODSAFE	Modular Urban Transport Safety and Security Analysis	190
NAVTRONIC	Navigational system for efficient maritime transport	393
PANTOTRAIN	PANTOgraph and catenary interaction: Total Regulatory Acceptance for the Interoperable Network	137
PICAV	Personal Intelligent City Accessible Vehicle System	196
PMnIDEA	Predictive Maintenance Employing Non-intrusive Inspection & Data Analysis	395
POSE²IDON	Power Optimised Ship for Environment with Electric Innovative Designs ON board	92
POWERFUL	POWERtrain for FUTURE Light-duty vehicles	96
PROLOGUE	Promoting Real Life Observations for Gaining Understanding of Road Behaviour in Europe	302
PUBTRANS4ALL	Public Transportation - Accessibility for All	199
QUIESST	Quietening the Environment for a Sustainable Surface Transport	99
RE-ROAD	Re-road – End of Life Strategies of Asphalt Pavements	102
RISPECT	Risk-based expert system for through-life ship structural inspection and maintenance and new-build ship structural design	402
SAFEGUARD	Ship evacuation data and scenarios	305
SAFER BRAIN	Innovative Guidelines and Tools for Vulnerable Road Users Safety in India and Brazil	308
SAFEGWAY2SCHOOL	Integrated System for Safe Transportation of Children to School	318
SAFEWIN	Safety of winter navigation in dynamic ice	320
SARTRE	Safe Road Trains for the Environment; Developing strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety and comfort benefits	106
SAVE ME	System and Actions for VEHICLES and transportation hubs to support disaster Mitigation and Evacuation	323
SECUREMETRO	Inherently secure blast resistant and fire safe metro vehicles	326
SILENV	Ships oriented Innovative soLutions to rEDuce Noise & Vibrations	109

SKIDSAFE	Enhanced Driver Safety due to Improved Skid Resistance	329
SKILLRAIL	Education and Training Actions for high skilled job opportunities in the railway sector	343
SMART RRS	Innovative Concepts for Smart Road Restraint Systems to Provide Greater Safety for Vulnerable Road Users	332
STADIUM	Smart Transport Applications Designed for Large Events with Impacts on Urban Mobility	202
STORAGE	Composite Structural Power Storage for Hybrid Vehicles	112
STREAMLINE	Strategic Research For Innovative Marine Propulsion Concepts	115
SUSY	Surfacing System for Ship Recovery	336
TelliBox	Intelligent MegaSwapBoxes for advanced intermodal freight transport	145
THOMO	Development of a Finite Element Model of the Human Thorax and Upper Extremities	339
THORAX	Thoracic Injury Assessment for Improved Vehicle Safety	342
TIFFE	Thermal SystemsIntegration for Fuel Economy	118
TRANSBONUS	Transport EU-Western Balkan Network for Training, Support and Promotion of Cooperation in FP7 research activities	446
TRANSFEU	Transport fire safety engineering in the European Union	345
TULCS	Tools for Ultra Large Container Ships	349
VIAJEO	International Demonstrations of Platform for Transport Planning and Travel Information	211

CP – IP

EBSF	European Bus System of the Future	177
HCV	Hybrid Commercial Vehicle	181
HERCULES-B	Higher efficiency engine with ultra-low emissions for ships	66
SAFETRIP	Satellite Application For Emergency Handling, Traffic Alerts, Road safety and Incident Prevention	315
SMART-CM	SMART Container Chain Management	141

CSA – CA		
ACCESS 2 ALL	Mobility schemes ensuring accessibility of public transport for all users	149
CITYNETMOBIL	City Network for Fair Mobility	168
CONDUITS	Coordination Of Network Descriptors for Urban Intelligent Transportation Systems	171
DELTA	Concerted coordination for the promotion of efficient multimodal interfaces	174
DIRECT-MAT	DISmantling and RECYcling Techniques for road MATerials - Sharing knowledge and practices	41
ESTEEM	Enhancing Safety and security aspects in Transport rEsearch in the Euro-Mediterranean region	253
INFRAGUIDER	Infrastructure guidelines for environmental railway performance	79
MEDIATE	METHodology for Describing the Accessibility of Transport in Europe	187
NICHES+	New and Innovative Concepts for Helping European transport Sustainability - Towards implementation	193
SAFERAIL	Development of Novel Inspection Systems for Railway Wheelsets	312
TURBLOG_WW	Transferability of urban logistic concepts and practices from a worldwide perspective	208
TYROSAFE	Tyre and Road Surface Optimisation for Skid Resistance and Further Effects	352

CSA – SA

B2B LOCO	Baltic - To - Balkan Network for LOGistics COmpetence	409
CETRRRA	Actions to Stimulate Participation of Cooperation Partners in Surface Transport Research	413
EMAR2RES	Support Action to initiate cooperation between the Communities of European MARine and MARitime REsearch and Science	417
ENABLE	Stimulate Sustainable Freight Transport Systems with Latin American countries	373
MARPOS	MARitime POLicy Support	422
PRESS4TRANSPORT	Virtual Press Office to Improve EU Sustainable Surface Transport research Media Visibility on a National and Regional Level	425
PROMARC	Promoting Marine Research Careers	399
SAFIER	Support Action for Implementation of ERTRAC's Road Transport Research Priorities	428
SIMBA II	Strengthening Road Transport Research Cooperation between Europe and Emerging International Markets II	431
SMART	Services for SMEs in collABorative tRansporT research projects	437
Star-net Transport	European Network to support the sustainable surface transport SMEs	440
TECH-CLINIC SST	Setting-up of Effective Technological Clinics to Address Real Knowledge Needs of Surface Transport Industry	443
TRANS-AFRICA	Promoting Public Transport in Africa	205
VISIONS-OLYMPICS	The next generation of products and procedures for vessels and floating structures	405
YEAR	Young European Arena of Research	449
YEAR-2010	Young European Arena of Research - 2010	452

Index by Partners

01DB-METRAVIB SAS	360
A.S. Watson (Europe) Holdings B.V.	134
A+S Consult GmbH, Forschung und Entwicklung	308
Aalborg Industries A/S	66
ABB Turbo Systems AG	66
Abertis Autopistas España, S.A.U.	315
ABS Corporate	263
ACCON GmbH	159
ACEBI SAS	92
ACOUCITE	69
ACTIA S.A.	177
Adam Mickiewicz University Foundation	440
Adam Opel GmbH	63, 82, 259, 277
Admarin Designers Consultants Contractors	72
Administrador de Infraestructuras Ferroviarias	123, 281
Administration de l'Équipement et des Déplacements/AED (Brussels Capital Région)	171
Administration of Customs and Excises	141
Advanced Computer Systems S.p.A.	393
Aerosol & Particle Technology Lab. / Chemical Process Engineering Research Institute / Centre for Research and Technology Hellas	181
AFP MKT Ltd	409
AfriDeut Consult Ltd	234
AGE - La plate-forme européenne des personnes âgées	187
Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile	181
Agenzia per la Mobilità del Comune di Roma Società per Azioni	202
Agenzia per la Promozione della Ricerca Europea	440
Agenzia Regionale per la Mobilità del Lazio	156

Aggregate Industries UK Limited	329
AGU Zürich (Arbeitsgruppe für Unfallmechanik)	219
Airbus UK	222
Akdeniz University	409
Aker Arctic Technology	384
Alfa Products & Technologies	159, 289, 312
ALGOE	315
Alma Consulting Group S.A.S.	127, 137, 280, 345
Alma Mater Studiorum Università di Bologna - UNIBO	99
ALPHA Composites GmbH	82
ALSTOM Transport SA	35, 127, 137, 190, 281, 345, 395, 434
Altair Development France	277
Altea Italia, Srl	211
ALTRA S.P.A.	181
Alveus d.o.o.	320, 367
Amberjack Projects Ltd.	29
American Bureau of Shipping - Europe LTD	240
Amparo Solutions AB	318
Anatoliki S.A. Development Company	174
ANCHORAGE	413
ANCO S.A. Agencies, Commerce & Industry	211
ANEK Lines	228
Anonymos Etaireia Ellinikon kai Diethnon Metaforon Proodos AE	141
Ansaldo STS France	190
Ansaldo STS S.p.A.	225 , 281, 376
AnsaldoBreda S.p.A	123, 345
Antwerp Port Authority - Gemeentelijk Havenbedrijf Antwerpen	141
API SA	215

Applied Research and Communications Fund	440, 446
Aqualiner	29
ArcelorMittal Ostrava a.s.	332
Arctic and Antarctic Research Institute	320
Aristotle University of Thessaloniki	240, 409
Artesis Hogeschool Antwerpen	102
Arttic SAS	115
ASCI SYSTEMHAUS GMBH	413
Ashok Leyland Limited, Telematics Business Unit	202
Asociacion de Investigacion Metalurgica del Noroeste	367
Associação Brasileira de Engenharia	211, 431
Associação Portuguesa para a Normalização e Certificação Ferroviária	137
Association de Gestion de l'Institut Catholique d'Arts et Métiers de Nantes	57
Association Européenne Des Fournisseurs Automobiles Aisbl	425
Association of the European Railway Industry	345
Association of Train Operating Companies	35
Associazione Costruttori di Acciaio Italiani - ACAI	99
ASSTRA – Associazione Trasporti	177
Astrium GmbH Bremen	336
ATAC S.p.A.	395
ATAF- Azienda Trasporti Area Fiorentina S.p.a.	152
Athena - Research and Innovation Center in Information, Communication and Knowledge Technologies	228
Atlantec Enterprise Solutions GmbH	402
AtoutVeille	370
AUDI Aktiengesellschaft	277
Autoliv Development AB	341
Automotive center – Centar za vozila, Sarajevo	446
Autopistas, Concesionaria Española, S.A. (Unipersonal)	315

Autoridad Portuaria de Gijón	53
Autostrade per l'Italia S.p.a.	329
Autotech Engineering A.I.E.ES	277
AVL List GmbH	32, 66, 91, 98, 108, 425
Avonwood Developments Ltd	390
AZD Praha sro	281
Azienda Trasporti Milanesi S.p.A.	177
Azienda Trasporti Verona Srl	177
Balance Technology Consulting GmbH	92, 336, 360, 405
Balancia	308
Balfour Beatty Rail S.p.A	79
Banverket - Swedish National Rail Administration	79, 281, 376
BAP Logistics Ltd	134
Baudis Bergmann Rosch Verkehrstechnik GmbH	281
Bayerische Motoren Werke Aktiengesellschaft	246
Bayrisches Innenministerium - Polizeipräsidium Oberbayern	234
BDO EOS Svetovanje d.o.o.	174
BDZ Passenger Traffic EOOD	199
Becker Marine Systems	360
Beijing Public Transport Holdings, Ltd.	211
Beijing Transportation Research Center	211
Bekaert Advanced Coatings NV	23
Ben-Gurion University of the Negev	215, 296
Berends Consult	177
Bergische Universität Wuppertal	86, 345
bfa-Augsburg Ballonfabrik See- und Luftausrüstung GmbH & Co. KG	336
BIS Bremerhavener Gesellschaft für Investitionsförderung und Stadtentwicklung mbH	177
BKV Ltd - Budapest Transport Closely Held Corporation	177
Blekinge Tekniska Högskola	360

Blue Print IT Solutions	149
BMT Group Ltd	263, 266, 305, 336
Bohler Schmiedetechnik GmbH & Co. KG	66
Bombardier Transportation GmbH	35, 123, 137, 190, 199, 281, 326, 345, 376
Bombardier Transportation Sweden AB	376, 387
Bombardier Transportation UK Ltd	281, 345
BPV - Beratung und Planung im Verkehrswesen GmbH	141
BRE Global Ltd	345
Brüel & Kjær Sound & Vibration Measurement A/S	38
Bruntons Propellers Ltd	75
Brže Više Bolje d.o.o.	349
Budapest University of Technology and Economics	315, 425
Budapest University of Technology and Economics - Department of Highway and Railway Engineering	425
Budapesti Muszaki es Gazdasagtudományi Egyetem	190, 443
Bundesanstalt für Materialforschung und -prüfung	240
Bundesanstalt für Materialforschung und Überprüfung	82
Bundesanstalt für Straßenwesen	215, 238, 243, 259, 277, 342, 352
Bureau Veritas	92, 109, 263, 266, 273, 305, 336, 349 , 360, 367, 402
Bureau Veritas - Registre international de classification de navires et d'aéronefs SA	92, 305, 336, 349 , 360
BVT Surface Fleet Limited	44
BW Gas ASA	393
Bytronic Automation Limited	395
C.R.F. Società Consortile per Azioni	63
C.T.M. AMBIENTE SRL	360
Cadzow Communications Consulting Ltd	184
Canal de Experiencias Hidrodinámicas de El Pardo	256, 349
CANEVAFLOR SAS	69

Carbonia AB	29
Carnival plc	263, 270, 393
Caterpillar SARL	35
CD-adapco France	381
CEHIPAR	109
CEN - Comité Européen de Normalisation	141
Center of Maritime Technologies e.V.	53, 263, 360
Central Road Research Institute (CRRl)	431
Centre de Documentation, de Recherche et d'Expérimentations sur les pollutions accidentelles des eaux	72
Centre de recherches routières - Opzoekingscentrum voor de wegenbouw	41, 102
Centre d'études pour les réseaux	211
Centre d'études sur les réseaux, les transports, l'urbanisme et les constructions publiques (CERTU)	177
Centre d'Etudes Techniques de l'Equipement du Sud Ouest	174
Centre européen d'études de sécurité et d'analyse des risques	215, 231, 238, 243, 339
Centre for Research and Technology - Thessaly	370
Centre for Research and Technology Hellas	35, 141 , 149, 174, 181, 215, 302, 323, 373 , 422
Centre Internacional de Mètodes Numèrics en Enginyeria	360
Centre National de la Recherche	63
Centre National de la Recherche Scientifique (CNRS)	115, 165, 266
Centre Scientifique et Technique du Bâtiment	99
Centro de Estudios e Investigaciones Tecnicas de Gipuzkoa	127, 177, 246
Centro di ricerca per il Trasporto e la Logistica – Università degli Studi di Roma 'La Sapienza'	156, 253
Centro Interuniversitario di Ricerca Trasporti	419
Centro Ricerche Fiat S.C.p.A.	32 , 50, 60 , 72, 96, 118 , 162 , 165 , 181, 222, 259, 277, 293, 387, 428
Centro Studi Industriali di Taddei Simona Maria e C. SAS	86

Centrum dopravního výzkumu v.v.i.	215, 285, 409
Centrum Naukowo-Techniczne Kolejnictwa	345
Centrum Techniki Okr towej S.A	115, 266
České dráhy AS	35
Ceske vysoke uceni technicke v Praze	82, 89, 96, 413
CETE de l'Est - Laboratoire Régional des Ponts et Chaussées (LRPC) de Strasbourg	99
CETENA S.p.A. Centro per gli Studi di Tecnica Navale	109, 360, 367
Chalmers Tekniska Högskola AB	35, 38, 82, 115, 177, 219, 231, 238, 296
Charles Taylor & Co Limitd	273
Chinese Academy of Meteorological Sciences	413
City of Barcelona (BN)	171
City of Paris - Department of roads and transportation (Paris)	171
City of Stockholm, Environment and Health Administration	69
Clarity Consulting Information and Management Services Ltd	234
Cliff Funnell Associates	440
Cold Car spa	165
Color Line AS	263
Color Line Marine AS	270, 305
Combibox System	171
Comité de Liaison de la Construction d'Equipements et de Pièces d'Automobiles Clepa aisbl	440
Commissariat à l'énergie atomique	63, 289, 293
Commission of the European Communities - Directorate General Joint Research Centre	26, 228
Communauté Urbaine de Lyon	171
Communauté Urbaine de Strasbourg (CTL)	156
Community of European Railway and Infrastructure Companies	376
Community of European Shipyards Association	364, 399, 405, 417

Compagnie Maritime d'Affrètement - Compagnie Générale Maritime	349
Compañía Trasmediterranea	53 , 109
Componenta Pietarsaari MS Oy	66
Compositec	57
CONCAWE IVZW	428
Conncept Swiss	318
Consiglio Nazionale delle Ricerche	26, 32, 35, 82, 299
Consorcio Regional de Transportes de Madrid	177
Consorzio Armatori per la Ricerca scrI	357, 402
Construcciones y Auxiliar de Ferrocarriles Investigación y Desarrollo, S.L.	123
Construcciones y Auxiliar de Ferrocarriles, S.A.	127
Consultores Investigacion Tecnologica S.L.	357
Contact Srl	137
Continental AG	38
Continental Aktiengesellschaft	165
Continental Automotive GmbH	82
Continental Rail S.A.	35
Continental Safety Engineering International GmbH	341
Continental Teves AG & Co. oHG	390
Converteam Technology Ltd	92
Corus UK Limited	376
Corus UK Ltd, trading as Corus Rail	395
COSCO Network E Logistics Co Ltd	141
COSCON - Cosco Container Lines	141
Council for Scientific and Industrial Research - CSIR (South Africa)	202
Council for Scientific and Industrial Research (CSIR)	431
Cranfield University	395
Cross-border Research Association	134

CS Systemes d'Information SA	360
CSA COMPUTER & ANTRIEBSTECHNIK GMBH	413
CTL Logistics S.A.	145
CURRENTA GmbH & Co. OHG	345
DAF Trucks NV	181
Daimler AG	32, 82, 231, 259, 277
Damen Schelde Naval Shipbuilding B.V.	92, 360
Danaher Motion AB	181
Danish Maritime Authority	270
Danish Road Directorate / Danish Road Institute	41, 102
Danish Technical University	66
Danmarks Tekniske Universitet	381
Danone PDPA srl	165
Dantec Dynamics GmbH	222
D'Appolonia S.p.A.	35, 177, 360, 395
Darmstadt University of Technology - Institute of Ergonomics	225
DB Netz AG	281
DCNS	109 , 336
DCNS SA	92
DeCeTe Duisburger Container Terminal Gesellschaft	134
Delft University of Technology	66, 329
Delphi Automotive Systems Luxembourg SA	82, 428
Delphi Diesel Systems S.A.S.	96
DENSO Thermal Systems S.p.A.	118
Det Norske Veritas	29, 269, 358
Det Norske Veritas AS	92, 256 , 266, 378, 393
Deutsche Bahn AG	35, 123, 127, 137, 345
Deutsches Zentrum für Luft-und Raumfahrt e.V.	211, 281, 293, 315
Development centre for Ship technology and Transport systems	115

DHL Global Forwarding (Belgium)	134
DHL Management (Switzerland) Ltd	141
DHL Worldwide Express Logistics NV/SA - Global Customer Solutions	390
Diab Norge AS	29
Dievropaiki Ektairia Symbolon Metaforon Anaptikis kai Pliroforikis AE	141
Digigroup Srl	177
DIMAC RED Srl	181
DIMETRONIC SA	190
Dipartimento di Ingegneria Navale, del Mare e per l'Ambiente (DINMA) - Università degli Studi di Trieste	270
Distretto Tecnologico sull'Ingegneria dei Materiali polimerici e compositi e Strutture	437
Dokuz Eylul Universitesi	44
Dorel Netherlands (a trade name of Maxi Miliaan B.V.)	250
DP World - The Peninsular & Oriental Steam Navigation Company	141
Dutch Maritime Network	422
Dynamics, Structures & Systems International	395
DYNAMore Gesellschaft für FEM Ingenieurdienstleistungen mbH Karlsruhe	277
E.On Ruhrgas AG	82
E4tech Srl	32
ECKA Granulate GmbH & Co. KG	66
eco2Win AB	79
Ecocat Oy	82, 96
Ecole Centrale de Lyon	47
Ecole Centrale Marseille	349
Ecole Polytechnique Fédérale de Lausanne (EPFL)	156
École Supérieure d'Electricité	293
ECONET S.L.	437
ECT Delta Terminal B.V.	134

ECT Venlo B.V.	134
EDC- European Datacomm NV	141
EIA - European Intermodal Association	141
Eidgenössische Technische Hochschule Zürich	413
Elasis S.C.p.A.	184
Elbit Systems Ltd.	225
Electricité de France SA	63
Elsag S.p.A.	437
EMEF, SA - Empresa de Manutenção de Equipamento Ferroviário, SA	312
EMPA - Swiss Federal Laboratories	66
Empresa de Transportes e Trânsito de Belo Horizonte S.A.	208
EMS PreCab GmbH & Co. KG	360
Emtele Oy	234
Energys Ltd	75
Engineering Center Steyr GmbH & Co. KG	50
ENMM	360
Ente Autonomo Volturno Srl	174
Envirocoustics A.B.E.E	312, 370
Epitropi Ereunon Panepistimiou Thessalias	215
Erasmus Universiteit Rotterdam	134
Esarc Hi-Tech srl	360
ESI Group S.A.	246, 277, 381
ESP Ltd	75
Essex County Council	332
Estaleiros Navais de Peniche, S. A.	367
Estaleiros Navais de Viana Do Castelo	256
ETC Battery And FuelCells Sweden AB	112
ETF Nautilus UK	273
ETH Zurich	66

EURNEX e.V.	376, 413, 419
Eurocities	193
Europe Recherche Transport (ERT)	149, 156, 215, 246, 285
European Asphalt Pavement Association	102
European Commission's Joint Research Centre	222
European Community represented by the European Commission – Directorate General Joint Research Centre	96
European Community Shipowners Associations	273, 364
European Composite Recycling Services Company srl	57
European Conference of Transport Research Institutes	452
European Council for Maritime Applied R&D Association	399
European Council for Maritime Applied Research & Development	417, 422
European Federation of Railway Trackworks Contractors	376
European Intermodal Association	131, 141, 145
European Journalism Centre	425
European Marine Equipment Council	92, 364, 399, 405, 440
European Rail Infrastructure Managers asbl	376
European Road Transport Telematics Implementation Coordination srl (ERTICO)	162, 202, 211 , 428, 431
European Space Agency	393
European Union Road Federation - ERF	99
Europese Binnenvaart Unie	364
EUROPLATFORMS G.E.I.E	162
Eutelsat SA	315
EvoBus GmbH	177
Ewals Cargo Care B.V.	145
Exova Warringtonfire	345
Explosivos Alaveses S.A	326
ExxonMobil Research and Engineering Company	32
FACTUM Chaloupka & Risser OHG	215, 285

Faculdade de Ciencias e Tecnologia da Universidade de Coimbra	23
FACULDADE DE MOTRICIDADE HUMANA	215
Faculty of Mechanical Engineering and Naval Architecture	349
Faculty of Mechanical Engineering, University of Belgrade	199
Faurecia Sièges d'Automobile	219
Federal Institute for Materials Research and Testing (BAM)	112
Federal Mogul Friedberg GmbH	66
Federation of European Motorcyclist's Associations	215, 332
FE-DESIGN Gesellschaft zur Herstellung von Analysesoftware mbH	381
FEHRL AISBL (FEHRL)	352
Feldman Enterprises Limited	289, 312
Ferrocarril Metropolitana de Barcelona SA	190
FEV Motorentechnik GmbH	32, 91, 98, 108
FH Joanneum Gesellschaft mbH	50
Fiat Automobiles S.p.A.	238
FIAT Group Automobiles Spa	259
FINCANTIERI Cantieri Navali Italiani S.p.A.	270, 360
Finnish Meteorological Institute	320
Finnish Transport Agency	320
First Technology Safety Systems (Europe)	231 , 238, 243 , 250, 342
FIT Consulting Srl	165, 177
Fjellstrand AS	53
Fleetech AB	318
Flensburger Schiffbau-Gesellschaft mbH & Co KG	360
Folksam Ömsesidig Säk-försäkring	219
Fondation Européenne de la Science	417
Fondazione Graphitech	184
Fondazione per la Ricerca sulla Migrazione e sulla Integrazione delle Tecnologie	184

Fondazione Ugo Bordonì	315
FORCE Technology	360
Ford Forschungszentrum Aachen GmbH	63
Ford-Werke GmbH	118
Forschungsgesellschaft Mobilität GmbH - Austrian Mobility Research	174
Forschungsinstitut für Rationalisierung e.V.	281
Forsvarets Forskninginstitut	393
Forum des Laboratoires Européens de Recherche Routière	102, 428, 430, 449
Foundation for Research and Technology Hellas	446
Foundation Wegemt - A European Association of Universities in Marine Technology and Related Sciences Mekelweg - Faculteit MT	364, 399
Frantičarorka ehf / FTO Sustainable Solutions	437
FRANCISCO CARDAMA, S.A.	367
Fraunhofer Institute for Physical Measurement Techniques	60
Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.	141, 162, 177, 315
French national institute for transport and safety research	318
Fronius International GmbH	360
FTW Forschungszentrum Telekommunikation Wien GmbH	225
FUCHS Fördertechnik AG	360
Fundación CIDAUT	99, 219, 277 , 440, 443
Fundación Cidemco	345
Fundación de la Comunidad Valenciana para la Investigación, Promoción y Estudios Comerciales de Valenciaport	422
Fundación de los Ferrocarriles Españoles	326
Fundación Fatronik	95
Fundación Gaiker	57
Fundación para de Galicia	285
Fundación para la Investigación y Desarrollo en Transporte y Energía	293

Fundación para o fomento da calidade industrial e o desenvolvemento tecnolóxico de Galicia	437
Fundacion Robotiker	106
Fundación TEKNIKER	96
Fundación Valenciaport (FV)	373
Funkwerk Information Technologies GmbH	281
FUSP – Foundation of Support to University of San Paulo	308
Future Shape GmbH	360
Gdansk University of Technology	399
GDF Suez S.A.	82
GE Oil and Gas	399
GEA Vallaton et Chanard SA	156
GEAJ-M Vallotton et T. Chanard Architectes-Urbanistes FSU SA	168
GENESIS S. A.	360
Geotecnia y Cimientos S.A.	329
German Research Center for Artificial Intelligence	299
Germanischer Lloyd AG	44, 92, 256, 270, 360
Gheorghe Asachi Technical University of Ia i	234, 452
GIE de recherche et d'études PSA Renault	238 , 243
GLAFCOS Marine	299
Glafcos Marine Ltd.	299
Goodyear	159
Gospodarsko interesno zdruzenje ACS, Slovenski avtomobilski grozd	440
Gottfried Wilhelm Leibniz Universität Hannover	234
Gotthard-Strassentunnel	323
Grand Port Maritime De Nantes Saint-Nazaire	360
Graz University of Technology	219
Groupement Industriel des Constructions et Armements Navals	92

Groupement ITS-JU	211
Grupo Mecánica del Vuelo Sistemas S.A.	357
G-Tronix Ltd	370
Haldor Topsoe A/S	82
Hama Investeeringud OU	384
Hamburgische Schiffbau-Versuchsanstalt GmbH	115, 270, 357
Haute Ecole Arc Ingénierie	95
Head Acoustics GmbH	159
Hellenic Aerospace Industry	228
Hellenic Institute of Transport - The Centre for Research and Technology Hellas	149
Hellenic Ministry of Economy and Finance	141
Hellenic Ministry of Finance-Greek Customs	141
Hellenic Register of Shipping S.A.	378
Helsinki University of Technology	66
Hexcel Composites Ltd	370
High Modulus Europe Ltd	29
High Performance Space Structure Systems GmbH	222
High Technological Park - Technical University of Varna	109
Higher school of Transport 'Todor Kableshkov'	446
HM Revenue and Customs	134
Hochschule für Technik und Wirtschaft Dresden (FH)	35
Hogia Public Transport Systems AB	177
Holland Rudder Propellers	115
Hong Kong University of Science and Technology	413
Horama S.A.	299
Horama, Marketing & Engineering Services S.A	299
Hovertech Ltd	72
HRD Trailer-Engineering GmbH	145
Hübner Gummi- und Kunststoffe GmbH	177

Human Solutions GmbH	246
Human-Factors-Consult GmbH	413
HydrOcean	349
IAS	149
IAT Ingenieurgesellschaft für Automobiltechnik mbH	259
Icon Computer Graphics Ltd	381
ICSO - International Cargo Security Organisation	141
IDIADA Automotive Technology SA	106, 231, 238, 250, 259, 332
IDMEC	181
IFP Energies nouvelles	82, 89 , 96
ILS Oy	320
IMPACTS Europe	202
Imperial College London (ICL)	171
IMR- Desenvolvimento Organizacional Ltda	308
INASMET-TECNALIA	326
Indian Institute of Technology Bombay	44
Indian Register of Shipping	263
INDRA ESPACIO, S.A.	315
Industrial Research Institute for Automation and Measurements	315
Ineco Tifsa	127
INEO Systrans	177
Ingeniería y Economía del Transporte S.A.	281
Ingenieurgesellschaft Auto und Verkehr GmbH	66
Ingenieurtechnik und Maschinenbau GmbH	360
INNOSTART National Business and Innovation Centre	437
Innovacion Logistica Cargo-Xpress SL	53
Innovation & Development Consulting	308
Innovative Informatikanwendungen in Transport-, Verkehrs- und Leitsystemen GmbH	177

Inovamais SA	208
INOVAMAIS- Serviços de Consultadoria em Inovação Tecnológica	425, 443 , 440
INRETS	149
Institut Français du Pétrole	82
Institut für Zukunftsstudien und Technologiebewertung GmbH	35
Institut national de l'environnement industriel et des risques	63
Institut National de Recherche en Informatique et en Automatique (INRIA)	156, 196, 253, 378
Institut National de Recherche sur les Transports et leur Sécurité (INRETS)	177, 190, 215, 246, 285, 293, 326, 342
Institute for Fluid Dynamics and Ship Theory of the Hamburg University of Technology	115
Institute for Road Safety Research	285
Institute of Applied Physics of the Russian Academy of Sciences	256
Institute of Communication and Computer Systems	215
Institute of Shipping Economics and Logistics	422
Institute of Transport Economics	69
Instituto De Investigación Sobre Reparación De Vehículos S A	332
Instituto de Soldadura e Qualidade	240, 263, 289 , 312, 367, 402
Instituto Nacional de Técnica Aeroespacial	277, 357
Instituto Superior Técnico	137, 256, 376, 402, 413, 419, 434
Instytut Katalizy I Fizykochemii Powierzchni Polska Akademia Nauk	82
Instytut Podstawowych Problemów Techniki Polskiej Akademii Nauk	440
Instytut Transportu Samochodowego (Motor Transport Institute)	318
Integrated Resources Management Company Ltd.	446
Intelligence for Environment & Security - IES Solutions Srl	323
Intelligent Traffic & Travel Information	211

Intempora SA	285
Inter Mutuelles Assistance	315
Interautomation Deutschland GmbH	413
Interdisciplinair Instituut voor BreedBand Technologie vzw	69
Interface Transport	162
Intermodal Concepts & Management AG	145
International Association of Independent Tanker Owners - INTERTANKO	273
International Council of Marine Industry Associations	364
International Harbour Masters' Association	273
International Institute for Information Design	318
Irkutsk State University of Railway Engineering	413
Israel Institute of Technology (Technion)	171
Istanbul Metropolitan Municipality - Department of Transportation (Istanbul)	171
Istanbul Teknik Universitesi	357
Istituto Affari Internazionali	326
Istituto di Studi per l'integrazione dei Sistemi (ISIS)	202
Istituto Nazionale per Studi ed Esperienze di Architettura Navale	75, 115
Istituto per il Mediterraneo	253
Italcertifer S.C.p.A.	376
ITRoma - I.T. Ingegneria dei Trasporti srl	308
ITTI Sp.zo.o.	228
Iveco France S.A.	177
IVECO S.p.A	162, 181
IVRETS	149
JÁFI-AUTÓKUT Engineering Ltd.	277
Jean Chereau SAS	165
JEUMONT Electric SAS	92
Jiangyin Xie Tong Automobile Accessories Co. Ltd	57

Johnson Controls Hybrid and Recycling GmbH	63
Josef Stefan Institute	23
Katcon Global SA	82
Katholieke Universiteit Leuven	86, 99, 387
Kauno Technologijos Universitetas (KTU)	370
KeyResearch ApS	211
KEZIA	360
Kingston Computer Consultancy Ltd	370
Kite Solutions s.n.c. di Dunne Catherine e C.	190, 293, 296
Klaipeda Shipping Research Centre	422
Knorr-Bremse Systeme für Schienenfahrzeuge GmbH	376
KOCKUMS AB	360
Kockums Aktiebolag	53
Kompetenzzentrum - Das virtuelle Fahrzeug Forschungsgesellschaft mbH	387
Koninklijk Nederlands Vervoer	177
Közlekedéstudományi Intézet. Közhasznú Társaság	41
Kria S.r.l.	234
KUHNE + NAGEL GMBH	141
Kungliga Tekniska Högskolan	47, 127, 387
Kuratorium fuer Verkehrssicherheit (Austrian Road Safety Board)	318
Kuratorium für Verkehrssicherheit	215, 302
L.S. Fire Testing Institute Srl	345
Laboratoire Central des Ponts et Chaussées (LCPC)	41, 102, 329, 352
Laboratorio di Scienze della Cittadinanza - LSC	360
Le Moteur Moderne	96
Lear Corporation Holding Spain SLU	50
Link Consulting - Tecnologias de Informação, S.A.	413
Ljubljanski Potniski Promet D.O.O.	152
Lloyd's Register	115, 270, 299

Lloyd's Register EMEA	364
Lloyds Register ODS A/S	360
LMS International NV	47, 387, 390
LMS-Imagine	98
Lödige Systems GmbH	360
LogisticNetwork Consultants GmbH	162
London Underground Limited	190
Loughborough University	219, 238, 302, 310
Lubrizol Ltd	23
Ludwig-Maximilians-Universität München	219, 238
Lunds universitet	149, 443
M.B.I. S.r.l.	315
M/s Suncon Engineers Pvt. Ltd	308
MACIF	315
MAFLOW SpA	118
Magma Srl	184
MAGNA STEYR Fahrzeugtechnik AG & Co KG	181
Magneti Marelli Powertrain SPA	92, 211
MAIF	315
Mälardalen University	318
Malo Yachts AB	75
MAN Nutzfahrzeuge AG	177
MAN Diesel SAS	66
MAN Diesel SE	66
MAN Diesel, Filial af MAN Diesel SE, Tyskland	66
Management Agency of Zakynthos National Marine Park	26
Manchester Metropolitan University	127, 395
Manfred Hügel - Selektions- und Verfahrenstechnik	234
Människa Teknik Organisationspsykologi Lena Kecklund AB	296
MARI-Maritime Association For Research and Innovation	141

Marine & Remote Sensing Solutions Ltd	393
Marine Accident Investigation Branch	273
Marine Technical Group - DOLPHIN PLC	299
Marinelec Technologies	92
MARINTEK - Norwegian Marine Technology Research Institute A/S	53
Maritime and Coastguard Agency	263, 266, 270
Maritime Development Center of Europe	425
Maritime Information Technologies I EUROPE GmbH	360
Maritime Plymouth	399
Maritime Research Institute Netherlands	115, 349
Maritime Wirtschafts- und Schiffbauforschung GmbH	360
Master Plan BV	308
MASTERNAUT	315
Mastervolt	75
MAV-START Bahnpersonenverkehrs AG (MÁV-START Vasúti Személyszállító Zrt.).	199
Maxon Motor AG	152
Mazel Ingenieros, SOCIEDAD ANONIMA	196
MBB Liftsystems AG	199
MEC Insenerilahendused	266
MEDI METAL AKTIEBOLAG	44
Medizinische Hochschule Hannover	238
Memorial University of Newfoundland	305
MEMS AG - Matter Engineering for Metering Systems	82
MER MEC S.p.A.	281, 376, 395
MERMEC France	289
Meta System S.p.A	211
Meteorological Institute	256
Metro de Madrid SA	190
Metro Warszawskie Sp. z o.o.	326

METTLE SARL	131, 367
Meyer Werft GmbH	256, 266, 270, 360
Miba Gleitlager GmbH	66
Ministerie van Financiën, directoraat-generaal Belastingdienst	134
Ministero dell'Interno – Dipartimento dei Vigili del Fuoco, del Soccorso Pubblico e della Difesa Civile	323
Minoan Lines SA	305
Mizar Automazione SpA	202, 318
Mobisoft Oy	390
Mobycon	308
Modelway srl	86
Möller GmbH	92
Monash University	215
Monash University Accident Research Centre	285
Moscow State University of Railway Engineering	413
MOUCHEL LTD.	332
MSU - Michigan State University	222
MTEL-KTEI Teleinfra Company India Private Ltd	234
MTU Friedrichshafen GmbH	35
Müller-BBM GmbH	69
MultiMedia InnoVation	202
Municipality of Solva	174
Nanocyl	112
Nantes Métropole - Communauté Urbaine de Nantes	177
Napa Ltd	266
National and Kapodistrian University of Athens	289
National Center of its Engineering & Technology, Research Institute of Highway, M.O.C	431
National Institute of Transport	234
National Railway Company CFR - SA	79
National Railway Infrastructure Company	199

National Technical University of Athens	53, 215, 263, 266, 329, 367 , 378, 399
National Technical University of Athens - Laboratory of Marine Engineering	66
National Technical University of Athens – Ship Design Laboratory	270
National Technical University of Athens, Laboratory of Remote Sensing	26
NAVTEQ B.V.	162
NCC Roads AB	159
NEA Transport Research and Training	202, 208
Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek - TNO	44, 92, 99, 141, 162, 181, 231, 238, 259, 302, 360
Nemzeti Kutatási és Technológiai Hivatal	440
Neorion Shipyard	299
Netherlands Organisation for Applied Scientific Research (TNO)	159
Network Rail Infrastructure Ltd	79, 127, 137, 281, 376
Newcastle University	399
Nexans Deutschland GmbH	92
Nexans France S.A.S.	92
Ningbo Port Group Information & Communication Co. Ltd.	141
NITEL	434
NL Agency, NL Innovation - Department EG-Liaison	446
Norwegian University of Science and Technology	367
Nuclear N.D.T. Research & Services S.R.L.	240
Nucleo de Comunicaciones y Control S.L.	281
NURC - NATO Undersea Research Centre	26
ÖBB-Infrastruktur Bau Aktiengesellschaft	79
ÖBB-Personenverkehr AG	199
Odecon Sweden AB	47
Odense Steel Shipyard Ltd	92, 349

OHB Teledata GmbH	134
Omsk State Transport University	413
Ooms Nederland Holding B.V.	329
OPEN UNIVERSITY	69
Or Yarok association	302
Österreichisches Forschung- und Prüfzentrum GmbH	63
Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H - arsenal research	99, 181, 215
Pannon Gazdasági Hálózat Egyesület	409
Partnership for Dummy Technology and Biomechanics GbR	342
Paul Scherrer Institut	66
PAULSTRA	360
PBS Turbo s.r.o.	66
PE International GmbH	177
Peab Asphalt AB	102
Petersburg State Transport University	413
Peugeot Citroen Automobiles S.A.	63, 246, 259
PIAGGIO & C. S.P.A.	215
Pilotfish Networks AB	177
PLANET S.A	141
Planet SA	141
Plannung Transport Verkehr AG (PTV)	211
Plastic Omnium Auto Exterior Services	57 , 165
Ploiesti City Hall	156
Pluservice srl	202
Politechnika Gdanska	240, 402
Politechnika Krakowska	240
Politechnika Lodzka	96
Politechnika Warszawska	32, 338, 378, 384

Politechnika Wroclawska	82
Politecnico di Milano	82, 89, 127, 137, 395
Politecnico di Milano - DIP. ENERGIA	98
Politecnico di Milano Dipartimento di Meccanica	127
Politecnico di Torino	82
Polo per la mobilità sostenibile	425
Polytechnic University of Tirana	446
Porthus NV	141
Poznan University of Technology, Institut of Combustion Engines and Transport	96
Praxair Surface Technologies GmbH	66
Principia Recherche Développement SA	305
Professional Association in vehicle Risk Prevention (PAIRP)	431
PROMETIS d.o.o.	409
Promotion of Operational Links with Integrated Services (POLIS)	159, 168, 187, 193 , 202, 428, 431
PROODOS SA	141
PROPRS Ltd.	225
ProRail B.V.	281
PSA - HESSE-NOORD NATIE NV	141
PTV - Planung Transport Verkehr AG.	141, 162, 184, 234
Quantum SPA	315
RAIL & BUS CONSULTANTS GMBH	190
Rail Safety and Standards Board Ltd	127, 137
Railsafe Consulting Ltd	281
RCL (UK) Ltd.	270
RE:LAB S.r.l.	162
Rede Ferroviária Nacional, REFER E.P.	289
Regia Autonom de Transport Bucure ti (RATB)	177
Regie Autonome des Transports Parisiens (RATP)	177, 190, 228, 326, 345

Regione Piemonte	162
Renault S.A.S. represented by Gie Regienov	63, 96 , 246, 277, 381
RENEKO AS	240
Renfe Operadora	123
Research Academic Computer Technology Institute	228
Research Institute of Highway, Minsitry of Communications, China	211
Réseau Ferré de France	127
ResilTech S.r.l.	225
Rete Ferroviaria Italiana S.p.A	281
RETEVISION I S.A.	315
Rhebergen Composites BV io	360
Rheinisch- Westfälische Technische Hochschule Aachen	32, 82, 145 , 243, 387, 452
Ricardo Franco Foundation (RFF)	373
Ricardo UK Limited	89, 106
Rieter Automotive Management AG	38
Rigel Engineering S.r.l.	299
Rijksuniversiteit Groningen	23
Rijkswaterstaat Dienst Verkeer en Scheepvaart (RWS)	352
RINA S.p.A.	299 , 360
RIVAL LIMITED	413
Robert Bosch GmbH	50, 60, 181, 231
ROC Bernard GmbH	234
Rolls-Royce AB	115
Rolls-Royce Marine AS	115
Rolls-Royce PLC	115
Rolls-Royce Power Engineering plc	92, 115
ROM Innovation et Stratégie	60
Rome Mobility Agency (RMA)	171

Royal Caribbean Cruise Line	305
Royal Institute of Technology Machine Design	53
RTCA Rail Technology Cluster Austria – Eisenbahntechnologiecluster Österreich	413
Rupprecht Consult	193
RWTH Aachen für Institut für Kraftfahrwesen	106
RWTH Aachen University	63
RWTH Aachen University - Institute of Technical Acoustics	99
S.C. Beespeed Automatizari S.R.L.	50
S.C. NAVALINK ROM SRL	44
SAAB Automobile Powertrain AB	82
SACMO SA	57
Safety At Sea Ltd	266, 270, 305
Safinah Limited	360
Saft S.A.	35, 63, 92
SAHA International (South Africa) (Pty) Ltd	202
SAM Electronics GmbH	92
Sandvik Powdermet AB	66
Sanitrade s.r.l.	360
SC Terra Mediu SRL	72
Scania CV AB	177
Scensive Technologies Ltd	26
Scheidt & Bachmann GmbH	281
Schenker AB	165
Schweißtechnische Lehr- und Versuchsanstalt SLV Mecklenburg-Vorpommern	360
Schweizerische Bundesbahnen	199
SCITEK Consultants Ltd	115
SDC Ship Design & Consult GmbH	53
Seacon Venlo Expeditie B.V.	134

Secretariat of CEN/TC 256 'Railway Applications' Hold by DIN FSF	345
Segura Durán Assessors S.A.	174
Senate Department for Urban Development	162
Sener Ingenieria y Sistemas SA	360
SEQUOYAH NV	141
Services for Maritime Managemet Srl	402
Servizi Operativi Anfibi Srl	72
SF-Control Oy	266
Shanghai City Comprehensive Transportation	211
Shipbuilders & Shiprepairers Association	360, 367
Shipping Company of Crete S.A.	228
Siberian Transport University of Railway Engineering	413
Siemens AG	35, 82, 123, 281, 378
Siemens AG Marine Solutions	53
Siemens Aktiengesellschaft	60, 127, 345
Siemens Norge AS	29
Siemens Transportation Systems GmbH & CO KG	199
Siemens VDO Automotive SAS	449
Simudyne Ltd	323
SINTEF Energy Research	118
Siradel	92
SIREHNA	349
Sistemas de Protección para Seguridad Vial SL	332
SKF Research and Development Company B.V.	23
Slovenske železnice d. o. o.	199
Société des Transports Intercommunaux de Bruxelles	289, 395
Société d'Ingénierie, de Recherches et d'Etudes en Hydrodynamique Navale S.A.	92
Société Marine de Service et d'Equipement Naval	92

Société Nationale des Chemins de Fer Français	35, 123, 127, 137, 312, 345, 376
Société Régionale Wallonne du Transport	177
Société Technique pour l'Energie Atomique	190
Society of Indian Automobile Manufacturers (SIAM)	202, 431
Solaris Bus & Coach S.A.	181
SP Sveriges Tekniska Forskningsinstitut AB	360
SP Technical Research Institute of Sweden	106, 345
Ss. Cyril and Methodius University	446
SSPA Sweden AB	29, 121, 127, 265
Stagecoach Group plc	395
STAM S.r.l.	326
STAR	409
State unitary enterprise Russian Research and Design Institute for Information, Automation and Communication of Russian Ministry of Railways	413
Statens geotekniska institut	41, 102
Statens väg- och transportforskningsinstitut	165, 234, 296, 318
Stemmann-Technik GmbH	137
Stena Line	115
Stena Rederi AB	320
Steyr Mototrs GmbH	75
Stichting Connekt	131
Stichting Maritiem Research Instituut Nederland	92, 266, 360
Stiftelsen Nansen Senter for Fjernmåling	26
Stiftelsen SINTEF	187, 378
Stockholm Environmental Protection Agency	159
Stockholm University	273
Stocznia Marynarki Wojennej S.A.	240
Strathclyde University	399
STX Finland Cruise Oy	360

STX France S.A.	92, 270, 360
SUNCOVE SA	326
SVMtec GmbH	86
Swedish Maritime Administration	320
Swedish Meteorological and Hydrological Institute	320
Swedish National Road and Transport Research Institute	174
Swedish Road Administration	318
SWEREA IVF AB	44
Swerea SICOMP AB	53, 112, 360
SYROS Shipbuilding and Industrial Enterprises SA	299
Tallink	320
Tallinn University of Technology	320
Tallinna Tehnikakõrgkool/ University of Applied Sciences	409
Tampere University of Technology	66
Technical Research Centre of Finland (VTT)	373
Technical Software Consultants Ltd	289, 312
Technical University of Delft	349, 399
Technical University of Denmark	349
Technical University of Munich	66, 171
Technical University of Sofia	381
Technion- Israel Institute of Technology	409
Technische Universität Berlin	123, 127, 202, 234, 238, 256, 262
Technische Universität Braunschweig	41, 102, 281, 293
Technische Universität Carolo-Wilhelmina zu Braunschweig	118
Technische Universität Darmstadt	390
Technische Universität Dresden	102, 190, 215, 443
Technische Universität Graz	82, 231
Technische Universität Hamburg - Harburg	360
Technische Universität Ilmenau	92

Technische Universität München	246, 378, 381
Technische Universität Wien	79
Technische Universiteit Delft	395
Technische Universiteit Eindhoven	184, 281
TechnoFirst	360
Tecnicas y Servicios de Ingeniería, S.L.	109, 360
Tecnogamma SpA	289, 413
Tecnología e Investigación Ferroviaria S.A.	123, 137
Tecnologie Urbane Srl	152
TEDOM s.r.o.	35
Tekia Consultores Tecnológicos S.L.	177
Teknillinen korkeakoulu	360
Teknologisk Institut	360
TEKS SARL	86
TeleConsult Austria GmbH	357
TELSYS GMBH	190
Termo-Gen AB	60
Test & Training International	302
TfL - Transport for London	187
Thales Rail Signalling Solutions GmbH	281
Thales Rail Signalling Solutions Inc.	190
Thales Software Systems (Shanghai) Co.,	211
The Advanced Composites Group Limited	112
The British Plastics Federation LBG	57
The Engine Consultancy Ltd	35
The Felixstowe Dock and Railway Company	134
The George Institute for International Health	285
The Rehabilitation Medicine Clinic, Department of Neuroscience and Locomotion, IKE, Faculty of Health Sciences, Linköping University, Sweden.	318

The University of Sheffield	69
The University of Surrey	367
Thessaloniki Port Authority SA	141
THETIS S.p.A.	202, 211
Ticona GmbH	152
TIFFA - Thai International Freight Forwarders Association	141
TIFFA EDI SERVICES CO., LTD	141
Timenco bvba	187
TIS.BR, Consultores em Transportes, Inovação e Sistemas Ltda	208
TIS.pt - Consultores em Transportes, Inovação e Sistemas SA	187, 208 , 413
TKMS Blohm + Voss Nordseewerke	360
TNT Global Express S.p.A.	162
Tongji University	413, 431
Totalförsvarets forskningsinstitut	115
Toyota Motor Europe	231
Traffic and Transportation Consultants (TTE)	159
Trafikkontoret Goteborg -Traffic & Public Transport Authority	159
Trakteplan S.L.	253
Trambus S.p.A.	177
Tramwaje Warszawskie Sp. z o.o.	395
Transman	193
Transport & Mobility Leuven NV	384
Transport & Travel Research Ltd	187
Transport and Telecommunication Institute	409
Transport for London	202
Transportation Research Institute - Hasselt Univeristy	187
Transportes Colectivos do Barreiro	196
Transportokonomisk Institut	302

TREDIT - Transeuropean Consultants for Transport, Development and Information Technology S.A	141
Trenitalia S.p.A.	127, 345, 376
TRENMO, Engenharia Lda	413
Trivector Traffic AB	174
TRL LIMITED	102, 215, 231, 243, 252 , 259, 285, 342, 352
True Heading AB	357
TRUMPF LASER GMBH + CO KG	360
TRW Automotive GmbH	231
TRW LIMITED	332
TSB Innovationsagentur Berlin GmbH	413 , 419
TSB/FAV	434
TSTG Schienen Technik GmbH & Co. KG	395
T-Systems P.R. China Ltd.	211
Türkiye Bilimsel ve Teknolojik Arastırma Kurumu	440
Tüv Rheinland Consulting GMBH	190
TÜV Rheinland TNO Automotive International BV	259
TWI Ltd	289, 367, 370 , 402
UCPH	434
UIC	434
Umicore N.V.	63
Umoe Mandal AS	367
Union Africaine des Transports Publics - UATP	205
Union des industries ferroviaires européennes - UNIFE	35 , 190, 281, 376
Union des transports publics et ferroviaires	177
Union Internationale des Chemins de Fer	35, 79, 123, 127, 137, 281 , 376 , 419
Union internationale des transports publics - UITP	190, 205 , 376, 428
Union Technique de l'Automobile, du Motorcycle et du Cycle	259
Uniresearch BV	231, 243, 342, 393

Uniunea Romana de Transport Public Asociatii	440
Universidad de Buenos Aires (UBA)	373
Universidad Nacional de Ingenieria - Plataforma Tecnológica Transporte Logistica y Movilidad	208
Universidad Politécnica de Madrid	53, 177, 281, 323, 342, 396, 399
Universidad Politécnica de Valencia	35, 96
Università degli Studi di Firenze	387
Università degli Studi di Genova	96, 109, 196
Università degli Studi di Modena e Reggio Emilia	215, 234, 318, 322
Università degli Studi di Padova	72, 215
Università degli Studi di Roma 'La Sapienza'	127, 137, 156, 177
Università degli Studi di Roma 'La Sapienza' - Dipartimento di Idraulica, Trasporti e Strade	127, 177
Università degli Studi di Roma Tor Vergata	141
Università degli Studi di Salerno	174
Università degli Studi di Torino	256
Università degli Studi di Trieste	360
Università degli Studi Roma Tre	177
Università di Pisa	181, 196
Universitas	149
UNIVERSITAS, Cooperativa de Ensino Superior e Investigação Científica	285
Universitat de les Illes Balears	299
Universitat de València	302
Universitat Politècnica de Catalunya	109
Universität Rostock	35
Universität Stuttgart	82, 149, 234, 323
Universität Wien	215
Universität zu Köln	231

Universitatea 'Politehnica' din Timisoara	50
Université Claude Bernard Lyon 1	277
Université de Liège	360
Université de Nantes	360
Université de Strasbourg	219, 238
Université de Technologie de Belfort-Montbéliard	234
Université de Technologie de Compiègne	190
Université de Technologie de Troyes	390
Université de Valenciennes et du Hainaut-Cambrésis	123, 190, 296, 339
Université El Hadj Lakhdar Batna	253
Université Libre de Bruxelles	246
Université Mohammed V-Agdal - Ecole Mohammadia d'Ingenieurs	253
University College Dublin	102, 452
University College London	184, 196, 263, 315
University Duisburg-Essen	256
University of Algarve	26
University of Basel - Department of Psychiatry, Center of Applied Technologies in Neurosciences	323
University of Birmingham	79, 123, 123, 289, 312
University of Bradford	69
University of Bradford - UNIBRAD	99
University of Bristol	57
University of Cambridge	159
University of East Anglia	349
University of Exeter	57
University of Florence	152
University of Greenwich	263, 305
University of Karlsruhe	66
University of Kragujevac	446
University of Kuopio	66

University of Leeds	23, 208, 296
University of Limerick	57
University of Liverpool	222
University of Ljubljana	23
University of Newcastle	127, 193, 323 , 326 , 376, 402
University of Newcastle Upon Tyne	35, 92, 177, 323 , 326 , 376, 402
University of Nottingham	234
University of Patras	44, 222, 277
University of Rostock	399, 405
University of Rousse	409
University of Sheffield	86
University of Siegen	66
University of Southampton	38, 193, 281, 360, 387
University of Strathclyde	44, 109, 263 , 266, 270, 336, 360, 402
University of Surrey	250
University of Thessaly	215
University of West Bohemia	339
University of Western Macedonia	89
University of York	281
Univerza v Mariboru, Fakulteta za gradbeništvo	409
UPCE	434
Uppsala universitet	63
Urals State University of Railway Transport	413
Uriarte Safybox SA	57
VA TECH HYDRO GMBH	378
VALEO SA	428
VALEO systèmes thermiques SAS	60
Valeo Thermal Systems	47

Vallen Systeme GmbH	240
Valtion Teknillinen Tutimuskus	215, 234, 285, 345, 360, 370, 384 , 390
Vamp Ltd	92
Vansco Electronics Oy	66
Västtrafik AB	177
VENTREX Automotive GmbH	82
Veolia Environnement Recherche et Innovation Snc	177, 181
VEOLIA EUROLINES Group	315
Verband Deutscher Verkehrsunternehmen e.V. (VDV)	177
Verein für Fahrzeugsicherheit Berlin e.V.	238
Verkehrsbetriebe Karlsruhe GmbH	199
Verkehrsgesellschaft Bremerhaven AG	177
via donau - Österreichische Wasserstraßen-Gesellschaft mbH	357
Vienna Model Basin Ltd	270
Vienna University of Technology / Technische Universität Wien	199
Viešoji staiga 'Socialinis ir ekonominis plėtros centras'	440
VIL - Vlaams Instituut voor de Logistiek VZW	141
Vilnius Gediminas Technical University	409
Visteon Systèmes Intérieurs	293
Vlaams Gewest	452
Vlaamse Vervoersmaatschappij De Lijn	312
Voith Turbo GmbH & Co. KG	35, 47
Voith Turbo Lokomotivtechnik GmbH & Co. KG	47
Volkswagen AG	38, 96, 259, 381, 387, 428
Volkswagen India Pvt. Ltd	308
Volvo Car Corporation	112, 219, 259
Volvo Personvagnar AB	106
Volvo Powertrain Cooperation	63

Volvo Technology AB	23, 50, 57, 162, 177, 181 , 387 , 428
Volvo Technology Corporation	106, 165, 390
Volvo Technology Corporation AB	165
von Karman Institute for Fluid Dynamics	47
Vossloh España SA	35
VTG Rail UK Ltd	312
VTI - Statens väg- och transportforskningsinstitut	165
VTT - Altion Teknillinen Tutkimuskeskus	141
Vulkan-DMR S.r.l.	360
Vultron Trade American-Hungarian Developing and Trading Co. Ltd	177
Vyskumny ustav dopravy, a.s.	409
Walvisstaart	115
WARTSILA FINLAND OY	360
Wärtsilä Finland OY	66
Wärtsilä Propulsion Netherland BV	66
Wärtsilä Schweiz AG	66
Wecon GmbH Nutzfahrzeuge-Container-Technik	145
Wesob Spolka z Ograniczona Odpowiedzialnoscia	145
Western European Graduate Education in Marine Technology	405, 417
Westinghouse Brake and Signal Holdings Ltd	281
Wiener Linien GmbH & Co. KG	79
Wikki Ltd	349
Wilhelmsen Marine Consultants	115
Wincanton GmbH	145
Witt IndustrieElektronik GmbH	413
Wy sza Szkoła Logistyki	409
Xerox Manufacturing Nederland B.V.	134
Yantian International Container Terminals Limited	134

YLec Consultants	72
Zavod za gradbenistvo	352, 449, 452
Zenergy Power GmbH	92
Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg	63
Zilinská Univerzita v Ziline	145, 440
ZTS Vyskumno-Vyvojovy Ustav Kosice AS	196

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Sustainable Surface Transport Research in the Seventh Framework Programme

The aim of this publication is to provide information on more than 100 projects which were selected in the first two FP7 Calls in the field of Sustainable Surface Transport.

The background, objectives, description of work and expected results of each project are described. The contact details of the project coordinators and the partnerships are also given. Comprehensive index lists by technical discipline, acronym, partner and instrument are also provided to facilitate your search.



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