



# Skyline

n°9

Bringing Sustainable Air Transport Closer

**FEBRUARY 2013**

**A NEW BOOST,  
A NEW MOMENTUM**

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# BACK TO THE FUTURE



Clean Sky launch – May 2008



JTIs at the European Parliament - 2011



Manuela Soares

András Siegler

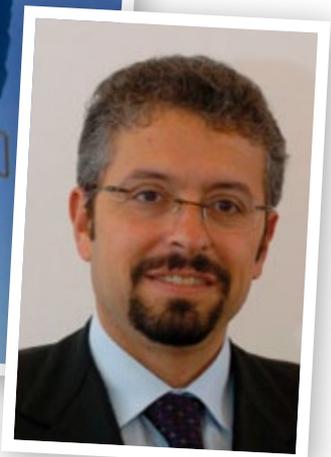


Charles Champion



Large 3 shaft engine

© Rolls-Royce



Alessandro Franzoni



Clean Sky 2 is now walking on two legs: technical content and legal framework. The JU has provided the Commission with the industry's input for the Impact Assessment; this input includes, in particular, the definition of the objectives of the main demonstrators and technology streams foreseen - besides a continued focus on environment, they also prioritize competitiveness and mobility. In parallel, a first, technical, open consultation of potential "Core Partners", who are intended to play the same roles as the current Associates, gathered 200 participants during a three day discussion last December.

The Horizon 2020 budget is not decided yet. However should the balance between budget lines be revisited, let's recall here and now the vital role aeronautics plays in Europe's industrial, global position, and how much these so-called "level 3" projects are 'the' instrument to guarantee that the funding spent results in actual developments and actual products. Clean Sky 2 will continue maturing technologies from different starting points, different "readiness levels", with a common philosophy to eventually bring all of them to the highest step, if relevant: it is the only initiative to achieve this goal; value for money is, therefore, unrivalled.

Now comes the time to also step back and reflect on the "raison d'être" and fundamentals of such a Joint Technology Initiative – such a PPP. The success of the current set-up justifies building on the existing principles. This is also the recognition that Clean Sky is not just another funding source but a perennial body, able to manage two programmes in parallel (with an overlap period between Clean Sky and Clean Sky 2) and possibly more, should it be entrusted to do so in the future.

It is essential that, while being consistent with Horizon 2020 rules, the JU keeps the ability to adapt to its specific environment and targets, and to be granted a few derogations when duly justified. The PPP notion means balanced funding by the private and the public partners, an open-minded set of rules and the continuation of the autonomy – a situation which sometimes looks more demanding than being just a kind of outgrowth of the Commission, but which is the condition to quick, efficient, and flexible action.

The direct link the JU has with the Council and the Parliament is both an enabling factor and the logical consequence of true autonomy. And I would like to thank the ITRE committee for its support so far and reaffirmed in particular through the interview

with Amalia Sartori, chair of the ITRE committee in the Parliament, gave to Skyline. Indeed, when European competitiveness is at stake; when European re-industrialisation is a shared political objective; when more attention is given back to "hard science" and hard technologies; when networking SMEs, academia and industrial leaders across Europe is a must for innovation, the JTI concept appears as an invaluable cornerstone.

However, we must do more and better to promote our achievements. For instance, the efficiency of the Clean Sky scheme with respect to SMEs, despite the information provided through various communications channels, is still not widely known. In the coming weeks, we will further market our first results and successes and ensure that the knowledge we now have about SMEs and their environment is maximised; for instance we will actively involve our Partners in a broad discussion to improve the effectiveness of Clusters as future Core Partners – we will pursue and enlarge the dialogue initiated during our last General Forum in November where some Partners have already shown enthusiasm to be further engaged in Clean Sky strategy, well beyond their direct participation in Projects.

The chairmanship of Charles Champion (and vice-chairman Catalin Nae) came to a conclusion at the end of 2012. The Governing Board warmly thanked both of them for their contribution. It elected a new Chairman and a new Vice-Chairman for 2013 - respectively Alessandro Franzoni, Co-COO at Alenia Aermacchi, and Ric Parker, Director of Research and Technology at Rolls-Royce. They tell Skyline the reasons for the involvement of their companies as major integrators, and outline their expectations for Clean Sky 2. And I also welcome Manuela Soares, the new Director of Transport in DG RTD, replacing András Siegler with whom we have worked so closely since the beginning of this Clean Sky journey. Manuela was in charge of Environment in the same DG: a very happy omen for our cleaner skies.

**Eric Dautriat,**  
Executive Director of  
the Clean Sky Joint Undertaking

# THE FUTURE OF CLEAN SKY

## TOWARDS CLEAN SKY 2



**Ron van Manen,**  
*Clean Sky Technology Evaluation Officer, and  
project co-ordinator for Clean Sky 2 preparation*



*Since reporting in October, steady progress has been made in the preparation of the proposed Clean Sky 2 Programme to be vested within Horizon 2020. But the pace is expected to pick up sharply in the first half of 2013, where numerous milestones lie ahead. Industry's formal proposal to the European Commission will take shape, and the Commission's Impact Assessment will mark a key decision point for the EU's next steps towards securing the Programme's creation and timely launch (earmarked for 2014). Ron van Manen explains.*

As the final weeks of 2012 arrived, EU negotiations were in full swing on the next Multi-year Financial Framework (the overall EU budget for 2014 – 2020). Horizon 2020, the new Framework Programme for Research and Innovation to be executed within this 7-year budget, was similarly 'in play', as the Commission's package proposals (among which the Rules for Participation) made its way through the legislative process between the Commission, the Council of the EU and the European Parliament. Despite the uncertainties related to a definitive budget for the whole period 2014-2020, and rules governing the proposed programme, the Clean Sky 2 'Taskforce' was pressing ahead with the further preparation necessary to support the Commission in the next legislative steps.

On December 10<sup>th</sup> - 12<sup>th</sup>, consultation meetings were held with a broad cross-section industry, research organisations and academia. Participants were able to hear directly from Eric Dautriat plus candidate leaders of progress made since the ILA Event in September. More importantly, the meetings allowed participants from across the EU and FP7 Associated States to inject ideas for technical content and ensure the next stages of the industrial proposal carry broad support from the sector. 193 participants from 15 Member States and Associated States joined the "Letter of Intent" (LoI) Signatory Entities and the JU Team in Brussels for three days of intense meetings, where over 309 individual face-to-face sessions were held between the candidate Leaders of the Clean Sky 2 demonstrator projects and the session participants. As a result, records of attendance and areas of interest expressed by the participants have now

been compiled by the JU Team. In the next stage of programme development, the qualification, selection criteria and grants award processes for participation as future Core Partners (Members) will be disseminated alongside the next updates with respect to content. This is now likely to be in the second quarter of 2013.

Meanwhile, the scope and content of all key demonstrator activities are being thrashed out by the Taskforce with consideration given to all input received in December. This will culminate in an updated Programme Outline, and once the available budget is known more precisely, in a formal proposal from the LoI Signatories to the Commission.

A key next phase in the overall preparation starts mid-February, when the Commission reviews the Proposed Clean Sky 2 Programme before its Impact Assessment Board. The Commission's eventual proposal to extend and continue the Clean Sky JTI within Horizon 2020 has to go through a formal impact assessment as required by the EU legislative process. Assuming a positive judgment is received and findings and recommendations are duly addressed, the Commission's legislative proposal formally proposing the extension and continuation of the JTI could then proceed to the consultative legislative process thereafter - in the course of the second half of the year.

Meanwhile, the Commission's draft proposals for the basic legal framework for JTIs under Horizon 2020 are being prepared, key elements being the basic Regulation, the related Statutes, the Financial Rules applicable to PPPs, and specific Rules for Participation to Calls. The Joint Undertaking, in cooperation with its industrial Leaders, is closely following this process and is providing inputs on Clean Sky operating needs. This will help establish specific Clean Sky 2 basic Regulation and Rules for Participation governing the programme, the financial rules, the membership and the participation. Based principally on the Horizon 2020 legal framework, the Clean Sky 2 legal and regulatory aspects will need close and constant scrutiny by the industry, the JU and the Commission experts to ensure the right balance is struck: so continuity from Clean Sky into the Clean Sky 2 Programme is maintained, and consistency and simplification are ensured in conforming with the general Horizon 2020 Rules.

All in all, 2013 promises to be a busy year; where we should see the Clean Sky 2 Programme take shape and pass the hurdles on its way to being launched in 2014.

# WIND TUNNEL TESTS

## OPEN ROTOR

### A STEP TOWARDS FULL SCALE GROUND DEMONSTRATOR

**Marc Doussinault**, Propellers Module Manager - **Snecma**

Snecma prepared the on-going full aircraft wind tunnel test campaign with an "isolated" test campaign in May 2012. During this campaign, blades designed by Snecma were installed on a Z08 isolated engine, without pylon or any other installation system. These tests were important to assess the behaviour of the propellers in "pure" conditions. But for Open Rotors, these performances are largely affected by the aircraft installation: pylon, asymmetry of directivity, wing wake...

A full aircraft test matrix has been built to answer all these installation effects. It is always difficult to build such a test matrix: so many parameters have to be studied that engineers need the specific test slot to be allocated several times so they can test every configuration they need; of course this has an impact on the budget. Our job is to find the best compromise and focus on the high level objectives! The aircraft and engines mock-up design are very smart, minimizing the time needed for configuration changes, allowing quick start and stop procedures. Snecma, Airbus and DNW teams work together in a very efficient way. Even if one can hear French, Dutch, German, English and even Spanish in the control room, the test program runs well. Flexibility (we often need last minute changes in the test matrix to take into



account the analysis of the first results), efficiency (test productivity is very high, and we always find solutions to technical problems) and professionalism (from riggers to data acquisition specialists, we all know what we have to do) are the key words of this test campaign.

One of the main outcomes of this test will be to anticipate as accurately as possible integration effects in the Snecma blade design strategy. This work will feed the next major step for Snecma: the full scale Open Rotor engine demonstrator scheduled in little more than 2 years.

### OPTIMISING OPEN ROTOR ACOUSTICS

**Uwe Fuss**, Chief Integration Engineer Open Rotor Technologies - **Rolls-Royce**



Rolls-Royce first performed extensive tests of a contra-rotating open rotor (CROR) in the 1980s when they commissioned a new purpose-built rig (rig 140) which was tested at the ARA wind-tunnel in Bedford (UK).

Following the resurgence of interest in open rotors as part of the DREAM programme the rig was rebuilt as Rig 145 and tested with Rolls-Royce's partners. The tests involved farfield noise at DNW (Netherlands) in 2008 and performance and nearfield noise at ARA in 2010. A number of different configurations and operating conditions were investigated providing valuable information on performance and noise characteristics. Rolls-Royce then produced its own "2<sup>nd</sup> generation"

of optimised CROR blades which were tested in a number of isolated configurations at DNW in 2010. The test was successful in demonstrating the significant noise reductions of these "2<sup>nd</sup> generation" blades.

In 2011, as part of the European Union's Clean Sky programme, Rolls-Royce tested their new blades for high-speed performance and nearfield noise at ARA using Rig145. There were "uninstalled" and "installed" phases led by Rolls-Royce and Airbus, respectively. The test generated performance and nearfield noise data for analysis and for comparison against Rolls-Royce's and Airbus's methods (including installation effects). To acquire the detailed nearfield noise data, new bespoke microphone arrays were constructed. This array data is being used partly to validate predictions of absolute nearfield noise levels and also to validate tools specifically developed to "acoustically transpose" results from one location to another. Significant test data has been generated and evaluation of it is ongoing.

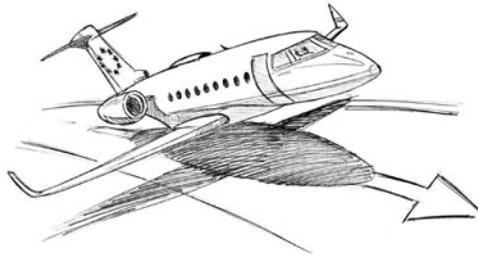
# NEW NAMES AT THE TOP

## ALESSANDRO FRANZONI

*Chairman of the Clean Sky Governing Board  
Co-COO at Alenia Aermacchi*



When, at the beginning of the 2000's, the idea was born to develop a research technology initiative committing major European players in the field of eco-friendly air transportation, few could have imagined just how important this subject would become just a few years later. Today, however, irrefutable indicators and figures that are considered, by nature, objective show a different reality. Soon there will be more than 20,000 aircraft carrying millions of passengers everyday in the world and the market shows a constant growth rate of approximately 4%. The market itself is no longer just looking for comfortable aircraft landing on time, it also demands sustainable aircraft in every aspect including environment, design, in-service support, maintenance and zero-waste to landfill.



The Clean Sky initiative came at the right time, anticipating this change and in some cases already influencing the technical choices to be introduced in future products. Today we are about halfway through the journey and we are entering the stage of completion of the first demonstrators that will enable us to verify and validate the technological developments undertaken. 2013 is therefore a year that requires a dedicated attention to meet our goals.

My election as the Chairman of the Clean Sky Governing Board comes at this very particular moment and it is with great pleasure that I join the team again after having contributed to the launch of the programme. We are now facing a crucial period and I will put all my efforts into actively supporting the Governing Board and the JU and ensuring that there is no impediment to the full achievement of our objectives. We must in particular focus on absolute respect of the program schedule and on the rigorous analysis of results, made possible through implementation of the innovative methodologies introduced with the TE. Another incentive that must guide our action is the opportunity to develop large-scale demonstrators in the future

program H2020 through the initiative that we hence call Clean Sky 2. This initiative is the natural evolution of the current Clean Sky Programme. It expands the technological development goals to contribute to the emissions reduction and is already challenging us to also meet those of the return of competitiveness and employment.

The role of the JU is in this sense fundamental – it played a vital role to ensure the success of this innovative mode of governance; it is only thanks to the effective use of the management tools provided by this body that results are achieved in such a short time. This is the only way for the European aeronautics sector to maintain a competitive position in the market. I would also like to make a point and send a strong message to my colleagues of the Governing Board to further stimulate and develop communications in 2013. We must open the Programme as much as possible to get new partners and achieve effective results. We can and must do better in the area and further promote and share this unique initiative and its tangible results with the European research systems.

Enhanced communication will allow stakeholders to have greater knowledge of the return on investments and contribute to widening the research partner base. We must not forget that the JTI's experience represents a radical change in the way we set up, conduct and fund research projects in Europe, aligning strategies, objectives, policies and results, and Clean Sky as the European research Flagship is one of the most performing JTIs.

I would like to conclude my first communication as Chairman by recalling the objectives I want to pursue with the board: respecting the schedule, ensuring accurate validation of results, and enhancing their promotion. Developing environmentally friendly aeronautical products is no longer a slogan but a duty to future generations.

## CLEAN SKY JOINT UNDERTAKING – STAFF

*To reach any staff member of Clean Sky via email: [firstname.lastname@cleansky.eu](mailto:firstname.lastname@cleansky.eu)*

*We welcome*

**Maria-Fernanda FAU:** Maria-Fernanda is our new Communication Officer. She worked at Business Europe and EuroCommerce.

**Bruno MASTANTUONO:** Bruno is the Legal Officer of Clean Sky. He used to work in REA after his job in the European Parliament.

**François SEYNAEVE:** François is our Ex-post Audit Officer. He previously had been working as an independent consultant, notably in the industrial and European spheres.

## RIC PARKER

*Vice-Chairman of the Clean Sky Governing Board,  
Director of Research & Technology, Rolls-Royce*



### *As a key initiator of the JTIs and a Co-Leader within Clean Sky, how has in your view the JTI worked to date?*

I supported the JTI concept from the early beginnings of FP7. I had the pleasure of chairing Clean Sky's formal launch. But from then it took over 2 years for the JU to truly get up and running, so it's fair to say it was a "slow and painful birth". Now – as Clean Sky passes its mid-point it is motoring along and running effectively. We are past the half-way mark in terms of the ACARE vision for 2020, and Clean Sky is making a real impact on the reaching the ACARE goals, and delivering to its promises. Another real success is the SME engagement. It is not only stronger than foreseen: it easily stands up to competition from any other instrument in FP7. Clean Sky's scheme, enabling single entities to participate via Calls for Proposals, makes a big difference and clearly works well; we must build on this successful approach.

### *What do we need to learn from it for the future, e.g. Clean Sky 2?*

My main concern is not what to change, but to retain what works for Clean Sky 2. We have learnt a lot in Clean Sky and, as I said, it now works well. In Horizon 2020 and towards Clean Sky 2 I sometimes feel the Commission want to change too many things: the amount and percentage of funding to the major partners, the freedom to provide single participant grants and the rates at which partners are reimbursed, etc. All of these could endanger Clean Sky 2. If major issues like reimbursement rates cannot be sorted, there is a real risk that major industrial players will not sign up to Clean Sky 2 at all.

### *Can you tell us about the complementarity between national and European research programmes?*

**Andrea TOTH:** Andrea is Clean Sky's Accounting Officer. She previously worked in several EU agencies (Eurojust, EIT, Cepol).

**Paolo TRINCHIERI:** Paolo joined the JU team as Project Officer for Eco-Design. He has a strong industrial background as he has been working in Avio.

### *How the SAGE fits within the Rolls-Royce technology roadmap/planning?*

Rolls-Royce works with all stakeholders to ensure integration of UK and German National Programmes (and Spanish programmes through our ITP joint venture), and FP7 programmes, including Clean Sky. Duplication is in no one's interest; industry co-funds these efforts!

The Rolls-Royce focus in SAGE is threefold. The first area concerns the development of advanced, low-weight low pressure systems. Introducing composites in large fans can save weight and reduce fuel burn and CO<sub>2</sub>. A second thread is the Low NOx 'Lean Burn' demonstrator. Cleaner combustion is an essential part of the ACARE targets which are seeking 80% reduction by 2020 and 90% reduction by 2050. Finally, we have made very significant progress on Open Rotor, as have our colleagues in Snecma. In so doing the massive fuel-saving potential has been validated: 10-15% when compared to the best state-of-the-art advanced turbofan architectures, and noise predictions have been confirmed.

### *Rolls-Royce is often seen as a 'benchmark' in research partnerships and global links. How important are the European links?*

The European links in our global network are essential. Our network of University Technology Centres spans Europe with centres in the UK, Germany, Sweden, Norway and Italy, and with Spanish Universities through ITP. We work closely with German National Aerospace Research Centre, DLR. EU funding through the Framework Programmes is vital to this network. It is the cement that holds it all together. European industry must stay competitive against US competitors, but also recognise new entrants in China, Russia and elsewhere. There is also competition for technology investment. Countries like Singapore offer very attractive schemes for companies willing to develop technology locally. Europe has to build on the huge success of Framework 7 and stay on top in Horizon 2020.

### *We say goodbye to*

**Michel GOULAIN:** Michel had been appointed as Project Officer by the JU in March 2010 for the SAGE ITD. He was involved at the beginning in JTI Clean Sky to define the program and the demonstrator. We wish him good luck in his next job at Airbus!

As of March 2013 he will be replaced by **Vittorio SELMIN** as Project Officer for SAGE. Vittorio was formerly in charge of the Eco-Design ITD.

# INTERVIEW

## AMALIA SARTORI

Chair of the Industry, Research and Energy committee (ITRE)  
of the European Parliament



A year ago Amalia Sartori, member of the European People's Party group at the European Parliament, was elected chair of the Industry, Research and Energy (ITRE) committee. She talks with Clean Sky about the future of research policy and particularly about Horizon 2020.

### **Clean Sky: Is budget the main battle in MEP's response to Horizon 2020?**

Amalia Sartori: Budget is quite a challenge of course. A more effective use of the funds allocated to research is obviously essential but it is not enough. Horizon 2020 contains three priorities in line with the 'Europe 2020' growth strategy, namely "Excellence of the science base", "Leadership in enabling and industrial technologies" and "Societal challenges". Innovative research is essential for Europe competitiveness and only a significant budget increase (compared to FP7) will give Europe a chance to give a real change.

### **Current discussions indicate there could be a budget cut that would affect the transport sector, including Clean Sky: what is your view on this?**

Europe has to maintain and develop its industry. And it is true that the aeronautical industry is one of the most prominent European sectors and it is considered an area of excellence: most of the large European companies are global leaders. We need to preserve this leadership particularly now that European industry needs to "come back".

### **The competitive position of the EU aeronautical industry is challenged by newcomers in the world market, threatening European jobs in what will actually be a growing sector globally. Which steps should Europe take to answer this challenge?**

Indeed, a strong industry is the only way to create jobs, and jobs mean growth. In aviation in particular, technological innovation is the keyword. One of the major problems Europe is facing is the fact that the private sector has to increase its engagement in research. Public-private partnerships represent an important mean for delivering long-term research investments. In that sense PPPs such as Clean Sky, the flagship of European aeronautical research and innovation, are definitely one of the best models to follow and they have my full support for their smooth continuation under Horizon 2020.

### **We are now delivering our first scale demonstrators while actively contributing to CO<sub>2</sub> emissions reduction. What would be your recommendations to bring industrial and environmental objectives closer?**

Any industrial leadership working towards 'green transport' is part of the response in tackling climate change and answering societal challenges. Clean Sky JTI is proving to be an effective vehicle to mature and demonstrate promising green technologies. As you know, the ITRE committee works also on the energy dossier: reducing our energy dependency is a major issue and here again any initiative pursuing this objective should be further developed. All sectors and all actors need to be engaged in these challenges - SMEs in particular.

### **Since its beginning in 2008, Clean Sky has been developing global partnerships – our programme now involves more than 500 participants with a very high participation and funding in favour of SMEs...**

This notion of 'reinforced partnership' is essential when designing and implementing research policy; Horizon 2020 has a dual objective that is to make Europe grow and reward the capacity of innovation. Quite often SMEs are at the basis of this innovation. I therefore support every programme and initiative that encourages the participation of SMEs as well as their access to finance. The high participation rate of SMEs in Clean Sky is a very positive achievement for the Joint Undertaking.

### **Indeed Clean Sky is an 'easily accessible programme' to SMEs in particular. More than 38% of beneficiaries in Clean Sky calls for proposals are SMEs and 50% of beneficiaries are newcomers...). To what extent will SMEs be given priority in the future?**

These statistics are very positive and prove that Clean Sky is playing an important role in boosting the participation of SMEs, their competitiveness and access to the market. Encouraging the participation of SMEs in research programmes is part of the EU strategy for growth, and help boosting the competitiveness of European SMEs. It is important that the experience developed under FP7 serves under Horizon 2020 and it is our role to preserve this opportunity by easing the participation of SMEs. I am confident that we will do our best to reach a final agreement that takes adequately into consideration the operational needs and specificities of JTIs, that are proving to meet key strategic objectives and need the full support of all institutional sectors in the interest of European industry, as it is the case with Clean Sky.

# GENERAL FORUM 2012

## CLEAN SKY'S MEMBERS AND PARTNERS VOICE THEIR RECOMMENDATIONS

In case you missed it, here is an insight into the 2012 General Forum.

The morning session was dedicated to the Clean Sky annual assessment. "Half of the planned activities have been completed, and half of the budget has been consumed" Eric Dautriat, the Executive Director of the JU said. He also explained that in addition to managing the Clean Sky Programme, the JU team had also actively started the preparation of Clean Sky 2.

As for the state of play of ITDs activities, Clean Sky is now entering an active demonstration phase with the first tests of demonstrators completed this year. Clean Sky is also on track as regards environmental targets, with a planned 30% improvement in fuel efficiency that contributes to ACARE 2020 goals<sup>1</sup>.

Three major topics were discussed in the afternoon - Communication and dissemination of results, Networking within Clean Sky, Innovation in calls.

**Communication and dissemination of results:** There is a need to try and address the general public. How? Notably by referring to Clean Sky in product information and dissemination, and by using the Clean Sky logo on material – especially during tests. All contributions (success stories, visuals, facts and figures...) from members are very welcomed. In other words: "the more information you give, the better coverage you get". Although finding the balance between protecting sensitive information and communicating on achievements can be challenging, it is essential to do more both internally and externally to promote Clean Sky activities.

Regarding **Networking within Clean Sky**, getting early information on Topics is essential for Partners. Participants recommended a yearly one-day session outlining the annual programme and to use National Contact Points<sup>2</sup>, regional clusters etc. to find partners<sup>3</sup>. When looking for partners, it is easier to contact first companies

one has already worked with. This is why building the right network – according to the Calls one plans to answer - is essential. RTD partners can also be included in consortia when necessary.

As to ensure the right level of **Innovation in Calls**, the process could be improved by opening the participation of non-aerospace members and promoting the involvement of research establishment and universities, and by ensuring a fair use of IPR between members and Topic managers. It is also important that objectives and purpose of topics are detailed enough, so that participants understand the background of the Call and come with innovative solutions. Clusters have also been invited to share their experience and lessons learnt about the way of working in Clean Sky to efficiently prepare their involvement in Clean Sky 2.

The outcome of those fruitful workshops was then shared in a plenary session, concluded by Charles Champion, the Executive Vice-President of Airbus and chairman of Clean Sky Governing Board in 2012.

Once again we thank all participants and hope to see you all next November!

<sup>1</sup> The Advisory Council for Aviation Research and Innovation in Europe sets a 50% reduction of CO<sub>2</sub> and perceived noise and a 80% reduction of NOx by 2020.

<sup>2</sup> This list is available on Clean Sky website

<sup>3</sup> To register your company's capabilities and access Clean Sky's partners database, please send an email to [info@cleansky.eu](mailto:info@cleansky.eu)



# SUCCESS STORY

## ACADEMIC KNOWLEDGE AND SMEs

*Academia and RTOs transfer their knowledge to industries and SMEs thanks to EU funding*

### GMV – DELFT UNIVERSITY OF TECHNOLOGY

WEMACS and AeroDesign projects (GRA ITD) were awarded to a GMV-led consortium also involving Spin.Works (Portugal), Delft University of Technology (Netherlands) and KE-Works (Netherlands).

WEMACS – Detailed Weights and Manufacturing Costs – aims to design and develop software that provides estimates of aircraft weight and manufacturing costs on the basis of their configuration parameters. This software includes weight estimation methods that give an accurate estimation of the component weight, while the computational cost is relatively small. In addition, the implemented methods are sensitive to all the relevant design parameters. The project includes six-months of engineering support (i.e., feedback to technical questions and small scale modification to the software) with the objective to create a linkage to other projects (financed by Clean Sky) related to aircraft design, and increase the potential use of the WEMACS tool. This tool will be used for further research activities in the fields of aircraft preliminary design and estimation models for weight and cost.



**Roelof Vos**, Faculty of Aerospace, Delft University of Technology,  
**Rui Venâncio**, GMV

AeroDesign – Preliminary Design Techniques – sets out to create an integrated set of design and analysis methods to support initial aircraft design for a given set of top-level requirements (range, number of passengers, field performance). The analysis methods includes

analysis tools for weight, aerodynamics, stability, performance, and noise. Furthermore, this tool inhibits an automatic optimization routine to satisfy all requirements while optimizing for a (set of) performance metric(s). In addition, it provides the designer with a three-dimensional representation of the aircraft that can be directly loaded into a Computer-Aided Design (CAD) environment for further design refinements. This tool is currently under development - the project ends in August of 2013.

Delft University and Spin.Works are primarily responsible for the technical content of the design, analysis, and optimization modules, while KE-Works supports the development of stand-alone software applications based on these modules. GMV, as prime contractor, coordinates both projects. On a technical level it is also responsible for software integration.

### HIT09 – UNIVERSITY OF PADOVA

A success story on how academia and business can work hand in hand has been developed within Clean Sky. It all stems from an idea of Professor Ernesto Benini from the University of Padova (UNIPD), who decided to bring innovation into a concrete enterprise by co-founding HIT09 Srl, a high-tech SME spin-off from the above University which is very active in the aerospace field.

Established in 2010 in Italy, HIT09 now employs around 20 people, 15 of whom are highly qualified PhD research engineers under the technical supervision of Rita Ponza, a senior research engineer with long-term experience in rotorcraft technology. They come from both academia and industry, coupling cutting edge research capabilities with industrial flexibility and commitment to market. The HIT09 approach is based on the observation that universities encourage minds with a strong attitude for innovation; and that the intellectual growth and valorisation of such a unique capability must be the primary commitment of any high-tech company willing to compete in the market at international level.

**Rita Ponza**, HIT09 Srl  
**Ernesto Benini**, Industrial Engineering Department, University of Padova

The University of Padova and HIT09 now work together as a consortium in many research programs, including Clean Sky, in particular within the Green Rotorcraft ITD.

Among others, two programs are worth mentioning: “TILT0p” and “CODE-Tilt”, both devoted to the aerodynamic shape optimization of several components of the “ERICA” (Enhanced Rotorcraft Innovative Achievement) aircraft, a 10-ton, 20-passenger civil tiltrotor which is believed to be an effective counterpart to the American V22 “Osprey” by Bell and Boeing. The TILT0p project closed on December 2011 while CODE-Tilt is still under development and will end by September 2013.

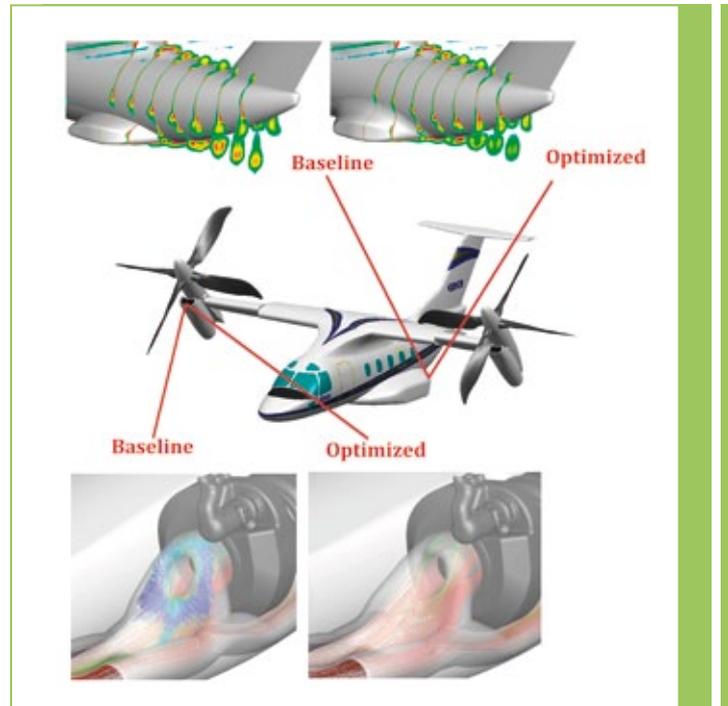
TILT0p dealt with the multi-objective constrained aerodynamic design optimization of the airframe-engine integration into the ERICA tiltrotor nacelle. In this project, innovative design methodologies were developed and applied in an industrial environment to significantly improve the aerodynamic performance of both the intake and the exhaust systems, in terms of inlet total

pressure loss, inlet distortion, exhaust back pressure and efficiency of the inertial particle engine by-pass separator. The results, which will be validated experimentally within the next year, are very promising as the expected enhancement in the intake/exhaust duct efficiency is almost +50% overall in the cruise conditions with respect to the baseline solution.

On the other hand, CODE-Tilt is aimed at the multi-objective aerodynamic design optimization of the ERICA tiltrotor fuselage for drag minimization, where the major fuselage components, namely the nose, landing gear sponsons, wing-fuselage junction and empennages are being considered. Although the project is not yet closed, the results achieved so far are encouraging, as the predicted drag reduction has now reached almost 7%. Further reduction in the aircraft drag is likely to be found at the end of the project.

“As an SME and as a spin-off from University, the UNIPD-HIT09 consortium has a unique point of view on innovation: our goal is to transfer technology from University to industry and to customize innovative solutions that otherwise would remain bounded into an academic environment”, says Prof. Benini: “in this liaison, the role of the University is vital as it naturally brings a proactive attitude towards problem solving, high motivation and mind-set towards intellectual competition”.

The technical manager of HIT09, Rita Ponza, adds by stating: “Usually SMEs find it hard to access European funding (e.g. in the conventional Collaborative Research Programs) as they suffer from reduced visibility: this is especially true for aeronautic industry, where the big industrial players are often quite reluctant to collaborate with smaller partners.



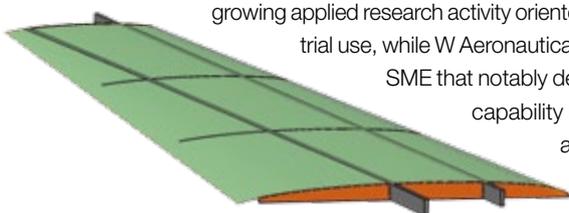
Therefore, Clean Sky offers a unique opportunity for getting funds and demonstrating the industrial applicability of design tools developed in universities and/or SMEs. For an SME as we are, participating in a Clean Sky Call for Proposals is a great opportunity for consolidating relationships with major industrial partners, sharing objectives and solutions and definitely becoming part of the aeronautics community”.

## ASCAMM-W AERONAUTICA

The INARAS project aims to automate the painting of riblets for drag reduction, thus reducing CO<sub>2</sub> emissions on future and existing aircraft. The project will deliver final results at the end of 2013, and should be a comprehensive and great step toward the implementation of full industrial riblets technology, developed by Fraunhofer IFAM, which would allow considerable fuel saving.

In the INARAS project, Ascamm particularly demonstrates its capabilities in designing and implementing, and in working on integrated automated robotics systems to an industrial TRL6.

Ascamm and W Aeronautica joined forces to get a full range of competencies. Ascamm is a technology centre that has been developing a growing applied research activity oriented towards industrial use, while W Aeronautica is an engineering SME that notably developed a strong capability in Design and FE analysis of aircraft parts.



Isometric CAD view of the mock-up

Angel Lagraña, *Ascamm*  
David Álvarez Morales, *W Aeronautica*

One of W Aeronautica’s tasks in INARAS is the Computer-aided design (CAD) of the individual components: a mock-up aircraft part, the displacement platform and the integration between the robotic system and the riblet application head. Fraunhofer IFAM provided advice to develop the selection criteria for the mock-up parts. This allowed W Aeronautica to define precisely the design requirements for the mock-up.

The complementarity between Ascamm and W Aeronautica is essential for the project, as both organisations bring on specific sound experience. In the case of Ascamm, the major contribution comes from the Automation and Mechatronics Unit. This unit has worked several years on very complex – and even out of the state of the art - robotics and sensing systems.

The success of INARAS so far also resides in the cooperative approach that members of the consortium have been following. David Álvarez, from W Aeronautica says “Three requirements ensure the success of a collaborative project such as INARAS: Coordination, information transparency and communication”.

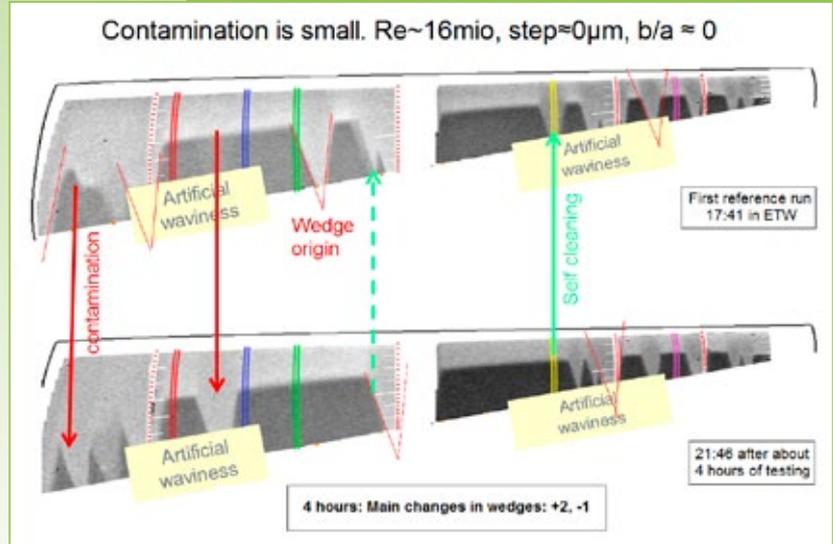
# WIND TUNNEL TESTS

## LAMINAR WING

Jürgen Quest, *European Transonic Wind tunnel*

Natural Laminar Flow (NLF) is established as a key technology stream within Clean Sky Smart Fixed Wing Aircraft in order to reduce aircraft drag. As part of the process to mature NLF for application, European Transonic Wind tunnel (ETW) has performed experiments with a large low-sweep half model at flight-relevant Reynolds numbers.

The completed European research project TELFONA, led by **Airbus**, had investigated the applicability of ETW for NLF wing design. Measured transition locations were compared with the results of linear stability analyses. The results have shown that experimental data were sufficient to obtain critical ETW N-factors for cases with either predominant NTS-factors or for predominant NCF-factors. TELFONA's results have demonstrated that ETW's flow quality enables laminar testing close to free flight conditions.



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Now, ETW has been used within Clean Sky to contribute to a wing design methodology that aims at increasing the laminar performance by taking into account different surface imperfections. The transition locations are again measured by the German Aerospace Research Center (DLR) Göttingen using CryoTSP. The data will serve to validate CFD predictions on NLF wing designs including such imperfections as they may occur on a real aircraft.

# CALLS

## INFO ON CALL 14

The fourteenth Call for Proposals was published in January 2013. The deadline to submit your proposal is **April 18<sup>th</sup> 2013**.

The total funding for this Call is €34,755,000. There are 54 Topics, the breakdown is as follows:

- Green Regional Aircraft (GRA) [4 topics],
- Systems for Green Operations (SGO) [20 topics]
- Smart Fixed Wing Aircraft (SFWA) [2 topics]
- Green Rotorcraft (GRC) [4 topics]
- Eco Design (ED) [6 topics]
- Sustainable and Green Engines (SAGE) [18 topics]

The Call Text, Rules for Participation etc. are on our website and on the Participant Portal (Identifier: SP1-JTI-CS-2013-01).

In case you need local support on Clean Sky - technical and administrative aspects of the Calls, organisation of information days, identification of areas of cooperation... you can contact your National States Representative Group (NSRG) - the contact list is on our website. Or you can use the special mailbox for the call which is described in the call text.

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