Dear colleague,

Welcome to the fifth newsletter of the X-Noise EV project, which coordinates the European research effort dedicated to the reduction of aviation noise.

X-Noise EV continues to deal with wider strategic aspects in its recent contributions to the ACARE Strategic Research and Innovation Agenda and in cooperation in particular topic areas with the USA and Canada. The midterm meeting was held in January 2013 and Dominique Collin, X-Noise EV coordinator, has recently submitted the midterm X-N EV report, see X-NOISE EV Mid-term Report – Public Summary.

The European airframe and engine manufacturers have supported the new noise standard/new stringency level for commercial aircraft, adopted recently in the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP); see Airbus’ recent formal statement Airbus-re-new-noise-std.

This newsletter also includes:

- descriptions of progress of projects:
  - the major noise project OPENAIR-update including some details of the extension of this and the most recent view in respect of the proposed follow-on of this work within Horizon 2020 (see http://ec.europa.eu/research/horizon2020).
  - the L1 project JERONIMO (Jet noise of High Bypass Ratio Engine: Installation, Advanced Modelling and Mitigation) commenced 1 November and was kicked off at the EADS Innovation Works (coordinator) on 12-13 December. See also website www.fp7-jeronimo.eu.

- other major current and close to conclusion projects, ORINOCO-update and NINHA-update
- the recently concluded projects, COSMA-update and TEAM_Play-update.

- information on the most important recent_major_meetings and forthcoming_major_events including:

2nd Noise Mapping Seminar: Action Plans, Motril, Spain, 18-19 March 2013 – a brief summary is available 2ndNoiseMappingSeminar


- articles from National/Regional Focal Points and a Scientific Committee Representative:
  - from Urban Emborg (RFP-Nordic Region) including reference to 4th CEAS European Air and Space Conference, RFP-Nordic-region-report.
  - from Yusuf Ozyoruk (Scientific Committee Representative-Turkey), SC-rep-Turkey-report.
  - from Antoni Niepokólczycki (NFP-Poland), NFP-Poland-report.

- related outreach with a forthcoming French/Indian joint meeting in New Delhi ac2013newdelhi-invitation.

Please kindly forward this newsletter to your colleagues to encourage their participation in the network and to draw attention to the website www.xnoise.eu on which we can and do provide topical information on all of the projects.

Additionally, do put your information on the website via the website calendar and news contacts - it is important to send reminder updates on such as deadlines. Please, do think of forwarding the same/similar to us, as soon as available.

Best regards,
Gérard Fournier and Christine Bickerstaff
Co-editors
gfic@wanadoo.fr and bickerschrism@aol.com
X-Noise EV Mid-term Report – Public Summary

Definition of Research Agenda

Support was provided to the Observatory Platform Technological and Institutional (OPTI) assessment, stating that to maximise chances of achieving the 2020 targets, the following recommendations should be considered:

1) Maintain significant effort in support of Noise Reduction Technologies generation 2 to reach TRL6, including active techniques and addressing integration issues such as weight, performance and durability.
2) Maintain support to activities on Novel Architectures, with a particular focus on Low Noise Aircraft configurations.
3) Ensure effective implementation of Low Noise Operational Procedures as successfully investigated in FP5 and FP6.
4) Consolidate European predictive capability to evaluate the impacts of aircraft noise on communities, including environmental interdependencies.
5) Support improved understanding and modelling of community impacts and overall annoyance.
6) Promote an harmonised policy framework on land use practices and mitigation options as well as develop clear indicators to assess progress made in their effective implementation.

Addressing key aspects of the X-Noise roadmap, a strategy consistent with these recommendations was then formulated to point out the programmes that would be needed to achieve the 2020 targets.

Steps were taken as well to support the development of the new ACARE Strategic Research and Innovation Agenda (SRIA). Contribution was provided in view of the Volume 1 and 2 outlining a phased and comprehensive strategy aimed at achieving the noise targets set by the Flightpath 2050 vision. These recommendations emphasise beyond the key technology aspects the need for a wider research agenda in the area of impacts management.

A workshop on General Aviation noise was held to support future identification of key issues and associated research needs. 40 participants attended the workshop representing 10 countries.

A Noise Mapping seminar was organised to review the issues involved in the full mapping process. During the seminar research needs were identified for: model improvement, validation of model and database, supplemental noise metrics and land use planning.

Dissemination:

The 1st and 2nd annual Scientific Workshops have been successfully organised. The first one on Acoustic Liners and Associated Propagation Techniques gathered in Lausanne 80 participants from 21 countries. The second workshop dedicated to Aeroacoustic Installation Effects and Novel Aircraft Architectures was held in Braunschweig and brought together 70 participants coming from 18 countries.
X-Noise EV also supported participation in Aerodays 2011 by way of a common stand with OPENAIR, a session dedicated to noise projects and a paper included in the proceedings. A dedicated aircraft noise EU projects session was also organised within the framework of Euronoise 2012 in Prague.

The X-Noise public website has been maintained and regularly populated with updated information, including network newsletters. The calendar feature welcomes information provided by organisers round the world to promote their conference and help planning future events.

**Integration of Research Community**

The first period has been very active for a number of national Focal Points as their network has now reached a critical mass and periodic activities such as annual workshops can be considered as established. In the areas targeted for regional network development (South America, Mediterranée, Balkans), the highlight was the success of a workshop in Rio (ANEW 2011), organised in coordination with several Brazilian stakeholders.

**Outreach and Cooperation**

The International Technology Seminar on Open Rotors undertook a review of noise technology programmes past and present dedicated to Open Rotor engine concepts. Contributions were provided by EU and Russian experts from industry and research organisations. Key US experts currently engaged in Open Rotor noise research were invited and provided contributions. The Seminar output was later used to provide a technology status on Open Rotor noise during the ICAO CAEP Independent Experts Review held at the end of 2011.

Recommendations were made within the framework of CooperateUS and CANNAPE Support Actions for topics of interest in considering cooperation with USA and Canada. These were followed by a dedicated collaboration seminar co-organised by X-Noise EV and ECATS with their US counterpart PARTNER consolidating principles of cooperation and identification of priority topics (annoyance modelling, long distance noise propagation, interdependencies modelling). Concerning cooperation with Canada, proposal was made at the 3rd CANNAPE workshop to focus on acoustic liners of the 3rd generation. Contacts established at this occasion have led to developing a detailed project outline aimed at a possible joint call with Canada in the next framework programme.

*Dominique Collin, X-Noise EV Co-ordinator*
Recent major meetings


Forthcoming major events

- 19th AIAA/CEAS Aeroacoustics Conference 2013, Berlin, Germany, 27-29 May 2013 – as the conference is in Europe in 2013, the prestigious CEAS Aeroacoustics Award is being presented. See www.aiaa.org/aeroacoustics2013 and www.aeroacoustics2013.dglr.de.


- Summer School and Workshop on Non-Normal and Nonlinear Effects in Aero- and Thermoacoustics, Munich, Germany, 18-21 June 2013. Website www.td.mw.tum.de/tum-td/n3l


- COSMA Workshop - the COSMA results will also be presented at a workshop co-located with and following Inter-Noise in Innsbruck on 19 September 2013. Information will follow on www.xnoise.eu.
http://xnoise.eu

- **4th CEAS European Air and Space Conference**, Linköping, Sweden, 16-19 September 2013. There is a Swedish research initiative (the National Research Agenda, of which Aeronautical Research Programme is part). Expected is a possible special session on aeroacoustics. See also [http://ceas2013.redhammer.se](http://ceas2013.redhammer.se) and the [Nordic-region-report](http://ceas2013.redhammer.se).


2ndNoiseMappingSeminar

2nd seminar on AVIATION NOISE MAPPING (Action Plans),
18-19 March 2013, Motril (Granada), Spain - summary

Programme

The main objective of the seminar was to concentrate on the technical and administrative aspects, specific to drawing up noise action plans, revisiting the various stages of the process. The sessions were defined so as to reflect the various elements of the Balanced Approach to Noise Management, as endorsed by the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP).

Much of the seminar was dedicated to case studies and Land Use Planning and to potential improvements of the process, so as to be able to identify research needs in this field.

Time was allocated for discussion after each presentation, and at the end of each day, allowing interaction to maximise the interchange of information and points of view.
In total 31 persons participated, representing organisations from 14 countries (just over 50% of the participants from outside X-Noise EV is considered a very important achievement, especially with respect to the dissemination aspect targeted).

The main conclusions currently available on Research Needs

Most of the issues identified during the event have already been taken onboard in the ACARE Strategic Research and Innovation Agenda (SRIA) in support of Horizon 2020 (see http://ec.europa.eu/research/horizon2020). Because none of the 3 related proposals (PLAN-A, TEAM_Play2 and FATIMA) had been selected during the last Call, the original roadmap has had to be updated.

To avoid further delays it is important to get these topics embedded in the initial version of the H2020 work programme, which will probably cover the next 2 Calls. Additionally, it was considered that other funding schemes should be sought, especially considering that these projects contain a significant amount of work related to regulatory support; especially DG-MOVE, DG-ENV and EASA should be consulted on this.

It was decided to discuss the most relevant research topics identified in more detail in the Impact Experts Committee meeting, to be held the following day (March 20). See ImpactEC-March2013.

Nico van Oosten, WP Leader Management of Noise Impact
Impact Management Experts Committee activity

The IEC meeting took place on 20 March in Motril, Spain, following the second Noise Mapping Seminar. The meeting benefitted from the presence of 16 active participants (mostly existing members of X-Noise network, but also others including external experts on management of noise impact).

Dr Delia Dimitriu chaired the meeting and presented the aims and objectives, and, the achievements so far. She focussed on the need to identify new areas of research on noise management. Progress since the last meeting in November 2012 was illustrated along with reviews of the ongoing projects and initiatives, cooperation with European partners and with other regions, and new calls for proposals.

The aim of this particular meeting was to identify current *good and bad practices* regarding the implementation of management of noise impact, paying special attention to Land Use Planning (LUP).

A roundtable discussion took place and several members summarised their particular interests and involvements in the IEC activities, giving national examples, along with identified gaps in policy and at strategic levels. Additionally, several examples of what should be avoidable bad practices at rapidly growing airports were illustrated.

As next steps, several items for further work were identified:

- Enrolling a wider range of participants, including those already within the X-Noise network, but outside Europe, e.g., Egypt and Brazil
- Developing a roadmap on selected topics to avoid bad practices at airports related to LUP
- Developing noise research topics on Planning and Noise Management.

The subgroups selection discussion

The Committee Members divided in a set of subgroups with common interests in research development and with targets and objectives summarised in the schematic diagram here. As shown, the subgroups include: *Communication* (tools, case-studies), *Land Use Planning, Interdependencies, Annoyance.*
The results from the activities of these subgroups will be summarised in a report end October 2013.

_Delia Dimitriu_

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48th-3AF-Intl-Symp-summary


58 participants from 7 countries attended the symposium. 5 keynote papers and 25 contributions were presented.

Titles of the papers dealing with aeroacoustics and flow control can be found in the attached programme. (Note that Daniel Arnal gave a presentation on laminarity control in place of the withdrawn keynote paper by Martelli.)
Gérard Fournier

moreICSV20Bangkok-a

20th International Congress on Sound and Vibration (ICSV20), Bangkok, Thailand, 7-11 July 2013 - is sponsored by the International Institute of Acoustics and Vibration (IIAV), the Faculty of Science at Chulalongkorn University, the Acoustical Society of Thailand, and, the Science Society of Thailand; and, is organised in cooperation with: the Australian Acoustical Society, the Acoustical Society of China, the Chinese Society of Vibration Engineering, The Hong Kong Institute of Acoustics, the Korean Society for Noise and Vibration Engineering, and, the Acoustical Society of Singapore.

Theoretical and experimental research papers in the fields of acoustics, noise, sound, and vibration have been invited for presentation. The ICSV20 Scientific Programme will include invited and contributed papers and the following keynote lectures:

1. “Ship Noise and Vibration” - Nicole Kessissoglou, Sydney, Australia

2. “Hearing Loss Prevention in the Noisy Workplace” - Christian Giguère, Ottawa, Ontario, Canada

3. “Applications of The Acoustical Boundary Element Method (BEM) and Related Green’s Functions” - Martin Ochmann, Berlin, Germany

4. “Experimental Modal Analysis of Rotating Machinery” - Chong-Won Lee, Taejon, South Korea

5. “Urban Noise Management and its Practical Implementation” - Sergio Luzzi, Florence, Italy

6. “Statistical Energy Analysis (SEA) Applications in Vibration and Noise” - Dhanesh N. Manik, Powai, Mumbai, India

7. “Bionic Design of Acoustic Localization System Based on Auditory Orientation Mechanisms” - Zhushi Rao, Shanghai, China

See the ICSV20 website, www.icsv20.org for more details.
**moreMUSAF-II-2013-Toulouse**

MUSAF II Colloquium – ‘Around Aircraft & Within Engines’, Toulouse, France, 18-20 September 2013 - organised by CERFACS, supported by European Marie Curie project COPA-GT, leading aeronautical manufacturers (AIRBUS France and SAFRAN), STAE Toulouse and research groups. The Project is developing new effective approaches for aeronautical design.

The Colloquium covers:

- State of the art methods for CFD and multidisciplinary simulations, within the framework of aeronautical flows: full aircraft computations, rotorcraft, turbomachinery flows, reacting flows, thermo-acoustics, noise, heat transfer and aeroelastic predictions.
- New formulations and solutions for real-life Multi-Disciplinary Optimisation and control problems.

More information and registration on website [www.cerfacs.fr/musaf](http://www.cerfacs.fr/musaf).

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**ac2013newdelhi-invitation**

Acoustics 2013 New Delhi, November 10-15, 2013

The French Acoustic Society and the Acoustical Society of India have decided to organise a joint conference. **Acoustics 2013 New Delhi** will be a unique occasion to meet Indian university staff and students and industrialists working in acoustics.

This is for you, if you are concerned most particularly by aeroacoustics in its widest sense. Many interesting sessions are already planned: general aeroacoustics, computational aeroacoustics, acoustic/fluid dynamic phenomena, duct acoustics, propagation.

For more information, including registration, see the conference website: [www.acoustics2013newdelhi.org](http://www.acoustics2013newdelhi.org), and, contact Philippe Lafon urgently, if you expect to participate.

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ISMA2014/USD2014-advance


ISMA2014/USD2014 is next year's edition of a sequence of biennial international conferences on noise and vibration engineering, structural dynamics and modal testing. The last edition in September 2012 was attended by more than 700 participants from academia and industry. The technical programme was composed of 395 technical papers scheduled into 8 parallel tracks and 4 plenary poster sessions.

A single registration will grant access to both the ISMA2014 and the USD2014 conferences. Information on the conference topics and on the procedures for submitting abstracts and registration is on website: www.isma-isaac.be. (1 October 2013 - start of online abstract submission.)
Nordic Region
From Urban Emborg, RFP-Nordic Region,
Creo Dynamics AB, Sweden

The network of the Nordic region includes the following partners:

- Saab AB (Sweden)
- GKN Aerospace (Sweden)
- Chalmers University of Technology (Sweden)
- KTH Royal University of Technology (Sweden)
- FOI (Sweden)
- Sontech AB (Sweden)
- Creo Dynamics AB (Sweden)
- FFI (Norway)
- B&K (Denmark)
- Patria (Finland)

Network activities include information exchange on research activities in the region and also organising meetings and workshops particularly with the purpose of identifying research needs and ideas for national programmes and potential inputs to future EC projects. Additionally, providing information on aircraft noise research strategic features is an important network activity and recently of special interest in Sweden, where the (national) Aeronautical Research Agenda has now been established.

Creo Dynamics AB
Creo Dynamics AB was created in late 2009 and is a product development and niche consulting company covering acoustics, aerodynamics, structural dynamics, composites and non-destructive testing. A limited company, privately held by the holding company Vinngroup and the co-workers of Creo Dynamics (currently 18 co-workers), it matches the European definition of Small and Medium Enterprise (SME).

Participation in national and international research programmes is a cornerstone of the business. Creo is currently involved in both national and European Research Programmes, including the national project NFFPS on Aero-Acoustic simulations and the European Clean Sky Project HOSTEL within SAGE 4 (a project for the development of a hot stream engine liner, coordinated by Creo with partners including KTH, GKN and MTU).

NRA - New Aeronautical Research Agenda in Sweden

The new Aeronautical Research Agenda, “NRA Flyg”, announced in Sweden in 2010, has just recently been updated in “NRIA Flyg 2013”, so far, only published in Swedish.
This research agenda focuses on four research and demonstrator programmes:

- **NFFP6** – a continuation of the National Aeronautical Research Programme NFFP5 (see more below)
- **Triple use** – joint development between civil aerospace, military aerospace and other industries
- **Green and sustainable demonstrators** – for involvement with international civil demonstrators
- **Military demonstrators** – for involvement with international military demonstrators in the EU and transatlantic partnerships

In total the research agenda focuses on five research areas within aeronautics to be supported by five different demonstrators. Additionally, there are activities to encourage the participation of SMEs and to strengthen research networks.

**NFFP6**
The new Aeronautical Research Programme in Sweden, NFFP6 has recently been launched. The first call closed 6 March 2013 and the programme will continue until 2017.

The main areas of the programme are:

- Fundamental Aeronautics
- Concept studies
- Advanced structures
- Intelligent systems
- Engine Technology
- Air Traffic Management.

**CEAS 2013**
**CEAS** 2013 is organised jointly by the FTF and [Linköping University](http://www.liu.se) and will take place in [Linköping, Sweden](http://www.linkoping.se), 16-19 September 2013.

*Linköping is considered the aeronautics capital of Sweden, home of most important Swedish aviation industry and birthplace of Swedish aviation.*
CEAS2013 will address all disciplines of aeronautics and aeronautical systems, including design, development and operations, providing a forum for exchanging information across the wide field of aerospace, and, also a unique forum for networking with colleagues and friends from the aerospace industry, research institutions, academia and associations. Europe has a strong and proud tradition in aerospace, a very important area for Europe. Not only is there a substantial business domain, but also maybe equally importantly, aerospace is also a driver for technology development and innovation of benefit to society as a whole.

One of Europe’s greatest challenges is ensuring independence to maintain capabilities within the complete set of technologies required as the basis for a sustainable aerospace industry in Europe. This is important when Europe has to consider the next generation of aircraft. It is also fundamental for Europe to remain an attractive partner for international collaborative projects. To emphasise the importance of European development of technologies and capabilities, the central theme of the conference will be ‘Innovative Europe’. See also [http://ceas2013.redhammer.se](http://ceas2013.redhammer.se).

### SC-rep-Turkey-report

*From Yusuf Ozyoruk, X-Noise EV Scientific Committee Representative - Turkey, Middle East Technical University, Ankara, Turkey*

**Towards wider involvement in noise research in Turkey**

This short article provides an overview of the recent and current status of aircraft noise research in Turkey, and, of the recent and ongoing effort of the Scientific Committee Representative to develop a greater awareness on this issue and thereby a wider involvement of the national institutions in noise research.

**Efforts in raising awareness of aviation noise**

The first serious encounter of any institution from Turkey in aviation noise research was through the FP6 TURNEX (Turbomachinery Noise Radiation through the Engine Exhaust) project, where a reasonable working contact was established with European noise researchers.

Over the past few years people have been invited to national aerospace conferences to deliver invited talks on aerodynamic noise, and, sessions on aeroacoustics have been organised to bring together academicians and researchers. Such efforts have continued, whenever possible, see, for example, [http://aiac.ae.metu.edu.tr](http://aiac.ae.metu.edu.tr).

In addition, the SC Representative has put a special effort into site visits to industrial aerospace institutions and to governmental funding agencies to deliver talks on aircraft noise. In these visits and talks, aeroacoustics has been introduced in general and then with a special focus on the importance of quiet designs to meet stringent international noise limits.
Possibilities of developing some joint projects have been discussed. Most current aerospace research in Turkey, however, is geared towards military applications, so that slow response of the national industrial and governmental institutions in respect of noise is understandable. Nevertheless, the SC Representative continues contacting people from industry and various agencies.

For the past few years the Aerospace Engineering Department at the Middle East Technical University has organised specialised short lectures to aerospace professionals and people from governmental agencies in Turkey. We have been taking active part in these courses contributing lectures on aerodynamic noise. It is pleasing that positive reports have been received from people expressing the view that they now understand better the importance of noise as an issue.

**Current and expected noise projects**

The Middle East Technical University has recently established a centre of excellence for wind energy research, [http://ruzgem.metu.edu.tr](http://ruzgem.metu.edu.tr), funded by the Turkish Government. This centre houses a 512-computer core computational facility. Along with this computational support, the Turkish Science and Technological Research Foundation has just awarded the Aerospace Engineering Department a project to develop computational tools for wind turbine aerodynamic noise prediction. The particular focus of this project is on the turbulent self-noise from wind turbine rotor blades.

Additionally, as a result of the efforts of raising awareness on noise and discussions with national industry colleagues a couple of national project calls for development of computational tools for jet engine noise and helicopter rotor noise to be used to aid design in national industry now seem possible.

**Turkish/European contacts**

The two main aerospace companies in Turkey:

- Turkish Engine Industries Inc. (TEI), engine manufacturer, and,
- Turkish Aerospace Industries Inc. (TAI), oriented more towards design and manufacturing of military helicopters and small aircraft,

have been the contacts for various EU projects.

TEI and the TOBB University are currently taking part in a combustor design work package on the Efficient Systems and Propulsion for Small Aircraft (ESPOSA) project, but they express interest in getting involved also in noise projects in the near future.
Endless Runway

The Endless Runway FP7 project is proposed as an answer to the strong need for airport capacity increases. The Endless Runway is a radical and novel airport concept, consisting of a circular runway. This new structural approach could generate a breakthrough in sustainable airport capacity by avoiding the physical constraints of conventional runways by shifting the lift-off and touchdown points of individual aircraft. This would allow aircraft to shorten their overall trajectories through optimised departure and arrival routes and would offer the unique characteristic that the runway could be used under practically any wind conditions. In addition, this feature would allow aircraft to operate efficiently from gate to gate by minimising the required taxi distances.

The project research focusses on various aspects of the concept, including the sizing of the circle, passenger comfort, airport infrastructure, current aircraft behaviour, new aircraft configurations adapted to operations on a circular runway, and, air traffic management considerations.

With few exceptions capacity benefits result from circular runway implementation, and environmental profits are expected. As the aircraft can fly out in any direction from the airport, environmental impact will become a new optimisation problem as more communities will be overflown, but with less noise per community. The circular runway can also provide benefits for special maneouvres, such as the Continuous Descent Approach, for which effects will be investigated.

The Institute of Aviation will deal with an assessment of environmental impact of the new concept. Project partners include:- NLR, DLR, INTA and ONERA.

Aerodynamic and aeroacoustic investigations of owl flight

This proposal results from a growing interest of researchers in mechanisms responsible for the low sound generation by owls in flight. General investigations of anatomical solutions, which are the result of long evolutionary processes and have appeared in nature, now constitute a dynamically developing branch of contemporary science. The adaptation processes of animals (and plants) are examples of truly interdisciplinary optimisation, which in the timespan of millions of years has produced many effective solutions, and, which can be mimicked by modern science and technology.

The owl is one of the examples of wildlife attracting special attention from scientists. Amongst many representatives of owls quiet flight capability has reached perfection, allowing for almost silent flight in the audible frequency range. Such species of owl constitute unsurpassed as yet examples of extremely optimised flying objects, quietly interacting with airflow. Gathering of indepth knowledge of the anti-
Noise solutions occurring in association with owl anatomy may provide a valuable contribution to the development of science and technology and in the future may result in the creation of new noise-abatement technologies.

The scope of project will comprise observations and documentation of owl flight, models prepared for computer simulations and analyses of physical phenomena occurring in owl flight and experimental investigations of selected relevant aeroacoustic and aerodynamic phenomena.

The proposed project is multidisciplinary in nature and will involve scientists in such disciplines as biology, ornithology, aerodynamics and aeroacoustics, from leading Polish universities and research and development institutions.

**Development of Innovative Aviation Noise Monitoring System**

This project is intended to fill the gap between detailed and complex tools and simpler cost-effective tools for aircraft noise identification and management. The project proposal (submitted in conjunction with the well-known Polish sound and vibration manufacturer, the SVANTEK Company) is aiming at the elaboration of a system comprising both monitoring and modelling components.

The system is intended to be significantly less expensive compared to those available on the market and to be usable except where the very highest standards for detailed monitoring and modelling software for terminal traffic are demanded. It is hoped that this might make it more affordable and available to small and medium-sized airports.

**Reduction of Light Aircraft Propellers Noise by Shaping their Geometrical and Construction Parameters**

The aim of the proposed project is the elaboration of methods for shaping geometrical and construction parameters of light aircraft propeller blades to reduce noise levels, whilst maintaining the other propeller quality requirements such as efficiency.

Optimal solutions will be developed based on the visualisation of the convected acoustic waves obtained from a combination of numerical modelling and experimental noise research in tests on prototype propellers undertaken using fairly new research techniques in acoustic metrology: sound intensity measurement and two laser visual anemometry techniques (Particle Interference Velocimetry and Laser Doppler Anemometry). A comprehensive test programme of several prototype propeller designs and constructions will yield data to be utilised for improving propeller functional parameters.
Airbus supports new noise standard

Industry to further reduce aircraft noise by seven decibels

The International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP) has adopted a new noise stringency level for commercial airplanes. The milestone achieved at the CAEP meeting last week lowers the current standard by seven decibels. Having now been agreed by the ICAO CAEP, the new stringent noise standard will be presented for final review and approval by the ICAO Council later in 2013. This new standard will come into force on the 31st December 2017.

“Over the past 40 years, Airbus has put a lot of effort into reducing noise at source and to bringing the quietest aircraft to the market. This new standard is another major step in how the global commercial aviation industry is pro-actively addressing environmental protection,” said Fabrice Brégier, Airbus President and CEO.


At Airbus, innovation and technology are key to provide aircraft that generate fewer emissions and less noise while carrying a maximum payload over the mission range. All Airbus development aircraft (NEO and A350 XWB) are designed to be compliant with the new noise standard.

In addition, Airbus continues developing new solutions to further reduce the operational noise. Several functionalities are available such as the Automatic Noise Abatement Departure Procedure (NADP) that optimises the thrust and flight path to reduce noise over populated areas.

In the UK, which has the strictest noise regulations in the world, the A380 was given an award for its quiet operations by the UK Noise Abatement Society in 2012.

The A380 carries 42 percent more passengers than its nearest competitor, but produces half the noise energy when taking off, and three to four times less noise energy when landing. The A350 XWB, the aircraft with the leading environmental performance in the long-range market is up to 16 decibels below the current standard requirement.

Source: Airbus, an EADS N.V. company (Paris: EAD.PA)

Published on ASDNews: Feb 15, 2013
OPENAIR-update

The OPENAIR project has now been underway for 4 years, and, although the original forecast project duration has been reached, not all the work envisaged has yet been completed. The consortium has requested an 18-month extension from the European Commission (up to September 2014). Negotiations are not easy; the EC has severe problems in obtaining internal approval for such extensions nowadays, even without additional funding being requested. At the writing of this newsletter, formal approval had not yet been received.

Remaining test work in OPENAIR is mainly concentrated on:-

- the Active Nozzle testing in CEPRA19, taking place in spring 2013, and,
- the Active Stator tests in RACE, scheduled for September 2013.

Following the analysis of these final tests, a Technology Evaluation process will be used to assess:-

- the benefits of each individual technology on a range of platforms, and,
- the total noise reduction potential that the combined OPENAIR technology suite is able to establish.

OPENAIR will mature the technologies to TRL5, and, therefore, a followon research effort is required. Following the “Expertise Search and Info Day Workshop” in October 2012, discussions with potential partners have resulted in good support for a “Level 2” bid in call 1 or call 2 of Horizon 2020. The call timings are currently slipping due to the delayed decision on the overall EU budget, but at the writing of this newsletter, the expectation is that call 1 will be published and opened by the EC in December 2013.

Eugene Kors, Coordinator
NINHA (Noise Impact of aircraft with Novel engine configurations in mid- to High Altitude operations).

The introduction of aircraft with advanced contrarotating open rotor (CROR) engine powerplants is expected to contribute significantly to the reduction of fuel burn and gaseous emissions. In the 1980’s prototypes of the first generation of open rotor engines were developed and tested. One of the findings was that the noise from such engines, including particularly even in enroute flight, was significant, thus hazarding public acceptance. Since then significant effort has been dedicated to improving CROR aeroacoustic design and the new generation of CROR engines currently envisaged will be much quieter than their predecessors.

The NINHA project is assessing whether noise during mid- to high altitude operations might potentially hinder the introduction of this new generation of powerplant. It is determining the level and impact of this enroute noise and hence assessing the overall viability of these new engine concepts.

The project has now reached its final phase, in which the various developments are being used to assess the enroute noise.

Main achievements are:

WP1 Propagation modelling

- Existing raytracing propagation methods had been revisited and provided to WP2.
- An existing Potential Euler (PE) propagation method had been adapted for application to longrange vertical propagation. This method has now been used to validate the raytracing methods.
- Flight tests had been performed with an A400M at high altitudes, during which noise was measured close to the source (with a chase plane) and on the ground. Atmospheric conditions had been recorded. The measurements have now been used to validate the PE propagation method.
- Based on the raytracing model an engineering model has been developed, enabling faster calculations. Initial results clearly indicate the important variation in noise levels received on the ground due to propagation effects. The observed scatter is being dealt with in the impact assessment.

WP2 CROR enroute noise levels

- CROR source data obtained during various DREAM windtunnel tests had already been reanalysed and transposed from nearfield to farfield.
- The raytracing methods from WP1 had already been implemented in the SOPRANO aircraft noise prediction platform. Additionally, the specific metrics identified in WP3 have now been implemented therein.
- During an internal workshop agreement has been reached on the determination of the open rotor noise levels received on the ground.

WP3 Enroute noise impact

- A literature survey had already been conducted to determine those metrics most relevant for enroute noise of open rotors (for example, taking into account low background noise levels, discrete rotor tones).
- An extensive measurement campaign had already been conducted to obtain enroute noise from large turboprops. These data have been included in the EASA BANOERAC database (originally mainly containing turbofan data), and, the enhanced database had subsequently been used for the impact assessment studies.
- An enroute noise impact model, based on actual air traffic in 3 countries (ES, NL and RO), had been developed. Together with the noise data from the enhanced BANOERAC, an enroute noise map had been derived for each country. These maps are serving as a baseline in the impact assessment study for open rotor enroute noise.

- The methodology for the final assessment has been developed and is now being implemented and tested. The final project meeting will be held early morning 23 September 2013 in Seville, Spain, to deal mainly with any outstanding administrative issues. The final workshop, in which the main results of NINHA will be presented, will follow immediately. Also, US work on the same topic will be presented. This workshop aims at reaching consensus on the current status of enroute noise work and the way forward, therefore international cooperation in this field will be discussed. This workshop is limited to invited experts.

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COSMA-update

The FP7 project COSMA (Community Oriented Solutions to Minimise Aircraft Noise Annoyance) ended on 31 March 2013 after a total duration of 46 months.

The main achievements are the development and usage of various tools such as:

- the Sound Synthesis Machine,
- the Airport Noise and Climate Synthesiser, and,
- the Virtual Resident.

For the establishment of a psychometric database, 1200 telephone interviews at each of three important European airports were carried out successfully and evaluated by applying statistical methods.

To develop design recommendations, many optimised airport scenarios, including operational and technological aspects, were established and assessed in respect of the noise impact on the airport communities.

The project was officially closed after a public workshop and the final project review meeting (see photo), both held in March at the European Commission in Brussels. The final project report will be available shortly.

Photo: Final project review meeting on 15 March 2013, Brussels.

The COSMA results will also be presented at a workshop co-located with and following Inter-Noise in Innsbruck on 19 September 2013.

Michael Bauer, Coordinator
TEAM_Play-update

TEAM_Play

European Tool Suite for Environmental and Economic Aviation Modelling for Policy Analysis (TEAM_Play)

Modelling of aviation’s sustainability has become more complex and requires broader assessments including environmental and socio-economic impacts to provide adequate decision support. The US-developed Aviation Environmental Tool Suite reflects this trend by combining different models into a tool suite to allow integrated assessments.

The FP7 TEAM_Play project addresses the same requirement.

Prior to the development of TEAM_Play, in Europe numerous individual models already existed, addressing different aspects of air transport and related impact modelling. Therefore, the main focus of the initial work in TEAM_Play has been on creating a modelling framework in which existing European modelling capabilities could be combined to support and strengthen the European perspective in the international policy arena.

TEAM_Play has also broadened the scope of potential impact assessments improving awareness of additional effects, which, although crucial for aviation development, had not yet been fully addressed in earlier modelling systems (e.g., impact monetisation, third party risk, airport capacity constraints, extended forecast horizon, alignment of local, regional and worldwide assessments).

See the TEAM_Play structure Work Package (WP) structure in the figure below.

In WP1, a data warehouse and data exchange platform were established to ensure the consistent provision of data and the structured transmission of input and output data between models.

In WP2, the actual tool suite was established with appropriate model interfaces. The suite includes various air transport forecast, technology response and environmental impact models. Also developed were policy decision support tools, a macroeconomic impact model and an energy module to assess air transport and worldwide energy consumptions in perspective.

In WP3, model runs for selected baseline, business as usual and other policy scenarios were carried out.
Conclusions: The actual effects of regulatory action are frequently difficult to estimate and frequently resulting in tradeoffs between economic and environmental impacts and between the various individual environmental impacts.

The TEAM_Play tool suite has achieved an important contribution towards providing a European capability for the measurement and assessment of the economic and environmental impacts of the air transport system and its related policies.

Various state-of-the-art tools have been successfully combined in a tool suite, linked to a common data warehouse and then tested for selected scenarios. The flexibility of the tool suite permits assessments to be undertaken with different approaches, methodologies and resolutions and to be related to a wide range of sustainability indicators.

In particular, as well as connecting the individual tools and providing tested work flows for individual assessments, the current capabilities of the TEAM_Play tool suite are:

- Quantification of current and future aviation impacts (considering such as economic and social trends, technology developments and policy options)
- Goal assessments (for such as ACARE/Flightpath 2050, SESAR, IATA) quantifying the level of achievement based on user-defined scenarios
- Normative modelling (assisting in identifying requirements to reach the goals)
- Quantified scenarios in longterm developments, providing an appreciation of various aviation trends
- Analyses from worldwide and European levels down to local airport level
- Local assessments based on data in the Data Warehouse Platform containing EUROCONTROL-provided information on European airports.

Sven Maertens Coordinator
ORINOCO-update

ORINOCO is co-funded by the European Commission and The Ministry of Industry and Trade of the Russian Federation

Jet noise still remains the main source of noise at takeoff. To reach the targets of the ACARE agenda (a reduction of the external noise by 10 EPNdB per operation of fixed-wing aircraft by 2020) a technology breakthrough is necessary.

ORINOCO is the cooperation between Europe and Russia in advanced engine noise control based on plasma actuators. The novel concept of using plasma actuators to control jet noise requires a fundamental approach to understanding the interaction mechanisms with the main jet and the resulting radiated sound. Several avenues of investigation - theoretical, numerical and experimental - have already been identified towards the ultimate goal of evaluating plasma actuator concepts to reduce jet noise.

The development and the improvement of plasma actuators suitably applicable to jet noise were major features in the first stage of the project.

Several plasma techniques have been investigated and developed by the specialists involved in the project (TsAGI, GPI RAS, TRINITI, IVTAN, ONERA):

- Dielectric Barrier Discharge,
- Slipping Surface multipoint Discharge,
- Barrier Corona Discharge,
- Magneto-Plasma Actuator,
- Combined High Frequency and Direct Current Discharge, and,
- Plasma Synthetic Jet.

Following the initial steps of design, manufacturing and improvement, each of the actuators has been implemented on a single-stream nozzle to evaluate effects on the jet. The various plasma actuator concepts result in different impacts on the jet especially in respect of such features as: streamwise ionic wind, shock wave and vortex generation (see examples in the figures below).
Complementarily with these laboratory tests, the strategy for the control of jet noise has been investigated. CNRS has carried out experiments based on a single-stream jet excited with fluidic micro-jets. Synchronous flow-acoustic measurements were used to correlate instability waves with farfield noise. The nearfield measurements were also used by the University of Roma 3 to distinguish sound from pseudo-sound through wavelet analysis.

Through an analytical approach, TsAGI has explored zero mode coupling as a way of reducing jet noise. Additionally, TsAGI has performed an experimental investigation on a corrugated nozzle, illustrating that the excitation of the higher mode can result in strong reduction of the radiated sound. Experiments have been supported by measurement techniques, based on a method of phase conditional averaging of Particle Interference Velocimetry (PIV) data, developed by CIAM to extract from the jet flow the behaviour correlated with a specific resonant frequency.

Based on these control strategy results, the efficiency of plasma actuators in reducing jet noise is currently being assessed. These acoustic tests are being carried out on single-stream nozzles in three facilities (CNRS, LMFA and TsAGI).

A great effort has been made in respect of the development both of the plasma actuators themselves and of the detailed understanding of the jet noise mechanisms. All the results are now converging towards the final stage of the project: jet noise reduction based on plasma actuators.

Franck Cléro, ONERA, and Victor Kopiev, TsAGI - Coordinators

More information on the project website www.orinoco-project.org.

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