X-Noise EV #9 Newsletter Summer 2015

Dear colleague,

Welcome to the ninth 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 and assessment of achievements relative to the ACARE Strategic Research Agenda objectives.

There are 3 major Enabler Projects continuing:

- RECORD (to December 2015), an update was given in the last newsletter [link to newsletter#8].
- IDEALVENT (to September 2016), update here, [IDEALVENT-update], and,
- JERONIMO (to October 2016), for which an update will be provided in the next newsletter.

Additionally:

- Information on the most important recent major meetings and forthcoming major events including:
  - Broadband Noise of Rotors and Airframe, The 5th Scientific Workshop of X-Noise EV/ 19th CEAS-ASC Workshop, La Rochelle, France, 23-24 September 2015; it will be organised in co-location with the X-NOISE “Network of networks” Seminar and the ANERS 2015 Symposium the same week commencing 21 September 2015.

- articles from National/Regional Focal Points:
  - from Sorin Gabroveanu (RFP-Balkan Region) including report of meetings in November 2014 with Bulgarian and Slovenian colleagues [RFP-Balkan-Region-report]
  - from Harry Brouwer (NFP-The Netherlands) including report of a symposium held with aircraft noise stakeholders [NFP-The Netherlands-report]
  - from Attila Nagy (NFP-Hungary) including report of planned public workshop in April 2015 [NFP-Hungary-report]
  - from Luis Braga Campos (NFP-Portugal) - a full report including the most relevant references – an overview and detailed technical areas [NFP-Portugal-report]
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
IDEALVENT-update

From Christophe Schram, co-ordinator

Within the framework of the IDEALVENT project, research is being undertaken to improve the measurement, understanding and model installation effects in ducted fan systems. The targeted application is aircraft Environmental Control Systems (ECS).

A fan and valve have been provided by Liebherr Aerospace and are being tested in the acoustic laboratories of the von Karman Institute for Fluid Dynamics and Katholieke Universiteit Leuven in collaboration with Kungliga Tekniska Hoegskolan.

To identify the prominent source and propagation path, Embraer has conducted beamforming measurements on one of its aircraft.

Simultaneously, significant modelling work has started. On the theoretical side, Ecole Centrale de Lyon has been developing a mode-matching technique. On the numerical side, Siemens Industry Software has been improving the broadband fan noise models implemented in their Boundary Element and Finite Element solvers. The Deutches Zentrum für Luft und Raumfahrt and the New Technologies and Services have run preliminary simulations of the blower unit, providing the data that is required as input for the sound prediction (see figure below).

The next steps will consider the application of sound control techniques, such as those based on Micro-Perforated Panels developed by Sontech.

Comparison of wall pressure spectra at 3 streamwise locations (see crimson circles in upper frame) obtained from URANS, IDDES and IDDES + VSTG*.

*Notes: go to next page
Notes:

URANS = Unsteady Reynolds Averaged Navier-Stokes
IDDES = Improved Delayed Detached Eddy Simulation: an unsteady CFD modeling approach
VSTG = Volumetric Synthetic Turbulence Generator: a method to prescribe unsteady turbulent fluctuations in an unsteady CFD model, to represent the effect of a turbulent inflow (without this, the simulation underpredicts the turbulence in the whole domain)
Recent major meetings

- **Inter-Noise, Melbourne, Australia, 16-19 November 2014.**
  At this event, a dedicated session was organised featuring presentations of achievements reached within EU-funded aircraft noise research projects.

- **9th Iberoamerican Congress On Acoustics (Fia2014), Valdivia, Chile, 1-3 December 2014.**
  [http://www.socha.cl](http://www.socha.cl)

- **4th International Conference on Acoustics and Vibration (ISAV2014), Tehran, Iran, 10-11 December 2014.**
  This event was organised by the Iranian Society of Acoustics and Vibration.

- **50th 3AF International Conference on Applied Aerodynamics, Forthcoming Challenges for Aerodynamics, Toulouse, France, 30-31 March to 1 April 2015**

- **NOVEM 2015, 13-15 April 2015, Dubrovnik, Croatia**
  Emerging technologies in selected areas with major scientific challenges in the field of structural vibration, vibro-acoustics, flow-induced noise and vibration and noise and vibration control.

Forthcoming major events


- **20th International Symposium on Nonlinear Acoustics including the 2nd International Sonic Boom Forum, Lyon, France, 29 June- 3 July 2015.** This meeting aims at bringing together researchers in the field of nonlinear acoustics, and providing a platform to promote sharing and collaboration in specific focus areas. [http://isna20.sciencesconf.org](http://isna20.sciencesconf.org) and [https://www.conforg.fr/bin/usrlogin_isna2015](https://www.conforg.fr/bin/usrlogin_isna2015)


- **22nd International Congress on Sound and Vibration (ICSV22), Florence, Italy, 12-16 July 2015.** See [ICSV22-invitation](http://xnoise.eu) and [http://www.icsv22.org](http://www.icsv22.org)

- **Broadband Noise of Rotors and Airframe, The 5th Scientific Workshop of X-Noise EV/19th CEAS-ASC Workshop, La Rochelle, France, 23-24 September 2015;** it will be organised in co-location with the X-NOISE “Network of networks” Seminar and the ANERS 2015 Symposium the same week commencing 21 September 2015. See programme in [15-03-12_FlyerXnoiseCeas2015_v7.pdf](http://xnoise.eu)

See also 12th-WESPAC


Training

- CERFACS training, Toulouse, France - see information on regular CFD and CAA courses http://www.cerfacs.fr/training


RFP-Balkan Region report

Current activity situation for Balkan region - from Sorin Gabroveanu (RFP-Balkan Region)

Member activity / Lists of work being undertaken

Contributions from CEPSTRA Ltd and INCAS (Romanian) National Institute
There has been a face-to-face discussion with Mr. Pavel Wolf, coordinator of the ESPOSA European Project. Mr. Wolf visited Bucharest (for a project meeting) and we discussed the possibility of using small gas turbines to equip the personal aircraft being discussed within the (X-Noise EV) General Aviation Task Group. The situation appears to be very interesting for all likely participants - ESPOSA and PBS from Czech Republic, COMOTI and INCAS from Romania. One of the main objects will be to reduce the engine noise (difficult for small engines) and to reduce the propeller noise for the small propeller-powered aircraft. In the future, it seems possible that we will be able to start a cooperation along these lines.

There has been contact with the Romanian Military Academy, but the full information required is not yet forthcoming.

Noise reduction studies have been discussed with Politehnica University of Bucharest (Aerospace Division) with the intention of realising a low noise, lightweight variable pitch propeller for turboprops under 2500 SHP.

In respect of the Republic of Moldavia, one of our colleagues will be visiting the NFP and will have discussions on present and future work on noise reduction. The NFP will also provide a list of works and papers.

We have conducted internet and telephone conferences with new members of the specialist network from the Bulgarian Aeronautical faculty in Sofia and from the Serbian National Health Institute in Belgrade and expect to follow these up with face-to-face meetings early in 2015.

In Slovenia, the former NFP from the Pipistrel Company became very busy, so it became necessary to find an alternative person. This has been found in Sonja Jeram, a researcher in the national Slovenian Health Institute. She is very interested and has a good expertise. An extract from her Curriculum Vitae and information on her institute follow below.
Extract from Curriculum Vitae for SONJA JERAM, selected as most relevant for X-Noise EV

Name
SONJA JERAM

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17 EIPPROVA, SI-1000
LJUBLJANA, SLOVENIA

Telephone
+ 3861 2441 555
Fax
+ 3861 2441 471
E-mail
sonja.jeram@nijz.si or sonja.jeram@gmail.com

Most recent and relevant experience

- Dates (from - to) 2008 – present
- Name and address of employer National Institute of Public Health, Slovenia
- Type of business or sector Department: Environmental Health / Environmental Noise
- Occupation or position held Researcher
- Main activities and responsibilities
  - Involved in expert opinion on environmental noise effects on health for the Ministry of Health in support of issuing opinions on the acceptability of the national and local spatial planning.
  - Collaboration with Ministry of the Interior for analysis of public complaints
  - Collaboration with Environmental Inspectorate for analysis of public complaints
  - …
  - Raising public awareness in the field of environmental noise (website, publications, lectures…)
  - Lecturing at University of Ljubljana (Medical faculty) on Environmental Noise and Health

- Dates (from – to) 2009 – 2011
- Name and address of employer National Institute of Public Health, Slovenia
- Type of business or sector EU project, FP7 ENNAH, The European Network on Noise and Health
- Occupation or position held Researcher
- Main activities and responsibilities Collaboration in the EU network, gathering data on national activities in the field of Environmental Noise and Health
ADDITIONAL INFORMATION

References:

Original scientific article

Professional article

Published scientific conference contribution
- ....
- ....

Independent professional/scientific component part or a chapter in a monograph
- ....

Sonja Jeram has a wide range of other experience, exemplified by the following Award
- Doerenkamp-Zbinden Prize 2011 – Sonja Jeram - in acknowledgment of her outstanding work in the promotion of alternatives to animal testing in ecotoxicology, especially in recognition of her contribution to acute fish toxicity http://www.doerenkamp.ch/en/default.html?id=65

For further information
See: http://izumbib.izum.si/bibliografije/Y20120227134434-10211.html
Description of NIJZ

The National Institute of Public Health (NIJZ) is the central Slovenian institution for public health practice, research and education. Its academic staff work on various tasks covering the areas of epidemiology of communicable and non-communicable diseases, health promotion, health protection, health system research and national coordination of preventive programmes in primary health care. It also functions as the central statistical authority in health. Although public health practice is not in the exclusive domain of a single type of organisation or profession, in Slovenia as in many other countries, the majority of important public health functions and services are provided by NIJZ.

The main function of NIJZ is to provide research in the field of health, protect and increase the level of health of the population by raising the awareness of population and carrying out other preventive measures. NIJZ’s main activities are funded by the Ministry of Health and include national health statistics and research in the field of public health including health care systems; activities to identify health threats and design measures for their control; designing and providing health promotion programmes and preparing a scientific background for health-friendly policies, programmes and measures for disease prevention.

NIJZ is a public institute. Following legislation changes brought about by the Slovenian Health Services Act in 2013, the previous institution (also named the National Institute of Public Health) underwent organisational restructuring. From 2014 onward, NIJZ is organised as one central unit with nine regional offices.

The Centre for Environmental Health is involved in the environmental assessment procedure, in accordance with Article 42 of the Environment Protection Act and Article 19 of the Decree laying down the content of environmental reports and on the detailed procedure for assessing the effects on the environment of implementing the plan. The National Institute of Public Health supports the Ministry of Health in issuing opinions on the acceptability of the effects on the environment of implementing the plan in terms of protecting human health including with expert opinions on environmental noise.

NIJZ employs over 400 staff members.

NIJZ has successfully coordinated and participated in various international projects. NIJZ has also taken on the role of lead partner in three prominent EU-funded Joint Actions: EPAAC – European Partnership for Action Against Cancer, PARENT – Cross-border Patients’ Registries Initiative and CANCON – Development of a European Guide on Quality Improvement in Comprehensive Cancer Control.
NFP-The Netherlands-report

From Harry Brouwer (NFP-The Netherlands)

The Netherlands national network on external aircraft noise organised a symposium called “Innovate together towards a quieter environment” (“Samen innoveren naar een stille leefomgeving”). This stakeholders’ day was held on 3 October 2014 at the National Aerospace Laboratory, NLR. The objective was to bring together people, who are involved in inventing, developing, testing, and applying innovations dedicated to the realisation of a quieter living environment.

Much research is carried out in the Netherlands with the objective of reducing acoustic annoyance and many organisations have an interest in the results. Mutual exchange of information and co-operation are, therefore, essential for progress in this research, and, it was the purpose of this symposium to contribute to that progress.

The newest developments in the field of acoustics in the Netherlands were discussed: development of sensors, noise of wind turbines, aircraft noise, and noise issues at the Ministry of Defence. One of the presentations was devoted to the research on aircraft noise from a European perspective.

The symposium was well attended by about 40 participants from industry, ministries, research establishments and universities.

See also:-

- Programme ProgrammeAkoestiekSymposiumNLR3Oct14-andEnglish
- Presentation Airplane noise in Europe-031014.pdf
NFP-Hungary-report

From Attila Nagy (NFP-Hungary)

An X-Noise Aircraft Noise session was held during the annual Seminar on Noise Control organised 5-7 November 2014 by OPAKFI, Hungary.

This seminar is an annual event of the Noise and Vibration Control Department of OPAKFI (the Hungarian Scientific Society for Optics, Acoustics, Motion Pictures and Theatre Technology).

With more than 30 participants, the X-Noise session included 6 presentations on diverse topics connected to aeroacoustics:

- 2 presentations on behalf of the Institute of Transport Sciences Non-Profit Ltd regarding results from recent initiatives in air traffic management and noise control;
- 1 presentation on behalf of Budapest Airport and a private consulting company on the new Engine Test Stand at Budapest International Airport;
- 1 presentation by a private consultant on a comparison of complaints on the noise from different transport modes;
- 1 presentation by myself, the National Focal Point (NFP) on aircraft noise and the European vision for aviation (Horizon 2020, Flightpath 2050);
- 1 presentation by Dr Ferenc Marki from Budapesti Műszaki és Gazdaságtudományi Egyetem (BME, the Budapest University of Technology and Economics) on results from the Community Oriented Solutions to Minimise aircraft noise Annoyance, the COSMA project.

A followup meeting was organised between the NFP and the Head of Environment Protection at Community Affairs, Environment, Health & Safety Directorate of Budapest Airport. Participants have agreed on attempting to launch a national project for improved communication between airports and citizens, and, also on organising a public workshop for interested citizens in April 2015. The aims of the workshop will be to help citizens understand noise basics, and, to show them what noise control actions manufacturers and operators can take.
From Luis Braga Campos (NFP-Portugal)

“Aeroacoustics Research in Portugal 2012-2014”, a succinct report with detailed references to 11 published papers is available immediately below.

Luis adds that, although Embraer has two factories in Portugal in Evora, one for metallic and one for composite structures, and, owns OGMA in Alverca, it is understood that all their aeroacoustics research is done in Brazil.

( Editorial note: Samir Gerges at Universidade Federal de Santa Catarina in Brazil is a partner of the X-Noise EV consortium and has reported in Newsletter#8.)

AEROCOUSTICS RESEARCH IN PORTUGAL 2012 – 2014
The research has covered a range of topics on aeroacoustics with relevance to low-noise airport operations and aircraft and engine design and that were the subject of a recent review [1].

Concerning sound generation two important mechanisms are:-
(i) moving surfaces, and,
(ii) fluid inhomogeneities in a flow [2].

The former topic (i) was addressed in more detail concerning analysis and synthesis of the noise of a propeller at an angle-of-attack including comparison with experimental data from two sets of wind tunnel tests [3]. This includes a generalisation of the classical multipole expansion to rotating sound sources in a mean flow.

An important aspect of sound propagation in ducts, such as aeroengine inlets, is the interaction of sound with vorticity in the boundary layer leading to acoustic-shear waves. The exchange of energy between the sound waves and the mean flow is indicated by an oscillation energy [4] or acoustic Hamiltonian that generalises the classical energy density.

The shear flow also modifies the generation of sound for sources inside shear layers or a boundary layer [5]. The energy exchange with the shear flow in a boundary layer enhances the sound absorption by acoustic liners, and, may also have a bias flow [6] leading to a third-order wave equation.

The effectiveness of acoustic liners may enhanced by using a non-uniform wall impedance that couples the duct modes and affects:-
(i) sound generation by sources in the duct [7];
(ii) the radiation of sound out of the nozzle to an observer in the far field [8].

Downstream of a turbine sound propagation is affected not only by shear, but also by swirl. The interaction of sound with vorticity, either shear or swirl or both, can lead to the appearance of a continuous spectrum [9] in the absence of broadband sources or turbulence. This continuous spectrum is absent only in the case of rigid body swirl, and occurs for any non-constant radial profile of angular velocity; the continuous spectrum also occurs for any axial shear flow velocity profile, and is absent only for uniform flow.

The noise disturbance that affects near-airport residents is due to both engine and aerodynamic sound sources, whose spectra and directivity are modified by atmospheric and ground effects, including:-

(i) atmospheric density and temperature gradients and ground impedances that cause refraction and absorption [10];
(ii) atmospheric turbulence that causes spectral and directional broadening [11].

For brevity this note and the references that follow include only papers published in the period 2012-2014, and, exclude papers associated with refereeing and work in progress; communications to symposia are also excluded.

REFERENCES


This item from Dr W.S Gan has been lightly edited to reflect passed deadlines.

The 12th Western Pacific Acoustics Conference (WESPAC) will be held on 6 - 10 December 2015 in the vibrant city of Singapore.

WESPAC originated in Singapore in 1982 and we are pleased to bring it back to Singapore after more than 30 years!

The conference provides a perfect opportunity for engineers and scientists in all fields of acoustics to learn and network with colleagues from around the world.

Call for papers for abstract submission & Call for proposals for structured sessions are now passed.

Topics
- Acoustical Imaging
- Acoustical Oceanography
- Animal Acoustics
- Architectural Acoustics
- Education in Acoustics
- Engineering in Acoustics
- Musical Acoustics
- Noise
- Physical and Biomedical Acoustics
- Psychological Acoustics
- Signal Processing in Acoustics
- Speech Communication
- Structure and Vibration Acoustics
- Ultrasonics
- Underwater Acoustics

Important Deadlines
Call for papers Passed
Deadline for Proposals for Structured Sessions Passed
Deadline for Abstract Submission  Passed
Notification of Acceptance and Early Bird Registration Opens  15 July 2015
Deadline for Submission of Full-Length Paper  15 August 2015
Deadline for Early Bird Registration  15 August 2015
Deadline for Authors to Register  15 October 2015
Online Registration Closes  1 December 2015

Please visit our website at http://wespac2015singapore.com/abstract-submission for the abstract submission details, updates and other relevant information.

For any further enquiries, kindly email the scientific chair at scientificchair@wespac2015singapore.com

We look forward to your participation.

Yours sincerely,

Dr W.S Gan
General Chairman
WESPAC 2015 Organizing Committee
From Sinisa Krajnovic

Dear Colleagues,

A three-day course in "Applied LES, DES and URANS for Industry" will be given at Chalmers, Göteborg, Sweden, between 3-5 June 2015. The course will cover three important applications of CFD techniques in industry: prediction using unsteady CFD simulations (LES, DES, RANS, URANS), CFD for flow control and aerodynamic shape optimization. We believe that the course is useful for engineers and researchers in all industrial sectors where unsteady flows are of importance.

The number of participants is limited to 16.

More detail about the course and the registration can be found at http://www.chalmersprofessional.se/en/programs?tags=industriteknik,produktutveckling&id=6401#.VRaj1YUs3CI

Best regards,
/Sinisa

Sinisa Krajnovic

Professor of Computational Fluid Dynamics
Director of the Master Programme in Applied Mechanics

Google Scholar citations: http://goo.gl/McCeg

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