ANIMA

Aviation Noise Impact Management through Novel Approaches

# D6.5 1st Scientific Workshop Proceedings

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Aviation Noise Impact Management through Novel Approaches

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[1] Use one of the following codes: R=Document, report (excluding the periodic and final reports)
DEM=Demonstrator, pilot, prototype, plan designs
DEC=Websites, patents filing,press & media actions, videos, etc.
OTHER=Software, technical diagram, etc.

[2] Use one of the following codes: PU=Public, fully open, e.g. web
CO=Confidential, restricted under conditions set out in Model Grant Agreement
CI=Classified, information as referred to in Commission Decision 2001/844/EC.

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# 1 Executive Summary

This deliverable contains a short report of the 1st Scientific Workshop sponsored by ANIMA WP6. The workshop, with the title ***Future Aircraft Design and Noise Impact***, was held at NLR in Amsterdam on 6 and 7 September 2018.

# 2 Introduction

Subtask 6.2.4 of ANIMA is devoted to an Annual Network Event and Promotion of Research Effort. The event is organized following the practices developed since 1998 through the successive X-NOISE Thematic Network and Coordination Action projects. At the end of the annual event a scientific workshop is held, in co-operation with the Aeroacoustics Specialists' Committee of the Council of European Aerospace Societies (CEAS-ASC). The first Network Event in the framework of ANIMA was held at NLR in Amsterdam in the week of 3 – 7 September 2018, and the workshop was held on 6 and 7 September. The next section contains a short report of the workshop.

# 3 The workshop 'Future Aircraft Design and Noise Impact'

The focus of the workshop ***Future Aircraft Design and Noise Impact*** was on the relation between aircraft design and noise impact. Contributions on both technology and impact assessment were invited. One of objectives of the workshop was to encourage discussion and cooperation between researchers on low noise technologies on one side and on noise impact assessment and mitigation on the other side.

Topics on which contributions were invited included:

- Aircraft overall noise
- Noise propagation
- Auralization
- Noise impact of new architectures
- Boundary layer ingestion
- Distributed propulsion
- Single event models
- Metrics
- From wind tunnel data to noise impact assessment
- Noise impact of drones
- Non-acoustical factors

The call for contributions was issued on 17 May 2018. Also a website was developed: https://www.nlr.org/ceas-asc-2018-workshop . A total of

33 abstracts were received, 27 of which were accepted by the workshop scientific committee. In addition, 4 researchers accepted an invitation to present a keynote overview:

- Lothar Bertsch, DLR: *10 years of joint research at DLR and TU Braunschweig toward low-noise aircraft design - what did we achieve?*
- Russell Thomas, NASA: *Realizing NASA's Vision for Low Noise Subsonic Transport Aircraft.*
- Ingrid Legriffon & Laurent Sanders, ONERA: *Single Event Noise Prediction at ONERA - Case of aircraft powered by contra-rotating open rotors.*

The workshop was well-attended with 56 participants from 13 European countries and the USA. The participation from the USA was somewhat larger then on previous occasions with 6 participants from NASA, FAA, and Pennsylvania State University.

The first day, Thursday 6 September, was concluded with a dinner on a boat, which made a tour through the canals of Amsterdam.

As ANIMA partakes to the Open Data policy encouraged by H2020, presentations related to this workshop has been made publicly accessible. They have been deposited on the Zenodo public repository. As such, they have been automatically referenced by OpenAire. The associated DOI Badge is 10.5281/zenodo.1502431

# 4 Programme of the Workshop

The programme of the workshop was the following:

**Thursday 6 September 2018**

08:30 Welcome and registration

09:00 Opening

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| 09:15 | **Keynote 1** | Lothar Bertsch<br>*10 years of joint research at DLR and TU Braunschweig toward low-noise aircraft design – what did we achieve?* |
| | Session 1 | Aircraft Noise Annoyance: analysis Chair: Oleksandr Zaporozhets |
| 10:00 | p1 | Victor Sparrow, Michelle Vigeant, Mathias Basner, David Lee<br>*Overview of aviation noise impacts and the recent work of CAEP's Impacts and Science Group* |
| 10:20 | p2 | Ulf Tengzelius<br>*SAFT – Simulation of atmosphere and Air traffic, For a quieter environmenT* |
| 10:40 | p3 | Elena Narcisa Burtea, Dan Radulescu, Marius Deaconu<br>*Defining non-acoustical factors. Multidisciplinary focus* |
| 11:00 | p4 | Rebecca Cointin, James Hileman<br>*Addressing Aircraft Noise in the United States: Part I Understanding the Issues* |

11:20 lunch

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| 14:00 | **Keynote 2** | Russell Thomas<br>*Realizing NASA's Vision for Low Noise Subsonic Transport Aircraft* |
| | Session 2 | Aircraft Noise Annoyance: management — Chair: Christoph Zellmann |
| 14:45 | p5 | James Hileman<br>*Addressing Aircraft Noise in the United States: Part II Mitigation Solution Development* |
| 15:05 | p6 | Oleksandr Zaporozhets, Volodymyr Isaienko, Kateryna Synylo, L.Campos, Joana Soares<br>*PARE preliminary analysis of ACARE Challenge 3 environmental impact goals* |
| 15:25 | p7 | Constantin Sandu, Marius Deaconu, Valentin Silivestru, Cristian Olariu<br>*Technology for Reduction of Annoyance Caused by Aircraft in Cities* |
| 15:45 | break | |
| 16:15 | p8 | Elena Narcisa Burtea, Dan Radulescu, Marius Deaconu<br>*AHP applications to Noise Management* |
| 16:35 | p9 | Elena Narcisa Burtea, Dan Radulescu, Marius Deaconu<br>*Barriers in communication in Noise Managenent* |
| | Session 3 | Supersonic transport — Chair: Umberto Lemma |
| 16:55 | p10 | V.Kopiev, Yu. Medvedev, B. Zamtfort, V. Samokhin, G. Faranosov<br>*Compliance with Environmental Standards for Novel SST with Consideration of Jet Noise as a Dominant Source* |
| 17:15 | p11 | Artur Mirzoyan, Iurii Khaletskii<br>*Potentialities of Noise Reduction Using Low Noise Takeoff Thrust Management for Advanced Small and Medium Supersonic Civil Aeroplanes* |

18:30 Workshop Dinner

**Friday 7 September 2018**

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| 08:30 | **Keynote 3** | I. Legriffon, L. Sanders<br>*Single Event Noise Prediction at ONERA – Case of aircraft powered by contra-rotating open rotors* |
| | Session 4 | Novel architectures — Chair: Karsten Knobloch |
| 09:15 | p12 | G. Romani, Y. Qingqing, F. Avallone, D. Casalin<br>*Simulation of Boundary Layer Ingestion Noise for NOVA Aircraft Configuration* |
| 09:35 | p13 | U. Iemma, L. Burghignoli, F. Centracchio, M. Rossetti<br>*Metamodels based on deterministic and stochastic radial basis functions for engine noise shielding of innovative aircraft* |
| 09:55 | p14 | Ian Clark, Russell Thomas, Yueping Guo<br>*Noise Reduction Approaches for the NASA D8 Subsonic Transport Concept* |
| 10:15 | p15 | Ulf Tapken |

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| | *Fan noise due to boundary layer ingestion in novel aircraft architectures* |

10:35 break

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| Session 5 | Single event: impact | Chair: Ingrid LeGriffon |
| 11:05 p16 | Thijs Bouwhuis, Harry Brouwer, Sander Heblij, Mirjam Snellen, Dick Simons<br>*Auralization of Propeller Fly-over Noise Using Open Jet Wind Tunnel Test Data* | |
| 11:25 p17 | Antonio Torija, Rod Self, Jack Lawrence<br>*Impact assessment of aircraft noise with high content in complex tones* | |
| 11:45 p18 | Mark Jan van der Meulen, Harry Brouwer, Marthijn Tuinstra, Kylie Knepper<br>*From wind tunnel data to noise impact assessment* | |

12:05 lunch

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| Session 6 | Noise reduction technology | Chair: Mirjam Snellen |
| 13:30 p19 | Constantin Sandu, Marius Deaconu, Valentin Silivestru, Cristian Olariu<br>*Reapplying of the Corrugated Skin Used at Junkers Aircraft's Wings and Fuselage in Manufacturing of the Future BLI/Electric European Aircraft for Noise Reduction and Performance Improvement* | |
| 13:50 p20 | Marius Deaconu, Constantin Sandu, Valentin Silivestru<br>*Applying of Schroder Type Diffusers Combined with Perforated Sheet and Advanced Architecture Materials for Noise Reduction/ Diffusing* | |
| 14:10 p21 | Jason June, Russell Thomas<br>*Propulsion Airframe Aeroacoustic Integration Effects and Enhancement Strategies Using Acoustic Liners* | |
| 14:30 p22 | Patrick Okolo, Eleonora Neri, Cristina Paduano, Gareth Bennett<br>*An improved noise reduction modelling approach for woven wire mesh screens applied to aircraft landing gears* | |

14:50 break

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| Session 7 | Single event: sources | Chair: Gareth Bennett |
| 15:20 p23 | Eleonora Neri, Patrick Okolo, Cristina Paduano, John Kennedy, Gareth Bennett<br>*Characterisation and Reduction of Aircraft Landing Gear Noise* | |
| 16:00 p24 | Leandro Rego, Francesco Avallone, Daniele Ragni, Damiano Casalino, Mirjam Snellen, Wouter van der Velden<br>*Lattice-Boltzmann Computations of Jet-Installation Noise* | |
| 16:20 p25 | Yueping Guo, Russell Thomas<br>*On Aircraft Trailing Edge Noise* | |