Women in aviation research

Elisabeth Kotthaus, European Commission, DG MOVE

Rita Markovits-Somogyi, Hungarocontrol

Alison Roberts, NATS

Sara Bagassi, University of Bologna

Moderated by Tanja Bolic, SJU Scientific Committee

#SIDS2018
Gender equality in aviation and research and innovation
The EU perspective

By Elisabeth Kotthaus, Head Of Unit for Social aspects, Passenger Rights and Equal Opportunities, European Commission, DG for Mobility and Transport
Salzburg, 6 December 2018
Only 22% of women work in the transport sector. 40% in aviation but only because of certain occupations.
Percentage of women in Research

- Bi-annual dataset 'she figures'
- Report from EIGE entitled “Gender in Research” with practical examples of gender mainstreaming in research https://eige.europa.eu/gender-mainstreaming/policy-areas/research

- Women are gaining ground but progress is still slow and uneven.

<table>
<thead>
<tr>
<th></th>
<th>Share out of total (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female PhD graduates</td>
<td>43% (in 2004) 47% (in 2014)</td>
</tr>
<tr>
<td>Female heads of research institutions</td>
<td>16% (in 2004) 20% (in 2014)</td>
</tr>
<tr>
<td>Women researchers</td>
<td>31% (in 2005) 37% (in 2015)</td>
</tr>
<tr>
<td>Female professors</td>
<td>15% (in 2004) 21% (in 2013)</td>
</tr>
</tbody>
</table>
EU transport specific, action oriented, tools

• The *Declaration to ensure equal opportunities for women and men in the transport sector*

• The online module to share good practices on the Europa Website (example of ERTICO)

• The Women in Transport - EU Platform for change


**Funding opportunities**

• Horizon 2020 gender oriented projects

• EU annual prize for women innovators (DDL 16 January 2019)
Outcome of the Conference on how to attract women to the transport sector? of 27 November

Innovation is among the transport key attractors
Proposal made at the Conference on automation in transport of 20 November
Coffee break and exhibition
Engage KTN
Look ahead from the Engage network

Andrew Cook

8th SESAR Innovation Days
Salzburg, 03-07 December 2018
Overview

• Key features and objectives of Engage
• Brief thematic challenges recap; 2019-2020
• PhD / post-graduate theses Call
• Summer schools; student support
• Research community support (selection of activities)
• Taking stock
Key features and objectives of Engage
Engage – the SESAR Knowledge Transfer Network
Industry partners

Advanced Logistics Group (ALG)
AGIFORS - Airlines Group of the International Federation of Operational Research Societies
Air Traffic Controllers European Unions Coordination (ATCEUC)
Air Baltic
Airport Regions Conference (ARC)
American Airlines
ANE CR
Anotec
Association for the Scientific Development of ATM in Europe (ASDA)
Autoridade Nacional de Aviação Civil (ANAC)
Barcelona Supercomputing Center (BSC)
Belcontrol
Boeing Research and Technology Europe (BREET-Europe)
Bundesamt für Flugsicherung (BAF)
Civil Aviation Authority (CAA)
COOPANS Consortium
Department for Transport (UK)
Direction des Services de la Navigation Adriatique (DSNA)
Dreieck Luftverkehrszentrale Republik Slowenien (DZV)
European Meteorological Services Network (EUMETSAT)
European Passengers’ Federation (EFP)
Executive Airlines
Ferrovia Agraria
Flyair
FlightGlobal
Flughafen München / Munich Airport
Gatwick
Heliss
HENAV - High Endurance Multipurpose Aerial Vehicles
Honeywell Aerospace
HungaroControl
Icelandair
IFSTTAR - Institut Français des Sciences et Technologies des Transports, de l’Équipement et des Réseaux (INFRM) - Institut für Operations Research und Management GmbH
International Air Transport Association (IATA)
International Federation of Air Traffic Controllers’ Associations (PIATA)
Irish Aviation Authority (IAA)
LFV - Luftfartsverket
London Luton Airport
Lufthansa Systems
Manchester Airport
NATS
Navair
Network Manager - nominated by the European Commission
NEXTOR II Consortium - University of California, Berkeley and University of Maryland
PACE Aerospace Engineering & Information Technology
Pegasus Airlines
QinetiQ Ltd
Raytheon UK
Sabre Airline Solutions
SWISS - Swiss International Air Lines
Thomas Cook Airlines
TUBITAK - The Scientific and Technological Research Council of Turkey
Turkish Airlines
Introduction to Engage
Key features and objectives (2018-2021)

• Better integrate more applied/industrial & exploratory research (two-way process)
  • mutual benefit, integrated into the fabric, funded; interdisciplinary
• Education and training: future ATM skilled workforce
  • “develop new talent with a deep knowledge of the future ATM scientific research needs ... stimulating the next generation of ATM staff”
  • PhD and post-graduate thesis Call
  • 3 summer schools; ATC training courses; lecture progs
  • SESAR Innovation Days
• Knowledge hub (wiki) as a ‘go-to’ source, single point of entry for ATM knowledge
  • popular demand: improved search functionality; consolidated repository
• Not only larger concepts, but sum of large number of support actions
  • multiple grants; ‘light touch’
Brief thematic challenges recap; 2019-2020
Brief thematic challenges recap; 2019-2020
Overview of challenges, workshops, discussion over posters

#1. CNS vulnerability and security
Paula López
Innaxis

#2. Data-driven trajectory prediction
Dirk Schaefer
EUROCONTROL

#3. Efficient use of MET data
Tatjana Bolić
University of Trieste

#4. Novel market mechanisms in ATM
Andrew Cook
University of Westminster
### Brief thematic challenges recap; 2019-2020

**Example ideas for potential exploration**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Assesing the security of ATM elements and relationships to identify vulnerabilities and ensure protection against global threats</td>
<td><strong>1.</strong> Trajectory predictors supporting airborne self-separation: definition of requirements (accuracy, robustness, run time) &amp; concept development of enabling technologies and capabilities</td>
</tr>
<tr>
<td><strong>2.</strong> Enhancing cybersecurity of systems without having to replace and re-fit, including certification, legal and liability issues</td>
<td><strong>2.</strong> Improved matching of capacity to demand: enhanced TPIs integrating uncertainty assessment, robust planning and cost-efficiency assessment allowing better demand assessment at network level – and better capacity planning</td>
</tr>
<tr>
<td><strong>3.</strong> Building data-sharing architectures capable of connecting and providing access to distributed data while preserving privacy</td>
<td><strong>3.</strong> Data-driven approaches for the designing and prediction of AU preferences and behaviours enabling improved NM operations and flexibility-predictability trade-offs</td>
</tr>
<tr>
<td><strong>4.</strong> Adapting mental models to prepare operators to understand and manage cyber threats</td>
<td><strong>4.</strong> Collaborative multi-sector CDBR requirements definition and concept development of data-driven TPIs: support of CDBR involving various sectors</td>
</tr>
<tr>
<td><strong>5.</strong> Updating software and firmware on IT components to resolve security vulnerabilities of critical infrastructures</td>
<td><strong>5.</strong> Optimising and integrating different activities to assess, contain and communicate their network effects</td>
</tr>
<tr>
<td><strong>6.</strong> Further researching security analyses of aviation-specific protocol implementations (vulnerabilities, trust, software libraries)</td>
<td><strong>6.</strong> Improving data-sharing and data access to satisfy AU, NM and ANSP technical and organisational requirements and expectations: data format and availability, incentives for data sharing, confidentiality issues</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.</strong> Very high-resolution, very short-range forecasts using numerical weather prediction models &amp; observational data assimilation</td>
<td><strong>3.</strong> Incorporating behavioural science methods into improved traffic demand &amp; distribution predictor tools for ANSPs &amp; UOPPP</td>
</tr>
<tr>
<td><strong>4.</strong> Quantifying the sensitivity of operational processes to MET uncertainty, comparing these with other sources of uncertainty</td>
<td><strong>4.</strong> Assessing if incentives or penalties work as better drivers of behaviour: whether social norms can be used to improve collaboration</td>
</tr>
<tr>
<td><strong>5.</strong> Incorporation of ensemble weather information into decision-support tools, adapted for different ATM stakeholders</td>
<td><strong>5.</strong> Predicting and avoiding undesirable behaviour, such as gaming, in ATM allocation mechanisms</td>
</tr>
<tr>
<td><strong>6.</strong> Accurate prediction of wind shear conditions (e.g. visibility, glide-path wind) influencing arrival and departure operations for airports</td>
<td><strong>6.</strong> Building a better understanding of ‘afford’ and ‘fairness’, plus trade-offs across different stakeholders – with ‘flexibility’</td>
</tr>
<tr>
<td><strong>7.</strong> Consolidation of climate risk assessment methodologies for airports</td>
<td><strong>7.</strong> Improving the assessment of uncertainty and disturbance, and of new mechanism implications for policy recommendations</td>
</tr>
<tr>
<td><strong>8.</strong> Creating a climate forecast ‘baseline’ for aviation from the IPCC UN panel report</td>
<td><strong>8.</strong> Running models and tools in shadow-mode, with practical user interfaces and value in output metrics (e.g. costs, overloads)</td>
</tr>
</tbody>
</table>
Brief thematic challenges recap; 2019-2020
Everything on the website

Thematic challenge 3 – Efficient provision and use of meteorological information in ATM

**Workshop:** 13 November 2018, SESAR Joint Undertaking (SJU), Brussels, Belgium – Atmospheric scientists and ATM stakeholders shaping a more efficient provision and use of meteorological information in future aviation.

Final programme here. Presentations: [zip file1](#) (10MB); [zip file2](#) (13MB).

The main objective of this challenge is to improve overall ATM system performance by providing better user-support tools based on improved meteorological (‘met’) products. The focus is on the synergy of several methods and techniques in order to better meet the needs of operational users and to support aviation safety (e.g., through creating early warning systems) and regulation-makers (e.g., moving from text-based to graphical information provision). All stakeholders may benefit from this synergy: ANSPs (e.g., sector reconfiguration and separation provision), airlines (e.g., storm avoidance), airport operators (e.g., airport management under disruptive events), and the Network Manager (e.g., demand-capacity balancing). The challenge is, therefore, to bring the following perspectives closer: (a) for meteorological/atmospheric science, the development of products tailored to ATM stakeholders’ needs, which are unambiguous and easy to interpret; (b) for stakeholders, the identification of the most suitable information available and its integration into planning and decision-making processes.

[Fuller text here](#) (updated November 2018)

engagektn.com
Brief thematic challenges recap; 2019-2020
Everything on the website

- Catalyst funding Call open
  - maturing from exploratory to applied-orientation
  - up to €60k, 12 months, ‘light touch’ (also ‘open’)
  - during and post evaluation, how we can support development

First Call for catalyst funding

For full details and submission instructions: Call document
This Call closes on 15 February 2019 at 17:00 (Brussels time).

FAQs

Please use the contacts page to submit questions – select “Catalyst funding” as the subject.

FAQs will be listed below.
Brief thematic challenges recap; 2019-2020

Key steps in 2019-2020

• **First catalyst funding Call** closes 15 February 2019
  • plan to fund appx. 8 projects in this Call

• Review challenge status in Spring 2019 (TC1 workshop timed same period)
  • new Call for thematic challenge **topics** may be issued
  • previous proponents would be welcome to resubmit (to confirm interest)

• Most challenges (and 2019-awarded projects) expected to be invited to participate:
  • at 2019 summer school (possible co-location with a workshop)
  • in dedicated session at 2019 SIDs

• **Second catalyst funding Call** in 2020
  • further funding for appx. 8 projects (participate in 2021 activities)
PhD / post-graduate theses Call
PhD / post-graduate theses Call

- 01AUG18 – launch and dissemination of Call
  - thematic challenge abstracts published at same time (optional alignment)
- 04SEP18 – first batch of FAQs published
- 01NOV18 – Call closed (no further Call anticipated)
  - covers student salary/grant/scholarship & data/supporting materials
  - does not cover PhD fees / supervision costs
  - funding available: up to EUR 150k per thesis
- Proposals received – PhDs c.f. post-graduate theses
  - clarification process with some proponents
  - Awards Board evaluation in progress (ECTL Chair; two-level abstention process)
- Notification and start
  - working towards notifications in December 2018; expect to make appx. 10 awards
  - start ASAP in 2019 Q1; contract to sign with Engage (University of Westminster)
- Reporting and payments six-monthly (contingency for end 2021)
- Will be integrated into summer schools, thematic challenges, SIDs
  - additional, dedicated travel bursaries to cover attendances
Summer schools; student support
Summer schools; student support

Three summer schools, four days in duration
- Hosted by: FTTE (Belgrade, 2019); ECTL (Luxembourg, 2020); UNITS (Trieste, 2021)
- Engage PhD/post-graduate researchers present research in dedicated sessions
  - feedback from both industry and academia
- Sessions on research methodologies, tutorials on key ATM concepts and challenges
  - case studies / presentations of SESAR ER projects (completed and ongoing)
  - speakers from Consortium members, invited industry partners and IR projects (fees)
  - part of programme aligned with Engage thematic challenges
- Student travel bursaries (also for non-Engage PhD/p-g thesis students)

Further student / academic support
- 24 Gold Open Access journal paper grants
- ‘GEN-INTRO’ training (June and December, 2019)
  - two-day immersive experience at ATCO control position of real-time simulator under guidance of qualified controllers, using realistic traffic & pseudo pilots
  - Engage will pay fees for 2-3 groups; priority to PhD/post-graduate students
Research community support
EngageWiki

Welcome to EngageWiki

The repository that collects information on recent exploratory research accomplished by the ATM community, serving as a central knowledge resource and reference centre for researchers.

Engage is managed by a consortium of academia and industry, with the support of the SESAR 2020, to promote and facilitate the development of on-time traffic management research in Europe. Our focus is two-fold: inspiring new-researchers and helping to align exploratory and industrial research through a wide range of activities and financial support actions. Engage is an outward-facing network, advancing innovation and collaboration. We welcome the participation of new industry partners to join the growing group.

Projects news

EngageKTN
- Call for consortia funding open
- Info about the thematic challenge workshops

EngATM
- Deliverable D4.3 available
- Great success at the consortium meeting

AERoP
- Mid-term workshop coming up

The repository
- Research mapping and access
- Teaching and training
- Videos
- Grants
- Other resources
Research community support
EngageWiki

Create account

Username: [help me choose]
Enter your username
Password: Enter a password
Confirm password: Enter password again
Email address (optional): Enter your email address

To protect the wiki against automated account creation, we kindly ask you to enter the words you see in the box (more info):

Security check

Enter the text you see on the image
Can't see the image? Request an image

Create your account

EngageWiki is made by people like you.

4,200 edits
5,759 articles
100 recent contributors
Research community support
EngageWiki

- Events
  - Conferences
  - PhD fairs
  - Recruitment fairs
  - Summer schools
  - Workshops

- Research mapping and access
  - ATM concepts roadmap
  - Research concepts map
  - Research projects database

- Teaching and training
  - Academic courses (taught programmes)
  - Internships (placements, exchanges)
  - Research degrees (recent/current/planned post-graduate/post-doc)
  - Training courses (e.g. GEN-INTRO)
Research community support
ATM concepts roadmap

Potential avenues of research addressing the challenge

What barriers would we face to kick start research?

What shape would it take in a lab?

What quantitative/qualitative goals would be expected?

What shape would it take in operations?

What's the involvement expected from industry partners?

Links with other activities

ACARE WG?

PPP?
Research community support

Research concepts map

Key elements
- Essential Operational Changes (e.g. UDPP)
- ATM Technology Changes (e.g. A-CDM)
- interdisciplinary terms (e.g. “utility”, “centrality”)
- text-mined terms (e.g. “resilience”, “uncertainty”)

Metrics to measure active success
- emergent / interdisciplinary themes identified
- missing links / outliers identified
- new researcher links established
- ideas embedded in a proposal

Bottom-up map, clustering projects addressing common lines of research
Research community support
Research projects database

- Compare with SESAR Key Features / TRL mapping (top-down)
- More practical interface for project access / cataloguing
Taking stock
Taking stock
Some open questions

• Accessing ER(4) and IR documents for topic modelling / research maps
  • baseline and updates

• Detailed planning on what is stored in the wiki (repository)
  • trade-off between searchability and duplication (e.g. project websites, SIDs)
  • interface with Engage website (public-facing)

• Expanding coverage of initial (events, courses) databases ready for wiki
  • enable and incentivise institutions to collaborate with updates
  • respect GDPR

• Design, functionality and coordination of the ATM “concepts” roadmap
  • determination of “priorities”
  • collaborative work on definitions and design
Taking stock
Some selected milestones in first months

• Website launched (M1) and developed (average > 1200 hits per month)
  • wiki and supporting data being developed (dels behind the scenes)
• Calls and challenges
  • thematic challenge topics evaluated & launched; workshops held, disseminated
  • Call for PhDs / post-graduate theses launched and being evaluated
  • Call for catalyst funding launched – FAQ submissions open
• SESAR Innovations Days
  • established success already (non-disruptive change)
  • Engage industry partners on programme committee and at conference
  • 2019: heavier thematic challenge + PhD / post-graduate thesis integration
• Dissemination, communication
  • investing very heavy effort, but do let us know if you’ve ideas / not in the loop
  • new industry partners signing up; further involvement next year

EngageKTN-Coordinator@westminster.ac.uk
engagektn.com
twitter.com/EngageKTN
Engage KTN
Look ahead from the Engage network

Thank you

This network has received funding from the SESAR Joint Undertaking under the European Union’s Horizon 2020 research and innovation programme under grant agreement No 783287.

The opinions expressed herein reflect the author’s view only. Under no circumstances shall the SESAR Joint Undertaking be responsible for any use that may be made of the information contained herein.
EUROCONTROL PhD topics

- Call for Tender is open until 8 February 2019; only short responses required
- Alignment with Engage conditions; co-funding may be required

- 8 topics have been identified / 3 funded for sure, 5 possibly
  a) Automated DCB hotspot detection
  b) CNS spectrum efficiency and sharing
  c) DCB solver
  d) Evolution of primary surveillance
  e) Integrated performance framework for safety
  f) Evolution of route charge mechanism
  g) Software defined radios
  h) Benefits propagation from local RWY enhancements

- Do not hesitate to contact the technical people
<table>
<thead>
<tr>
<th>Project Description</th>
<th>Closing Date</th>
<th>Reference Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CIT infrastructure of the EUROCONTROL Agency</td>
<td>17 December 2018</td>
<td>18-140063-A</td>
<td></td>
</tr>
<tr>
<td>Flight Planning Contingency Development project</td>
<td>18 December 2018</td>
<td>18-110767-I</td>
<td></td>
</tr>
<tr>
<td>Catering for the NM User Forum</td>
<td>19 December 2018</td>
<td>18-140882-E</td>
<td></td>
</tr>
<tr>
<td>Acquisition and delivery of Microsoft Surface Pro tablets for the EUROC</td>
<td>4 January 2019</td>
<td>18-660754-A</td>
<td></td>
</tr>
<tr>
<td>PhD Research Contracts</td>
<td>8 February 2019</td>
<td>18-220569-A</td>
<td></td>
</tr>
</tbody>
</table>
2018 SESAR Young Scientist Award Ceremony
SESAR Young Scientist Award 2018

- Recognises young scientists with high potential.
- Showcases research contributing to any SESAR activity by supporting the scientific development of “Air Traffic Management and Enabling Technologies”.
- Providing a mechanism for further personal development
Overview 2018 SESAR Young Scientist Award

✓ Facts
  • Call launched in early May;
  • Call closed on Sept 5th;
  • Approx 20 applications received from many different countries (e.g. Spain, Italy, Germany, France, Slovenia, Ireland, Serbia, UK, India (resident in Spain), Russia (resident in Sweden), etc);
  • Evaluation performed in accordance with the published rules by an independent jury.

✓ Jury included:
  – 3 Scientific Committee members
    • Peter Hecker
    • Patrizia Marti
    • Rita Markovits
Three shortlisted candidates
In third place....

Goran Pavlovic

For his innovative work on the idea of airport pair route charging system
In second place....

Riccardo Patriarca

For his PhD work on “Developing risk and safety management for sociotechnical systems: From Newtonian reasoning to Resilience Engineering”
In first place...

Gianluca Di Flumeri

For his work examining electroencephalography-based measures of mental workload for the development of passive Brain-Computer Interfaces to be used in operational environments.
One last prize....

For the best poster....

pyBADA: Easy BADA integration in python for rapid prototyping
SIDS App Leaderboard

<table>
<thead>
<tr>
<th>Rank</th>
<th>Username</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Frenchez Pietersz</td>
<td>24400</td>
</tr>
<tr>
<td>2</td>
<td>Tatjana (Tanja) Bolic</td>
<td>20100</td>
</tr>
<tr>
<td>3</td>
<td>Dario Martínez Romero</td>
<td>18900</td>
</tr>
<tr>
<td>4</td>
<td>Gokul Krishna Srinivasan</td>
<td>17600</td>
</tr>
<tr>
<td>5</td>
<td>Marouan CHIDA</td>
<td>8900</td>
</tr>
</tbody>
</table>
Closing words

Peter Hotham, Deputy Executive Director, SESAR JU
SIDS 2018 highlights

• 330 participants
• 33 posters on 8 key themes
• 3 interactive plenary sessions
• 3 days of 4 technical sessions
• 3 networking events
• 3 shortlisted SESAR Young Scientist Award candidates .. one winner
• 3 site-visits (tomorrow)
• One incredible event – each year it just gets better
Further opportunities to get involved in SESAR

- Please consider registering as an expert on the Participant Portal (PP)
  - SESAR JU uses a wide range of expertise – we always need more!
  - As a SESAR JU evaluator, you will benefit from unique insights into SESAR JU and the opportunity to build your expertise and network

- Expert-evaluator registration
  - If you haven’t registered yet, please do so
  - Please also confirm your registration to us by e-mail at info-call@sesarju.eu
8th SESAR Innovation Days

Thank you!
SAVE THE DATES: SIDS 2019

The week of 2-6 December 2019
8th SESAR Innovation Days

Thank you!