The SESAR KTN – Engage

Overview; delivery in 2019; getting involved in 2020

Prof Andrew Cook, University of Westminster
Overview
Industry partners
Our doors are still open

Advanced Logistics Group (ALG)
AEGEOES - Airline Group of the International Federation of Operational Research Societies
Air Traffic Controllers Europe Union Coordination (ATCEUC)
eServices
American Regions Conference (ARC)
American Airlines
ASO
Ariadne
Association for the Scientific Development of ATM in Europe (ASDA)
Azerbaijan National Air Agency (ANAC)
Barcelona Supercomputing Center (BSC)
Bayern Innovations GmbH (BING)
Bundesverkehrsministerium Flughafenverwaltung (BVF)
Civil Aviation Authority (CAA)
CODAAMN Consortium
Department for Transport (UK)
Direction des Services de la Navigation Aérienne (DSNA)
Direction générale des Affaires Techniques et de la Modernisation de l’Air (DGAMT)
European Meteorological Services Network (EUMETNET)
European Pilots’ Federation (EPF)
Executive Airlines
Finnair
FlightGlobal
Finnair's Helsinki / Munich Airport
Ganetis Airlines
Helsingin Lentotila
HEMS2 - high end small Multipurpose Aerial Vehicles
Honeywell Aerospace
Hongan
Iberia
IAPST - Institut Français des Sciences et Technologies des Transports, de l’Aménagement et des Réseaux
IATA World Trade Center Research and Management GmbH
International Air Transport Association (IATA)
International Civil Aviation Organization (ICAO)
International Geophysical Year (IGY)
International Meteorological (IMF)
International Federation of Air Traffic Controllers’ Associations (FIATA)
Irish Aviation Authority (IAA)
Ivy, Luton
Londonderry Airport
Lytham St Annes
Manchester Airport
NATS
Pirenaia
Network Manager – nominated by the European Commission
Pirelli & C. S.p.A.
Rotterdam The Hague Airport
Sabena Belgian Airlines
SABRE - Swiss International Air Lines
SABTA - Scientific and Technology Research Council of Turkey
SAS
Schiphol Amsterdam
SITA
SITAALL
SITAALI
Skygates
Software AG
Spanish Airspace Management Agency (AEPIA)
The Aerospace Institute of the University of Zürich (IAZ)
Turkish Airlines
United Airlines
Virgin Atlantic Airways
Vodafone
Vodafone Spain
Virgin Australia
Volga-Dnepr Airlines
Volga-Dnepr Air Cargo
Volga-Dnepr Airlines
World Security
Xilinx
Core activities
2018 – 2021

- ‘One-stop’ European knowledge hub, concepts roadmap, research repository
- 4x SESAR Innovation Days (non-disruptive; industry)
- 12 thematic challenge workshops
- 3 European summer schools (Belgrade ‘19, Luxembourg ‘20, Trieste ‘21)
- 10 PhDs (interdisciplinary); 16 catalyst fund projects (TRL pipeline)
- Future ATM skilled work-force; student mobility
  - under-/post-graduate teaching & training initiatives
  - internships & employer links
  - journal publication grants
  - travel grants

35% of €4m as consortium effort
Thematic challenges

Background

Engage Thematic Challenges

At the core of the KTN is the definition of various thematic challenges: new ideas suggested by the research community, not already included within the scope of an existing SESAR project. They are developed along with the ATM concepts roadmap and complementarily with some of the network’s PhDs and theses.

engagektn.com
twitter.com/EngageKTN
Thematic challenges

Background

16 catalyst funds up to €60k
- (mostly) migration to higher TRL
- ‘light touch’ – 12 months max
- 2 CF Calls: NOV18 and JAN20
- no further PhD Call (AUG-NOV18)

- 4 thematic challenges in parallel
- dedicated workshops
- alignment with most PhDs

website
open invitation
industry partners

COLLABORATIVE DESIGN

dedicated sessions at SIDs
Thematic challenges
Workshops in current rolling window (by challenge number)

#1. CNS vulnerability and security  Paula López, Innaxis
17 June 2020, Frequentis, Vienna

#2. Data-driven trajectory prediction  Dirk Schaefer, EUROCONTROL
02 December 2019, Athens (co-located with SIDs)

#3. Efficient use of MET data  Tatjana Bolić, Uni. Trieste
05 November 2019, SJU, Brussels

#4. Novel market mechanisms in ATM  Andrew Cook, Uni. Westminster
12 November 2019, Nommon, Madrid
## Engage PhDs

10 PhDs launched, up to €150k per thesis (not fees/supervision)

<table>
<thead>
<tr>
<th>Title</th>
<th>TC1</th>
<th>TC2</th>
<th>TC3</th>
<th>TC4</th>
<th>Supervisor</th>
<th>Proponent</th>
<th>Inst. 2</th>
<th>Inst. 3</th>
<th>Inst. 4</th>
<th>Co-fund?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision support system for airline operation control hub centre ('DiSpAtCH')</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Prof Dr-Ing Peter Hecker</td>
<td>TU Braunschweig</td>
<td>Jeppesen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trajectory planning for conflict-free trajectories: a multi agent reinforcement learning approach ('RL4CFTP')</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>Prof George Vouros</td>
<td>University of Piraeus Research Center</td>
<td>CRIDA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection, classification, identification and mitigation of GNSS signal degradations by means of machine learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Prof Nicolas Couellan</td>
<td>ENAC</td>
<td>Uni. Oklahoma</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Machine learning techniques for seamless traffic demand prediction</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>Dr Xavier Prats</td>
<td>Nommon</td>
<td>UPC</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Machine learning applications to extend agent's conflict resolution capabilities</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>Dr Miquel Angel Piera</td>
<td>Autonomous Uni. of Barcelona</td>
<td>ASLOGIC</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Integrating weather prediction models into ATM planning ('IWA')</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Dr Valentin Polishchuk</td>
<td>Linköping University</td>
<td>LFV</td>
<td>Uni. Sevilla</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Advanced statistical signal processing for next generation trajectory prediction</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>Dr Xavier Prats</td>
<td>Universitat Politècnica de Catalunya</td>
<td>ISAE-SUPAERO</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>A pilot/dispatcher support tool based on the enhanced provision of thunderstorm forecasts considering its inherent uncertainty ('STORMY')</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>Dr Manuel Soler</td>
<td>Universidad Carlos III de Madrid</td>
<td>ETH Zürich</td>
<td>Spanish Met Office</td>
<td>GTD Systems</td>
<td>✓</td>
</tr>
<tr>
<td>Second generation agent-based modelling for improving APOC operations</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>Prof Daniel Delahaye</td>
<td>Amsterdam University of Applied Sciences</td>
<td>ENAC</td>
<td>Uni. Paul Sabatier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stochastic control of tactical airline operations in hub airport networks</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>Prof Dr-Ing Hartmut Fricke</td>
<td>TU Dresden</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
## Catalyst funding

10 awards made, up to €60k per project (H2020 limit) – *high value*

<table>
<thead>
<tr>
<th>Title</th>
<th>TC1</th>
<th>TC2</th>
<th>TC3</th>
<th>TC4</th>
<th>Lead contact</th>
<th>Coordinator</th>
<th>Inst. 2</th>
<th>Inst. 3</th>
<th>Inst. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authentication and integrity for ADS-B</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Prof Dr-Ing Jens Schmitt</td>
<td>TU Kaiserslautern (DE)</td>
<td>SeRo Systems (DE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The drone identity - investigating forensic-readiness of U-Space services</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Dr Yijun Yu</td>
<td>Open University (GB)</td>
<td>NATS (GB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data-driven trajectory imitation with reinforcement learning</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Prof George Vouros</td>
<td>University of Piraeus (EL)</td>
<td>Boeing RT (ES)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Data-driven approach for dynamic and Adaptive trajectory PredictiON (DIAPasON)</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Jose Manuel Cordero</td>
<td>CRIDA (ES)</td>
<td>Deep Blue (IT)</td>
<td>ZenaByte</td>
<td></td>
</tr>
<tr>
<td>An interaction metric for an efficient traffic demand management: requirements for the design of data-driven protection mechanisms</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Dr Juan José Ramos</td>
<td>Aslogic (ES)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probabilistic weather avoidance routes for medium-term storm avoidance (PSA-Met)</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Prof Damián Rivas</td>
<td>University of Seville (ES)</td>
<td>MeteoSolutions (DE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airport-sCAle seveRe weather nowcastinG project (CARGO)</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Dr Riccardo Biondi</td>
<td>University of Padova (IT)</td>
<td>LMU Munich (DE)</td>
<td>GReD srl (IT)</td>
<td>Leonardo (DE)</td>
</tr>
<tr>
<td>Operational alert Products for ATM via SWIM (OPAS)</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Dr Hubges Brenot</td>
<td>Royal Belgian Institute for Space Aeronomy (BE)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MET enhanced ATFCM</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Gladys Mercan</td>
<td>DSNA Services (FR)</td>
<td>MetSafe (FR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploring future UDPP concepts through computational behavioural economics</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>Ricardo Herranz</td>
<td>Nommon Solutions and Technologies (ES)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Thematic challenges

### Taking stock

<table>
<thead>
<tr>
<th></th>
<th>TC1</th>
<th>TC2</th>
<th>TC3</th>
<th>TC4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhDs</td>
<td>-</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Catalyst fund projects</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>
Delivery in 2019
Belgrade summer school
Dissemination for 2019

The first summer school organized by the Engage KTN will take place 09-13 September 2019. 

The aim of the summer school is to foster the engagement of high quality education and research, by means of gathering researchers and industrial experts for comprehensive tutorials on key Engage research topics, including

- Air Traffic Management
- Air Traffic Service
- Aircraft
- Air Transport
- Air Traffic Control

Attendance to the summer school is free of charge; however, interested postgraduate students must register by completing an online application form no later than 20 June 2019. Notification of acceptance will be sent by 26 June 2019.
Belgrade summer school
Summer school 2019

Engage KTN summer school 2019

The first summer school organised by the Engage KTN will take place 09-13 September 2019, in Belgrade, Serbia. This will include tutorials on key ATM concepts and challenges as well as on research methodologies, including case studies and presentations of prominent SESAR exploratory research projects.

Read more
Belgrade summer school
Summer school 2019

• 32 registered participants from 14 countries:
  • Belgium (2); Bulgaria (1); France (2); Germany (3); Greece (2); Italy (1); Norway (1); Serbia (5); Singapore (1); Spain (7); Sweden (1); The Netherlands (3); Turkey (1); UK (2)

• Predominantly mixture of full-time/part-time students and young researchers
  • 23 PhD, 8 MSc, 1 BSc; some industry delegates

• Engage financially supported travel/accommodation of 17 students
  • including all Engage PhDs (in addition to scholarship funds)
  • 9 / 10 Engage PhDs participated
  • each presented their topic to stimulate discussion and receive technical feedback

• Lecture topics pre-selected by Engage PhD supervisors (May 2019)

• Lectures from five Engage consortium members; meeting with KTN mentors

• Content development in years 3 and 4 (2020 slide later)
‘GEN-INTRO’ training places

Training in 2019

- EUROCONTROL, Institute of Air Navigation Services (IANS), Luxembourg
  - two-day immersive experience at ATCO control position
  - real-time simulator under guidance of qualified controllers
  - using realistic traffic and pseudo pilots

- 22-23 October 2019

- Priority to Engage PhD candidates (4 places) & catalyst fund projects (2 places)
  - places filled quickly
  - very positive feedback

- More places in May 2020 (slide later)
‘One-stop’ European knowledge hub
Concepts roadmap, research repository – core legacy
Forthcoming opportunities
Forthcoming opportunities
Getting involved in 2020

• Second Call for catalyst funding
• Technical workshops
• ‘GEN-INTRO’ training places
• Thematic challenge workshops
• Second summer school
• Journal publication grants
• Travel grants
• Internships & employer links
• **SESAR Digital Academy**
  • future ATM skilled work-force; student mobility – several synergies
Second Call for catalyst funding

Getting involved in 2020

January 2020 (possibly early in the month)

Also on Commission’s Participant Portal

Engage consortium ineligible; €60k limit; very similar to previous Call; TC or ‘open’; FAQs
Technical workshops

Getting involved in 2020

09/10 March 2020 (TBC; World ATM Congress)

Madrid – others announced ASAP; may be co-located with demand (ER4?); industry-oriented?

Limited places, priority to Engage PhD candidates & catalyst fund projects; plus experts
‘GEN-INTRO’ training places
Getting involved in 2020

05-06 & 07-08 May 2020 (possibly more in 2021)

EUROCONTROL, Institute of Air Navigation Services (IANS)

6 further places, priority to Engage PhD candidates & catalyst fund projects
Thematic challenge workshops
Getting involved in 2020

17 June 2020: CNS vulnerability and security (other workshops later in year; SIDs)
(avoiding ICRAT)

Vienna (hosted by Frequentis)

Open to all
Second summer school
Getting involved in 2020

w/c 06 July 2020

EUROCONTROL, Institute of Air Navigation Services (IANS)

Open to all, appx. 30 places, priority to Engage PhD candidates & catalyst fund projects
Journal publication grants

Getting involved in 2020

In progress (e.g. SIDs 2018 Special Issue?)

Gold Open Access fees; no journal prioritisation *per se*

SIDs Special Issue -> PhD candidates (reserve) -> catalyst fund projects -> open
Travel grants
Getting involved in 2020

On-going (exploring further internal fund allocation)

Engage events

Aimed at students who could not otherwise attend (simple form)
Internships & employer links

Getting involved in 2020

On-going (could peak from January 2020 – ER4 announcement?)

Mostly European opportunities

Open to all (so far)
– the SESAR Knowledge Transfer Network

engagektn.com

twitter.com/EngageKTN
Thank you