



Engage

Thematic challenge 4

Economic incentives for future ATM implementation



Third Workshop



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

Agenda

1100-1115	Welcome and introduction to the workshop	<i>Andrew Cook (University of Westminster) Paul Ravenhill (Think Research)</i>
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SESSION 1: An Industry Perspective

1115-1145	RoMiAD presentation	<i>Maribel Tomás Rocha (Think Research)</i>
1145-1230	Industry panel: “What are the practical challenges of increasing ATM digitalisation and virtualisation?”	<i>Eduardo Garcia, Manager European ATM Coordination & Safety (CANSO)</i> <i>Klaus Meier, CTO (skyguide)</i> <i>Philippe Bochet, ATC Product Line Director (Thales)</i> <i>Alain Siebert, Chief Economist & Master Planning (SESAR JU)</i> <i>Moderator: Paul Ravenhill (Think Research)</i>

1230- 1330	Lunch	
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SESSION 2: A Research Perspective

1330-1345	Overview of current exploratory research on wider ATM incentives domain	<i>Andrew Cook (University of Westminster)</i>
1345-1430	Exploratory research panel: “How do we incentivise positive change in ATM?”	<i>Benno Guenther (Salient) for BEACON project</i> <i>Radosav Jovanović (University of Belgrade) for CADENZA project</i> <i>Eduard Gringinger (Frequentis) for SlotMachine project</i> <i>Ruben Alcolea (Nommon) for ITACA project</i> <i>Moderator: Andrew Cook (University of Westminster)</i>

1430-1445	Coffee break	
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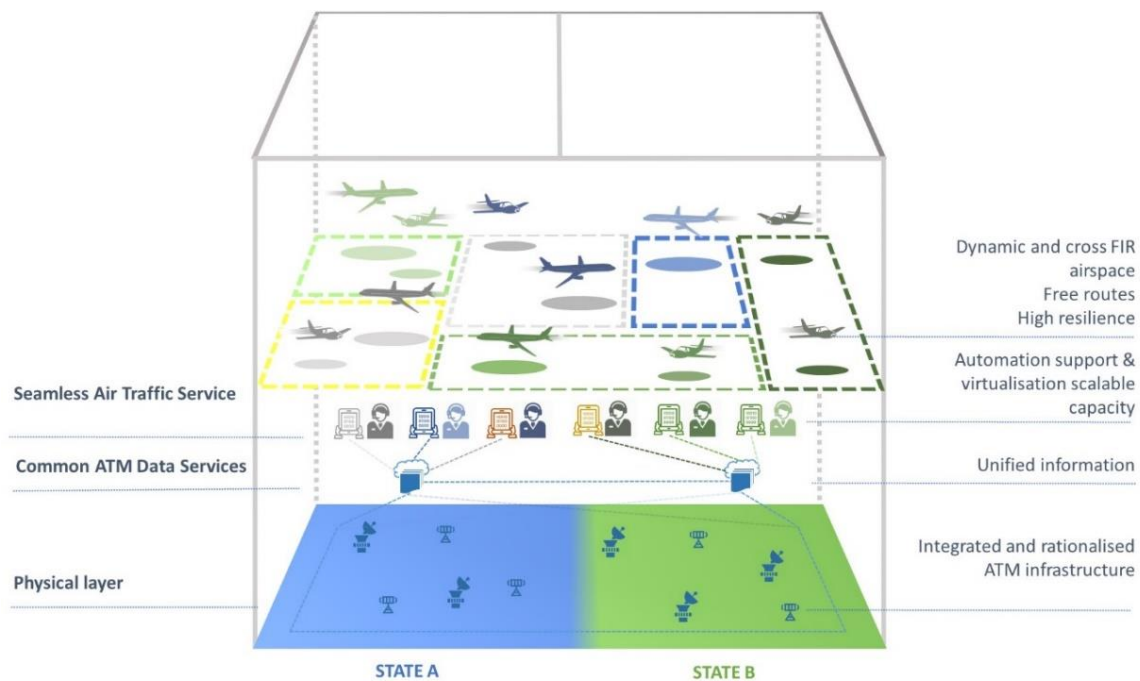
SESSION 3: Future R&D Needs

1445-1530	Workshop: “Defining future research needs”	<i>Dirk Schaefer (Eurocontrol)</i>
1530-1545	Wrap-up and next steps	<i>Andrew Cook (University of Westminster)</i>

Session 1: An industry perspective

Objective

SESAR's Airspace Architecture Study proposed a new approach to the provision of Air Navigation Services based on a distributed architecture capable of supporting increased flexibility scalability and environmental efficiency. Along side the technological transformation, organisational change is also required with existing and new players adopting different business models to more effectively share and manage risk.



But how do you incentivise the transition? This panel will discuss the industry perspective of the transition and how it can be incentivised.

Moderator

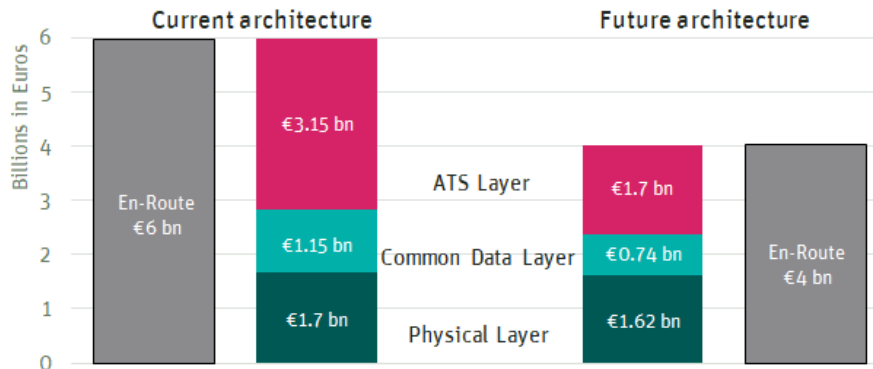


Paul Ravenhil, Director, Think Research

Paul has taken a leading role in the development virtualisation. He was a key author of the SESAR Airspace Architecture Study, has supported the development of the skyguide virtualisation strategy and is a member of the EUROCAE WG-122 on Virtual Centres (leading on regulatory issues) and the CANSO working group on virtualisation.

Project RoMiAD

Project Romias is a catalyst fund project in TC4 of the Engage KTN which investigated the market impacts of AAS deployment. The project found that the new architecture enables new business models to operate with several distinct markets. Project RoMiAD focused in the evolution of the ATS, Common Data and Physical Layer for en-route ATM. We estimated the current size of the market in these three layers and the potential cost reductions achievable through virtualisation. The benefits are significant particularly in the ATS layer.



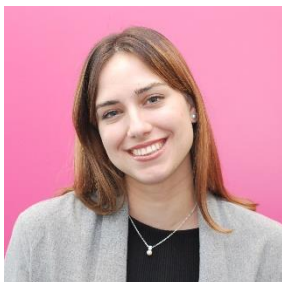
ATS Layer: The ATS layer is the largest market and has the greatest scope for improvement with the potential to reduce the current costs of €3.15 bn by up to 60%. In order to maintain national infrastructures it is likely that collaboration will drive best value in this layer.

Common Data Layer: The market size is in the order of €1 bn per annum, potentially reduced by 35% if the infrastructure is sufficiently harmonised. The flexibility provided to the ATS layer has three times the benefits available from rationalisation within the Common Data Layer itself. Competition in this layer is likely to drive best value.

Physical Layer: The physical layer is different to the other two markets due to the range of services involved in addition to the CNS considered in this report, there is also AIS and MET. We see limited benefits within in the traditional CNS markets but much high potential when considering the transition of iCNS and deployment of new technologies.

Realization of these benefits as much about new business models as technology adoption. From an ATSP perspective, the level of CAPEX is significantly reduced but overall expenditure remains high due to subscriptions. To realize the benefits ANSPs need to adopt collaborative models and support the Network Manager where Pan-European collaboration is most advantageous.

Presenter



Maribel Tomás Rocha, Think Research

Maribel Tomás Rocha is an ATM Consultant at Think Research where she leads the ATM strategic and policy portfolio. She focuses on the modernisation of the European ATM system and especially on Virtual Centres and ADSPs.

Panel discussion – the panellists



Eduardo García González, Manager European ATM Coordination & Safety at CANSO

Eduardo coordinates and advocates CANSO Europe positions on technical, operations and safety matters. He received the SESAR Distinguished Service Award for sustained outstanding performance in the HALA! (Higher Automation Levels in ATM) Research Network by the SESAR Scientific Committee and was also awarded the “Derek George Astridge Safety in Aerospace Award” and the “Safety Award in Mechanical Engineering” by the Institution of Mechanical Engineers UK.



Klaus Meier, CTO at skyguide

Klaus leads skyguide’s Engineering and Technology department. Besides providing safe and reliable ATM systems, his strategic objective is to transform today’s classic systems towards a flexible architecture and a new operational concept. The strategic initiatives behind those objectives are the Virtual Center Program of skyguide, CNS as a Service and an integrated UTM solution. Klaus is an electrical engineer by training, holds a Ph.D. from the Swiss Federal Institute of Technology and an Executive Degree from MIT Sloan.



Philippe Bochet, ATC Product Line Director at Thales

True expert in Air Traffic Management systems, Philippe Bochet has worked for Thales for 30 years. Today, Philippe is the ATC product line Director for Airspace Mobility Solutions, based in Rungis, France. In his role, Philippe is in charge of defining product roadmaps and governance for air traffic control systems (including tower, approach and en-route solutions) from technological, functional and business perspectives. Philippe holds an Engineering degree in aeronautics, specialized in Data processing and Air Traffic from ENAC (National French Civil Aviation School) and is passionate about aviation.



Alain Siebert, Chief Economist & Master Planning at SESAR JU

Alain Siebert is responsible for all economic and master planning aspects of SESAR, the EU project geared at digitalising the infrastructure supporting Aviation in Europe. In this position he is also responsible for organising and managing the involvement of the broader stakeholder community in making the right choices with regards to innovation and making sure it responds to EU policy priorities.

Prior to joining the SESAR Joint Undertaking Alain started his career as a Management Trainee at Air France. He later joined SAS Group as Executive Assistant to the Chief Financial Officer and was promoted Manager for Strategic Development.

Session 2: A research perspective

Objective

Research on the economics of ATM provision has been on-going for several years - not least within SESAR's Exploratory Research programmes and under thematic challenge 4 of the Engage KTN.

During this panel we will hear from four such projects and discuss how much has been achieved to date and topics that are emerging for further study.

Moderator



[Prof. Andrew Cook, University of Westminster](#)

Andrew leads the ATM team at the University of Westminster and is coordinator of Engage, a member of the SESAR Scientific Committee, AGIFORS, ASDA, EUROCONTROL's ART and the Programme Committee of the SIDs.

BEACON

BEACON builds on the concept of User-Driven Prioritisation Process (UDPP) already developed by Eurocontrol. UDPP is currently a simple way for airlines to avoid impact of massive delays on their fleet, by reordering their own flights within constraints. BEACON will study the feasibility of extending UDPP to allow multi-prioritisation processes in the airspace (e.g. encompassing departure slots, regulation slots, arrival manager slots), and exchange of slots between airlines. For this, it will build two models: a strategic model with long-term planning capabilities for the agents, and a more detailed tactical simulator to capture network effects and compute various key performance indicators. To properly capture the agents' behaviours, BEACON will make use of behavioural economics. Effects like endowment, loss-aversion, hyperbolic discounting and others will be explored, in order to take them into account in the design of the new prioritisation mechanisms right from the start.

BEACON will increase the understanding on what Behavioural Economics can add to ATM concepts elaboration and validation methodologies and will deepen and broaden the concepts of prioritisation in ATM beyond UDPP and their potential impacts on Network performance.



[Benno Guenther \(Salient\) for BEACON project](#)

CADENZA

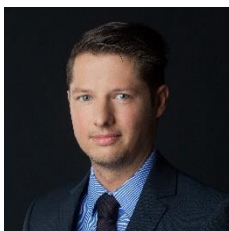
CADENZA aims at developing a detailed trajectory broker concept for the European network, incorporating advanced demand-capacity balancing mechanisms. It builds upon the findings of the 2019 Jane's-ATC-Innovation-award-winning SESAR Exploratory Research project COCTA, as well as upon latest industry developments. The trajectory broker will balance capacity and demand through a coordinated capacity provision process and collaborative trajectory management (including a novel trajectory charging scheme). CADENZA covers all areas of capacity provision (en-route, terminal area, and airport) as well as all temporal levels (strategic, pre-tactical and tactical). Based on previous research we expect significant improvements in cost-efficiency as well as positive impacts on other key performance indicators, especially delays. The CADENZA concept will be thoroughly validated, using mathematical models and comprehensive real-world trajectory data. Sensitivity analysis will incorporate non-nominal conditions as well as different assumptions with respect to the overall air traffic management framework, e.g., different levels of flexibility in capacity provision. Moreover, a high degree of stakeholder involvement – including an industry expert panel and stakeholder workshops – ensures practical relevance.



Radosav Jovanović (University of Belgrade) for CADENZA project

SLOT MACHINE

With passenger numbers expected to gradually rise again, the aviation industry will be confronted with growing air traffic and limited capacity at airports and in the air. This may lead to an increase in delay again where airlines need to prioritize their important flights. At the same time, airlines are struggling with increased cost pressures while the highest safety standards continue to demand compliance with complex processes. The EU-funded project SlotMachine aims to develop a cost-efficient solution, enabled by Multi-Party Computation (MPC) and blockchain technology, which will extend the existing slot swapping capabilities between different airlines. EUROCONTROL, the AIT Austrian Institute of Technology, Johannes Kepler University Linz (Austria), Swiss International Airlines, and Frequentis aim for a new kind of marketplace for airlines to exchange slot priorities in Air Traffic Management (ATM). The platform to be developed by the SlotMachine consortium is expected to enable more flexible, faster, scalable, and semi-automated processing of slot sequence transactions in a fair and trustworthy way. Built with a privacy-first approach, the goal is to protect sensitive airline data from competitors and airport operators and therefore fully unleash the potential of slot swapping.



Eduard Gringinger (Frequentis) for SlotMachine project

ITACA

The goal of ITACA is to accelerate the development, adoption and deployment of new technologies in ATM. In order to contribute to achieving this general objective, ITACA will develop a new set of methodologies and tools enabling the rigorous and comprehensive assessment of policies and regulations aimed at amplifying the uptake of new technologies within ATM.

The specific objectives of the project are:

- Identify the main drivers and barriers for technological change in ATM and devise a set of policy measures and regulatory changes with the potential to lower such barriers and incentivise faster technology upgrade.
- Develop an agent-based model of the R&I lifecycle allowing the representation of the complex decisions and interactions between ATM stakeholders and their impact on the development and implementation of new technologies.
- Validate the behavioural assumptions of the agent-based model through a set of participatory simulation experiments involving the direct participation of ATM stakeholders.
- Demonstrate and evaluate the potential of the newly developed methods and tools through a set of policy assessment exercises that will analyse the impact of a variety of policies and regulatory changes aimed at accelerating technology change in ATM.
- Consolidate the methods, tools and lessons learnt delivered by the project into a coherent policy assessment framework and a set of policy recommendations, and provide guidelines for the future maintenance, evolution and use of the proposed framework.



Ruben Alcolea (Nommon) for ITACA project

Session 3: Future R&D needs

Objective

What topics need to be researched to help understand how the business context is changing? How regulation can incentivise change? How risk can be better managed? How price can be used to promote better environmental behaviours? How to take account of passenger preferences?

The Digital European Sky (aka Phase D of the European ATM Master Plan) is a new context for ANS provision. Is the current economic research heading in the right direction? Do concepts like price modulation deemed difficult in the current system become more useful?

So bluntly, which economic and regulatory research topics should we:

- Start doing?
- Continue doing?
- Stop doing?

Rules of the game

This session is an interactive on-line session where you are stringly encouraged to provide ideas for research and vote for the best. Instructions will be provide. **Please don't be shy!**

Moderator



[Dirk Schaefer, Eurocontrol](#)

Dirk works in EUROCONTROL's Innovation Division in Brétigny, France. He is the programme chair of the SESAR Innovation Days and the General co-Chair of the US-Europe ATM R&D Seminar.