



# 13<sup>th</sup> USA/EUROPE Air Traffic Management R&D Seminar

17 - 21 June 2019, Vienna, Austria

## ATM2019 CALL FOR PAPERS



The United States Federal Aviation Administration and EUROCONTROL are jointly organising the Thirteenth USA/Europe ATM R&D Seminar. This continues a series started in 1997 hosted alternately in Europe and the USA. These seminars allow the ATM community to share and discuss R&D results and to build consensus on major issues. They have a strong record of creating and reinforcing working and personal relationships amongst leading experts and researchers in the industry.

ATM2019 will provide a platform for researchers to share results that can contribute to current European and US ATM initiatives, SESAR and NextGen, as well as addressing issues outside and beyond these programmes.

The Programme Committee invites research papers that present new concepts, analyses and methodologies in one of the themes set out below. Papers may address any part of the lifecycle from early concept through to implementation. The Committee will furthermore consider papers that demonstrate the infeasibility of concepts, positive deployment experiences where the R&D community may learn valuable lessons as well as papers that describe and analyse relevant innovative concepts and emerging technologies. Papers describing research and concepts that apply globally rather than in one part of the world alone will be looked upon favourably.

Papers should clearly explain their objectives, approach, methodology and results, and draw conclusions that demonstrate the scientific value of the work. Absence of clear results will often constitute grounds for rejection. Authors should take care to reference previously published work - the ATM Seminar repository contains more than 800 past papers at [www.atmseminar.org](http://www.atmseminar.org). Papers already presented at other conferences or like forums will be rejected. Submissions are welcome from organisations engaged in ATM R&D worldwide. Papers arising from collaboration between different organisations, in particular joint international efforts, will be viewed positively.

**Seminar themes** are described on the following pages

**Full papers** are to be submitted through EasyChair – instructions and templates are provided on the Seminar web site.

**Closing date** for submission: **Sunday 17 February 2019** - no extensions will be granted to this date.

Papers will be peer-reviewed by at least three committee members according to criteria indicated above and further detailed on the web site.

**Notification of acceptance** or rejection: **Friday 12 April 2019**.

Authors presenting their papers are expected to attend the entire seminar. This is critical to achieving the key goal of creating and reinforcing professional and personal relationships for the benefit of the ATM industry. Best paper awards will be presented during final plenary sessions.

The ATM Seminar series is included in international research publication indexes. Accepted papers will thus be indexed in SCOPUS and assigned a DOI reference.

All seminar attendees will pay a registration fee to cover the costs of conference facilities and meals. No special financial support is foreseen.

[www.atmseminar.org](http://www.atmseminar.org)

<b>Programme Committee</b>	
<b>Europe</b>	<b>US</b>
<p><b>Dirk Schaefer (EU Chair)</b>, EUROCONTROL <b>David Bowen</b>, SJU <b>Marc Bourgois</b>, EUROCONTROL <b>Nicolas Durand</b>, ENAC <b>Hartmut Fricke</b>, TU Dresden <b>Peter Hecker</b>, TU Braunschweig <b>Jacco Hoekstra</b>, TU Delft <b>Eric Hoffman</b>, EUROCONTROL <b>Billy Josefsson</b>, LFV <b>Dirk Kuegler</b>, DLR <b>Guglielmo Lulli</b>, Lancaster University <b>Jose Miguel de Pablo</b>, CRIDA/Enaire <b>Miquel Àngel Piera Eroles</b>, UA Barcelona <b>Anthony Smoker</b>, Lund University /IFATCA <b>Georg Trausmuth</b>, Frequentis</p>	<p><b>Eric Neiderman (US Chair)</b>, FAA <b>Kenneth Allendoerfer</b>, FAA <b>Hamsa Balakrishnan</b>, MIT <b>Mike Ball</b>, University of Maryland <b>Mark Hansen</b>, UC Berkeley <b>Jim Hileman</b>, FAA <b>Sandy Lozito</b>, NASA <b>Natesh Manikoth</b>, FAA <b>Karen Marais</b>, Purdue University <b>Joe Post</b>, FAA <b>Tom Reynolds</b>, MIT Lincoln Lab <b>Midori Tanino</b>, FAA <b>Craig Wanke</b>, MITRE CAASD <b>Mark Weber</b>, NOAA <b>Shannon Zelinski</b>, NASA</p>

# ATM 2019 theme descriptions

*These descriptions outline the scope of each theme as envisaged by the Programme Committee. They are not exhaustive, so related subject matter not explicitly mentioned below may be submitted for consideration.*

## **Network and strategic flow optimisation**

NextGen and SESAR promote efficient use of airport and airspace resources through strategic flow management and optimization from the perspectives of both carrier and service provider. This theme includes concepts of collaborative decision making (CDM) for solving congestion problems.

## **Trajectory prediction and trajectory and queue management**

A key paradigm change in NextGen and SESAR is the shift of control by tactical clearance to management by reference to a trajectory. Topics in this theme include all aspects of trajectory planning, optimization, and coordination including real time updates and traffic synchronization. Also included are tools and procedures for queue management such as arrival manager, departure manager and surface manager. The topic also includes enhanced techniques for trajectory prediction.

## **Separation**

This theme encompasses concepts, algorithms, analysis and systems that address tactical separation in the air and on the airport surface. Topics include methods and models for assessing separation requirements, ground-based, airborne, and combined approaches for safety alerting and conflict resolution, and wake turbulence management.

## **Enhanced surveillance and navigation**

This theme includes concepts for advanced surveillance, navigation and associated procedures to increase throughput in en route and terminal airspace. Topics may include use of ADS-B surveillance information, cockpit display of traffic information, performance-based navigation procedures, 4D information and the impact of trajectory-based operations.

## **Integrated airport/airside operations**

This theme includes models and analysis of airport surface operations and the coordination of local airport management decisions with the surrounding airspace decisions. Goals can include mitigating delays on scheduled airport operations, airspace delays and congestion and negative environmental impact. Topics include airport performance assessment and dynamic scheduling of airport and airspace resources, models that include the use of CDM are welcome.

## **Economics, finance and policy**

This theme includes economic incentives to change the behaviour of air transport actors, finance of air traffic services and modernization initiatives, investment analysis of ATM improvements, airport access control policy, equipage issues, adaptation to climate change, appropriate roles of government, air navigation service providers (ANSPs), and industry, and trade-offs between competing policy goals.

## **Globally interoperable systems and data**

This theme encompasses research and development of concepts, standards and systems that support the harmonization of aviation technologies and capabilities. It addresses the integration and coupling of related, but physically or logically distributed aviation systems and data to improve communication, collaboration and operational decision-making. Topics of interest include aviation information reference and exchange models, data standardization, data networking and sharing, information management, and tools to support collaboration of stakeholders using diverse systems.

## **ATM performance measurement and management**

Topics of interest include prediction, measurement, control and optimization of one or more dimensions of air transportation system performance including cost efficiency, flight efficiency, capacity, productivity, punctuality, and predictability. Empirical and analytical (e.g. model-based) studies for individual programs and the system as a whole, both within and across ANSPs, are welcome. Note that research on human performance should be submitted under the human factors theme.

## **Safety, resilience and security**

Safety and resilience topics of interest include the application of models and methods to assess system and human response to unexpected operating conditions in the socio-technical ATM system, to compare current and future approaches for risk mitigation and to validate contributions from future technology and automation to safety management. Safety and security management have commonalities but often require different approaches due to the nature of the risk/threat. Security topics of interest include cybersecurity, the protection of airports and other critical ATM infrastructure with physical vulnerabilities, and unwanted UAS activity.

## ***Environment and energy efficiency***

Of particular interest are: assessment and measurement of aviation's environmental impacts and energy efficiency as well as interdependencies among these and other parameters; approaches to improve ATM and operational procedures from an environmental and energy efficiency perspective; analyses of impacts of new aircraft and other new technologies on the environmental performance of ATM and operational procedures; and results from ATM and operational procedure demonstrations.

## ***Weather in ATM***

This theme includes the integration of weather information into ATM decision making to understand and mitigate its impact on operations. Topics include quantifying the impact of weather on air traffic operations, decision making in the presence of weather forecast uncertainty, and generally all consideration of the role of weather and weather forecasting in the practice of ATM.

## ***Human factors***

NextGen and SESAR concepts will change the roles and responsibilities of human operators in the air traffic control system. Human factors issues include: human-system integration, decision making, training, selection and performance monitoring, organizational dynamics, change management, individual and team performance and adaptive automation. Topics include tools, techniques and metrics to enhance the performance of humans in ATM.

## ***Autonomous, unmanned and remotely piloted aircraft systems***

This theme focuses on the safe and efficient integration of UAS/RPAS and autonomous systems into ATM operations, especially in managed airspace. Topics of interest include separation requirements, trajectory-based operations, dynamic network analysis of the decision loop changes from separation through traffic synchronization, design and analysis for increased autonomy to ensure safety, resilience and trust in the system, and human/automation interaction with UAS.

## ***Complexity science, analytics and big data for ATM***

Papers should address the application of complexity science, and related disciplines to air transportation when seen as a complex socio-technical system. Analysis of large volumes of structured or unstructured ATM data that can bring fresh insight is also included in this theme. Topics may include understanding of air transport system complexity and behaviour, emergent behaviour with appropriate modelling and simulation techniques, forensic investigation/data mining and analysis and complexity metrics. The theme also includes applications of machine learning in ATM.

