Fourteenth USA/Europe Air Traffic Management Research and Development Seminar

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The United States Federal Aviation Administration and EUROCONTROL are jointly organising the Fourteenth 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.

ATM2021 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. **Due to the uncertainty regarding COVID-19, the seminar will take place in September 2021 in a virtual format, potentially allowing for optional in-person participation should conditions improve. The format will be adapted so as to allow remote participation from different time zones. Details will be announced progressively on the conference website.**

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 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 to a single nation or region will be looked upon favourably. Papers addressing the present pandemic, or pandemics in general, and how the aviation industry can assess and mitigate its impact are specifically encouraged.

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 850 past papers at 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: Monday 19 April 2021

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 2 July 2021

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. Best conference papers may be included in a special issue in a recognized scientific journal.

All physical 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

Conference co-chairs: Eric Neiderman, FAA (eric.neiderman@faa.gov)
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Programme Committee

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ATM 2021 theme descriptions

These descriptions outline the scope of each theme as envisaged by the Programme Committee. They are not exhaustive; 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 air carriers and service providers. 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 from 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, analyses 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 analyses of airport surface operations, and the coordination of airport and airspace management decisions. Goals can include the mitigation of surface and airspace congestion and resulting delays and environmental impacts. Topics include airport performance assessment and dynamic scheduling of airport and airspace resources. Models that include the use of CDM are welcome. This topic also includes the emergence of Digital/Remote Towers and accompanying technologies such as computer vision (as primary surveillance), augmented reality, intelligent & interactive digital dashboards.

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; avionics equipage mandates and incentives; adaptation to climate change; appropriate roles of government, air navigation service providers (ANSPs), and industry; and trade-offs between competing policy goals.

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 effectiveness, 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. The interdependencies that may emerge between different key performance indicators or key performance areas are equally of interest. 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; propose assessment and measurement of safety performance and resilience; 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 physical protection of airports and other critical ATM infrastructure, and unwanted UAS detection/mitigation.

Environment and energy efficiency

Of particular interest in this theme are the assessment of aviation's environmental impacts and energy efficiency, approaches to reduce aviation's environmental impact and improve energy efficiency via ATM and improved operational procedures, analyses of impacts of new aircraft and other technologies on the environmental performance of aviation; and results from related 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 socio-technical concepts will change the roles and responsibilities of human operators in the air traffic management system. Human factors issues include: human-system teams, 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. Papers may also address macro ergonomics, or the "systems approach" to human factors, and the new perspective resulting from these.

UAS/RPAS and New Entrant Operations

This theme focuses on the safe and efficient integration of UAS/RPAS, autonomous and new entrant 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. New entrants include high altitude operations (balloons, High Altitude Long Endurance UAS, etc.), commercial space and Urban Air Mobility (UAM) operations.

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.

Aviation and the Pandemic

This theme solicits contributions that specifically address the assessment and mitigation of the impact of the present COVID-19 pandemic, or any other crisis of similar nature, on the global aviation system.