Call for papers - ATM 2009

The eighth USA/Europe Seminar on Air Traffic Management Research & Development welcomes papers that produce new concepts, analyses and methodologies on the themes outlined below. The seminar will take place on 29 June – 02 July 2009 in Napa, California, USA.

In a continuous effort to further the science on ATM that is necessary to lead to a harmonized global Air Traffic Management (ATM) system, the United States Federal Aviation Administration and the EUROCONTROL Organization are jointly organizing the Eighth USA/Europe Seminar on ATM R&D. This event will take place June 29 – July 2, 2009, in Napa, California USA. It is a continuation of seminars held since 1997 in both Europe and the USA.

Both in Europe and the USA considerable efforts under the Single European Sky ATM Research (SESAR) and Next Generation Air Transportation System (NextGen) initiatives respectively are ongoing to define and develop the next generation of ATM systems for the 15 to 25 year timeframe. The Eighth USA/Europe ATM R&D Seminar in Napa, California includes in addition to near term research, emphasis on longer term ATM operational aspects. Papers presenting results from innovative research as well as investigative R&D should thus focus on operational improvements for the next generation ATM system and for envisioned interim steps in addition to more near term changes to today's systems.

With these seminars we hope to create and reinforce working and personal relationships between leading experts and researchers in the ATM R&D community, share available results and build and maintain consensus on major issues.

The Program Committee welcomes papers that present new concepts, analyses and methodologies addressing the following themes in air traffic operations:

- Network and Strategic Traffic Flow Optimization
- Air Ground Automation Integrated Concepts
- Trajectory and Queue Management
- Separation
- Enhanced Surveillance and Navigation Applications and Procedures
- Dynamic Airspace and Capacity Management
- Integrated Airport/Airside Operations
- Finance and Policy
- ATM Performance Measurement and Management
- Innovative Methods for Safety Assessment
- Concepts for Security in ATM
- Environmental Impacts in ATM System Design and Operation
- Innovative ATM Concepts
- Weather in ATM
- Human Factors

Theme Descriptions

The following theme descriptions provide example sub-topics that authors should take into consideration:

- **Network and Strategic Traffic Flow Optimization**
  This theme deals with concepts for strategic Flow Management and Optimization. From a carrier perspective it includes management and optimization of carrier network and block times. From the service provider perspective it includes layered planning, integration, and optimization of traffic management initiatives. This theme also includes concepts of collaborative decision making (CDM) for collaboratively solving congestion in both airspace and airports. Examples are collaborative flight planning, collaborative implementation of strategies to balance demand to reduced capacity during severe weather, integrated modeling of and execution of airport and airspace programs, Pre-day of and day of operation departure schedule management for balancing with scheduled capacity, etc.. Future concepts for traffic flow management are also part of this theme. Examples include: dynamic utilization of military or restricted airspace and future role of schedulers, dispatchers, traffic managers and controllers and other operators engaged in flow management.
- **Air Ground Automation Integrated Concepts**
  Advanced concepts for ATM that utilize both ground and aircraft-based capabilities to enhance capacity and maintain safety. Topics may include: roles and responsibilities for pilots and controllers, such as delegation of separation responsibility; ground-air integrated decision support tools; modes of operations corresponding to different "qualities of service" related to airspace user needs, level of equipage and traffic density; management of airspace needed for

unmanned aircraft systems (UASs); common situational awareness and information management; highly structured airspace operations (high density corridors, expressways); certification of tightly coupled ground-air automation capabilities; safety assessments and management of disruptive conditions and contingencies as well as analysis of trade-off configurations (e.g., benefits) of ground and aircraft-based capabilities.

- **Trajectory and Queue Management**
  NextGen and SESAR focus on the shift of control by tactical clearance to management by reference business trajectory. This includes: trajectory planning and optimization; contract negotiation and updates; traffic synchronization to organize traffic sequences and reduce traffic density; airborne separation assurance systems and their role in executing trajectories. This also includes the queue management functions such as arrival manager, departure manager, surface manager, and other ATM decision support tools as well as their integration. A third general area is the integration of advanced procedures into trajectory management. Finally, research addressing the role of the controller and methods for dealing with failure situations as the shift toward trajectory-based operations occurs is of interest. Analyses of specific procedures that exploit enhanced surveillance and navigation capabilities to reduce environmental impacts or increase operational efficiency also fall under this theme.
- **Separation**
  NextGen and SESAR ensure safety through use of technology and procedures while satisfying necessary separation constraints so as to optimize capacity. This includes: tactical separation management functions and airborne separation assurance systems, safety alerting for collision avoidance relative to algorithm accuracy and advisories, methods and models to assess separation requirements in different operational environments, and methods and models to validate both reduced separation minima as part of wake turbulence management and roles and responsibilities of pilots, controllers and automation systems; management of airspace needed for unmanned aircraft systems (UASs) Other topics include runway incursion alerting systems and modeling with the pilot or controller in-the-loop, and ground automation control functionality.
- **Enhanced Surveillance and Navigation Applications and Procedures**
  This theme includes concepts for utilization of advanced surveillance, navigation, and procedures to increase throughput in en route and terminal airspace. Topics may include: utilization of ADS-B surveillance information and Cockpit Display of Traffic Information (CDTI) for flight following, merging and sequencing; application of advanced surveillance and navigation to reduce separation; support to high-density terminal operations, including multi-airport configurations; disruptive conditions and contingencies; mixed equipage operations; requirements, concepts and technologies for high precision, all area, cost effective and secure cooperative and non cooperative surveillance and broad area precision navigation; implications of enhanced surveillance and navigation capabilities for trajectory based operation and 4D conformance monitoring requirements.
- **Dynamic Airspace and Capacity Management**
  NextGen and SESAR include the concept of managing airspace capacity to meet demand. Based on the expected flows (aggregated shared business/mission trajectories) the airspace and related assets are managed in an effort to accommodate the demand. Topics include procedures and support tools for dynamic management of airspace according to the needs of varying traffic densities, weather and military activities; dynamic optimization of highly organized structures (highways, corridors, structure routes/procedures); human factors considerations (for example, situation awareness) on the impact of dynamic structures (for example how often can the structure be changed, what is the lead time for the change, how much it can be changed).
- **Integrated Airport/Airside Operations**
  This area encompasses Airport Surface Operations. Topics include Surface surveillance, movement, guidance, and flow optimization. Arrival Flow Management, Departure Flow Management and their integration into optimized Arrival/Departure Capacity Management. Surface flow optimization and monitoring to prevent gridlocks. Ramp/Apron management and surface data collaboration. Continuous and Out of Gate to Off Runway On Runway to In Gate (OOOI) operations. Taxi-in/out delay monitoring. Delay prevention/alarms beyond preset delay thresholds. Dynamic pre-Departure Clearance. Virtual Control Tower Operations. Airport collaborative Decision Making. Human factors in airport operations.
- **Finance and Policy**
  Successful transition to SESAR and NextGen will depend heavily on appropriate financing and policies in a broad range of areas. Topics include: types of business cases that will be used by Air Navigation Service Providers (ANSPs) and other stakeholders to make implementation decisions; appropriate measures to represent the value of air transportation; who pays how much for services; ways of accelerating equipage; allocation of scarce airport and airspace resources; mechanisms for allocating scarce resources; deciding who will get access to data in a net-centric system-wide information management environment; appropriate roles of government, ANSPs, and industry; trade-offs between environmental, efficiency, and equity goals, assessment of and experience with alternative financing; other policy issues.
- **ATM Performance Measurement and Management**
  Topics of interest include forecasting, measuring, monitoring, controlling and optimizing different dimensions of air transportation system performance, including safety, efficiency, punctuality, cost effectiveness and environmental impacts of air transportation; quantification of performance objectives; assessing how well proposed systems will meet objectives; assessing achievement of objectives after system implementation; assessment and mitigation of uncertainties; and experience with models and simulations for ATM system performance measurement and management.
- **Innovative Methods for Safety Assessment**

Papers relating to innovative methods for assessing safety are solicited for this track. Topics of interest include: design, modeling and assessment techniques for future ATM systems (including new vehicles operations); advances in collision risk models; methods for including humans in safety assessment models; system level safety/risk assessment; benchmarking safety assessment; extensions to traditional approaches (operational hazard analysis, safety requirement definition, fault tree analysis ...); methods for assessing safety of complex systems with consideration of interaction of system components; impact of emergent system behavior on safety; assessing the value of Safety Management Systems and similar techniques. Papers should include a discussion of the advances this methodology provides over other methods. An example of the application of the methodology and identification of other potential applications should be provided. Papers dealing primarily with assessment of safety for specific ATM applications should be submitted in tracks relating to the application.

- **Concepts for Security in ATM**
  The theme covers the integration of security concepts and requirements with ATM operations to ensure safe, efficient, and secure flow of traffic. Topics may include: advanced concepts for identifying and dealing with potentially hostile aircraft; effective management of special use airspace; management of airspace needed for unmanned aircraft systems (UASs); roles and responsibilities of ANSP, security and defense personnel in dealing with security situations; integrated information needs and common situational awareness, such as surveillance; use of airport security information (e.g. passenger security delays) in ATM decisions (e.g. departure planning); concepts for providing new capabilities and procedures for moving passengers and cargo through airports securely and efficiently.
- **Environmental Impacts in ATM System Design and Operation**
  Environmental constraints must be addressed in order to grow aviation activities. Both the NextGen and SESAR concepts seek to enhance energy efficiency and reduce environmental impacts for the next generation ATM system. Rising fuel costs are providing new drivers toward efficiency and creating new opportunities for the use of alternative fuels. Papers being submitted on this topic can cover a range of issues including assessment and measurement of the environmental impacts of the ATM system; modeling approaches to optimize environmental performance, clean and quiet operational procedures; approaches to optimize both environmental and system performance (e.g. single engine taxiing); analyses of trades between environment and other parameters (e.g., capacity and safety considerations such as separation); analyses of impacts of new aircraft and alternative fuels on the environmental performance of ATM.; and results from demonstrations such as the Atlantic Interoperability Initiate to Reduce Emissions (AIRE) Analyses which are primarily focused on efficiency and capacity but have environmental benefit should be submitted in the category with the primary focus to assure best consideration.
- **Innovative ATM Concepts**
  Both the NextGen and SESAR concepts seek to leverage innovative concepts in ATM and air-ground integration. This theme focuses on very advanced or non-traditional system concepts.. Concepts included in this theme are typically ones for which mature evaluation/analysis results are not yet available. This includes unmanned aircraft systems (UAS) technology; procedures for ATM and separation; and system architectural aspects, modeling and analysis requirements for future concept development and validation. Other topics include innovative alternate applications of advanced technologies and procedures to refine intended benefits.
- **Weather in ATM**
  This theme includes the integration of weather information into ATM decision making to mitigate the impact of weather on operations. Topics may include: direct integration weather information into advanced tactical and strategic decision support tools; operational and performance requirements for weather information to support envisioned future operations; common situational awareness for service providers, pilots and flight operations; cockpit-based weather information capabilities to ensure safety; quantification of the impacts of weather on ATM operations (e.g. how many delays are avoidable); roles of pilots and controllers related to ‘separation from weather‘ given envisioned advanced capabilities; UASs as both providers of weather observations and users with unique weather needs; translation of weather phenomena into ATM impacts (e.g. what airspace is available); system implications for weather information sharing, including application of net-centric technology.
- **Human Factors**
  Both the NextGen and SESAR concepts rely on new cross-cutting paradigms with changes in delegation of responsibility between pilots and controllers and also dynamically allocating functions between human operators and automation. Human factors issues include human-system integration, roles of automation making ATM decisions vs. human decisions, assessments spanning the system life cycle such as methods in error/incident analysis, and change management and organizational factors within ATM. Papers addressing decision support concepts, applications, procedures, human-centered tools and information management should be submitted in the category with the primary focus to assure best consideration.

Submission of papers, format details and evaluation criteria

Classification

Along with their submission authors are requested to suggest the theme to which the paper should be attributed.

Structure of Paper

Each paper should begin with an **Abstract** of between 100 to 300 words, allowing the reader to understand the main ideas of the work and its relevance for the air traffic management areas given above. Following the Abstract, there should be a list of **Keywords**. The key words will enable search functions in the ATM seminar website.

The body of the text should start with an **Introduction** to the overall paper and it should explain the paper's main contributions. A **Background** should assess the international state-of-the-art relevant to the work described. Note that suitable references to other relevant work in the subject area are essential. The paper should end with **Conclusion**, **References**, and the **Biographies** of the authors (not more than 100 words per author).

NOTE: Please visit the seminar website to review the best papers from the ATM2007 Seminar as examples.

Format and Template

Please use the following template (MSWord format) as a guide for formatting your ATM2009 paper submission.

A template for formatting your paper is provided here.

Submission

The paper should be submitted - **in PDF** - using the paper submission template on the seminar web site. It should not exceed 10 pages (including the authors' bios) and it **must** be the

Final Paper!!

This is a complete paper for which, after the selection process, editorial changes or last findings will only be accepted with the agreement of the reviewers.

The Program Committee is encouraging graduate students to respond to this call for papers by reducing the seminar registration fee for students whose papers are accepted.

Papers presenting significant new results that build upon prior efforts presented at previous USA/Europe ATM R&D seminars are encouraged. Authors should review papers and proceedings from previous seminars published on the ATM seminar Web site (www.atmseminar.org). Papers previously presented at other conferences or like fora will not be accepted.

Joint papers resulting from collaboration between organizations are encouraged. Preferential consideration will be given to joint USA/European papers.

Papers must be submitted no later than January 23, 2009!

Please note also that **no deadline extension** will be granted.

Authors will be notified of acceptance or rejection of their paper by March 27, 2009.

Authors presenting accepted papers are expected to attend the entire seminar. This is critical to achieving the seminar's goal of creating and reinforcing working and personal relationships between leading experts and researchers in the ATM R&D community. During the final plenary session it is especially important that a representative for each paper be present.

A selection of the seminar papers will be published in a special issue of ATC Quarterly.

All information on this seminar will be continuously updated and can be accessed along with proceedings from previous seminars on the seminar website, where all (selected) papers will be published:

Evaluation Criteria

The selection of papers will be based on a weighted evaluation of the following criteria:

1. Relevance to ATM, in particular to the themes indicated above
2. Overall significance
3. Originality of approach or content
4. Methodology (rigorous, repeatable and demonstrable)
5. Scientific reasoning (as appropriate: logical arguing, technical soundness, adequate results)
6. Organisation / writing / clarity
7. Adequacy of references

Please note again that joint US/European papers are particularly welcome!

Program Co-Chairs:

Sabrina Saunders-Hodge, Federal Aviation Administration (sabrina.saunders-hodge@faa.gov)

Vu Duong, EUROCONTROL Experimental Centre (vu.duong@eurocontrol.int)