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# IFAR – International Forum for Aviation Research



## “Future oriented ATM Research – Report of the IFAR Working Group”

### IFAR ATM Efficiency Initiative on Integrated Arrival/Departure/Surface (IADS) Operations

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## PROBLEM

- Airport terminal area and surface inefficiencies have long been recognized as a major constraints on ATM system performance, incurring delays, resulting in excess fuel consumption, noise, and emissions.
- Lack of integrated technologies contributes to major delays at busy terminals.
- Operational needs are only addressed at regional level - no global perspective.
- ICAO Aviation System Block Upgrades (ASBU) 2 (2018) and 3 (2023) not sufficiently defined in Integrated Arrival, Departure, Surface (IADS) area.  
(whereas Blocks 0 and 1 are well defined)

## OBJECTIVE

- Develop a globally harmonized research concept of operations for Integrated Arrival/Departure/Surface (IADS) to reduce fuel consumption, noise, and emissions, and inform ICAO ASBUS 2 and 3.

Lead group of 13 national research organization initiative on Integrated Arrival, Departure, Surface (IADS) operations to inform ICAO Aviation System Block Upgrades 2 and 3; capture global challenges and research capabilities; enable bi-lateral collaboration



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## APPROACH AND PLANNED DELIVERABLES

**Task 1:** Organize face-to-face/remote WebEx meetings and calendar for exchange

**Task 2:** Catalog regional operational challenges and modernization initiatives

**Task 3:** Catalog research initiatives and capabilities and potential application to recognized operational challenges in Task 2.

**Task 4:** Identify deliverables for additional data requirements and specific solutions  
→ ***Leverage existing agency funded activities***

**Task 5:** Identify existing and potential new bi-lateral agreements to execute on deliverables identified under Task 4

**Task 6:** Conduct bi-lateral collaborative work

**Task 7:** Develop the unique IFAR global perspective otherwise not available

- Global catalog of needs from a complete world view
- Global catalog of research capabilities and initiatives
- Global benefit pool map
- Inform ICAO ASBU Blocks 2 and 3

**Task 8:** Disseminate the results to Inform ICAO and users

- Share pre-competitive and public results to advance joint knowledge
- Inform further development of global operational concepts (e.g. beyond NextGen/SESAR and ICAO ASBU 2 and 3) through specific research activities/concepts



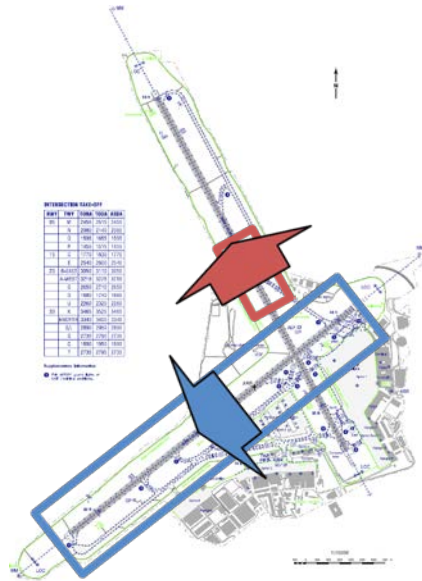
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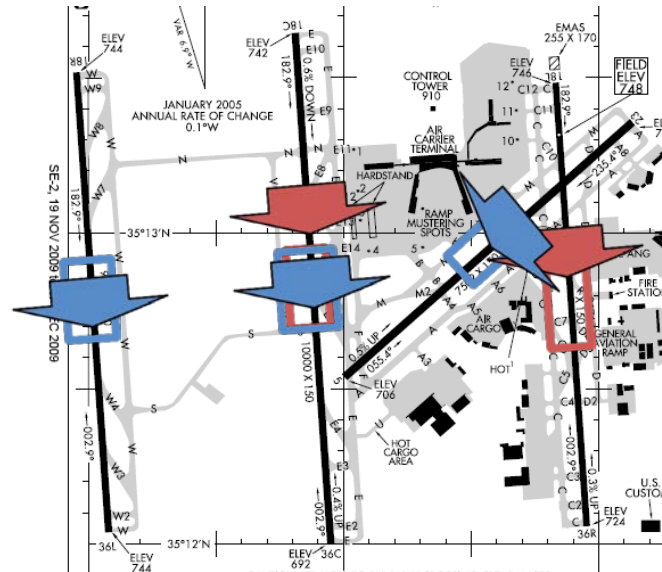
## NASA and DLR cooperation on ATM:

### Example: Align surface and runway management philosophies

Validation of departure and surface management from NASA and DLR for airports in respective environments to create a joint operational concept.



Hamburg International Airport (Germany)



Charlotte International Airport (NC, USA)

First step: Simulation runs of departure and surface management tools from NASA and DLR were conducted for a German and a US airport on both sides. (DLR's departure manager CADEO and NASA's Tactical Runway Configuration Management)



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## EXPECTED RESULTS

- Build a complete global view of IADS by sharing regional challenges and needs;
- Accelerate individual research progress through knowledge sharing;
- Share the research needs and results with the users (airlines, NSPs, national and international regulatory bodies, etc.);
- Enhance the ability for IFAR members to identify, test and/or implement solutions appropriate for their national or regional needs:

*This can benefit those with robust research programs and/or mature systems, as well as those members who are seeking already developed solutions to put in place.*

## SIGNIFICANCE

- IFAR is uniquely positioned to deliver globally harmonized results;
- Efforts inform ICAO ASBU 2 and 3 (extending beyond NextGen and SESAR);
- Forms a repository of global solutions and capabilities;
- Enables global harmonization at the concept level to accelerate implementation of harmonized technologies downstream;
- Offers opportunities for potential new partnerships or collaborations among IFAR members to achieve greater national and multilateral objectives.





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## NEEDS AND OPPORTUNITIES

- All IFAR member states feel the impact of IADS challenges through increased fuel consumption, noise, emissions, and delays due to (naming a few):
  - Lack of Information Sharing and Inaccurate System Predictability
  - Interfering Terminal Area Trajectories
  - Manual Surface Operations and Lack of Coordination of Traffic Management Initiatives
- Individual domain applications without an integrated solution ignores the reality of cross-domain dependencies
- It is important to create a complete picture at the global level:
  - SESAR (Europe) and NextGen (USA) objectives well understood
  - CARATS (Japan), CNAS (China), Russia, India, Brazil, Korea challenges not as well understood by USA and Europe
  - IADS is identified as research gap and challenge in NextGen and SESAR
- IADS is a good first challenge to accept: it is big, important and manageable
  - All IFAR members can contribute no matter their size or location
  - Contribution could be research, solution, data, or operational validation
- Bi-lateral partnerships for field evaluation offers access to otherwise unavailable evaluation environments



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## PROGRESS

- Bi-weekly WebEx to collaboratively execute on the tasks
- Captured regional operational challenges, research technical challenge needs, and ATM modernization initiatives:
  - US and NextGen
  - Europe and Single European Sky ATM Research Joint Undertaking (SESAR-JU)
  - China and New-generation Civil Aviation ATM System
  - Japan and Collaborative Actions for Renovation of Air Traffic Systems
  - India GAGAN SBAS System, PBN, ATFM, and Indian Ocean emissions initiatives
  - Russia ATM Development Program
  - Korea National ATM Reformation and Enhancement (NARAE)
  - Brazil ATM Implementation Plan
  - NavCanada Performance Based Navigation initiatives
- Currently capturing the research activities and capabilities of the IFAR members





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## SCHEDULE

- November 2014 Zhuhai Summit:
  - Completed ToR, Task Plan, Schedule, and Deliverables
  - IADS ATM Initiative presentation at IFAR Summit for approval and solicitation of new members
- November 2014 - May 2015:
  - Face-to-face workshop
  - Develop detailed deliverables and complete Tasks 1, 2, and 3
- October 2015:
  - Complete Task 4
  - Develop and share research needs in global perspective
  - Develop and share research solutions in global perspective to solve unique regional issues
  - Identify potential bi-lateral collaboration opportunities
  - Begin engagement with users
- November 2016:
  - Initiate development of a globally harmonized Concept of Operations
  - Share results of bi-lateral engagements among IFAR members and users
  - Develop the first draft of input to long-term R&D plan (i.e., ICAO ASBU 2 and 3, cognizant of the current R&D framework of NextGen/SESAR)
- In the years 2017 to 2018: complete Tasks 5-8



**Thank-you for your attention!**

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