

air traffic management integrated test bed (atm-itb)



Services Overview

The ATM ITB is an EADS-headed test and simulation environment, in line with the International Civil Aviation Organization (ICAO) Global Air Traffic Management Operational Concept, which is currently under development in programs like Single European Sky ATM Research (SESAR) and Next Generation Air Transportation System (NextGen). The test bed offers integration, verification and validation services for a broad range of current and future ATM concepts. Three divisions of EADS – Airbus, Astrium and Cassidian – joined forces with three external partners – 4D Aerospace R&S GmbH / Universität Salzburg, Airport Research Centre GmbH (ARC) and Avitech AG – in order to develop an open and a scalable target architecture supporting the ATM business, from Marketing and Consulting to Concept Validation and System of Systems Verification.

Focus Areas

Currently, three key aspects of global ATM evolution are core to the ATM ITB activities:

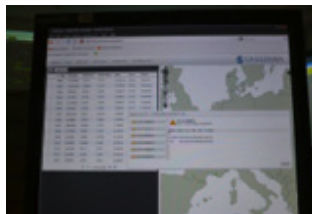
Civil-Military Integration: For optimized usage of airspace, civil and military stakeholders have to work together to enable economic, ecologic, safe and secure processes in day-to-day operations. The ATM ITB is validating ways to securely communicate and exchange data during airspace incident scenarios, between civil and the military stakeholders. The main achievements of these activities include securing situational awareness for all parties, providing flexibility to minimize costly re-routings and ensuring all “nodes in the network” are informed about the situation.

Integration of Unmanned Aircraft System (UAS) into Controlled Airspace using Global Navigation Satellite System (GNSS) and Satellite Communication (SatCom):

Usage of UAS for wide-use depends on seamless integration into controlled airspace. Satellite-based communication and navigation services are crucial technologies to build upon. The ATM ITB shows how UAS can be managed in controlled airspace if satellite based communication and navigation are employed using standards like Automatic Dependent Surveillance Contract (ADS-C) and Controller Pilot Data Link Communications (CPDLC). Air Traffic Control (ATC) and ground based operators can communicate in a controller-pilot style – for instance to solve potential conflicts - even if the Unmanned Aerial Vehicle (UAV) is far beyond line-of-sight.



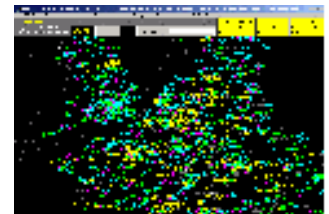
Radar and traffic simulation (RAVIR / COSMOS NG - Cassidian)



Civil-Military Integration (Cassidian ATC/CRC products)

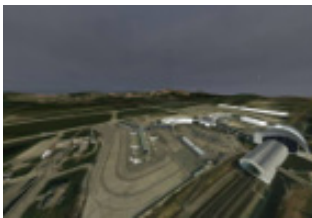


A340-600 Simulator (PLREF MOSART - Airbus)

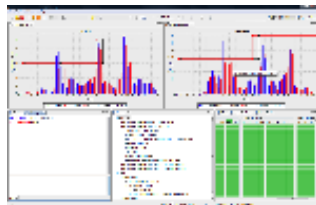


Air Traffic Generator & ATC position (NavSim - 4DAe/ Univ. Salzburg), Sat-based CNS (Astrium)

Airport: Today, airports often are a source for delays in the air traffic system. In addition to infrastructure limitations, suboptimal decision and guidance processes are major contributors to the inefficiencies. The ATM ITB is used to demonstrate the value of an Airport Collaborative Decision Making (A-CDM) cell, integrated into an Airport Operations Center (APOC). Airport authorities, airlines, and ATC together, with the A-CDM cell, were able to solve adverse effects from weather or from an emergency situation with minimized delays.



Simulation of Aircraft Traffic Processes (CAST Aircraft - ARC)



Simulation of Airport Operation Center/APOC (ATHOS - Astrium)

Technical Concepts and Access

The ATM ITB is composed of more than 25 building blocks, developed inside EADS or provided by external partners, using the following operational ATM standards:

- AFTN, AMHS, NOTAM, ATS Messages (FPL), MET messages (METAR, Spec, TAF), IFPS/ETFMS messages, CPDLC, ADS-C, Asterix Cat 48, Asterix Cat 20, MLAT

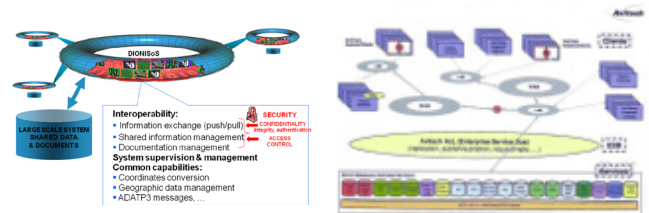
The ATM ITB also supports future concepts like:

- System-Wide Information Management (SWIM), Advanced Flexible Use of Airspace (aFUA), A-CDM, and UAS integration into controlled airspace

The ATM ITB is comprised of different layers for information interchange:

- The simulation backbone ensures monitoring and control of the complete simulation infrastructure in all cases (stand alone/distributed, real time/fast time).

- The ATM operational backbone for SWIM including current exchange of AIM, Flight/Flow and MET Data.
- The military communication backbone is connected to SWIM through a secure gateway, ensuring adherence to “Single Sky” philosophy.



Secure military communication layer (DIONISS - Cassidian)

SWIM aeronautical data exchange layer (AxL - Avitech AG)

The ATM ITB offers scalable solutions from stand alone, co-located and limited experiments, up to internationally distributed system-of-systems test bed applications.

Several options are available to gain access to the ATM ITB:

Simulation Standards: Connectors to proven HLA 1.3 / RPR FOM 1.0 or Shared Virtual Sky Interoperability backbone are ready to use or can be developed easily

Operational Standards/Systems: AxL, AMHS or message formats like Asterix Cat 48 can be used as well to connect to the ATM ITB

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