Status of SESAR

Iris Public Event – 04/02/2013
Peter Hotham (SESAR JU)
Set up a binding framework at EU level

With which instruments?

Guidance Material & Common Projects

‘Legal means’ is through implementing provisions of Article 15a of Regulation (EC)550/2004

Commission implementing Regulation
Guidance Material

- ATM Master plan
- Further develops the definition of common projects
- Establishes the deployment governance
- Identifies incentives for implementing common projects

Detailed processes & arrangements are defined in the relevant instruments

Common Projects

ATM Master plan implementation tools aiming to identify, "endorse" & deploy ATM functionalities that:

- Contribute to achieving the essential operational changes
- Are mature enough for industrialisation & implementation
- Require a synchronised deployment
Deployment Manager

- Composed of individual or groupings of operational stakeholders also from third countries
- Establishes appropriate cooperative arrangements with the Network Manager, the SJU & the Military
- May also establish arrangements with the manufacturing industry

Deployment Governance

- Aims to ensure the timely & synchronised implementation of common projects
- Composed of 3 levels:
  - Policy level
  - Management level
  - Implementation level
Timeline

December 2012
EC inter-service consultation
SSC discussion

February 2013
ICB opinion

March 2013
SSC opinion (vote)

April 2013
Adoption

Early 2014
Call for the Deployment Manager

End 2014
Selection of DM, Programme approval, Project selection

Early 2015
Governance in place
Comprehensive project view of all deployment activities necessary to implement **common projects**

It is established by the Deployment Manager in coordination with the Network Manager, the SJU and the Military and approved by the Commission

Constitutes the binding reference for the work of the Management and Implementation levels

Updated upon the adoption of each new **common project**
The European ATM Master plan 2012

The reference for SESAR deployment

• Outlines the essential operational changes contributing to SES performance objectives

• The reference for the modernisation of the European ATM system and for the coordinated, synchronised & timely deployment of SESAR
Pilot Common Projects

• EC Requested SJU to ‘prepare a proposal on the content of a pilot common project including the methodology’

• Master Plan describes ‘Essential Operational Change’ coming from SJU results. Select those that:
  • Make significant contribution to performance
  • Are mature enough for industrialisation & implementation
  • Require a synchronised deployment

• The Deployment programme will derive from the Pilot Common Project activity

• Not covering iris SATCOM in the pilot, as beyond the criteria - but a common project is a potential future option
Delivering Essential Operational Change

SESAR Programme Contribution to ‘Key Features’ and ‘Enablers’

- **Airport Integration and throughput**
- **Conflict Management and Automation**
- **Moving from Airspace to 4D Trajectory Management**
- **Network Collaborative Management and Dynamic/Capacity Balancing**
- **Traffic Synchronisation**

**Release Schedules:**
- **Release 3**: Queues
- **Release 4**: Queues
- **Release 5**: Queues
- **Release 6**: Queues

**Notes:**
- Operational Improvement steps
- Pre-Industrialisation level
- Target IBPs supporting validation
Objectives

- Third step in a sequence of exercises performing a gradual validation of trajectory exchange with the aircraft (2D/3D moving towards 4D) and validates the concept of a shared trajectory to ensure consistency of information between ground and airborne systems.

Validation Platform(s)

- ECTRL MUAC
- Airbus Flight Test Aircraft

Performance Expectations

- Improvement on Efficiency, Arrival Predictability.
SESAR Key Principles

THE 4D TRAJECTORY PRINCIPLE

THE SYSTEM WIDE INFORMATION MANAGEMENT

AUTOMATION
Efficient communication services are required to enable the key SESAR principles.
Enabling Efficient ATM Communication Services
Supporting all airspace users

- Mainline aircraft
- Regional aircraft
- Business aircraft
- General Aviation
- Military aircraft
  - ATM services
  - OAT not in the SESAR remit
- Unmanned Aerial Vehicle
  - ATM services
  - NOT in SESAR remit: Intra UAS domain services (e.g. C&C, ATM relay, payload, sense and avoid).
Taking a Global Approach

• SJU manages the EU-US Cooperation on Research (SESAR-NextGen), is active at ICAO (Block Upgrade, ANC12) and fully involved in EUROCAE and RTCA

• ICAO framework
• EUROCAE/RTCA

Spectrum availability is also critical
Separating the Issues

- **‘Data com’ Services**
  - CPDLC, DCL, D-TAXI, i4D, etc...
- **‘Data com’ networking**
  - (FANS), ATN/OSI transition to ATN/IPS
- **Physical Data link**
  - VDL/2 transition to Future L band etc...
- **Supporting Avionics**
  - Retrofit and forward fit issues (FMS, Display, etc)
- **Deployment**
  - Budget, mandates, timescales
Operational Needs and the Datacom Services

Initial 4D Trajectory Operations synchronises the flight plan or Reference Business Mission Trajectory between air and ground and supports the use of a time constraint to synchronise dense en-route and terminal traffic flows whilst allowing the aircraft to fly its profile in the most optimal way to meet that constraint.

- **Reduce routine tasks and voice communication**
- **Enable Initial 4D Trajectory Ops + additional services**
- **Full 4D Business / Mission Trajectory**

**CPDLC:**
- ACL: ATC Clearance and Information service
- AMC: ATC Microphone Check service

Supported by:
- DLIC: Data Link Communications Initiation
- ACM: ATC Communications Management

(European Datacom Mandate)

**CPDLC:**
- DCL: Departure Clearance
- D-TAXI: Data Link Taxi Service
- D-OTIS: Data Link Operational Terminal Information Service
- Additional CPDLC services supporting i4D

Plus
- Enhanced position reporting providing future waypoints with time in seconds supported by ADS-C EPP (Extended Projected Profile)

(Current scope of WG78/SC214)

Advanced ATM Services to be defined (Part of the work of SESAR in Europe)

+ Taking a fresh view of the requirements from a stakeholder needs perspective.
The Datacom Networking

ATN/OSI
FANS 1/A

ATN/OSI*

ATN/IPS**

ATN Standards & FANS1/A

Converged Standards

New Standards - TBD

FANS 1/A in Oceanic
(ATN Baseline 1)

(ATN Baseline 2)

Transition to ATN/IPS

*Open Systems Interconnection Model

**Internet Protocol Suite
Mapping Datacom Services and Networking to the Physical

Reduce routine tasks and voice communication
Enable Initial 4D Trajectory Ops + additional services
Full 4D Business / Mission Trajectory

ATN/OSI FANS 1/A
ATN/OSI
ATN/IPS

VDL-2 SATCOM
VDL-2 SATCOM Aeromacs
New SATCOM LDACS Aeromacs

SESAR Step 1
SESAR Step 2
SESAR Step 3

(French ATM Master Plan)
Technology and Requirements

• Technology development is a long term action (and so must be expedited)

• Operational Requirements not able to provide all of the detailed elements required for technology development

• Requires an iterative approach with initial technical developments based on initial and early view of customers upcoming operational requirements
The basis for the work in SESAR

- The future system (FCI) will be a system of systems integrating a number of communications sub networks
- SESAR ATM concept introduces new ATM services that are demanding in data exchanges (latency, capacity, availability, …)
  - 4D Trajectories Management, ASAS, …
  - CDM, Meteo info, SWIM, …
- A system wide view of the Com. needs will be taken, looking at synergies between ATM needs and other Com services.
  - Opening up the stakeholder view on Com requirements
- The business case and consideration of the business model is at the heart of the way forward.
Required Communication technology research

• The evolution of the usage of VDL Mode 2. **No SESAR project is currently addressing VDL Mode 2 capability evolution**

• New Terrestrial datalink technology (LDACS). **Project 15.2.4** is planned to address initial feasibility of LDACS 1. More work will be required.

• New SATCOM technology/approach. **Project 15.2.6** is addressing this.

• Aeronautical Mobile Airport Communications System (AeroMACS). **Projects 15.2.7 and 9.16** are addressing this technology.

• Adaptation of Link 16 & development of a ground gateway for interconnecting military/civil. **Projects 15.2.8 and 9.20**

• Flexible communication avionics. **Project 9.44**.

• The multilink concept. **Project 15.2.4** is planned to address this.

• Aircraft connectivity in SWIM. **WP 14 and Project 9.19**

• Voice Communications. **No SESAR project is currently addressing voice concept**.
ATM services could be supported by commercial services under certain conditions.
ATM services could be supported by commercial services under certain conditions

Affordable and transparent charges
Safety and Performance requirements are met and can be certified

Long term availability assurance (e.g. business priority)

Provide necessary segregation (safety, security, spectrum regulation)

Necessary stability vs shorter commercial lifecycles
SESAR and Iris Links - Overview

- We have closely followed and worked together on both ANTARES and THAUMAS in iris, in particular how to:
  - Define requirements and services
  - Define and achieve performance required in continental airspace
  - Align deliverables where possible between iris & SESAR
- As of Nov, the ESA Ministerial has resulted in support being committed to the development and demo of a Precursor system by 2017, based on an enhancement of SB200 Safety
- Precursor is a particularly interesting option for us, as:
  - The timeframe and approach allows for evolutionary delivery
  - Potential for Integration of i4D validation and demonstrations
  - Possible cost optimisation through commercial considerations
  - Could accelerate the deployment of trajectory-based operations
Incentives

Union financial support for SESAR deployment shall focus on implementation projects in accordance with the rules & procedures of the relevant Union funding programmes, in particular through the CEF.

Other incentives will have to be defined in the appropriate legal instruments.

Common projects may identify the incentives that are best suited for their implementation.
Deployment Manager
Composition & cooperation

Composed of individual or groupings of operational stakeholders also from third countries

Establishes appropriate cooperative arrangements with the Network Manager, the SJU & the military

May also establish arrangements with the manufacturing industry
information on the industrialisation of products
support in setting up a large scale deployment programme & its financing
<table>
<thead>
<tr>
<th>TMA</th>
<th>En-route</th>
<th>Oceanic</th>
<th>Random during Flight</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>- OOOI</td>
<td>- NOTAM</td>
<td>- Free Text</td>
<td>- NOTAM</td>
<td>- DataLink Logon</td>
</tr>
<tr>
<td>- Textual Weather Reports</td>
<td>- Free Text</td>
<td>- Maintenance Problem Resolution</td>
<td>- Textual Weather Reports</td>
<td>- FOQA Data Transfer</td>
</tr>
<tr>
<td>- Position Report</td>
<td>- Real Time Maintenance Info</td>
<td>- ACMS</td>
<td>- Flight Status</td>
<td>- Fuel Tickets</td>
</tr>
<tr>
<td>- Engine Performance Reports.</td>
<td>- Graphical Weather Info</td>
<td>- Central Maintenance Computing System</td>
<td>- Engine Performance Reports.</td>
<td>- Handling Process Monitoring</td>
</tr>
<tr>
<td>- Graphical Weather Information</td>
<td>- Air to Air Free text</td>
<td>- Credit Card Authorization</td>
<td>- Real Time Maintenance Info</td>
<td>- Load documentation acceptance</td>
</tr>
<tr>
<td>- Real Time Met Office Reports</td>
<td>- ACMS</td>
<td>- Emergency Data Transfer</td>
<td>- Central Maintenance Computing System</td>
<td>- Notice to Captain</td>
</tr>
<tr>
<td>- ACMS</td>
<td>- Aircraft Rotation / Flight Progress</td>
<td>- Hijack Report</td>
<td>- Company NOTAM's</td>
<td>- Onboard Video</td>
</tr>
<tr>
<td>- Airline Aircraft Sequencing</td>
<td>- Air to Air Free text</td>
<td>- In Flight preparation of next flight</td>
<td>- Credit Card Authorization</td>
<td>- On ground 4D trajectory Negotiation</td>
</tr>
<tr>
<td>- Airport Delay Information</td>
<td>- ACMS</td>
<td>- Flight plan destination renegotiation</td>
<td>- Delay Reports</td>
<td>- Passenger Information List</td>
</tr>
<tr>
<td>- Central Maintenance Computing System</td>
<td>- Onboard Video</td>
<td>- Optimization of Flight Plan</td>
<td>- Diversion Reports</td>
<td>- AOC Link Test</td>
</tr>
<tr>
<td>- Climb Wind Uplinks</td>
<td>- Optimization of Flight Plan</td>
<td>- Pax medial examine</td>
<td>- Emergency Data Transfer</td>
<td>- Aircraft Briefing Cards</td>
</tr>
<tr>
<td>- Diversion Message</td>
<td>- Pax medial examine</td>
<td>- Passenger e-Mail/text msg</td>
<td>- Emergency Report</td>
<td>- ACMS</td>
</tr>
<tr>
<td>- FMC Progress Reports</td>
<td>- Flight plan destination renegotiation</td>
<td>- Central Maintenance Computing System</td>
<td>- ETA</td>
<td>- Aircraft Door Movements</td>
</tr>
<tr>
<td>- Flight plan destination renegotiation</td>
<td>- Onboard Video</td>
<td>- Credit Card Authorization</td>
<td>- Aircraft Health Management</td>
<td>- Electronic Airway Bill</td>
</tr>
<tr>
<td>- Onboard video</td>
<td>- Optimization of Flight Plan</td>
<td>- Delay Reports</td>
<td>- Aircraft Technical Logbook</td>
<td>- Catering Lighting</td>
</tr>
<tr>
<td>- Pax medial examine</td>
<td>- Pax medial examine</td>
<td>- Diversion Message</td>
<td>- Aircraft Telemetry Service</td>
<td>- Baggage Loading</td>
</tr>
<tr>
<td>- SIGMET update</td>
<td>- Passenger e-Mail/text msg</td>
<td>- Electronic Flight Folder</td>
<td>- Central Maintenance Computing System</td>
<td>- Central Maintenance Inventory</td>
</tr>
<tr>
<td>- Broadcast Weather Information</td>
<td>- Broadcast Weather Information</td>
<td>- Flight Log Transfer</td>
<td>- Flight Inspection</td>
<td>- Marketing announcements</td>
</tr>
</tbody>
</table>

**COCR V2 described AOC services**

SJU Extension Considerations

• **Focus remains on Research & Innovation**
  
  • Increased Exploratory Research

• Develop Master Plan Step 3 Performance-based Operations & Technology

• More large scale demonstrations

• Increased support to Implementation of SESAR

• **Plan to move SJU End-date from 2016 to 2024**