

Contextual note – SESAR Solution description form for deployment planning

Purpose:

This contextual note introduces a SESAR Solution with a summary of the results stemming from R&D activities contributing to deliver it. It provides to any interested reader an introduction to the SESAR Solution in terms of scope, main operational and performance benefits, relevant system impacts as well as additional activities to be conducted during the industrialization phase or as part of deployment. This contextual note complements the technical data pack comprising the SESAR deliverables required for further industrialization/deployment.

Improvements in Air Traffic Management (ATM)

Communication services in terms of datalink systems and services in support of i4D and Aeronautical information data sharing are required and described in the Master Plan, along with the key airborne objective of realisation of the multi-link concept.

The Iris Precursor service is designed to exploit an opportunity for early benefits in the 2017-2025 timeframe by deploying an aviation communications service based on the existing Inmarsat SwiftBroadband (SBB) service. This would augment existing VHF Datalink (VDL) capability in Europe to improve current Link2000+ and planned I4D ATS datalink services delivery through increased reliability and capacity, and help establish satellite communications as a key component in the future ATM communications landscape. The Iris Precursor service establishes the necessary communication infrastructure to support interoperable Oceanic and Continental i4D operations.

Operational Improvement Steps (OIs) & Enablers

- CTE-C02f: Future Satcom for ATM : Precursor /INMARSAT SBB - class B Satcom. Defines a new satellite A-G datalink to provide service redundancy to the existing terrestrial datalink VDLm2, adapting the existing commercial SATCOM systems (i.e SBB)

Potential impacted OIs:

Code	Title
AO-0105	Airport Safety Net for Vehicle Drivers

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Air traffic services (ATS) datalink using Iris Precursor

AO-0206	Enhanced Guidance Assistance to Airport Vehicle Driver Combined with Routing
AO-0215	Airport ATC provision of ground-related clearances and information to vehicle drivers via datalink
AOM-0208-B	Dynamic Mobile Areas (DMA) of types 1 and 2
AOM-0208-C	Dynamic Mobile Areas (DMA) of type 3
AUO-0302-C	Provision of clearances using Datalink: performance based implementation
CM-0105-A	Enhanced ATC processes by the use of new CPDLC messages and related procedures
CM-0105-B	Enhanced ATC processes by the use of new CPDLC messages and related procedures in Trajectory based operations
CM-0605	Separation Management in En Route using Pre-defined or User-preferred Routes with 2D RNP Specifications
CM-0606	Separation Management in the TMA using Pre-defined Routes with 2D RNP Specifications
CM-0607	Separation Management in En Route using RBTs with 2D RNP Specifications
CM-0608	Separation Management in the TMA using RBTs with 2D RNP Specifications
CNS-0001-B	Rationalisation of COM systems/infrastructure for Step2
CNS-0001-C	Rationalisation of COM systems/infrastructure for Step3

Background and validation process

The SESAR Solution “ATS Datalink using Iris Precursor” has been verified through a series of development activities, laboratory testing and flight test on Airbus aircraft. A high level summary of the verification activities is presented hereafter.

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Lab testing

Laboratory activities were split in two phases. Both phases were performed at Airbus laboratory.

The first phase aimed at verifying the integration between ATSU and SATCOM systems with remote connection to ground systems (hosted at Inmarsat premises). The second phase allowed running complete i4D test scenario with the whole representative datalink chain (from avionics to ANSP end-system, through Inmarsat and SITA network).

To summarize:

- First laboratory phase: System Integration (Avionics and ground)
- Second laboratory phase: i4D and CDPLC functional test and Performance assessment

Flight Test

SATCOM and ATSU prototypes have been installed on A330 test aircraft (MSN871) in order to perform some i4D datalink exchange in real environment with ANSP end-system.

Results and performance achievements

The main findings from the overall verification exercise can be summarised as follows:

- Good level of maturity of SATCOM and ATSU prototypes developed
- Compliance to RCP130 and RSP160 was demonstrated. This level of performance is the expected one for ATN baseline 2 services defined in the ED228.

Recommendations and Additional activities

Additional activities have already been identified in order to mature ATS Datalink using Iris Precursor Solution:

- ATS Datalink using Iris Precursor Business Case
 - A specific attention has to be put on the business model (i.e. communication costs, stakeholder's revenue sharing, ATC charges policy...) . AS an example, the use of satellite communication will allow alleviation of VDL mode 2 channel that is an opportunity to delay investments on ground infrastructures and therefore should dictate ATC charges policy in regards.
- ATS Datalink using Iris Precursor deployment scenario
- Verification and Validation in multilink environment
- Opportunities for SESAR2020 VLDs (potentially joined with other initiatives VDL2 or 4D Trajectory)
- Global simulation of Iris Precursor in European Airspace context

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Actors impacted by the SESAR Solution

- Airspace Users,
- Air Navigation Service Providers,
- Datalink service providers.

Impact on Aircraft System

The solution requires an upgrade of the aircraft avionics. Indeed, ATSU and SATCOM system with Precursor capability to be embedded on Aircraft.

Impact on Ground Systems

ATN network already in place or implementation in progress over Europe.

Adaptation to Inmarsat network to enable ATN traffic over SBB and to connect to existing ATN network.

Regulatory Framework Considerations

EASA material for the implementation of Iris Precursor systems (A/C embodiment) will be required.

Standardization Framework Considerations

The standardisation bodies and the documents to which SESAR project has contributed with and are still on-going is provided below:

- ICAO
 - CP/WG-T
 - Update SATCOM SARPS
- EUROCAE/RTCA
 - EUROCAE WG-82 and RTCA SC-222
 - Class B SATCOM MASPS
 - Class B SATCOM MOPS

Considerations of Regulatory Oversight and Certification Activities

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Evolution of the ATN B1 and B2 mandate might be necessary in order to authorize ATS Datalink using Iris Precursor communication means to operate in this environment.

Solution Data pack

The Data pack for this Solution includes the following documents:

SESAR Project “I4D Trajectory Exchange using Precursor for INMARSAT SBB (class B SATCOM)” (P15.02.05)

- SESAR P15.02.05 Security, Safety and Performance Analysis, deliverable D03
- SESAR P15.02.05 System Interface Document ATSU-SATCOM, deliverable D04
- SESAR P15.02.05 Iris Precursor Verification Report, deliverable D05

Intellectual Property Rights (foreground)

The foreground is owned by the SJU.

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