SESAR Solution

Enhanced Ground Controller Situational Awareness in all Weather Conditions for Step 1

Contextual note – SESAR Solution description form for deployment planning

Purpose:

This contextual note is a vehicle to summarize the results stemming from Release delivery activities. It provides a summary of the SESAR Solution in terms of results of the Validation exercises and achievements as well as additional activities to be conducted before or as part of deployment.

This contextual note is part of a package prepared for each SESAR Solution for which exercise results are conclusive and sufficient to support a decision for industrialisation. It complements a technical data pack comprising available deliverables required for further industrialization.

Improvement in ATM Operations

The solution develops further ADS-B applications improving ground Surveillance systems in terms of safety, performance, interoperability and security. Data quality is increased with regard to the current surveillance system by means of improved surveillance data.

The following new functionalities linked to ADS-B are implemented:

- Enhancement of the ADS-B GS (Ground Station) to check the validity of the ADS-B derived data and to discard possible spoofing messages as well as messages transmitted by erratic ADS-B transponders, guaranteeing an improvement of the surveillance in terms of security and safety.
- Rationalization of Surveillance infrastructure through integration of the ADS-B system and WAM (Wide Area Multilateration) system. It offers the advantage of an infrastructure-sharing between the two surveillance systems, providing a more flexible and cost-effective solution, and also the potential for substantial improvement of the 1090ES detection capability by taking into account multilateration-derived data during the squitter decoding process.

Operational Improvements – OI Steps

AO-0201-A : Enhanced Ground Controller Situational Awareness in all Weather Conditions for Step 1

The system provides the controller with the position and automatic identity of all relevant aircraft and all relevant vehicles on the movement area (i.e. manoeuvring area plus apron).

Background

EXE 06.03.01-VP-652

An exercise took place at Milano Malpensa airport. The exercise applied two different validation techniques: real time simulation and shadow mode in order to validate all proposed validation objectives.

In detail, the focus of the simulation was to validate Surface Safety Nets, the enhanced ADS-B ground station and the Controller Working Position, comparing reference and solution scenarios, in order to cover validation objectives proposed in the corresponding Validation Plan.

In order to satisfy the scope of the exercise, the following simulation scenarios were tested:

SESAR Solution

Enhanced Ground Controller Situational Awareness in all Weather Conditions for Step 1

Reference Scenario – The *Reference scenario* for the live traffic run was executed in order to compare it against the Enhanced ADS-B functionalities in the **ADS-B** scenario. This scenario was simulated by means of a shadow mode simulation with real traffic, and relevant data were opportunely recorded.

ADS-B Scenario – In order to validate ADS-B Ground Station Prototype, one additional scenario was tested through shadow mode. The Enhanced ADS-B Ground Station was fed with real traffic data, and the Controller Working Positions were provided with both ADS-B and Multi Sensor Fusion (MSF) tracks. The Enhanced ADS-B Ground Station (producing MSF tracks, which include Multilateration derived data, and exploiting the enhanced ADS-B validation algorithm) was tested against the ADS-B stand-alone tracks.

Results and performance achievements

ATCOs effectively noticed a data quality increase by means of Enhanced ADS-B applications compared to the current surveillance system.

ATCOs asserted that Enhanced ADS-B is useful to improve their Situational Awareness especially in case of low visibility conditions.

Safety is improved by means of a better Situational Awareness on the airport surface due to the combination of the different Safety Nets with enhanced ADS-B.

Safety assessment was conducted using qualitative assessment data collected with questionnaires, debriefing, over the shoulder observations and systems logs.

Additional activities

No Additional R&D needs were identified as necessary for this SESAR Solution.

Actors involved

Actors are:

- Ground Controller
- Tower Controller

Impact on A/C system

Aircraft should be equipped with ADS-B out capability.

Impact on ground systems

Ground system needs to process multisensor fusion.

Consideration of Regulatory Framework

The need for improving security related regulation affecting data exchange should be considered.

Consideration of Standardisation Framework

SESAR Solution

Enhanced Ground Controller Situational Awareness in all Weather Conditions for Step 1

The need for improving standards addressing security issues affecting data exchange should be considered.

Considerations of Regulatory Oversight and Certification Activities

The elaboration of the local safety argument and the local procedures should be taken into account, as well additional technical and operational elements should be considered within regulatory oversight and certification activities framework.

Concept Option reference (OFA and Validation Exercise titles)

OFA 01.02.01 - Airport safety nets

EXE-06.03.01-VP-652- Validation of airport safety nets and enhanced ADS-B