

## SESAR Solution

### Validation of LPV: ATC procedures and ATC Training

#### Contextual note

##### **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.

In addition, adequate consideration of the recommendations on the regulatory and standardisation frameworks and the regulatory and certification activities is required. These recommendations are detailed in the 'SESAR Solution Regulatory Overview – Validation of LPV; ATC procedures and ATC Training' included in the technical data pack.

##### **Improvement in ATM Operations**

ATC Units will be able to design and implement, and to train staff to operate, LPV procedures as a step towards full implementation of APV by 2016, as recommended by ICAO 36<sup>th</sup> Assembly. Implementation will provide a backup to current ILS systems, and also provides an alternative precision approach where NPA may currently be flown. This improves safety, and increases access to some airfields.

##### **Operational Improvements – OI Steps**

**AOM-0603** - Enhanced Terminal Airspace for RNP-based Operations with vertical guidance. This exercise addresses V3 maturity of this OI step but not fully, just the ATC aspect. Furthermore, LPV is just an enhancement of the terminal Airspace. New advanced procedures will be developed in phase-2 of project 05.06.03.

##### **Background**

The SESAR Solution has been validated through EXE-05.06.03-VP-224 on the Validation of LPV; ATC Procedures and ATC Training.

The **purpose** of this exercise was to:

- measure the impact on air traffic control of the implementation of Localizer Performance with Vertical Guidance (LPV) procedures, serving mainly as fall-back procedure in case of ILS failure; and
- assess air traffic controller training needs for the use of LPV procedures.

The two day validation exercise was conducted in Glasgow airport through real-time ATC simulator with the objectives to:

- Support the validation of the integration of LPV into the operational environment;
- Assess the LPV procedures implementation impact on ATC;
- Demonstrate whether performance is improved or not adversely affected by the integration of LPV in Glasgow;
- Assess the requirement for ATC training for use of the LPV procedures; and
- Propose and validate new LPV ATC procedures and training for controllers to implement LPV operations.

### **Results and performance achievements**

Validation activities for this concept demonstrated that:

- LPV approaches can be safely integrated into the operational environment and implemented as a fallback solution in case of failure of the Instrument Landing System (ILS) with only a minor increase in controller's workload;
- LPV procedures additionally enable landing operations in bad weather conditions or in airports that are not equipped with ILS;
- airport landing rate can be improved or maintained with LPV and costs associated with airport closure or flight diversions due to bad weather conditions can be avoided; and

The exercise has also provided valuable lessons for the design of ATC LPV procedures, such as the importance of defining and using standard phraseology.

### **Additional activities**

Concept option already deployed at several airports; regulation for LPV currently in development (AMC 20-28)

### **Actors involved**

- Navigation Service Providers who provide radio-navigation signals.
- Aircraft and avionics manufacturers
- Aircraft operators
- Data suppliers
- Aerodrome operators
- Providers of Air Traffic Services
- Airspace/flight procedures designers
- AIS Service Providers

#### **Impact on A/C system**

No impact on A/C system. However, ability of flight crews to choose the new procedures is dependent on the capability of the aircraft, and the qualification of the flight crew. Any operator wishing to use such a procedure would need to be equipped with a GNSS SBAS avionics requiring airworthiness approval against AMC 20-28 (EASA) and will require an operational approval from the national authority.

#### **Impact on ground systems**

No impact on ground systems. With full implementation, it may be possible to retire some older ground infrastructure.

#### **Consideration of Regulatory Framework**

There is no specific topic in the field of the regulatory framework to be considered in deployment, beyond the applicable regulations currently existing.

Each State has its own national process for the approval of operators to perform RNP approach procedures. Consequently, it could be opportune to promote the harmonisation of all LPV operations.

#### **Consideration of Standardisation Framework**

There is no specific topic on the standardization framework field to be specially considered in deployment, beyond the currently existing applicable standards with the exemption of the potential modification of the ICAO PBN manual (Doc 9613).

#### **Considerations of Regulatory Oversight and Certification Activities**

When proceeding with the local implementation of this SESAR Solution, the contribution to Safety of several related ATM elements (such as General Aviation and commercial traffic distributions) must be taken into consideration.

Where applicable the behaviour of the environment with pre-existing ILS should be considered.

Specific local mitigation measures related to risks derived from SBAS should be considered.

#### **Intellectual property rights (foreground)**

The foreground is owned by the SJU.