



# SESAR Solution Regulatory Overview

## *Single Airport Remote Tower*

### Document information

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### **Abstract**

This document contains an overview of the SESAR Solutions documented recommendations from regulatory, standardisation, oversight and certification perspectives resulting from the cooperation with EASA and National Authorities.

## Authoring & Approval

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# 1 Introduction

The purpose of this document is to provide an overview of the SESAR Solutions documented recommendations from regulatory, standardisation, oversight and certification perspectives resulting from the cooperation with EASA and National.

The document presents the recommendations issued by the National Authorities and EASA, for an acceptable deployment of the concepts contained in the SESAR Solution. These recommendations must be taken into consideration by the entities in charge of deployment of the correspondent SESAR Solution.

## 2 General recommendations

In general terms, it must be underlined that:

- 1) When deploying a SESAR Solution, the compliance with all applicable regulatory requirements must be ensured by the different concerned entities;
- 2) In particular, it must be ensured that the appropriate safety argument for the concerned change to the ATM functional system is performed in accordance with EC regulation 1035/2011 considering local specific risks and mitigation to those risks.
- 3) The present SESAR Solution does not constitute in itself an acceptable Means of Compliance with the previously mentioned regulatory requirements. Means of Compliance are subject to their acceptance by the Authorities involved in each concrete local implementation.
- 4) A verification of the existing standardisation and regulatory frameworks has to be done at the date of local deployment to identify possible major changes to the one in use at the moment of publication of this SESAR Solution.

## 3 Specific recommendations

### 3.1 On the Regulatory Framework

- This SESAR Solution does not foresee the elimination of different controller ratings for different aerodromes, or the creation of a new license either.
- Nevertheless, it is foreseen some impact in:
  - ATCO specific ratings
  - ATCO local endorsements
  - Continuous training of ATCOs
  - AFISO specific training
- Some small amendments of SERA, such as introducing the obligation to GA aircraft to have lights on in CTR, could be derived from this concept.

### 3.2 On the Standardisation Framework

- This SESAR Solution foresees the introduction of new standards on the technologies associated to synthetic vision displays and image presentation, covering aspects such as:
  - Depth of perception,
  - Contrast & brightness.
  - Screen layout.
  - Resolution
  - Field of view
  - Colours
  - Dynamic range
  - Automation of camera movements.
  - Avoidance of blind areas.
  - Reliability of the visual representation
  - Availability of the visual representation
  - Integrity of the visual representation
  - Accuracy of the visual representation
  - Time delays between image capture and visual representation.
  - Appearance of image freezing issues
  - Capacity of the visual representation to provide smooth and regular impression of moving objects to the human eye eventually in both 2D and 3D representation.
  - Procedures in case of image integrity failure.

In absence of harmonized European standards, local standards can be applied.

## 3.3 On the Regulatory Oversight and Certification Activities

### 3.3.1. Safety Domain

When proceeding with the local deployment of the solutions, the local safety argument should take into consideration:

- On technical matters:
  - Interactions with the rest of the air navigation and airports infrastructure, such as:
    - ✓ Quality, stability and bandwidth used for the connection between the remote tower and the aerodrome systems.
    - ✓ In particular, data link with meteorological systems such as:
      - Aerodrome Visual Range Meter
      - Weather radars
    - ✓ Air/Ground Aeronautical communications frequency assignment
    - ✓ Communications with Weather radar information sharing links.
  - Capacity of the system to record the visual presentation for accident/incident investigation purposes.
- On operational matters:
  - Equivalence of conventional visual observation and remote visual reproduction in the local environment, in particular (but not exclusively) related to:
    - ✓ ATCO situational awareness
    - ✓ ATCO perception
    - ✓ ATCO capacity to detect GA aircraft.
    - ✓ Maintenance of continuous watch through visual contact on all flight operations. Effect of time delays in the presentation on the visual reproduction in emergency situations (e.g. runway incursions).
    - ✓ Potential confusion between the different views that an ATCO/AFISO could suffer from having images originated in different cameras with different locations and angles of view on the manoeuvring area (e.g. positioning cameras on both sides of a runway)
    - ✓ Differences in brightness between ground and sky in the screen views.
    - ✓ Partial obstruction of visual detection during sunrise or sunset.
    - ✓ Contrast of screens with the background
    - ✓ Colour balance with different daylight configurations.
    - ✓ Screens arrangement (e.g. 6 or 9 screens, 240 or 360 degrees)
    - ✓ Integrated flight data label information, both with static information and with dynamic information, and measures to prevent the label from shadowing visual information.
    - ✓ Visual object tracking functionality, either automatically (rotation, tilt to the desired elevation angle and focus at the indicated distance) or through a manual pan-tilt zoom function.

- ✓ Camera angles and screen orientation in relation to airport layouts and in relation to the different legs of the VFR circuit
  - ✓ Use of infrared cameras.
  - ✓ Capability of the cameras to capture and transmit blinking beacon images in all circumstances.
  - ✓ Management of the “cone of silence” (flight area too high & too close to be visible on the screens).
  - ✓ Specific local conditions affecting the visibility (e.g. deficiencies in image capture due to seawater splash).
  - ✓ Availability of airport ambient sound and acoustic characteristics of the control room.
- Local procedures to manage movement of vehicles in the manoeuvring area.
- Local procedures on coordination of Remote Tower and APP control services, whether merged or not in the same dependency.
- Local procedures for operations during low cloud situations, limited visibility or similar.
- Specific training elements related to local airport characteristics
- Potential impact on VFR flights, compared to the equivalent in a conventional TWR environment, in particular taking into consideration among others:
  - ✓ Effect of the types of airspace surrounding the airport concerned (e.g. class C and D) on issuing take-off clearances
  - ✓ Effect on the visual observation of size, equipage, flight patterns and behaviour of VFR.
- Specific local requirements needed for safety reasons, such as:
  - ✓ Additional separations
  - ✓ Ground equipment (e.g. Radar)
  - ✓ On board equipment (e.g. Transponder, ADS-B).
  - ✓ Specific camera configuration (e.g. 2 layers of cameras for ground and one for sky, to minimize contrast)
  - ✓ Specific camera additional equipment (e.g. adaptable housing to mitigate sunshine effects).
  - ✓ Specific screen requirements (e.g. automatic adjustable contrast to mitigate daylight variations).
  - ✓ Specific ancillary equipment (e.g. automatic cleaning system for the windows protecting the cameras to avoid snowflakes affecting image capturing).
- Contingency procedures must be adapted to the specific local conditions, taking into consideration elements such as:
  - The use of emergency flares or signal lights, and signal light gun use procedure
  - The procedures in case of runway incursion and/or runway excursion
  - Alerting in case of failure conditions
  - The continuation of the service in case of major failure.
  - The management of the existing traffic in the scenario of complete failure at the time when the failure occurs



- Where possible, It is recommended to go for a phased approach in deployment, in order to gain confidence in the safety aspects of the Solution:
  - To start with AFIS first.
  - Move to one-to-one ATC services in simple- low-density airports.
  - Increase progressively the density and/or complexity of the airports served.

### **3.3.2. Non-safety Domains**

- This SESAR Solution can enable an important reduction of the costs of the provision of ATC services in aerodrome; nevertheless, this benefit can significantly vary from one location to another, heavily depending on the local business case, when considering aspects such as:
  - Cost of deployment of new technologies associated to the solution
  - Local balance between cost of personnel and cost of new technologies.
  - Status of the pre-existing equipment and infrastructure.
  - Level of investments in pre-existing equipment and infrastructure.
- This SESAR Solution can introduce new business opportunities which in turn are positive for the creation of the internal market. Nevertheless, a certain degree of business oversight will need to be done by the Authorities to prevent the risk of moving to a monopoly or cartel situation. In particular, the potential scenario of a centralized service provision would require specific oversight to avoid that airport owners would be locked into a single commercial service provider.

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