

Contextual note – SESAR Solution description form for deployment planning

Purpose:

This contextual note introduces a SESAR Solution (for which maturity has been assessed as sufficient to support a decision for industrialization) with a summary of the results stemming from R&D activities contributing to deliver it. It provides to any interested reader (external and internal to the SESAR programme) 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)

With this SESAR solution, the Network Manager shares in the planning phase the allocation of Target Times in regulated airspace with Airports, Airspace Users and ATC. Shared awareness increases the effectiveness of air traffic flow management measures.

The solution aims at complementing departure regulations, such as the calculated take-off time (CTOT), with the dissemination¹ of locally-generated target times, over the hotspot.

Each airport collaborates with terminal area control to develop its own strategy to allocate the available landing capacity. Strategies are likely to take into account airspace users inputs, the consistency of flight plans with seasonally-allocated airport slots, arrival route and runway allocation, or gate and connection management. NM performs an initial slot allocation based on CASA. The local tools located at the airport (AOP airport impact assessment tool AIMA) or TMA (FMP iAMAN) analyse the proposed allocation and may request changes to NM, who will accept them after having performed a network impact assessment.

This collaborative process contributes to a more coherent approach to demand regulation, which results in a reduced ATFM delays thereby benefitting passengers and airlines, as well as the network.

To ensure no further deviations, the plan needs to be of sufficient accuracy, e.g. updates in the execution phase need to be taken into account. Consequently, the Target Time is continuously monitored during the execution phase to detect deviation.

The solution provides more flexibility to the Airspace Users allowing them to adjust their takeoff time (within their CTOT and the departure airport constraints) and flight profile (with new flight performance) whilst maintaining the TTO & TTA.

Operational Improvement Steps (OIs) & Enablers

¹ Dissemination of TT of CASA-generated target times is also possible.

Release 5 SESAR Solution ID #18
Calculated take-off time (CTOT) and target time of arrival (TTA)

The solution addresses the following OI steps:

- DCB-0208² — DCB in a trajectory management context

The following enablers are considered as required in DS16

- **ER APP ATC 17:** Enhance Traffic and Flow Management sub-systems to support dynamic flow management in co-ordination with local, regional, and European levels.
- **NIMS-21a:** Initial Flight Planning management enhanced to support 4D for Step 1
- **NIMS-38:** Calculation and dissemination of the TTO & TTA
- **AOC-ATM-11:** Integration of constraints and answers
- **AOC-ATM-13:** Participating of the FOC/ WOC in the airport triggered CDM process
- **AOC-ATM-20:** Sharing of trajectory data between AOC/WOC and the ATM world using B2B web services
- **SWIM-APS-03a:** Provision of ATFCM Information Services for Step 1
- **SWIM-APS-04a:** Consumption of ATFCM Information Services for Step 1
- **SWIM-INFR-05a:** General SWIM Services Infrastructure Support and Connectivity.
- **SWIM-NET-01a:** SWIM Network Point of Presence

The following enablers are considered as optional in DS15:

- **NIMS-43:** Enhanced NM systems to process the Flight Object (FO) data related to the NM cluster including STAM, TTA and EFPL information
- **ER APP ATC 162:** ATC Flight Data Exchange with NM Using the Flight Object
- **SWIM-SUPT-01a:** SWIM Supporting Registry Provisions
- **SWIM-SUPT-03a:** SWIM Supporting Security Provisions
- **SWIM-SUPT-05a:** SWIM Supporting IP Network Bridging Provisions

Applicable Integrated Roadmap Dataset is DS16

Background and validation process

The main objective of this solution is to allow local actors to become more involved in the regulation of demand, in order to allow their knowledge of the local environment to improve DCB processes. In addition, the dissemination of TT to AU will increase their awareness of DCB constraints.

The involvement of local actors was validated in two different environments: airport and TMA, with each of them using a different set of criteria for TT allocation. For the airport, the proposed changes to TT were based on the AIMA. For the TMA TT revision requests were based on iAMAN, which uses arrival management criteria. The objective of the validation was to bring to maturity the process of allowing local actors to collaborate with NM in the allocation of TT, rather than define what the optimum strategy for TT allocation may be. It is expected that the local TT-allocation strategy that will be chosen will be highly dependent on the particular local environment where the solution is implemented.

² There is a need to submit a CR in DS17 in order to review and revise the scope of DCB-0208 in the light of the SESAR CTOT and TTA solution (i.e. remove the TT adherence concept from this OI)

founding members



Avenue de Cortenbergh 100 | B -1000 Bruxelles
www.sesarju.eu

Release 5 SESAR Solution ID #18
Calculated take-off time (CTOT) and target time of arrival (TTA)

The validation of the airport participation in TT-allocation processes also provided a test bed for the early integration of NOP/AOP and for the confirmation that delays and punctuality were improved through the application of this solution. Four airports, three ACCs and three airlines (with no active participation, but operating at participating airports) were involved.

The performance of a shadow mode exercise with “modified reality” (to ensure that the actors could take decisions and see their effects, without actually impacting the operational system) further confirmed the applicability of the DCB time-based measures and of the procedures followed to resolve and monitor hotspots. The same exercise also explored the potential benefits of improving TT adherence by either modifying departure times (through simulating increased adherence to CTOT in a shadow mode exercise coupled to a live trial) or modifying speed in flight (in a FTS). However, increased TT adherence by either increased adherence to CTOT or modification of in-flight speed is out of the scope of this solution.

Given the strong dependence of the solution on the integration of the airport, one of the exercises was performed in collaboration with the airport work package (Solution 21 Airport Operations Plan & AOP-NOP Seamless Integration “). This ensured the integrated use of the airport and air traffic control tools.

Results and performance achievements

From ATFCM point of view the concept can be considered to be as safe as today’s CASA regulations. Nevertheless, from an ATC point of view, SPR requirements still need to be further analysed during the industrialization / deployment phase.

Although FMP workload is increased by the monitoring and revision task, all human tasks related to the concept could be performed without any significant problems. Therefore, from ATFCM point of view, as well as from Airspace User point of view, the impact on Human performance can be considered as validated.

The involvement in TT generation of local actors has a positive impact on capacity and delay reduction. These values can be confirmed by future large scale demonstrations and by gradual deployment.

Recommendations and Additional activities

The following activities are relevant once transitioned to industrialization (V4):

- Develop appropriate training to ensure a safe and efficient application of the solution;
- A CBA for TTA dissemination to long haul flights needs to be done;

founding members



Avenue de Cortenbergh 100 | B -1000 Bruxelles
www.sesarju.eu

Release 5 SESAR Solution ID #18
Calculated take-off time (CTOT) and target time of arrival (TTA)

- Airspace User preferences and other airspace user interaction have to be integrated in the AIMA (Airport Impact Assessment) workflow process;
- Due to the lack of results related to Key Performance benefits of the concept it is recommend to perform more dedicated live trials and demonstrations tailored to the collection of performance parameters. The recommendation is to dedicate at least half of the trial period to the collection of reference data by using the current operational system. This can be both qualitative and quantitative data. During the second half of the trial, with equivalent traffic conditions, the solution system is gradually put in place and this would give a better opportunity to compare current system with the concept under validation and to quantify the performance benefits
- Still under consideration is enabling the Extended AMAN to propose actions on flights subject to DCB TTO and that are crossing a declared hotspot within the limits of the DCB static Target Window declared by DCB. This work will start in in SESAR 2020's PJ09 through the OI step DCB-0213 "Consolidation and facilitation of Target Times between local DCB, Airport CDM and Extended Arrival Management".

Actors impacted by the SESAR Solution

Airspace Users (Pilots), Airline Operation Centre (AOC), En-Route and TMA Controllers, Flow Managers, Network Managers.

Impact on Aircraft System

No impact on the aircraft systems is foreseen.

Impact on Ground Systems

Interoperability between the Network Manager and the Local Tools.

Regulatory Framework Considerations

This solution is directly linked to one (identified as "CTOT to TTA for ATFCM") of the six ATM Functionalities identified in the Implementing Regulation (EU) No 716/2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan.

Standardization Framework Considerations

No Standardisation impact has been identified. Please refer to the previous section.

founding members



Avenue de Cortenbergh 100 | B -1000 Bruxelles
www.sesarju.eu

Release 5 SESAR Solution ID #18
Calculated take-off time (CTOT) and target time of arrival (TTA)

Considerations of Regulatory Oversight and Certification Activities

No regulatory oversight or certification activities are foreseen.

Solution Data pack

OSED

- 13.02.03-D303 - Enhanced DCB OSED for Step1, Edition 00.05.01, 30/08/2016

SPR

- 13.02.03-D323 - SPR S1 Final, Edition 00.04.10, 23/09/2016

TS

- 13.02.03-D353 - Final Technical Specification for Step 1 Federated DCB and TT management, Edition 00.02.01, 15/09/2016.

SWIM

- TS: 14.01.04-D44-004 00.01.00 (04/07/2016). This document specifies the SWIM Yellow Profile including the requirements applicable to interface with the SWIM-TI.
- There are SDDs (and corresponding SWIM Compliance Report) for four non-ISRMs Services that are relevant for solution #18: HotspotManagement, NMCapacityData, NMFlightData, AirportFlightPlanningInformation. This information is EUROCONTROL foreground and is not available as part of this datapack.

DEMO Reports:

- iStream Demonstration Report

In addition to the above mentioned documents, the SWIM reference documents are included in the data packs of the SESAR Solutions SWIM Yellow Profile and SWIM Framework.

Intellectual Property Rights (foreground)

The foreground is owned by the SJU.

founding members



Avenue de Cortenbergh 100 | B -1000 Bruxelles
www.sesarju.eu

©SESAR JOINT UNDERTAKING, 2016. Created by the SESAR Joint Undertaking within the frame of the SESAR Programme co-financed by the EU and EUROCONTROL. Reprint with approval of publisher and the source properly acknowledged.