SESAR Solution

DMAN Baseline to be used for Integration of AMAN and DMAN

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 – DMAN Baseline to be used for Integration of AMAN and DMAN' included in the technical data pack.

Improvement in ATM Operations

The Basic DMAN is designed to support current Departure Management procedures which are established for controlling target times at start-up approval.

The main function of the Basic DMAN is to establish a pre-departure sequence (an order of aircraft automatically generated by their Target Start-Up Approval Time, TSAT). Basic DMAN determines the runway for departure (according to the local rules), when appropriate, and elaborates a pre-departure sequence taking into account EOBT/TOBT, scheduled departure times, slot constraints, runway constraints such as departure rate, etc.

In terms of operational improvements, Basic DMAN and the establishment of a pre-departure sequence permits:

- To share pre-departure sequence planning;
- To anticipate the flow variation (departure demand) more precisely;
- To monitor flight progress using the off-block target of each flight;
- To take airport capacity more precisely into account;
- To be clearer on the priorities used to allocate runway slot;
- To reduce runway waiting time (engines running);
- To regulate start-up request; and
- To enhance ATFCM (and the overall network) prediction if the dissemination of DPIs is activated.

The system's objective is to validate the agreed generic operational concept for a Basic DMAN within an Airport CDM context. Basic DMAN is an enabler for further improvements of the DMAN, and will be used as baseline for future AMAN and DMAN integration during later exercises in coming Releases.

Operational Improvement – OI Steps

TS-0201 - Basic Departure Management (DMAN)

Background and validation process

The SESAR Solution has been validated through EXE-06.08.04-VP 470 on the Validation of Basic DMAN to be used for future integration of AMAN DMAN.

The **purpose** of this exercise was to establish a pre-departure sequence, to improve traffic predictability, cost & environmental effectiveness and safety.

This validation exercise consisted of a series of live trials of enhanced DMAN in Paris CDG airport environment during the summer 2011, involving a total of 48 air traffic controllers. The validation mainly consisted of observations and measures performed on the operational CDG DMAN used in standard operational conditions.

The validation also included inputs from Frankfurt and Zürich airports (based on operational environments, no exercise conducted).

The exercise allowed validation in terms of procedures for establishing pre-departure sequence at Paris CDG, with a particular focus on potential delay reduction.

Results and performance achievements

The validation exercise demonstrated that the new tool can achieve:

- Performance improvement in terms of target start-up time, **predictability** and stability of departure sequence and start-up approval time - good predictability of off-time blocks – 84,8% of flights respect their TSAT window (5min window);
- A significant **reduction of average taxi** times with a decrease of 9%; comparison between summer 2010 and 2011 – 2010: 10min53s 2011: 9min58s
- Significant runway delay cuts and improved off-block **punctuality**: 93.8% of the flights observed in the trials were authorised to depart within 5 minutes after Target Off-Block Time (TOBT), constituting a 7.8% improvement;
- Improved adherence to Central Flow Management Unit (CFMU) slots, with 81% of all departing flights managing to respect the CFMU slot that was attributed to them; Dec. 2009 – April 2010 75,64%, ontime departure 83,91% (between Dec. 2010 and April 2011)
- Enhanced tactical scheduling, facilitating the implementation of changes to runway configuration;

- Benefits in terms of **environment sustainability** and **cost-effectiveness**: favourable results on fuel consumption, with a significant reduction in fuel burn and CO_2 emissions (average reduction of 14.6 kg per flight, corresponding to 46.6 kg drop in CO_2 emissions) due to reduced taxi times and waiting times on engines (Sep. 2010, Sep 2011).
- Human Performance, Capacity and Flexibility impacts not assessed.

Additional activities

Not Applicable.

Actors involved

Actors involved in operations of the SESAR Solution and the use of services supported by the DMAN:

- Airspace User Operations:
  - Aircraft operator
    - Airline Operations and Control Centre
    - Airline Station Manager
    - Flight Crew
  - Ground Handling Agent
- Airport Airside Operations:
  - Airport Slot Negotiator
  - Airport Operator
    - Airport Operations Centre
    - Apron Manager
- Air Traffic Services Operations
  - Airport Tower Supervisor
  - Tower Ground Controller
    - Delivery Controller
    - Apron/Ground Controller

Impact on A/C system

N/A. No impact on A/C system; EXE-06.08.04-VP-470 does not address any A/C enabler. No requirement on A/C system (different possibilities of providing pilots with TSAT existing).

Impact on ground systems

Impact on Aerodrome ATC:

- Ground Delivery must be provided with additional information such as TOBT/TSAT (TTOT);
- Electronic Flight Strip system is recommended.

Consideration of Regulatory Framework

On ground systems and constituents for AMAN/DMAN, there is a need to have Means of Compliance either through an EC Community Specification or as an EASA Certification Specification.

There is a need for an update of the Community Specification on Airport CDM (A-CDM) in line with the updated EUROCAE reference documents.

Consideration of Standardisation Framework

Integration of the A-CDM with initial DMAN will require an update of the A-CDM standards.

Consideration of Regulatory Oversight and Certification Activities

When preparing the safety argument, due consideration has to be taken, if applicable, to the behaviour of pre-existing related functionalities.

Local operational manuals should bring clarity to the allocation of responsibilities for the different depending on the local boundaries and external interfaces of the DMAN system.

The potential increase of workload of the ATCO due to non-adherence of flight crews to the procedures have to be considered in the local operational scenario.

The loss of data sources can be considered as an external occurrence to the system. This should be addressed in the elaboration of local safety arguments.

The cost-benefit factor for low traffic periods have to be assessed locally.

Local procedures should be in place to prevent any potential misuse of AMAN-DMAN procedures, such as providing early but non-realistic TOBTs and progressively delaying them.

Intellectual property rights (foreground)

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