

**Release 4 Local SESAR Solution #57**  
**UDPP Departure**

***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.*

**Improvement in Air Traffic Management (ATM)**

Departure swapping allows Airspace Users in a CDM (Collaborative Decision Making) Airport to change the priority order of unregulated flights among themselves and via the Airport authorities. Airlines are given flexibility in the Pre Departure Sequence (PDS) during disrupted situations at last minute, which usually lead to departure delays or cancelled flights:

- The Airport receives all the Flight Plans and sorts them by Reference Time. Depending on the definition of CDM rules, the Time-Reference may be either the SOBT (Scheduled Off-Block Time) or the EOBT (Estimated Off-Block Time). Whatever the rule for the flights' Reference Time is, a Reference-Time list is built, which is processed by an algorithm taking into account all constraints to define the Pre-Departure Sequence (PDS), and then allocating the TSAT (Target Start-up Time) with a retro calculation of the taxi-time.
- The UDPP (User Defined Prioritisation Process) Departure solution consists in reprioritising the Flights in the Reference-Time list, with a recalculation of the Pre-Departure Sequence and a new TSAT allocation.

The UDPP Departure solution provides 3 features for airlines to act on the priority of their non-regulated flights and allocation of Target Start-Up Approval Time (TSAT):

- Reordering of two or more flights of the departure sequence, ("swap priority between 2 flights"). This collaborative PDS is possible without impact on ATC operations. Actions require making the right choice at the right time, implying coordination with different actors within the airline. It can be considered as an enhancement of the A-CDM process;
- Prioritization: "ready to depart (reordering on one single flight of the sequence), thus prioritizing a flight among all the other flights of the same airline;

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- Substitution (automated ownership of departure order after cancellation): it allows the use of a departure slot belonging to a flight that the airline had previously cancelled;
- Through the A-CDM messages, the updated Target Take-off Times will be notified to the Network Management Operations Centre (NMOC), who may revise CTOTs accordingly. If the result of the swap is not acceptable for the airline, the UDPP Departure solution allows the AU to “un-do” the swap.

For the airlines, benefits are:

- Punctuality of prioritized flights improved thanks to a reduction of local departure delay;
- In some cases, cancellation of flights can be avoided, for example when a flight has to leave before a time-limit corresponding to crew duty limits or a curfew at destination;
- Reduction of misconnecting passengers/packages.

#### Operational Improvement Steps (OIs) & Enablers

AUO-0103 - UDPP Departure (DS14):

- AIRPORT-06: “UDPP Departure on A-CDM Airport system”
- AOC-ATM-17: “UDPP Departure system for FOC”

CDM airports will allow the Airspace Users to change among themselves (via the pre-departure management process) the priority order of flights in the pre-departure sequence.

#### Background and validation process

The solution has been validated through a set of Demonstration exercises within the D-FLEX Demo project. Departure Flexibility (DFlex) demonstration project was a live demonstration directly on the OPS system at Paris Charles-de-Gaulle (CDG); it involved the airport and AUs FOC.

A cost benefit study estimated the cost-benefit of departure swapping. Data from DFlex were analysed in combination with data from EUROCONTROL’s Central Office for Delay Analysis (CODA). The analysis permitted an estimation of the costs saved by “UDPP Departure” if it were to be deployed at CDM airports in Europe.

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#### Results and performance achievements

An increased flexibility for AUs to reorder their flights in the Pre-Departure Sequence is achieved without negative impact on safety, ATC operations, and airport capacity.

Detailed analysis shows that flights not participating in DFlex are on average adversely affected by DFlex swaps made by others, even if in most cases this impact is smaller than the impact of other operational actions. According to the DFlex report, “it nearly does not impact other flights, 98% of potentially impacted flights are not impacted by a change of TSAT. Operational actions (TOBT update in case of “airline” delays) have more impact on the Pre-Departure Sequence than DFlex actions. That is why this flexibility brought to DFlex AUs is transparent for the airlines not using DFlex.”.

This new feature induces an additional workload for FOC staff, as it demands some focus and decision making in the choice of flights to be reordered. However, examples during the demonstration trials showed benefits that could outweigh the additional cost that this workload may require, depending on the presence and operations of the airline.

#### Recommendations and Additional activities

CDM Partners have agreed to enhance the “Substitution” function in order to encourage airlines to cancel flights as earlier as possible and to allow those airlines to use the priority of the cancelled flight for other flights.

The use of DFlex options by an airline for which the airport is not a hub or at least is not a significant base seems complicated. Several reasons can be given (e.g. not enough opportunities, not enough staff). In these cases, airlines may still be able to benefit for DFlex provided the group to do so. This possibility would require inter-airline swapping and has yet to be investigated.

The fact that airlines can group themselves to use DFlex together is an option that could allow this kind of airlines to use DFlex more often.

#### Actors impacted by the SESAR Solution

The actors involved in the UDPP Departure are:

- NM Operations Centre (NMOC).
- Flight Operations Centre (FOC).
- Airport CDM (A-CDM).
- Airspace Navigation Service Providers (ANSPs).

#### Impact on Aircraft Systems

There is no impact.

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#### Impact on Ground Systems

The “Reorder” and “Prioritize” functions need to be implemented in A-CDM systems based on FSFS (First Scheduled First Served) /FOC Systems (a prototype was developed for Air France and FedEx systems and is now a fully operational system). For airlines that do not wish to adapt their CDM system, DFlex is also available through the CDM@CDG website. A mobile (iPAD) version with a graphical interface was developed, in order to increase access options (e.g. gate or even cockpit).

#### Regulatory Framework Considerations

There is no specific topic in the field of the Regulation Framework to be considered in deployment, beyond the applicable existing one.

#### Standardization Framework Considerations

There is no specific topic in the field of the Standardization Framework to be considered in deployment, beyond the applicable existing one.

#### Considerations of Regulatory Oversight and Certification Activities

There is no specific topic in the field of the Regulatory Oversight and Certification Activities to be considered in deployment, beyond the applicable existing ones.

#### Solution Data pack

The Data pack for this Solution includes the following documents:

- Regulatory overview;
- OSED: 07.06.02-D66 Edition 00.02.01 13/11/2015;
- DFLEX Demonstration Report Edition 00.01.00 09/07/2014.

#### Intellectual Property Rights (foreground)

The foreground is owned by the SJU.