

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.

Reactive Flight Delay Criticality Indicator (FDCI)

The FLIGHT DELAY CRITICALITY INDICATOR [FDCI] is a parameter provided by the Airspace User to indicate that it is critical that the flight progresses and arrives on time. Hence, the flight should preferably not be assigned any or much delay and it should even be tried to decrease an allocated delay if accepted and possible.

A flight should not be critical in the pre-tactical or early tactical planning phase. However, a flight can be an important flight from the beginning for several reasons like high revenue flight for airline or few occurrences scheduled in the week... Important flights are prompted to become critical flights along the day as disruptions of the planning, in the network or within the airline, come up. Nonetheless, any flight can potentially become critical.

Several variants of this concept are nowadays in use at local level (ANSP) and in a way at network level through the helpdesk.

In this contextual note, we focus on reactive FDCI that means the FDCI flight has an ATFCM delay and slot issued. From now onwards when used FDCI it means reactive FDCI.

An important advantage of providing the [FDCI] to the NOP is the transparency of the process and awareness for all network actors. This is an important element in this concept. Additionally the use of this indicator can be centrally monitored, traced and reported and a simple set of agreed rules can be enforced to avoid its abuse.

NMOC, local FMP and AOP can act to solve or improve the situation of a critical flight. See UC below.

Reasons to use FDCI are for example to avoid a curfew, to not miss an important connection, crew hours, to avoid incurring unnecessary high costs to the AU (airline reputation, VIP flight or high passenger economical compensation)

Sharing the FDCI has the following advantages:

- NMOC, FMP and AOP can help the critical flights. They can reduce the delay of a critical flight or avoid providing a delay during the cherry picking selection to create a DCB measure.
- Full transparency of information at network level (e.g. criticality shown in the flight list)



- One stop-shop for all AU to provide their criticality –unlike today growing distinct and ANSP-specific models of coordination.
- Less workload for FMP (compared to phone calls FMP/AO used sometimes today)
- Limited additional workload for NMOC Flow helpdesk (as number of FDCI is restricted)
- The use and a potential abuse of this indicator can and will be traced and reported based on FDCI post-analysis data.

Rules to prevent excessive use of FDCI

- Only top critical flights.
- Maximum number of FDCI request per AU per period.

Several ways to input the FDCI are envisaged:

- Main input: The AU can input via NOP/CHMI and NM eHelpdesk.
- Alternative: The FMP can also set the FDCI via NOP/CHMI if they receive directly a request by mail or phone from the AU

Operational Improvement Steps (OIs) & Enablers

Operational Improvement: **DCB-0219**: Flight Delay Criticality Indicator (FDCI) - Reactive

Enabler: **NIMS-65**: Enhance the eHelpdesk function to support FDCI

Applicable Integrated Roadmap Dataset is DS20.

Background and validation process

The concept has been validated through shadow-mode trials, using the NMVP (Network Manager Validation Platform), and human in the loop exercise including Network Manager, Flight Dispatcher (AU), Flow Manager and Local Traffic Manager using different scenarios of traffic load and disruption in the network.

This validation corresponds to an iteration of the joint validation exercise between Airspace Users Processes for Trajectory Definition solution and the Collaborative Network Management Functions solution.

The FDCI information, for a flight having an **ATFCM delay**, was provided by the Airspace User to both NM and FMPs to indicate that the concerned flight is critical for his business and that he requested that the flight progresses and arrives as much as possible on time.

- The resolution of an FDCI request is NMOC driven upon the reception of the FDCI improvement request and when more than one regulation is affecting the flight, alternatively in the case there is only one regulation affecting the flight the local FMP can requests the resolution to NMOC.
- The resolution is mostly a regulation exclusion or delay reduction (force slot) by NMOC and it is best effort.

Results and performance achievements

The main validated findings are:

- Usage of FDCI is beneficial to AU as an efficient mechanism to notify critical flights to NM/FMP.
- The shared situational Awareness (via the NOP) is increased for all stakeholders (FMP, APT, NM and AU).
- The Airspace User Simple Preference (FDCI) shared in the NOP supports decision making.
- The workload (automation, less phone call) is acceptable for flow management positions.

The performance achievements are mainly on:

- Punctuality (% Departures < +/- 3 mins vs. schedule due to ATM causes) but limited due to a small number of flights affected
- Cost effectiveness: it is assumed that there are 10 critical flights per day at network level, the AU preferences can be applied for 180 days in a year and the value of the delay for a critical flight is, on average, 15,000€

The Net Present Value (NPV) is **74 M€**. This is calculated with an 8% discount rate over the period 2019 to 2040.

FDCI - 2019-2040						
Discounted		NPV (M€)	Costs (discounted)	Benefits (discounted)	Discount rate	Discounted
	Network Manager	-3	3	0	8%	
	Scheduled Airlines	77	59	135	8%	

Table 1: FDCI Discounted CBA results (per stakeholder and overall)

The payback year is **2026**.

Recommendations and Additional activities

The recommended next steps are:

- to establish a roadmap of deployment of FDCI “reactive” in Ops
- to develop operational procedures, with a first module to be integrated in the eHelpdesk
- to further elaborate and validate as part of a SESAR solution the needs of the pro-active FDCI

Actors impacted by the SESAR Solution

Network Manager, Local Flow Manager, Flight Dispatcher

Impact on Aircraft System

N/A

Impact on Ground Systems



New parameter (FDCI) provided by the Airspace User to the Network management function to indicate critical flights.

Regulatory Framework Considerations

N/A

Standardization Framework Considerations

N/A

Considerations of Regulatory Oversight and Certification Activities

Positive impact on safety: manage the criticality earlier network wise helps to update the common plan for NM actors and provide more awareness to all actors.

Solution Data pack

The Data pack for this Solution includes the following documents:

- SESAR Project 09 – CBA V2 – v00.00.02, September 2019
- SESAR Project 09 – OSED V2 – Part I – OSED – v00.02.01, June 2019
- SESAR Project 09 – OSED V2 – Part II – SAR – v00.01.00, September 2019
- SESAR Project 09 – OSED V2 – Part IV – HPAR – v00.01.02, July 2019
- SESAR Project 09 – OSED V2 – Part V – PAR – v00.01.00, August 2019
- SESAR Project 09 – TS IRS – v00.02.00, September 2019
- SESAR Project 09 – VALR V2 – Part I – v00.01.02, September 2019

- SESAR Solution 07.01 – CBA V2 – v00.01.01, November 2019
- SESAR Solution 07.01 – OSED V2 – Part I – OSED – v00.00.16, September 2019
- SESAR Solution 07.01 – OSED V2 – Part II – SAR – v00.01.01, September 2019
- SESAR Solution 07.01 – OSED V2 – Part IV – HPAR – v00.00.04, September 2019
- SESAR Solution 07.01 – OSED V2 – Part V – PAR – v00.00.06, October 2019
- SESAR Solution 07.01 – TS IRS – Part I – v00.01.00, September 2019
- SESAR Solution 07.01 – VALR V2 – Part I – v00.01.00, September 2019

The data pack covers the reactive FDCI topic but not only. The SESAR contextual Note FDCI appendix compiles an extract of detail contents from these documents to allow easier reading.

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