

Contextual note – SESAR Solution description form for deployment planning

Improvements in Air Traffic Management (ATM)

The purpose of the Sub-regional Demand Capacity Balancing (DCB) Service (Supporting the DCB capability within the ICAO Global Concept) is to facilitate an improved usage of the airspace at the sub-regional level, through enhanced planning and consequently more appropriate tactical intervention in support of AU and AO operations. Consequently, the intent of the Sub-regional DCB common service is to enable the Europe-wide benefits of an integrated Sub-regional operation through reduced cost of service provision. The fundamental elements of the Sub-regional common service were described in the SESAR 2020 MAWP which is reflected or referenced in the following sections for compliance.

Sub-regional DCB Background Information

The operational Sub-regional service is intended to enable achievement of customer (AU and AO) operational ambition within the envelope of local and regional performance targets whilst simplifying the tactical interaction between stakeholders. Sub-regional activity takes management responsibility for the airspace for a number of geographically adjacent ACCs whilst presenting a single operational interface to the regional actor; representing the local actors, including Airports, within this airspace. Whilst involvement throughout the planning phase promotes predictability in operation, one of the key benefits of the Sub-regional capability is the additional flexibility provided closer to execution, as desired by customers. Such flexibility results from a detailed understanding of the airspace, the implications of the evolving demand and the ultimate impact on workload at local level. Another benefit is the ability to know, with a greater clarity than would be available at the Regional level, the actual configurations and running of the operations room(s) on a day-to-day basis. This local expertise allows the sub-regional to operate with a high level of clarity of the issues and options to resolve those issues, largely without recourse cumbersome constraints historically utilised. Within ACCs, during execution Sub-regional actors (Flow Manager), interacts significantly with relevant actors involved in the INAP process, optimising intervention for the benefit of the collective group or actors.

It is expected that Sub-regional DCB can be applied within a multi-ACC or multi-ANSP environment and facilitate an improved usage of the airspace at sub-regional level and facilitate tactical interventions when necessary, ensuring that any potential disruptions could be correctly managed. It is expected that several larger ANSPs perform some level of sub-regional activities through implementation of sub-regional type scenarios in the short term and tactical timeframes, although these may not be formally organised in the form of a full sub-region. The sub-region plans the optimal use of operational ACC resources and demand management measures to facilitate AU (civil and military) desires, based on the regional plan and within the prevailing business performance framework, for the rolling day of operation. The plan also includes measures for managing uncertainty (including weather). The scope also includes an AOP Common Service to facilitate the integration of AOP information into the NOP.

The service supports the Local Traffic Manager in the Long, Medium and short timeframes by developing plans to manage demand versus capacity within the scope of the sub-region.

The service supports the Local Traffic Manager in the tactical operation in managing unforeseen events by:

- adapting plans and developing further options as uncertainties develop.
- interacting with peers, AUs and the regional NMF service to develop / implement measures to achieve effective demand/capacity balance.

The service is active during the whole Planning Phase, from year before the time of operation to just before the Execution Phase within the sub-regional airspace (generally 2 hours before the time of active operation). The primary focus is the window encompassing pre-tactical to just prior to activation.

Sub-regional DCB Common Service

The Sub-regional DCB common service supports the DCB capability within the ICAO Operational Capability model. The operational sub-regional DCB common service uses existing operational processes and services, reorganising them to provide efficiencies, for example through the provision of a focal point for several ACCs, therefore reducing the number of point-to-point connections. The Sub-regional common service activities commence during the early planning phases, considering demand and working with regional and local actors to plan airspace capacity in support of the forecast demand. As the time of operation approaches, the Sub-region, in the form of the Flow Manager, performs the co-ordination necessary to maintain developed plans where possible. Where maintenance of plans is not possible, the key benefit of the sub-region is the ability to optimise the close to the time operation based on a detailed knowledge of the prevailing operational situation. This requirement for a detailed understanding necessarily limits the geographical dimensions of a sub-region. The need for a detailed understanding of the airspace infers service provision by an organisation with an ANSP component, particularly at the point of service delivery.

Sub-regional is described in the S1/S2020 Transition Conops produced by B4.2 – approved by SJU in Oct 2016. In the SESAR W1 Conops, Sub-regional DCB is not addressed, as sub-regional DCB is a mature MOPS and is currently operationally deployed, therefore no R&D is identified nor needed. As a result, there is no operational OI within S1/W1/W2 to link to, that addresses R&D for the concept as it is simply representing a clustering of local capability. This clustering is optional for ANSPs and, importantly for the scope of PJ15.01, comes with cost in terms of both resourcing and infrastructure. For NATS, as an ANSP that uses the Sub-Regional capability, this outlay is more than offset by the benefits that come from having a joined-up approach across its own ATSUs and cross-border with IAA (representing the UK/Ireland FAB). For Regional, the clustering is invisible and provides benefit in terms of fewer network nodes to interact with and reconcile CDM measures with. PJ15.01 was not intending to revalidate an existing operational concept, but to prove the viability of reducing the costs associated with point-point data transfer using a common service – thereby opening up the benefits of sub-regional to new entrants.

Contained within the Sub-Regional DCB High Level Architecture Description (HLA Appendix B) is a list of Information Flows. We have clearly indicated the information flows that we deem to have verified as a part of the technical verification and those that were not.

The technical validation reviewed the common service from the perspective of Sub-regional to Local and Sub-regional to Adjacent Sub-regional to determine feasibility. Due to the nature of common

services, it was deemed not necessary to verify connections to other nodes (Airport Ops Support, Aerodrome ATS, etc) as the service can be consumed by as many actors as required. The service and infrastructure is designed to be scalable through the use of cloud technology, the exact extent of the scalability needs to be confirmed as a part of industrialisation.

The primary benefit of the Sub-regional DCB common service is targeting a reduction in **Technology cost per flight (CEF3)**. The benefits are elaborated within the PJ15-01 Cost Benefit Analysis (CBA) for Sub-regional DCB Common Service.

There are no proposed primary benefits in terms of SESAR KPIs other than cost reduction. However, through the availability of an economically attractive Common Service, quicker implementation of Sub-regional DCB capabilities could be envisaged. Additionally, more ANSPs will be triggered to implement Extended Arrival Management. Both have a secondary effect on other SESAR KPIs than cost reduction.

Different input information from different ATM stakeholders are collected, as long-term demand information from regional DCB, capacity information from ANSPs and Airports, demand information from AUs and Military or weather forecasts from MET info providers. As output, the Service produces optimal capacity balancing for sub-regional airspace, encompassing the time window from the pre-tactical phase until the moment prior to the real-time operation phase.

In the Common Service, the provision of a Sub-regional DCB common service is made available to allow optimisation of the resources within the sub-region. A sub-regional provider can manage DCB services for a region where it is not economically viable to run such a service in isolation, or support operational resilience by providing a contingency capability.

It is expected that provision of sub-regional services will be staged in a market place that is open to competition, therefore it is expected that collaboration and partnerships between ANSP's and other stakeholders is necessary to facilitate activities. It is expected that a Sub-regional Provider needs to have a sub-regional common service offering, with costs, etc. The Sub-regional provision can then be offered to other ANSP's, ACC, Airport and other airspace related service provisions in the form of a Common service, accepting associated geographical limitations.

Operational Improvement Steps (OIs) & Enablers

- No Operational OIs
- OI: SDM-0401 Sub-Regional DCB Common Service (Business Improvement).
- Enabler: SVC-005 Provision of cost-efficient Sub-Regional DCB capabilities using a Common Service

Note: A change request (CR) has been generated for creation of a new technical system for PJ15-01 called 'Sub-regional DCB Common Service Provision'. CR 03610 'Creation of a new System Enabler for PJ15-01', is current is currently going through the CR assessment process.

Background and validation process

- Two Validations were performed at TRL6, one lead by NATS, one lead by ENAIRE.
- To support the validations the following documents were written:



- HLA (**NATS**)
 - SDDs (**NATS**)
 - TVALP (**ENAI**RE/**NATS**)
- Availability Note for individual exercises (NATS/Indra/Snowflake/Thales) (ENAI
 - A TVALR has been written that describes the results of the exercises and includes the results of service performance measurements taken during the exercises.
 - Further development of a Business Model and a High Level Architecture following the Common Service Method as defined in SESAR B4.5
 - A security assessment has been performed against the primary and secondary assets contained within the service. The security assessment has been documented within the Security Assessment Reports (Low, Medium and High sensitivity information) as per the SecRAM process.
 - A Cost Benefit Analysis (CBA) has been written highlighting the proposed value, the potential consumers and a detailed analysis of performance and cost benefits.

Results and performance achievements

The business case for Sub-Regional DCB common services is based purely on cost reduction.

Optimisation of Sub-Regions

Sub-Regional DCB systems should diminish technical coordination issues and should be able to “talk to each other” easier if based on the COSER model and the number of Sub-Regions could be now streamlined according to operational practices.

Reduction of investments at the European level

Those ANSPs that do not have plans for deploying the SESAR 1 Implementation Objectives at the beginning of the period or have less operational urgencies to implement can benefit from off the shelf Sub-Regional DCB systems under a COSER model. This saves the local ANSPs from investing in developing their own systems.

Faster deployment rate for Europe

Those ANSPs less prone to implement Sub-Regional DCB or running late for SESAR1 Implementation Objectives can benefit from fully operational and tested Sub-Regional DCB systems under a COSER model in a reduced time-horizon that they would otherwise should they require investing and developing in their own capabilities. Their time to FOC could be considerably reduced. Following expert judgement, it is proposed that FOC

During the years where Sub-Regional DCB under a COSER model is already implemented, PJ.15-01 could deliver additional Performance Benefits in all KPAs/KPIs defined for SESAR2020. In other words, if an Industry Partner could commercialise a standard sub-regional DCB system that could be relatively easily bought and implemented in other ANSPs in ECAC, this would deliver extra years of additional Performance Benefits.

There are no proposed primary benefits in terms of SESAR KPIs other than cost reduction. However, through the availability of an economical attractive Common Service, a quicker implementation of Sub-regional capabilities could be envisaged. Further, more ANSPs will be triggered to implement Sub-Regional operations. Both have a secondary effect on other SESAR KPIs than cost reduction.

Recommendations and Additional activities

Industrialisation would have to consider the stakeholders and their operational procedures. The service would need to be enhanced to include additional information flows, particularly the ability to feed common service data back into the Regional Network Manager, to support the wider sharing and distribution of information resulting from changes made within a sub-region.

As recommendation for the forthcoming stages, during industrialization and deployment phases special attention should be paid to the Service Availability, as it is one of the most important aspects to ensure when a Common Service is used on operation.

It is recommended that consideration, planning and further technical development of the Common Service is conducted to support integration of Sub-Regional and Local DCB tools with those utilised by airports.

It is recommended that the common services are further developed and expanded to include additional information/data elements that allow running operational scenarios and using cases against the common service based on the 7.2 use cases.

A standard should be developed to ensure that if the Sub-regional DCB common service is developed, then local tool development incorporates a standard interface promoting interoperability.

Actors impacted by the SESAR Solution

From a Business viewpoint, the Common Service Provider, ATS units (ACC, APP, TWR) and all further potential consumers of the data (AOC, NM, ...) are impacted. No change in concept of operations is envisaged.

Impact on Aircraft System

None – N/A

Impact on Ground Systems

Founding Members



As described in the High-Level Architecture for the Common Service, the Sub-Regional capability will be delivered by a Common Service provider which need to be consumed by the consuming systems, i.e. mainly ATS Systems.

Main impact is on the adaptation of interfaces of the consuming systems.

Regulatory Framework Considerations

There are no regulatory needs identified for the Sub-Regional DCB Common Service. The Sub-Regional DCB and Sub-Regional DCB Common Service is predominantly used in High capacity and high complexity airspace to enable an increase in capacity and a reduction in complexity. This means that it is unlikely at least initially that a Sub-Regional DCB Common Service would be deployed throughout the ECAC area.

Standardization Framework Considerations

There is a need for development of a standard to support deployment of Sub-regional DCB common services. When discussing the need for standardisation we need to understand the envelope for standardisation. PJ15-01 is an Enabling Infrastructure Solution and the definition of the solution predominantly resides in the Service architecture.

Considerations of Regulatory Oversight and Certification Activities

None – N/A

Solution Data pack

The Data pack for this Solution includes the following documents:

- PJ15-01 Business Model of the Sub-Regional DCB Common Service TRL6, 00.03.01, August 2019
- PJ15-01 Sub-Regional DCB High Level Architecture Description, V00.02.00, August 2019
- PJ15-01 Security Assessment Report Low Sensitivity Material V00.02.00, August 2019
- PJ15-01 Security Assessment Report Medium Sensitivity Material V00.02.00, August 2019
- PJ15-01 Security Assessment Report High Sensitivity Material V00.02.00, August 2019
- PJ15-01 Availability Note for ENAIRE Exercise (AN) V00.01.00, August 2019



- PJ15-01 Availability Note for NATS Exercise (AN) V00.01.00, August 2019
- PJ15-01 Technical Validation Report (TVALR) V00.01.01, October 2019
- PJ15-01 Technical Validation Plan (TVALP) V00.01.01, October 2019
- PJ15-01 Service Description Document Hotspot Definition and Propose V00.01.01, October 2019
- PJ15-01 Service Description Sub-regional DCB COSER V00.01.01, October 2019

Intellectual Property Rights (foreground)

The foreground is owned by the SJU.