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## Authoring & Approval

### Authors of the document

| Name/Beneficiary | Position/Title | Date |
|---|---|---|
| **EUROCONTROL** | Task leader | |
| **INDRA** | Solution Member | |
| **SINTEF** | Solution Member | |
| **THALES** | Solution Member | |

### Reviewers internal to the project

| Name/Beneficiary | Position/Title | Date |
|---|---|---|
| **Eurocontrol** | PJ09-W2 Project Manager | |
| **ENAIRE** | PJ09-W2-44 Solution Leader | |
| **DSNA** | OSED Task Leader | |
| **NATS** | Solution Member | |
| **SKYGUIDE** | Solution Member | |
| **ENAV** | Solution Member | |

### Approved for submission to the SJU By - Representatives of all beneficiaries involved in the project

| Name/Beneficiary | Position/Title | Date |
|---|---|---|
| **Eurocontrol** | PJ09-W2 Project Manager | 22 February 2022 |
| **ENAIRE** | PJ09-W2-44 Solution Leader | 22 February 2022 |
| **DSNA** | OSED Task Leader | 22 February 2022 |
| **INDRA** | Solution Member | 22 February 2022 |
| **SINTEF** | Solution Member | 21 February 2022 |
| **DSNA** | Solution Member | 21 February 2022 |
| **NATS** | Solution Member | 21 February 2022 |
| **SKYGUIDE** | Solution Member | 21 February 2022 |
| **ENAV** | Solution Member | 21 February 2022 |

### Rejected By - Representatives of beneficiaries involved in the project

| Name/Beneficiary | Position/Title | Date |
|---|---|---|

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# PJ09-W2 DNMS

## PJ.09-W2-44 DYNAMIC AIRSPACE CONFIGURATION

## Abstract

This document provides the future *architecture* technical specifications of the SESAR W2 Solution 44, "Dynamic Airspace Configuration (DAC)" (PJ.09-W2-44). The related operational concepts are developed by the [5]D2.1.001_SESAR Solution PJ09-W2-44 SPR INTEROP OSED_00.01.01 and validated as described by [6] D2.1.005_SESAR Solution PJ09-W2-44-V3 Intermediate VALP_00.00.04.

It aims also at building *technical specification* within the scope of PJ.09-W2-44. The technical requirements are provided in the dedicated chapter.

The SESAR W2 Solution 44, "Dynamic Airspace Configuration (DAC)", is built upon wave 1 results of the PJ08-01 and PJ09-02 SESAR Wave 1 Solutions.

The future architecture is developed following the European Air Traffic Management Architecture (EATMA) methodology in line with the [1] B.04.01 D138 EATMA Guidance Material.

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# 1 Executive summary

This document contains the Technical Specifications for PJ.09-W2-44. The SESAR W2 Solution 44, "Dynamic Airspace Configuration (DAC)" is built upon wave 1 results of the PJ08-01 and PJ09-02 SESAR Solutions.

The focus of the project is the integration of the DAC and Integrated Network Management ATC Planning (INAP) concepts into a Demand & Capacity Balancing (DCB) process with a particular emphasis on the INAP time horizon where the two concepts overlap.

The target maturity of the solution PJ.09-W2-44 is V3 and it is expected to be reached by the end of Wave2, end of 2022. The initial overall maturity of the concepts is V2.

The PJ.09-W2-44 first built a baseline on the architecture level. The baseline is a merge of the architectures built during the Wave1 by the PJ08-01 and PJ09-02 Wave1 solutions. They have been adapted and changed when necessary. Some new architecture elements have been implemented in order to cope with the new Wave2 features. On the Technical Requirements level, the baseline is also based on the Wave1 requirements.

The focus of the Wave2 new features is on:

- Further development of the DAC concept, notably optimised configurations and seamless integration of DAC at pre-tactical and tactical DCB phases.
- Adequate automatic support for spots detection, traffic analysis and measures monitoring.
- Development of new features to support analysis and resolution, namely what-if and what-else.
- Development of new indicators to fine-tune analysis and ease monitoring, namely the complexity and the uncertainty.
- Alignment of processes, roles and measures, based on the above mentioned features, ensuring the right level of coordination and shared situation awareness at local, sub-regional and regional network levels.

[…]

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# 2 Introduction[1]

## 2.1 Purpose of the document

The current document contains the outputs of the *Technical Specification/Interface Requirements Specification (TS/IRS)* tasks performed under the Solution 44 of the PJ09-W2 DNMS project.

The main purposes of the TS/IRS tasks on the solutions level are to define the *Architecture* and the *functional and non-functional System Requirements*. The Architecture encompasses the *Technical Systems* description and the definition of the Services. Requirements included in the TS/IRS satisfy requirements captured by the SPR-INTEROP/OSED document. They are enriched with Technical requirements coming from Architecture, Performance, Safety and Security tasks.

The *TS/IRS* development follows the *SESAR Solution Development Life Cycle* integrating continuously operational concepts developed by the Operational Specification (OSED) tasks and increasing progressively the level of granularity of the encompassed concepts. They are also in line with the outputs of the Validation activities.

The TS/IRS document contains the functional description of the functional blocks identified by the Solution 44 of the PJ09-W2 DNMS project together with the logical interfaces with the related functional blocks. Requirements included in the TS/IRS satisfy requirements captured by the SPR-INTEROP/OSED document. They are enriched with Technical requirements coming from Architecture, Performance, Safety and Security tasks. The links with associated EATMA elements, such as Functional Blocks (FBs) and Enablers (ENs), are developed by the Solution's Technical Architecture task.

## 2.2 Scope

This TS/IRS document provides the requirements specification, covering functional, non-functional and interface requirements related to SESAR Solution 44 of the PJ09-W2 DNMS project V3 target phase. Operational requirements have been developed in the [5] D2.1.001_SESAR Solution PJ09-W2-44 SPR INTEROP OSED_00.01.01 document.

The TS/IRS covers Operational, System, Services and Interfaces layers. The content integration uses the EATMA framework, which insures the coherency between above-mentioned layers. EATMA models development is under the TS/IRS responsibility and they are described in the current document.

The TS/IRS development is an iterative process. The final TS/IRS document will integrate consolidated results of the defined exercises.

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1 *"The opinions expressed herein reflect the author's view only. Under no circumstances shall the SESAR3 Joint Undertaking be responsible for any use that may be made of the information contained herein."*

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The following table lists the Operational Improvements (OI) developed by the Solution 44 of the PJ09-W2 DNMS project as well as the Initial and the Target Maturity levels.

| OIs | OIs Title | Initial Maturity level | Target Maturity level - end of Wave 2 |
|---|---|---|---|
| AOM-0805 | Collaborative Airspace Configuration | V2 finalised | V3 |
| AOM-O8O9-A | Initial Sector Design and Configurations Unconstrained by Predetermined Boundaries | V2 finalised | V3 |
| DCB-0210 | Full integration of Dynamic Airspace Configurations into DCB | V1 finalised | V3 |
| CM-0102-B | Dynamic Airspace Management based on complexity | V2 finalised | V3 |
| CM-0103-B | Automated Support for Traffic Complexity Assessment | V2 finalised | V3 |
| CM-0104-C | Automated Support to INAP (Integrated Network Management and Extended ATC Planning) Function | V2 | V3 |

[…]

## 2.3 Intended readership

This document is aimed at the following stakeholders:

- PJ.09-W2-44 solution members, which will decline the presented concepts and use cased on their validation exercises and ensure they are align with the solution full spectrum,

- PJ.09-W2-45 and PJ.09-W2-49 solution members, as part of the PJ.09-W2 project for mutual awareness of solutions progress and contents as they are inter-connected (see fig.1 for dependencies),

- SJU Program representatives, as the owner and final approver of the document,

- SESAR Wave 2 Solution 93 and SESAR Wave 3 PJ32, which will be recipient of DAC principles, especially cross border operations.

[…]

## 2.4 Background

SESAR W1 has developed both concept DAC and INAP in the frame of two distinguished projects, PJ08 and PJ09. As a consequence, the employed operational use cases are quite decupled and the system architectures are different, with not enough developed synergies.

The PJ09-44 solution is putting together the DAC and the INAP concepts, integrate them in a DCB process and develops them as a whole in order to reach the V3 maturity level.

The merge of the corresponding SESAR W1 architectures (operational models) has been performed.

The Solution 44 added a new layer of the operational models based on the existing models, in order to cope with the PJ09-44 purposes.

The solution improved the existing system models of the two projects in order to cope with the PJ09-44. It is expected the system architecture remains stable compared to the W1 system architecture.

[...]

## 2.5 Structure of the document

The document is structured as follows:

Section 1        Executive Summary
Section 2        Introduction
Section 3        "SESAR solution Impact on Architecture" contains the impact of the PJ09-S44 solution on the system architecture
Section 4        "Technical Specifications" describes the functional architecture and Technical Requirements
Section 5        "Implementation Options"
Section 6        "Assumptions"
Appendix A       "Service Description Document SDD" contains the description of the services as they are developed for the V3 maturity level.

[...]

## 2.6 Glossary of terms

| Term | Definition | Source of the definition |
|------|-----------|--------------------------|
| AIR-REPORT | A report from an aircraft in flight prepared in conformity with requirements for position, and operational and/or meteorological reporting. | ICAO Annex |
| Airspace Block (AB) | - A primary volume of airspace which has to be configured to build workable Sectors of Control defined as Configured sectors in this concept (CS) | SESAR W1 PJ08 OSED |
| Airspace Building Block | Elementary volume of modularised airspace (As defined by the appropriate ANSP) that are too small individually for controlling purposes, but instead form the basic constituent parts of a Controlled Airspace Block as part of an optimising process. | SWP 7.2 DOD |

| Airspace Configuration | Is a pre-defined and coordinated organisation of routes and their associated airspace structures, temporary airspace reservations and ATC sectorisation. | SWP 7.2 DOD |
|---|---|---|
| Airspace Reservation (ARES) | Airspace Reservation is a defined volume of airspace temporarily reserved for exclusive or specific use by categories of users. | European Route Network Improvement Plan (ERNIP), Part 3 - The ASM Handbook |
| Airspace Restriction | Airspace Restriction is a defined volume of airspace within which, variously, activities dangerous to the flight of aircraft may be conducted at specified times (a 'danger area'); or such airspace situated above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions (a 'restricted area'); or airspace situated above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited (a 'prohibited area'). | European Route Network Improvement Plan (ERNIP), Part 3 - The ASM Handbook |
| Airspace Structure | Airspace Structures are specific portions of airspace designed to accommodate the safe operation of aircraft.<br><br>In the context of the FUA Concept, "Airspace Structures" include Controlled Airspace, ATS Route, including CDRs, ATC Sectors, Danger Area (D), Restricted Area (R), Prohibited Area (P), Temporary Segregated Area (TSA), Temporary Reserved Area (TRA), Cross-Border Area (CBA). | European Route Network Improvement Plan (ERNIP), Part 3 - The ASM Handbook |
| Business Trajectory | A 4D trajectory which expresses the business intentions of the user with or without constrains. It includes both ground and airborne segments of the aircraft operation (gate-to-gate) and is built from, and updated with, the most timely and accurate data available. | P11.01.01 Transversal consistency of BT/MT requirements (across WPs)<br><br>D11.01.01-1 Definition of trajectory requirements for Step 1, including gap analysis, support to standardization report from Airspace Users perspective |

| Configured Sector | Configured Sector is the Result of the Sector Configuration process. This is the actual airspace a controller will be assigned to provide ATS services | SESAR W1 PJ08 OSED |
|---|---|---|
| Computed Take-off Time (CTOT) | An Air Traffic Flow & Capacity Management (ATFCM) departure slot, forming part of an Air Traffic Control (ATC) clearance, which is issued to a flight affected by Network Management regulations. It is defined by a time and tolerance (-5 to +10 minutes) during which period the flight is expected to take-off. | ICAO Doc 7030/4 – EUR<br><br>D11.01.01-1 Definition of trajectory requirements for Step 1, including gap analysis, support to standardization report from Airspace Users perspective |
| Controlled Airspace Block | A Controlled Airspace Block (replacing the current predefined elementary sectors) is a section of modularized airspace within which a Tactical Air Traffic Controller performs his controlling functions defined as a result of dynamic airspace configuration process. Controlled Airspace Blocks are created as a result of a dynamic airspace configuration process in which each controlled block is an optimised grouping of Airspace Building Blocks under consideration of the forecast traffic pattern and ATCO availability and Safety/Performance metrics. The Controlled Airspace Block forms the elementary size of a "Hotspot Unit." | SWP 7.2 DOD |
| Collaborative Decision Making (CDM) | Collaborative decision-making (CDM) is defined as a process focused on how to decide on a course of action articulated between two or more community members. Through this process, ATM community members share information related to that decision and agree on and apply the decision-making approach and principles. The overall objective of the process is to improve the performance of the ATM system as a whole while balancing the needs of individual ATM community members.<br><br>From a military perspective CDM is a process from which all participating parties can gain benefits through the negotiation of proposed options. The negotiation stops either at the moment when all participating parties agree with the result or when they reach a limit in their capability to accept further compromise due to defined priorities. | ICAO Doc 9971 + B4.2 (mil aspects)<br><br>SESAR 2020 Concept Of Operations Edition 2017 |

| DAC role | DAC role refers to composition of responsibilities for of carrying out of main DAC management related tasks and activities associated with DAC management processes at Local or Sub regional levels which include DAC planning, assessment, negotiation, publication and sharing, decision making and implementation. | SESAR W1 PJ08 OSED |
|---|---|---|
| Dynamic mobile area (DMA) | Dynamic mobile area (DMA) is an integral part of the MT described by a 4D data set, where the velocity parameter is equal to zero. DMA constitutes a defined volume of airspace that satisfies specific requirements from different Airspace Users.

There are two types of DMA that have been identified for Step 2:

DMA Type 1 is a volume of airspace of defined dimensions as integral part of MT at flexible geographical locations agreed upon a CDM process, satisfying Airspace Users requirements in terms of a time and/or distance constraint parameters from a reference point as specified by AU (e.g. Aerodrome of Departure).

DMA2: is a volume of airspace of defined dimensions described as integral part of MT and agreed upon a CDM process, satisfying the Airspace Users requirements. | SESAR 2020 Concept Of Operations Edition 2017 |
| Elementary Sector (ES) | ATC workable 3D airspace that can be controlled by ATCO for ATS provision and that cannot be split further down into workable/controllable sector(s) | [6] |
| Flexible boundaries (FB) | Sector boundaries that can be modified or refined to facilitate / optimise FRA trajectories. It is expected that Flexible boundaries can be facilitated through the use of:

- Flexible Drawing Tool

SAM (Sharable airspace module) - smallest, non-workable volume of airspace that can be dynamically attached (belong to) to any neighbouring ES or SAB, used to marginally adapt sector boundaries i.e. +/- 10nm | [6] |
| Flight Intents/ Flight Intentions | The future aircraft trajectory expressed as a 4-D profile until destination (taking account of aircraft performance, weather, terrain, and ATM service constraints), calculated and "owned" by the aircraft flight management system, and agreed by the pilot. | ICAO Doc 9854 |
| Flight Operation Centre (FOC) | Flight Operation Centre is a part (department, employee) of an Airspace user or a system used by an Airspace user providing FOC services and support like operational | P11.01.01 Transversal consistency of |

| | | |
|---|---|---|
| | control, flight planning, pre-flight briefing, in-flight support and post-flight analyses in accordance to AU's Operational Manual and Standard Operational Procedures. | BT/MT requirements (across WPs)<br><br>D11.01.01-1 Definition of trajectory requirements for Step 1, including gap analysis, support to standardization report from Airspace Users perspective |
| Forecast Business Trajectory | 4D definition of the trajectory associated with a level of uncertainties which evolved according to the time horizon. The FBT uncertainties are characterised by Time uncertainty, Lateral uncertainty, Vertical uncertainty.<br><br>The purpose is to elaborate the best predictable 4D Trajectory representation called Forecast Business Trajectory (FBT) using uncertainty modelling and including result on FBT itself. The FBT shall be built from historical data (statistical model) and various database (Airport, AO, …), then the FBT shall be refined all along the timeline based on SBT (2D + schedule or 3D + schedule or 4D profile), and trajectory elements that will be known only at a later stage of the planning process (information on 4D route, Constraints …)<br><br>FBT will be complemented by prediction algorithms and simulation tools used to anticipate flight intentions which are not yet known at the considered anticipated time (SBT maturity, weather conditions, etc.) | [6] |
| HotSpot | The HotSpot is a 4D volume (defined in time and space) representing a potential DCB imbalance (not critical as not impairing Safety), identified by ANSP(s) and potentially NM.<br>This imbalance is shared with partners, and ANSPs define solutions, supported by Collaborative Decision Making process and tools (either in strategical and pre-tactical phases, or in tactical phase with INAP). A hotspot situation represent a nominal, safety non critical and planned event. | OSED P13.02.03 SESAR1 |
| Imbalance | Imbalance between Demand and Capacity (measured by the occupancy rate in a Controlled Airspace Block) | [6] |

| INAP Timeframe | INAP covers three main time periods, all referred to the time of occurrence of the hotspot (i.e. 0H): | OSED PJ.09-W2-44 |
|---|---|---|
| | - **From -6H to -2H:** It is assumed that -2H is the cut-off time for CASA application, so this implies that most of the flights are still on ground.<br>- **From -2H to -40':** This period represents the gap that INAP is filling in the DCB process.<br>- **From -40' to -15':** In this period small adjustments are possible to optimise capacity without a safety issue.<br><br>*IMPORTANT NOTICE*<br><br>The figures provided are indicative and can slightly differ from one ACC to another, depending of the sector configurations. It should be up to INAP actors to adjust local time periods. To ease readiness of the document, 6hours and 15 minutes will commonly be used as reference in the following sections. | |
| Models A & B (DAC Management Process) | There are two main DAC management process models that are covered by this OSED: centralised and distributed DAC management models: Model A "Partially Distributed DAC Management Model" and Model B "Fully Distributed DAC Management Model" that are described below.<br><br>Model A is the "top down" DAC management model characterised by leading role of Network Manager who is kicking off, coordinating and monitoring the DAC planning process with local actors (at national or sub-regional level depending on local organisation) assisting NM with local expertise, data and knowledge.<br><br>Model B is "bottom-up" DAC management model characterised by leading role of local actors (at national or sub-regional level depending on local organisation) in DAC management process. | [6] |
| netLoad | The Network Load (netLoad) is an indicator developed to determine the severity of areas within the network, looking at the propagation of imbalances to non-nominal and critical areas from a network point of view. | OSED PJ.09-W2-49 |
| netSpot | The Network Spot (netSpot) is a captured geographical area that includes linked airspace clusters predicted to be in non-nominal or critical states.<br><br>The netSpot represents a reference for all concerned actors and stakeholders indicating that:<br><br>- a congestion is propagating at the network level moving to a non nominal or critical situations | OSED PJ.09-W2-49 |

| | - a global strategy will be coordinated and implemented to resolve it | |
|---|---|---|
| Network Operations Plan (NOP) | [NOP consists of]: a set of information and actions derived and reached collaboratively both relevant to, and serving as a reference for, the management of the Pan-European network in different timeframes for all ATM stakeholders, which includes, but is not limited to, targets, objectives, how to achieve them, anticipated impact. The NOP has a dynamic and rolling lifecycle starting in the strategic phase and progressively updated up to and including the execution and post-operations phases.<br><br>It supports and reflects the result of the collaborative ATM planning process: at each phase, stakeholders collaborate at developing a common view of the planned network situation, allowing each of them to take informed decisions considering the network effect and the Network Manager to ensure the overall coordination of individual decisions needed to support network performance. | SWP 7.2 DOD |
| OptiSpot | The OptiSpot is a 4D volume (defined in time and space) representing a traffic situation where opportunity for optimization has been identified by ANSP (INAP). An ATFCM situation yet to be optimized represents a nominal, safe and planned event. | [2] |
| Revision of the Reference Business or Mission Trajectory | The revision of the Reference Business or Mission Trajectory (RBT/RMT) is triggered at Controller or Flight crew initiative when there is the need to change the route and/or altitude constraints and/or time constraints, mainly due to hazards (traffic, weather), fine sequencing (CTA or CTO allocation) or inability for the aircraft system to meet a constraint (CTA missed). | [4] PJ19 - D2.5 : SESAR Concept of Operations (CONOPS 2019) |
| Shareable Airspace Block (SAB) | non-workable volume of airspace that can be dynamically configured (Attached) in a pre-defined way to any adjacent Elementary Sector (ES) or Airspace Block (AB) to build Configured Sectors (CS) | [6] |
| SAM (Sharable airspace module) | smallest, non-workable volume of airspace that can be dynamically attached (belong to) to any neighbouring ES or SAB, used to marginally adapt sector boundaries i.e. +/-10nm | [6] |
| Shared Business/Mission Trajectory | Published Business/Mission trajectory that is available for collaborative ATM planning purposes. The refinement of the SBT/SMT is an iterative process. | [3] SESAR ATM Lexicon |

| Reference Business/Mission Trajectory | The business/mission trajectory which the airspace user agrees to fly and the ANSP and Airports agree to facilitate (subject to separation provision). | [3] SESAR ATM Lexicon |
|---|---|---|
| Vertical Sharable Airspace Module (VSAMS) | Non workable volumes of airspace vertically split in 1000ft segments which must be configured with a minimum number of VSAMS to create a CS. | |
| Wing Operations Centre | The WOC is a generic term, which gathers the operational processes and services directly related to the airspace users and linked to Mission Trajectories and other aerial activities. This definition avoids detailing the diverse organisational structures existing in Europe. It is the Military equivalent to the civil Flight Operations Centre (FOC) | P11.01.01 Transversal consistency of BT/MT requirements (across WPs)<br><br>D11.01.01-1 Definition of trajectory requirements for Step 1, including gap analysis, support to standardization report from Airspace Users perspective |
| What if tools | „What-If" re-routing simulations allow selecting a single flight and perform re-route trials using flight route alternatives provided by the system, so that the delay imposed on this single flight is minimized and there is no overload on the traffic volumes crossed by the re-route flight.<br><br>The system automatically provides the benefit and overload, and also automatically calculates and displays the EET and route length differences between the original flight route and the provided flight route alternatives. | [6] |

**Table 1 Glossary of terms**

## 2.7 Acronyms and Terminology

| Term | Definition |
|---|---|
| ADD | Architecture Description Document |
| ATM | Air Traffic Management |
| CC | Capability Configuration |

| DCB | Demand & Capacity Balancing |
|---|---|
| EATMA | European ATM Architecture |
| E-ATMS | European Air Traffic Management System |
| EET | Estimated Elapsed Time |
| FAA | Federal Aviation Administration |
| IER | Information Exchange Requirement |
| INAP | Integrated Network Management ATC Planning |
| INTEROP | Interoperability Requirements |
| IRS | Interface Requirements Specification |
| ISRM | Information Services Reference Model |
| NAF | NATO Architecture Framework |
| NSOV | NAF Service Oriented View |
| NOV | NAF Operational View |
| NSV | NAF System View |
| OSED | Operational Service and Environment Definition |
| QoS | Quality of Service |
| SB/MT | Shared Business/Mil Trajectory |
| SDD | Service Description Document |
| SESAR | Single European Sky ATM Research Programme |
| SJU | SESAR Joint Undertaking (Agency of the European Commission) |
| SoaML | Service Oriented Architecture Modelling Language |
| SPR | Safety and Performance Requirements |
| SWIM | System Wide Information Model |
| TRL | Technology Readiness Level |
| TS | Technical Specification |
| UML | Unified Modelling Language |
| V&V | Validation and Verification |
| WSDL | Web Services Definition Language |

| XSD | XML Schema Definition |
|-----|----------------------|

**Table 2 Acronyms and Terminology**

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# 3 SESAR Solution Impacts on Architecture

## 3.1 Target Solution Architecture

### 3.1.1 SESAR Solution(s) Overview

The SESAR PJ09-W2 S44 Solution, "Dynamic Airspace Configuration (DAC)" has been set up to continue developing the DAC and INAP concepts under a dedicated CDM process.

Both concepts have been developed previously by the SESAR W1. The DAC concept have been developed by the Solution 01 "Management of Dynamic Airspace Configurations" of the Project #08 AAM "Advanced Airspace Management" while the INAP concept have been developed by the Solution 02 "Integrated Local DCB Processes" of the Project #09 "Advanced DCB".

Based on the existing operational concept and architecture developed by SESAR W1, the Solution 44 is continuing to develop the operational concept and technical architecture. For these purposes, the Solution 44 develops its own Use Cases.

The Architecture is a rolling task. It starts from the operational description developed by the OSED document and the developments follow the EATMA methodology. The coordination with the Validation activities is also necessary. The Validation is dealing with common EATMA elements such as OIs and ENs.

The following table introduces the list of Enablers associated to the Operational Improvements addressed by the PJ09-W2-S44 SESAR solution.

| SESAR Solution ID and Title | Functional Blocks/Role impacted by the SESAR Solution (from EATMA) | Enabler ID (from EATMA) | Enabler Title (from EATMA) | Enabler coverage |
|---|---|---|---|---|
| PJ.09-W2-44 DYNAMIC AIRSPACE CONFIGURATION | | | | • |
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| | | | Enhanced Complexity Assessment Tool | • |
| | | | | • |

**Table 3 SESAR Solution PJ09-S44 Scope and related Functional Blocks/roles & Enablers**

### 3.1.1.1 Deviations with respect to the SESAR Solution(s) definition

N/A

### 3.1.1.2 Relevant Use Cases

The S44 develops its own operational Use Cases adapted to the solutions' purposes. The main purpose of the S44 is to define new concepts and to continue developing already existing features when needed, to reach the target of developing a DAC INAP integrated into a CDM process.

Overlaps with the operational Use Cases of the W1 PJ09 and PJ08 baseline projects have been observed. In the same way, W1 MEGA models should be reused and enriched. New MEGA models have been built in order to fill the gaps when needed.

Operational Use Cases are developed by the [5] D2.1.001_SESAR Solution PJ09-W2-44 SPR INTEROP OSED_00.01.01 deliverable. The Table 4 below summarizes W2 S44 operational Use Cases.

| Operational Use Case | Description | Covering MEGA models | NSV4 |
|---|---|---|---|
| DCB-UC-01: Airspace Design | Describes the workflow and the assessment process of an Airspace Design that allows | [NOV-5] DAC W2 Airspace Design | |

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| | | | |
|---|---|---|---|
| | better distribution of ATCO workload using the DAC Toolbox that provides ANSP with different options to manage capacity and facilitate trajectories in their airspace through varying degrees of sector dynamicity and automation. | | |
| DCB-UC-02: Optimised configurations | This use case is identified to describe the workflow process at local/sub-regional level for the different sector configurations to support the accommodation of traffic demand/complexity in the most efficient way, during tactical phase | | |
| DCB-UC-03: Imbalance Detection and Spot Declaration during the Tactical Phase | Detects imbalances and declaration of spots during the Tactical Phase | [NOV-5] Spot Management | |
| DCB-UC-04: Spot analysis | Investigation within the INAP phase of a demand/capacity imbalance already identified as a spot at local level and published for wider visibility via the NOP | | |
| DCB-UC-05 How to choose a DCB measure | This Use Case is identified to describe the local workflow to choose the most appropriate DCB measure, both DAC and/or ATFM, at the right level of granularity (high certainty) | | |
| DCB-UC-06: Spot Resolution and monitoring | Identification within the early/mid-INAP phases of a demand/capacity imbalance, with subsequent resolution able to take into account: new sectorisation options; ARES options; and demand intervention to arrive at an optimised plan for progression into the latter stages of INAP processes. | [NOV-5] Spot Management [NOV-5] DCB Measures prepared in the RBT Revision process [NOV-5] DCB Measures prepared in the SBT Elaboration process (Planning Phase) | |
| DCB-UC-07: what if Flight exclusion tool | Describes the workflow and the computation process to support the analysis of a | | |

| | | | |
|---|---|---|---|
| | hotspot on capacity sector in short term to execution phases based on machine learning and/or expert rules analysis. | | |
| DCB-UC-08a: Air Traffic Control in an integrated DAC-DCB environment - hotspot | Describes how the integrated DCB-DAC environment and processes impact the ATCO workload to solve an identified hotspot | | |
| DCB-UC-08b: Air Traffic Control in an integrated DAC-DCB environment - optispot | Describes how the integrated DCB-DAC environment and processes impact the ATCO workload to address optispots | | |
| DCB-UC-09: Targeted flow CASA | This use case describes the application of a new type of regulation to a specific flow of aircraft. This regulation, called Target Flow CASA, is applied to reduce the number of flights impacted by a traditional regulation | | |
| DCB-UC-10: Change of DCB plan and its publication update | This use case is identified to describe the DCB changes assessment and publication | | |
| DCB-UC 11: Optimal ARES (DMA) allocation in DAC Pre-Tactical Level | This use case is identified to describe decision-making process in DAC on pre-tactical level to support the optimal ARES/DMA allocation vs local KPIs, traffic demand forecast, ATC volumes and sector configuration. This analysis is performed with support of automated tools and/or expert rules. The goal is to determine if the impact on planned airspace configuration triggered by ARES/DMA allocation can be reduced by the proper coordination process within DAC when inconsistencies are detected. | | |

**Table 4 MEGA operational models for W2 S44**

### 3.1.1.3  Applicable standards and regulations

[…]

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## 3.1.2 Capability Configurations required for the SESAR Solution

A Capability Configuration is a set of Roles and Technical Systems providing together Functions declined from stakeholders' operational and business needs.

EATMA Architecture work being ongoing, Capabilities, Nodes and Stakeholders shall be enriched with more information.

| SESAR Solution ID and Title | Capability Configurations (CCs) (from EATMA) | Sub-Operating Environment(s) where the CCs operate | Capabilities (from EATMA) | Nodes (from EATMA) | Stakeholders (from EATMA) |
|---|---|---|---|---|---|
| PJ.09-W2-44 DYNAMIC AIRSPACE CONFIGURATION | Regional ASM | En-Route Medium-High Complexity Network | Airspace management Airspace Reservation Management Free Route Airspace management | Airspace management | Network Manager |
| | Sub-Regional / National ASM | En-Route Medium-High Complexity Network | Airspace management Airspace Reservation Management Free Route Airspace management | Airspace Management | Civil-Military Airspace Management Cell (civil side) Civil-Military Airspace Management Cell (military side) |
| | Sub-Regional / Local ATFCM | En Route Medium-High Complexity Network | Airspace Reservation Management Air Traffic Complexity Management Air Traffic Demand | Air Traffic Flow and Capacity Management | Civil ATS En-Route Service Provider Civil ATS Approach Service Provider |

| | | | | | |
|---|---|---|---|---|---|
| | | | Provision (Airspace) | | |
| | Regional ATFCM | En Route Medium-High Complexity Network | Airspace Reservation Design <br><br> Airspace Reservation Management <br><br> Airspace/Sector Configuration Management <br><br> Free Route Airspace Management <br><br> Air Traffic Demand Provision (Airspace) <br><br> Airspace Capacity Information Provision (incl. Capacity Changes) <br><br> ATM Performance Management | Air Traffic Flow and Capacity Management | Network Manager |
| | ER ACC | En Route Medium-High Complexity | | Air Traffic Flow and Capacity Management; <br><br> Airspace Management; <br><br> Airspace Organization; <br><br> En- | Civil ATS En-Route Service Provider <br><br> Military ATS En-Route Service Provider |

| | | | Route/Approach ATS; | |
|---|---|---|---|---|
| | Civil AU Operations Centre | | Airspace User Ops Support;  Flight Deck | Airspace User  Civil Flight Operations Centre |

**Table 5 List of Capability Configuration required for the SESAR Solution**

[…]

## 3.2 Changes imposed by the SESAR Solution on the baseline Architecture

| Enabler ID (from EATMA) | Enabler Title (from EATMA) | Changes |
|---|---|---|
| **Enabler ID** | **Enabler name** | **List of changes on Systems, services, functions, etc…** |
| AIMS-23 | Enhanced digital data chain to ensure Aeronautical Information data provision to meet full 4D trajectory | Add Tech Systems(FB, F, Role, Port) covering it |
| ER APP ATC 80 | Enable ATC System to Use Dynamically-Defined Airspace Reservations | Add Tech Systems(FB, F, Role, Port) covering it |
| NIMS-04 | ATFCM capacity planning sub-system enhanced to take into account dynamic sector shapes | Add Tech Systems(FB, F, Role, Port) covering it  CR 02186 opened |
| AAMS-19 | Dynamic Airspace Configuration tools for the Integrated local DCB working position | Add Tech Systems(FB, F, Role, Port) covering it |
| NIMS-76 | Local Complexity Information Provision Service | Create NIMS-76 |

**Table 6 List of changes due to the SESAR Solution**

[…]

# 4 Technical Specifications

## 4.1 Functional architecture overview

The functional breakdown is consistent with the EATMA methodology. The architecture has been developed in a MEGA environment implementing all EATMA standards.

### 4.1.1 Dynamic Airspace Configurations - Resource Connectivity view

This section describes the capability configurations and data exchanges for the Dynamic Airspace configuration.
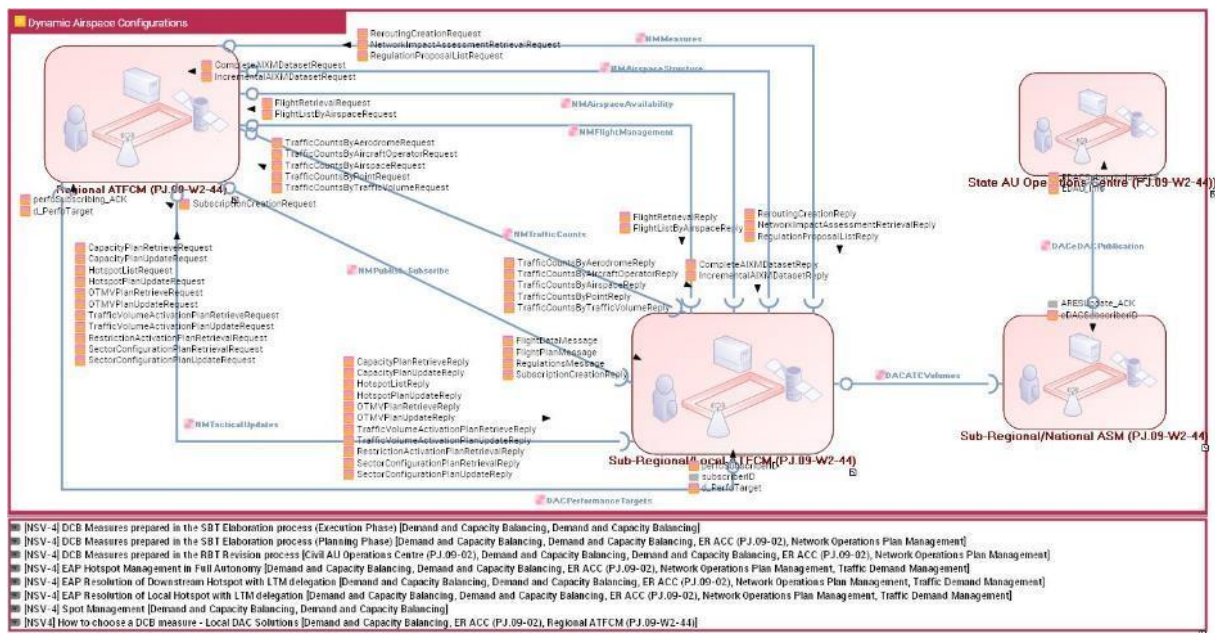


**Figure 1 [NSV1] Dynamic Airspace Configurations**

### 4.1.1.1 Dynamic Airspace Configurations - Resource Infrastructure view (NSV-2)

The diagram below describes the system interactions at the infrastructure level during the Dynamic Airspace Configuration processes.

| Regional ATFCM_CC (Comm element endpoint) | Communication Infrastructure (System Port) | Sub-Regional/Local ATFCM (Comm element endpoint) |
|---|---|---|
| AMQP at Regional ATFCM | IP_GND | |
| WS SOAP at Regional ATFCM | IP_GND | |

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| | IP_GND | AMQP at Sub-Regional/Local ATFCM |
|---|---|---|
| | IP_GND | WS SOAP at Sub-Regional/Local ATFCM |

**Table 7 Dynamic Airspace Configuration - Endpoints& System Port**
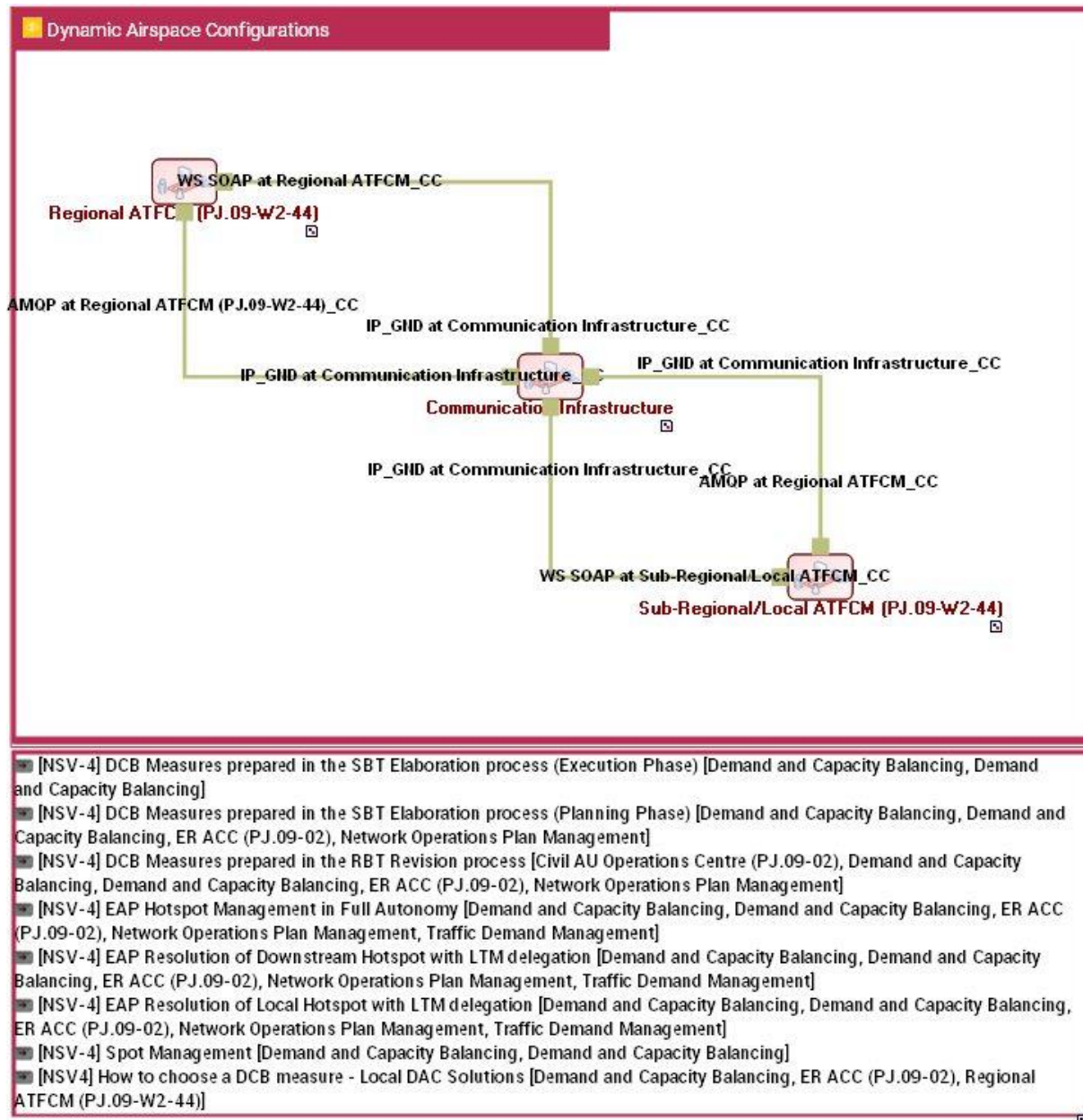


### 4.1.1.2 Dynamic Airspace Configurations - Resource Orchestration view (NSV-4)

This section describes how the systems interact at the Functions and FB level.
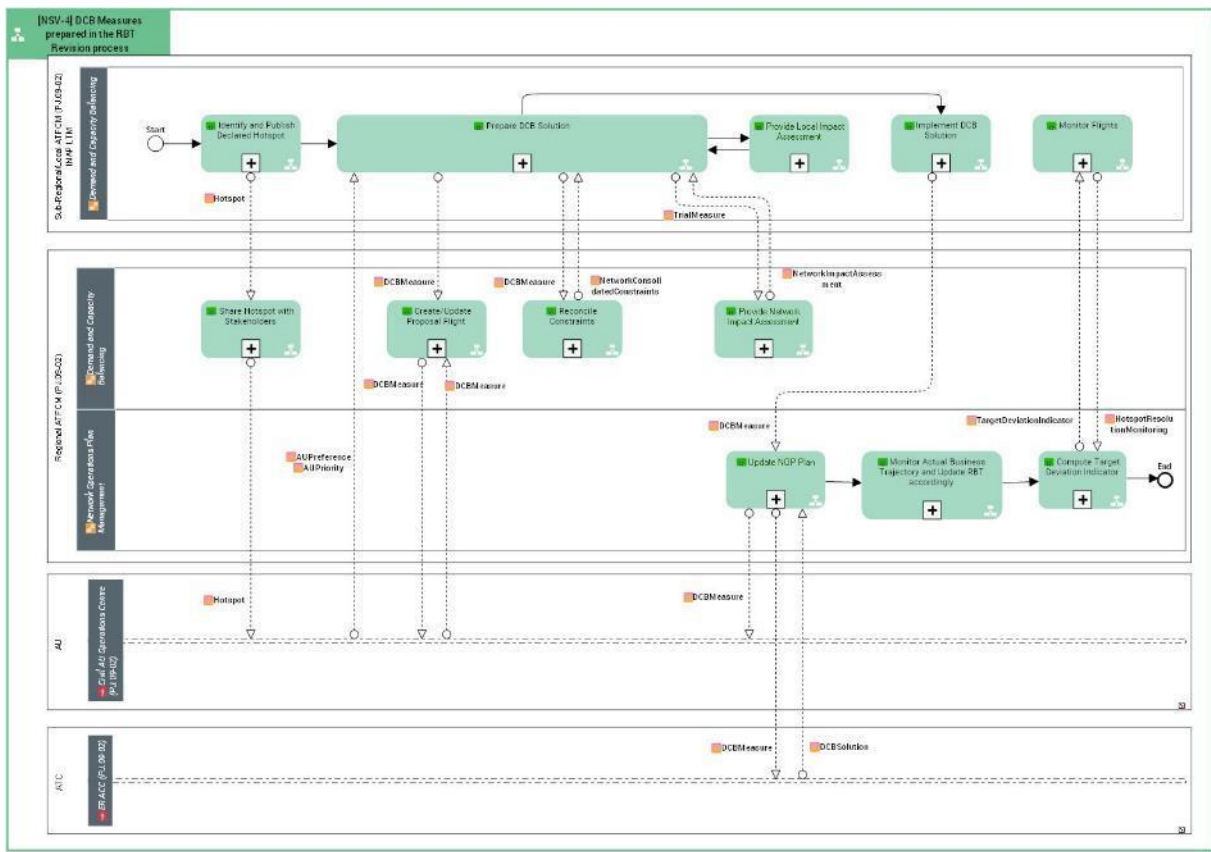
**Figure 2 [NSV-4] DCB Measures prepared in the RBT Revision process**
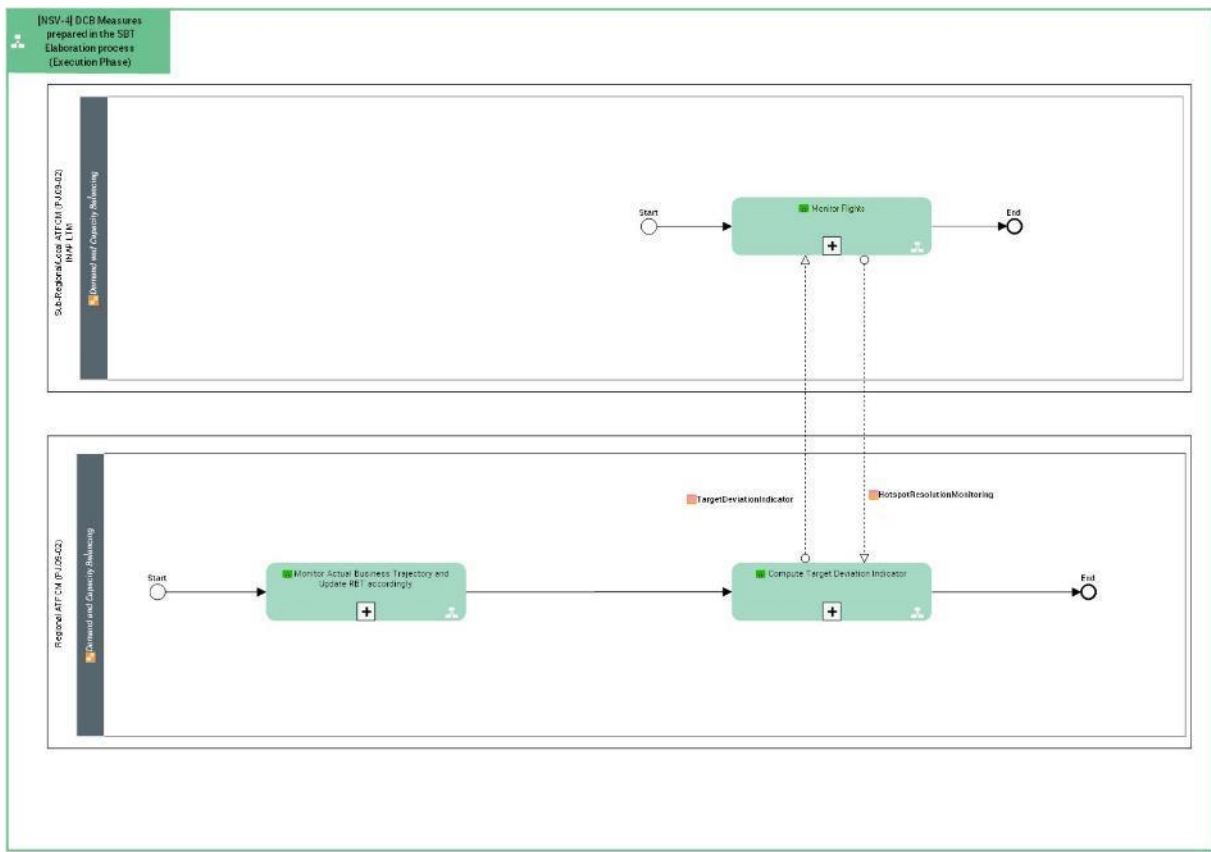
**Figure 3 [NSV-4] DCB Measures prepared in the SBT Elaboration process (Execution Phase)**
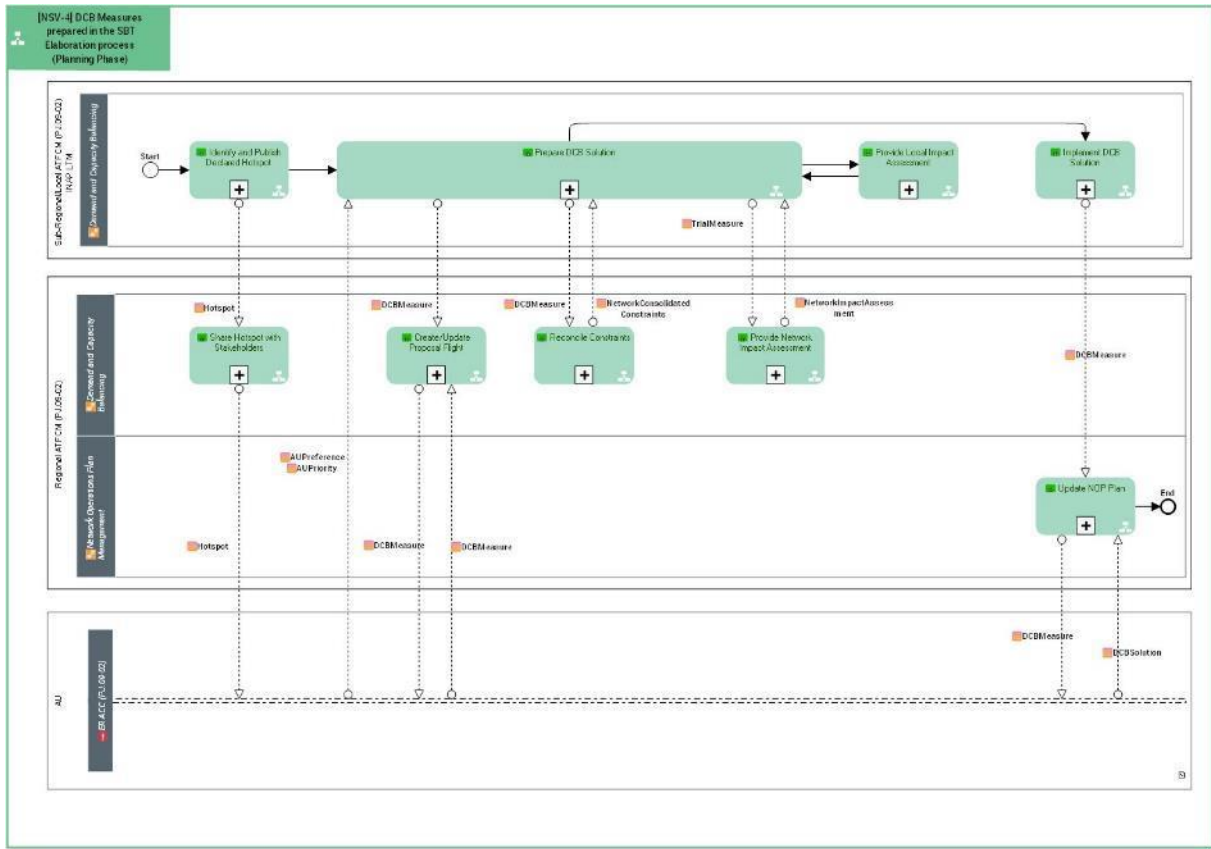
**Figure 4 [NSV-4] DCB Measures prepared in the SBT Elaboration process (Planning Phase)**

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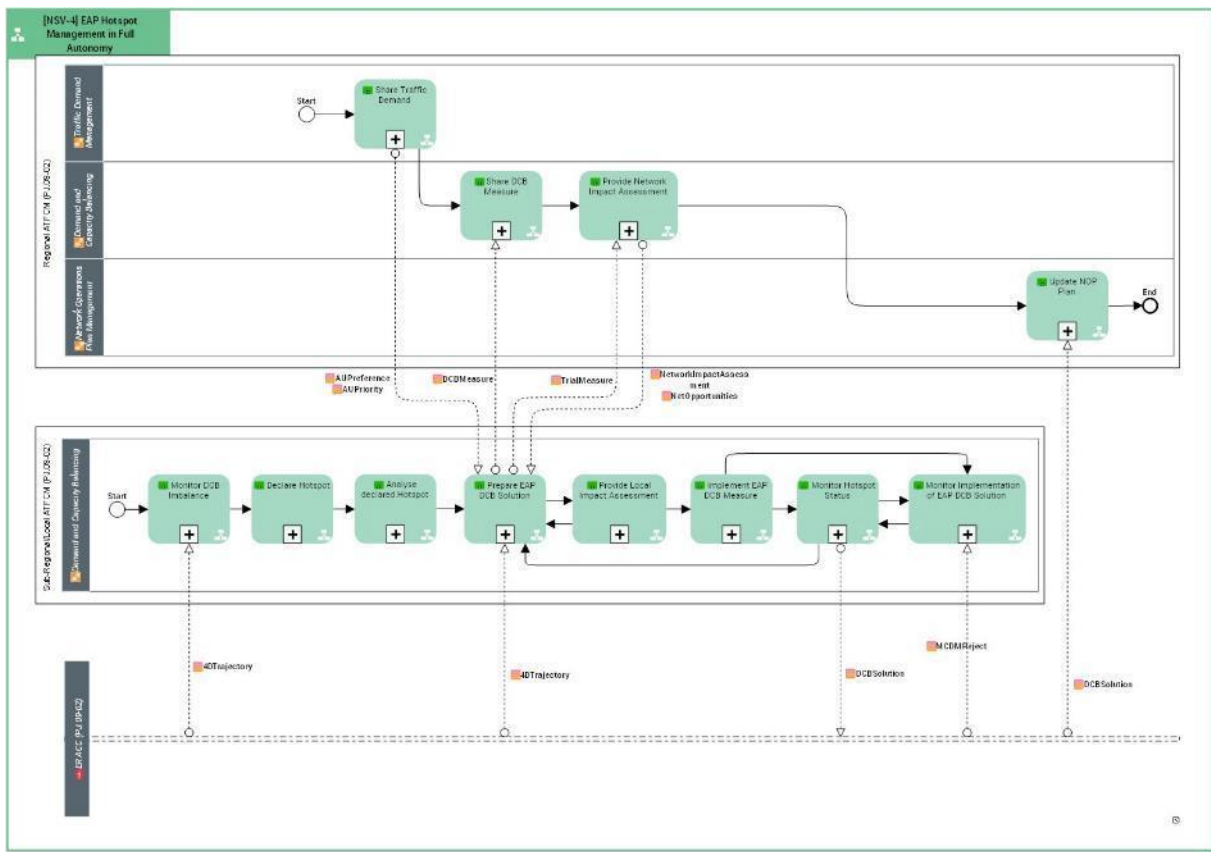
Figure 5 [NSV-4] EAP Hotspot Management in Full Autonomy
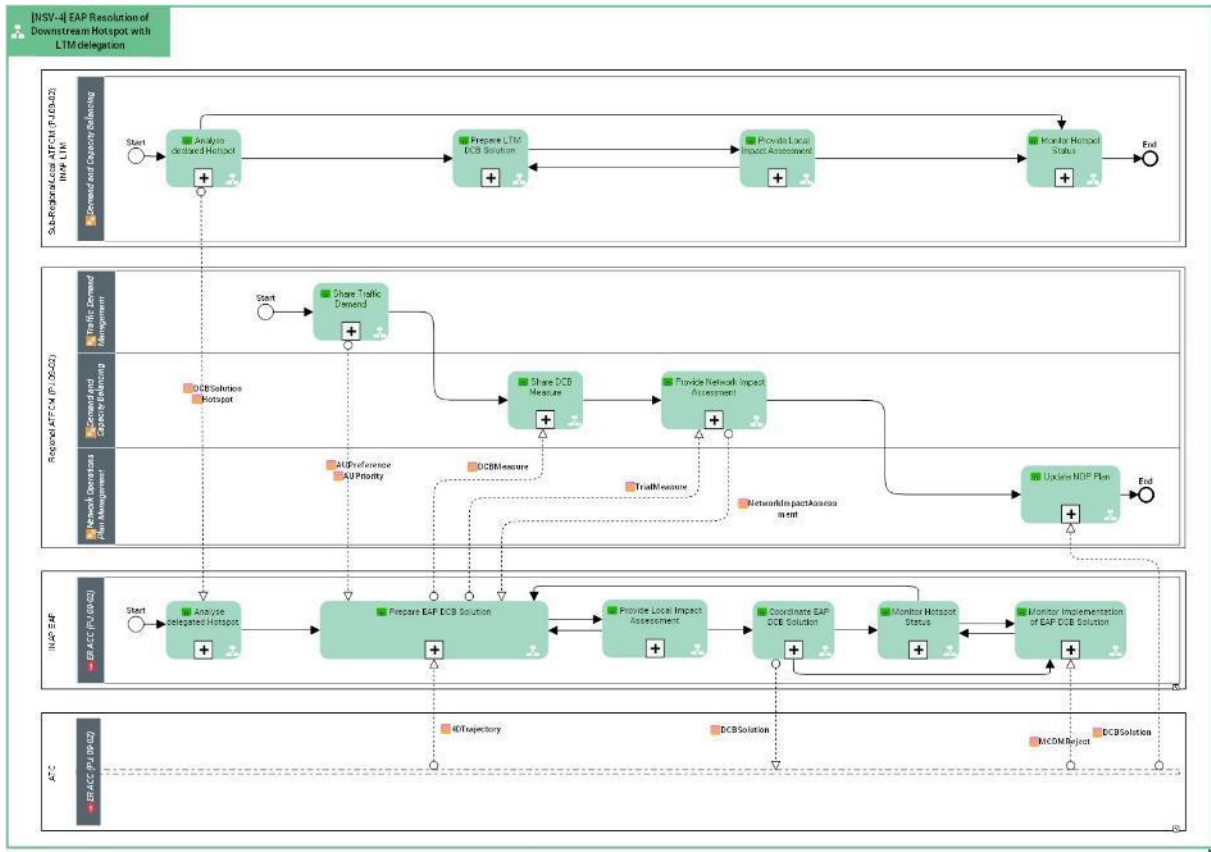
**Figure 6 [NSV-4] EAP Resolution of Downstream Hotspot with LTM delegation**
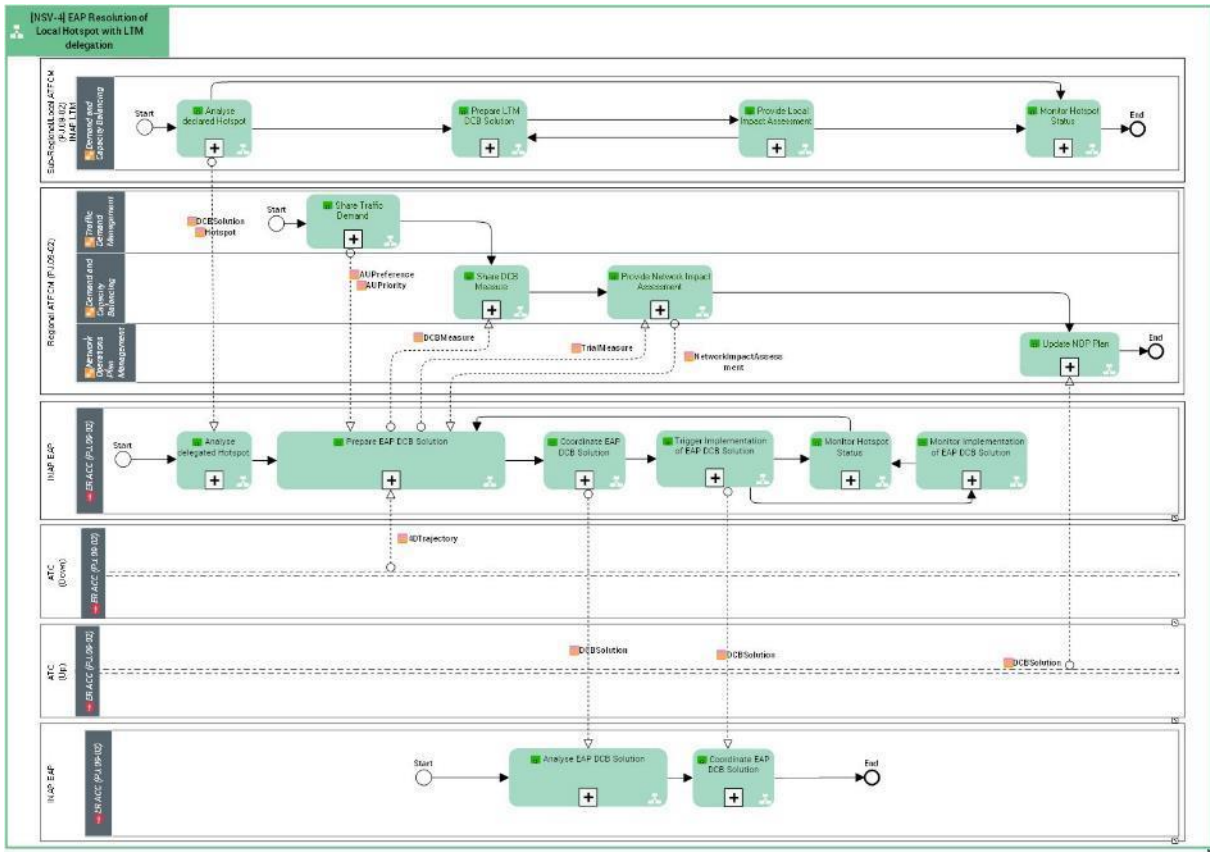
**Figure 7 [NSV-4] EAP Resolution of Local Hotspot with LTM delegation**
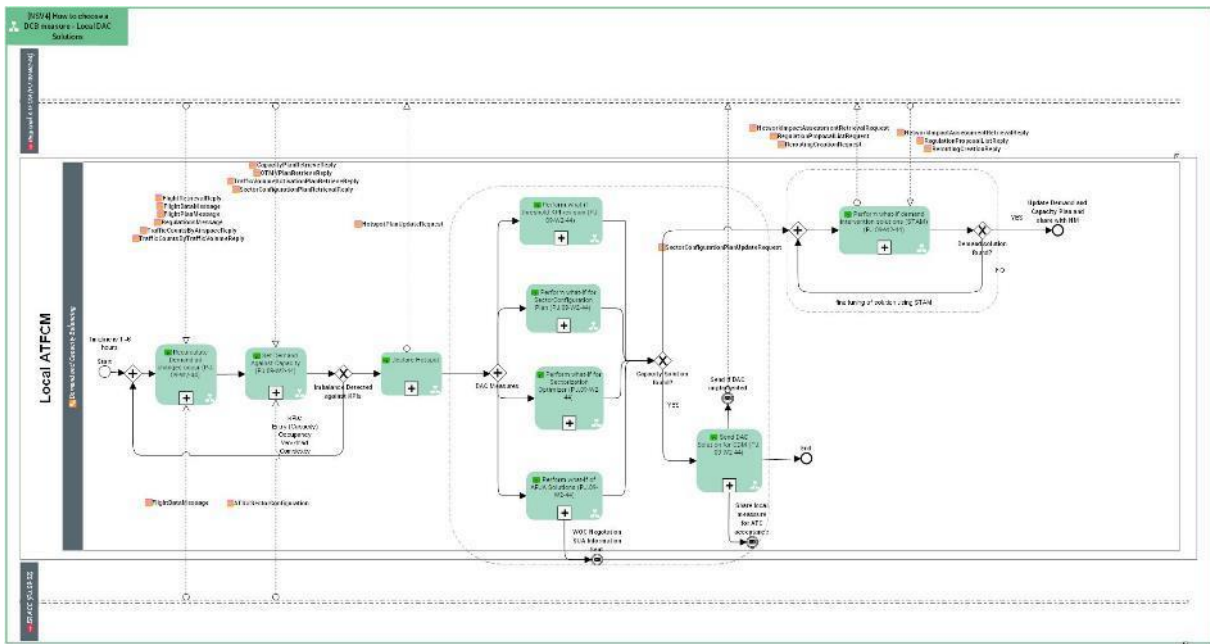


**Figure 8 [NSV-4] How to choose a DCB measure - Local DAC Solutions**

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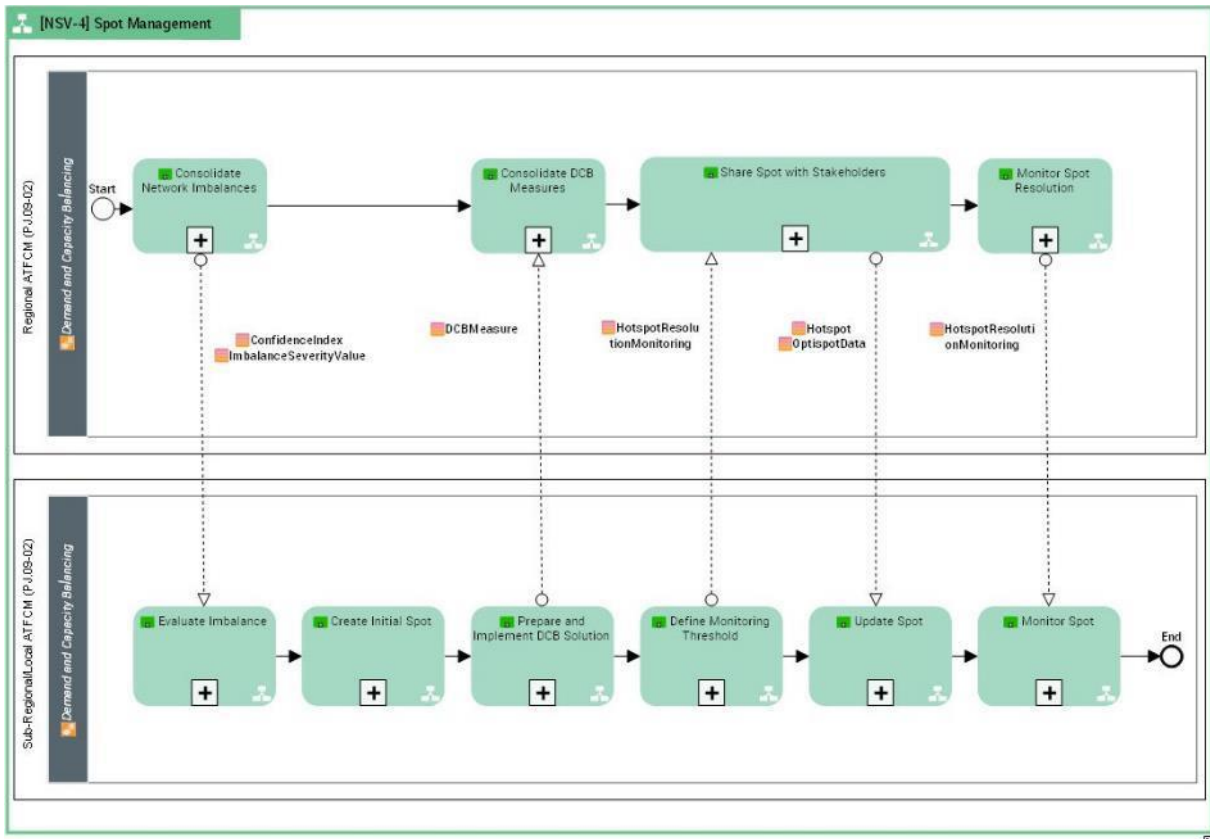
**Figure 9 [NSV-4] Spot Management**

## 4.1.2 HotSpot Management - Resource Connectivity view

This section describes the capability configurations and data exchanges for the HotSpot Management.

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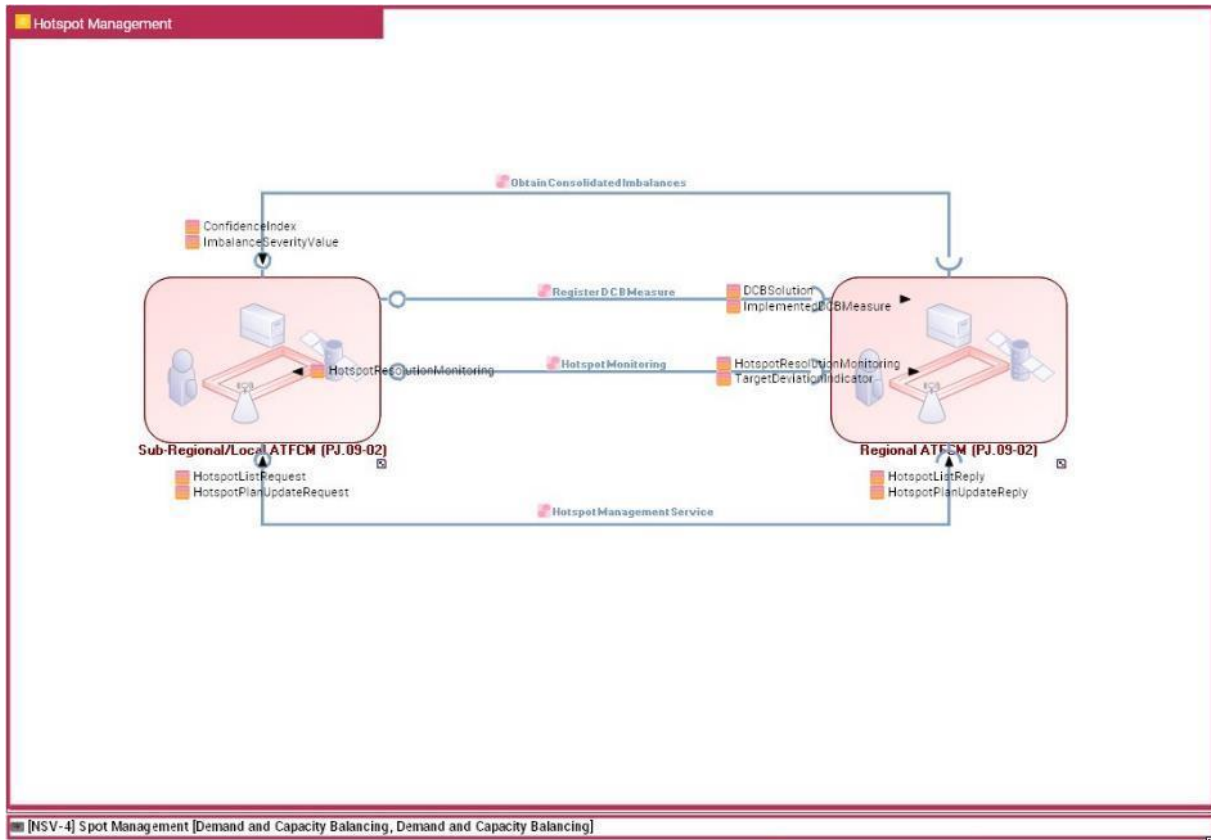
**Figure 10 [NSV-1] Hotspot Management**

### 4.1.2.1 HotSpot Management - Resource Infrastructure view (NSV-2)
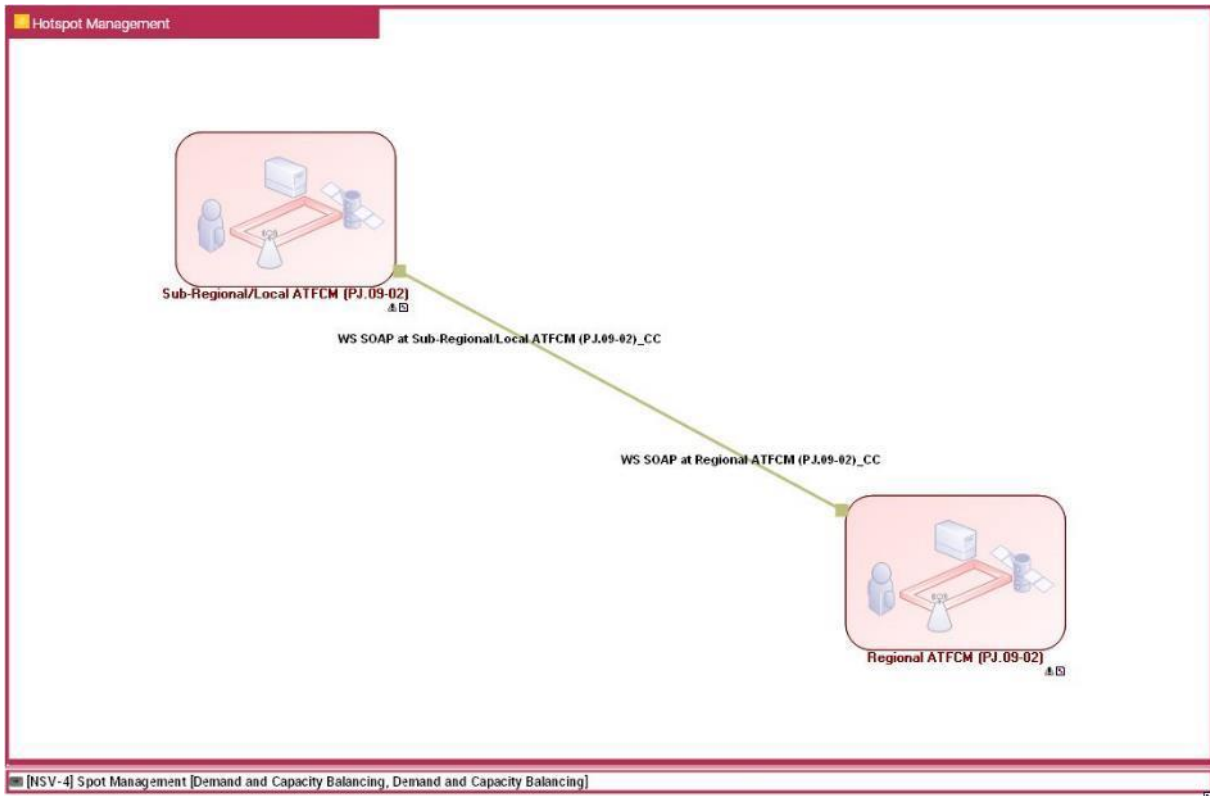


**Figure 11 [NSV-2] Hotspot Management**

| Regional ATFCM_CC (Comm element endpoint) | Sub-Regional/Local ATFCM (Comm element endpoint) |
|---|---|
| WS SOAP at Regional ATFCM | WS SOAP at Sub-Regional/Local ATFCM |

**Table 8 HotSpot Management - Communication endpoints**

## 4.1.2.2 HotSpot Management - Resource Orchestration views (NSV-4)
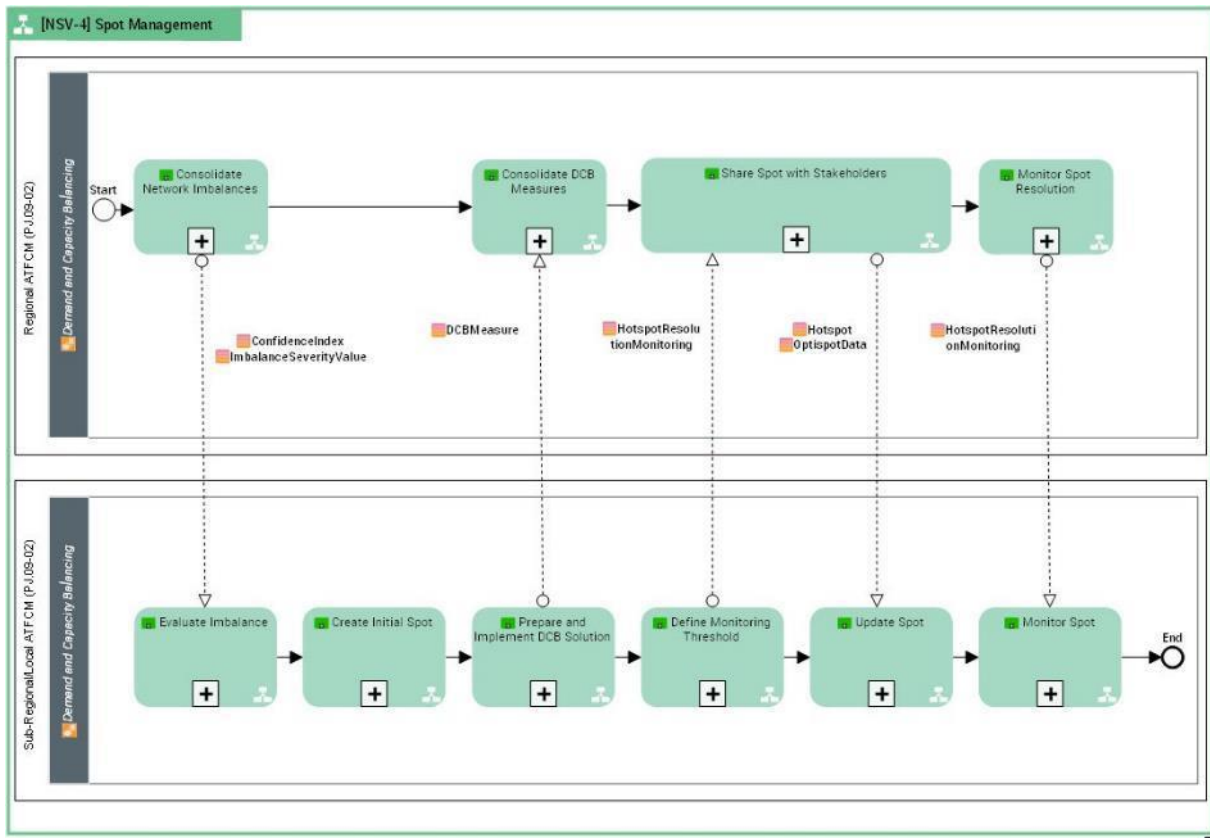


**Figure 12 [NSV-4] Spot Management**

## 4.1.3 INAP Function - Resource Connectivity view

This section describes the capability configurations and data exchanges for the INAP Function.

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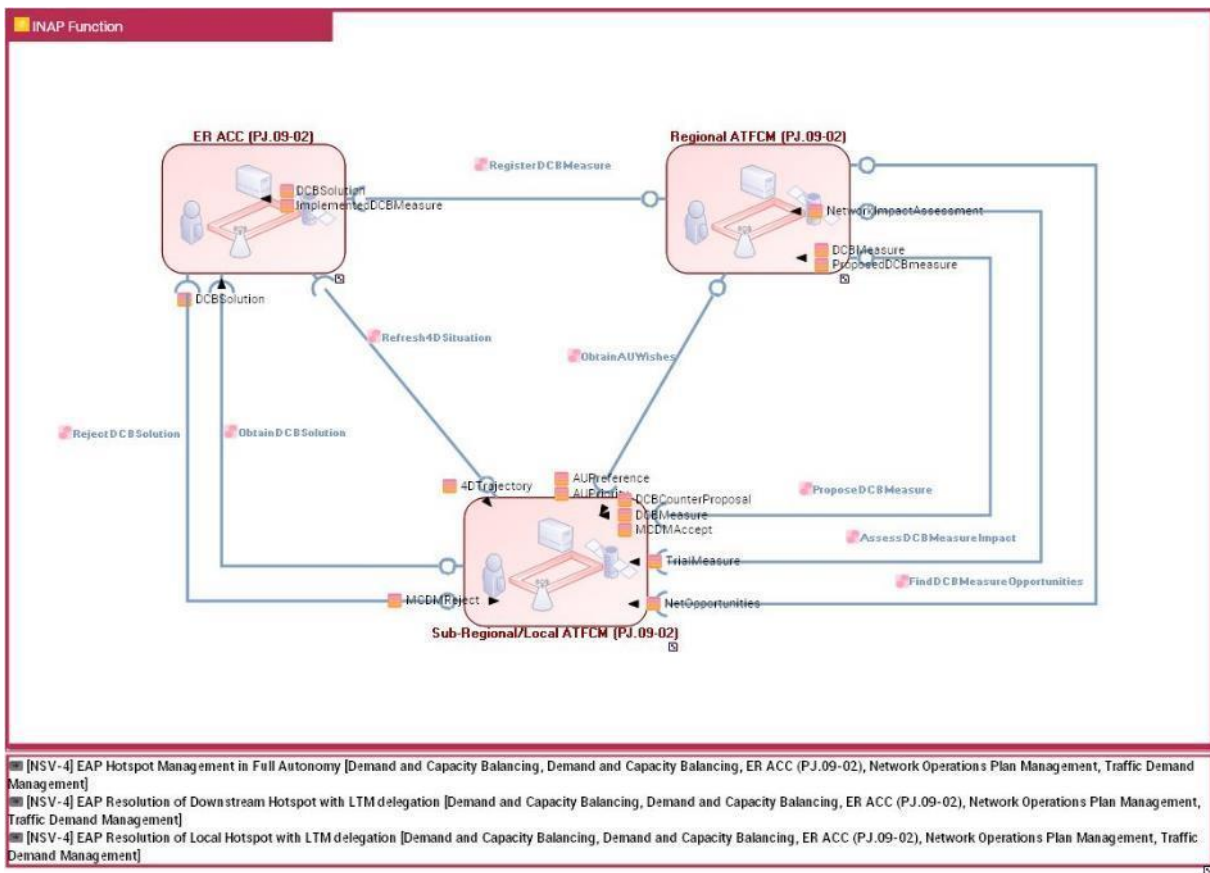
Figure 13 [NSV-1] INAP Function

### 4.1.3.1 INAP Function - Resource Infrastructure view (NSV-2)

Figure 14 [NSV-2] INAP Function

| Regional ATFCM | ER ACC | Sub-Regional/Local ATFCM |
|---|---|---|
| WS SOAP at Regional ATFCM_CC | WS SOAP at ER ACC_CC | |
| | WS SOAP at ER ACC_CC | WS SOAP at Sub-Regional/Local ATFCM_CC |
| WS SOAP at Regional ATFCM_CC | | WS SOAP at Sub-Regional/Local ATFCM_CC |

Table 9 INAP Function - Communication endpoints

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### 4.1.3.2   INAP Function - Resource Orchestration views (NSV-4)
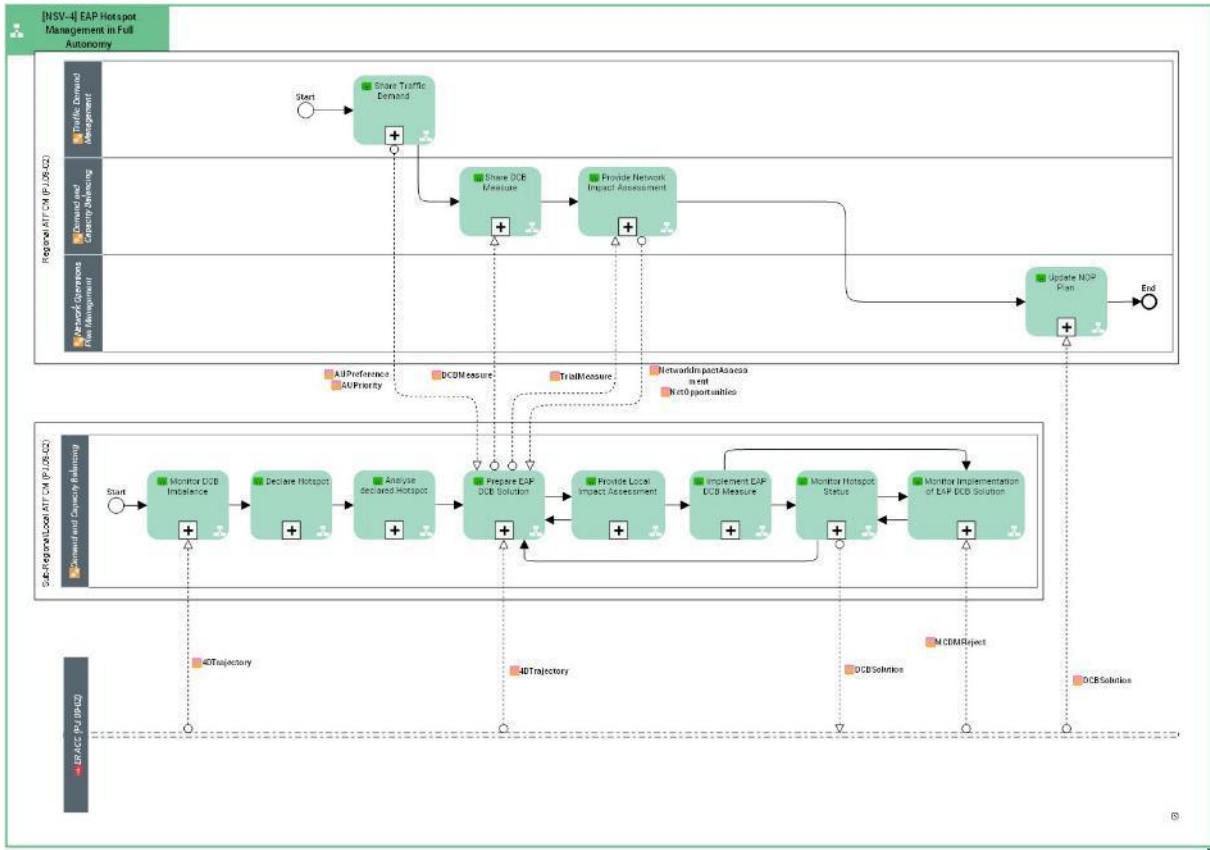


**Figure 15 [NSV-4] EAP Hotspot Management in Full Autonomy**

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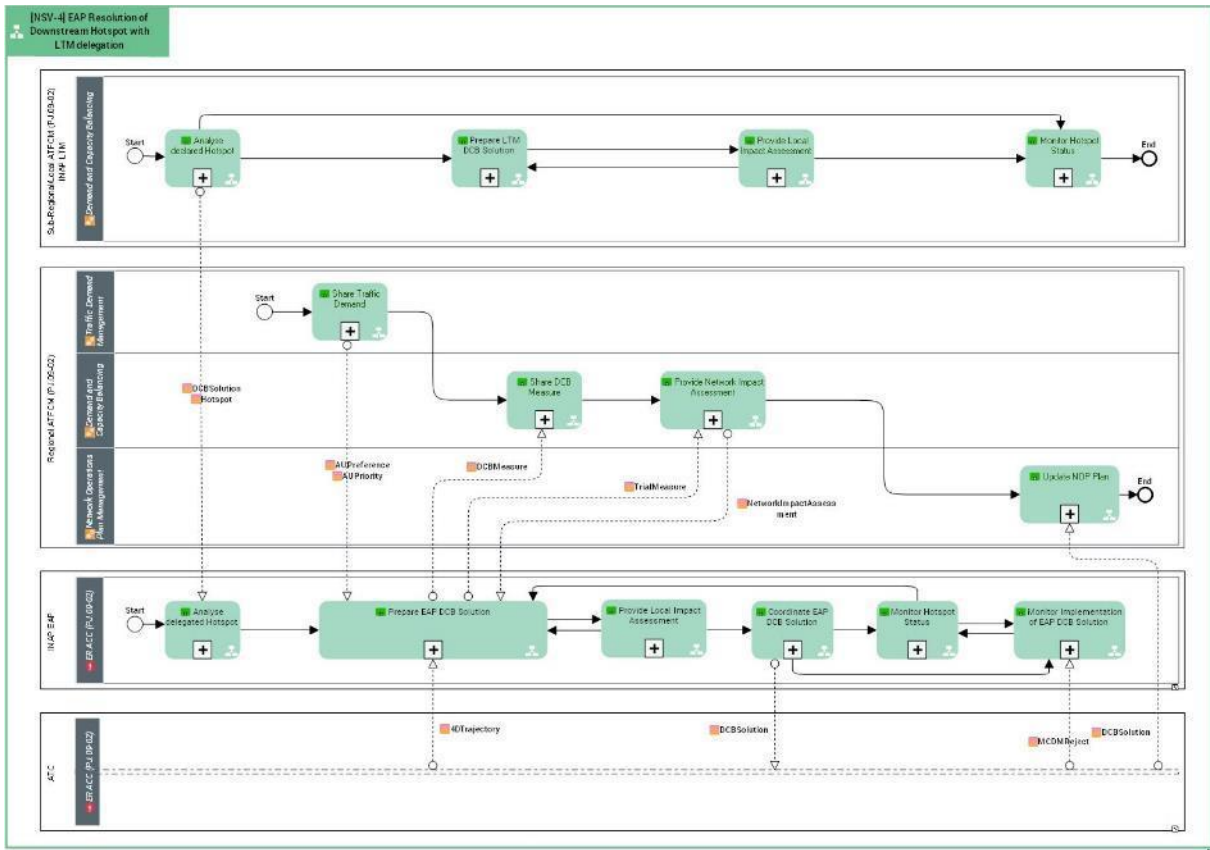
**Figure 16 [NSV-4] EAP Resolution of Downstream Hotspot with LTM delegation**

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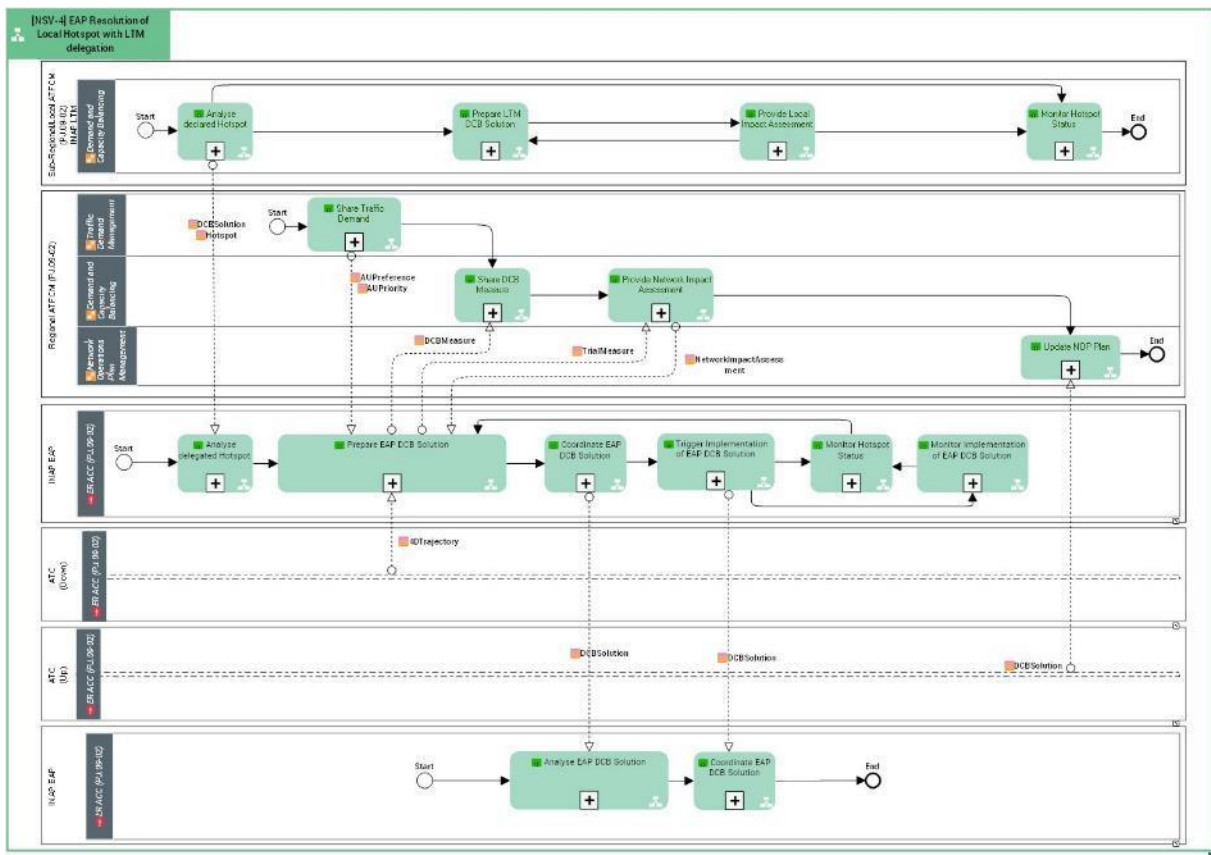
**Figure 17 [NSV-4] EAP Resolution of Local Hotspot with LTM delegation**

## 4.1.4 Target Time Management - Resource Connectivity view
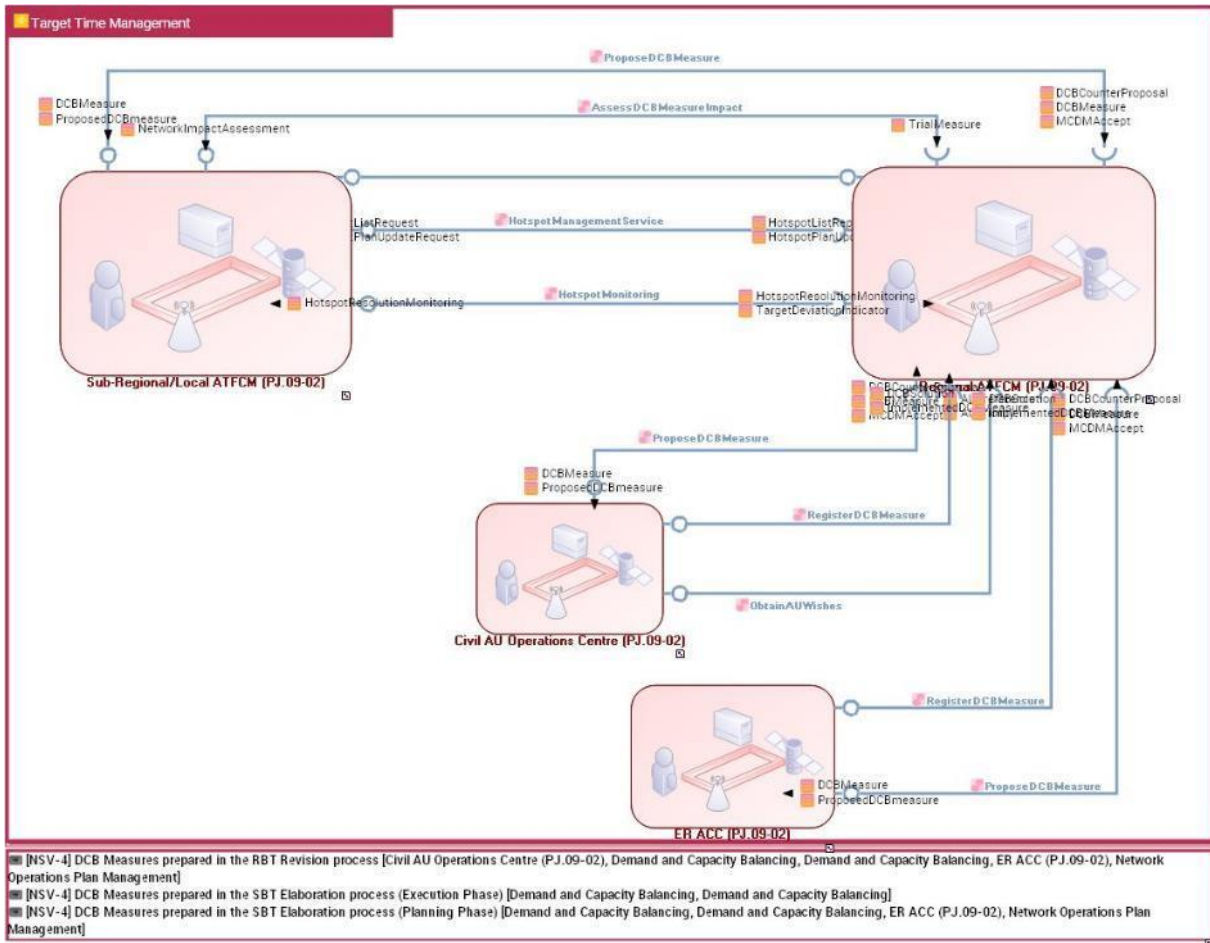
**Figure 18 [NSV-1] Target Time Management**

### 4.1.4.1 Target Time Management - Resource Infrastructure view (NSV-2)
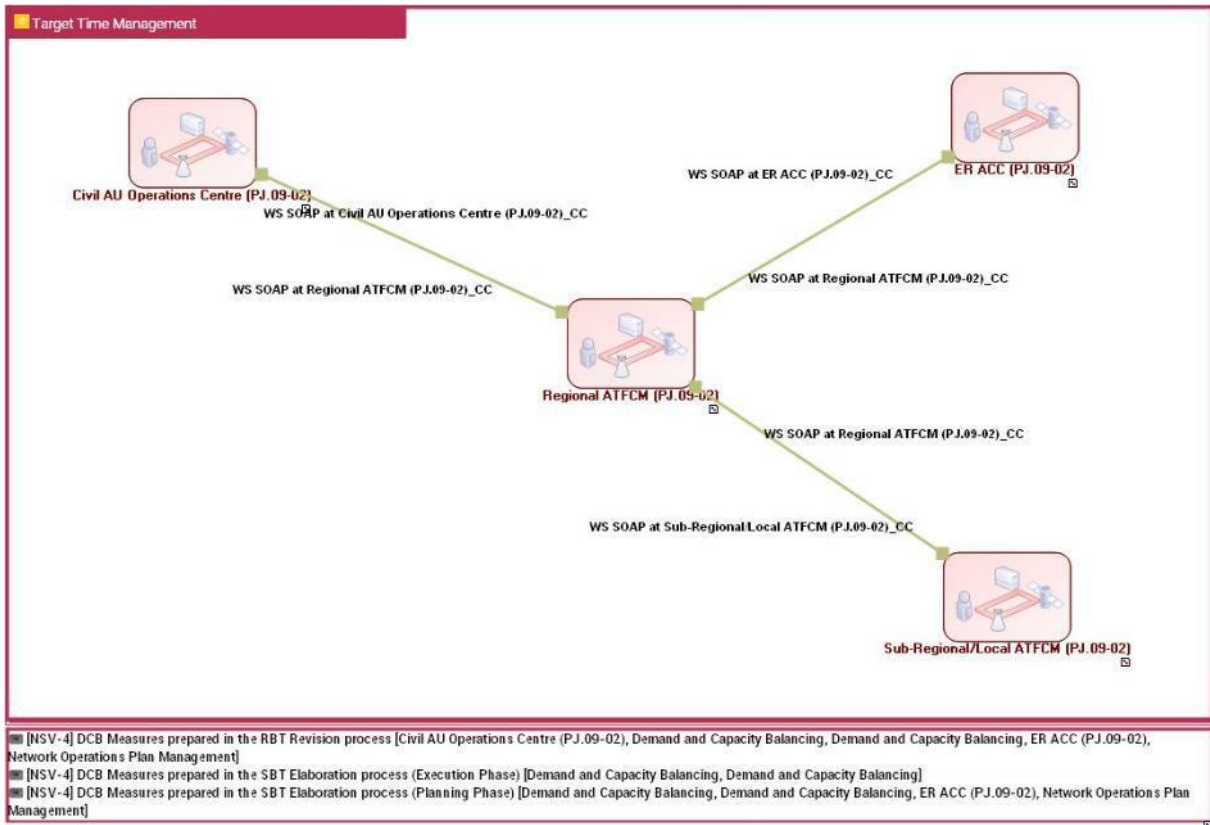


**Figure 19 [NSV-2] Target Time Management Infrastructure**

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## 4.1.4.2 Target Time Management – Resource orchestration view (NSV-4)
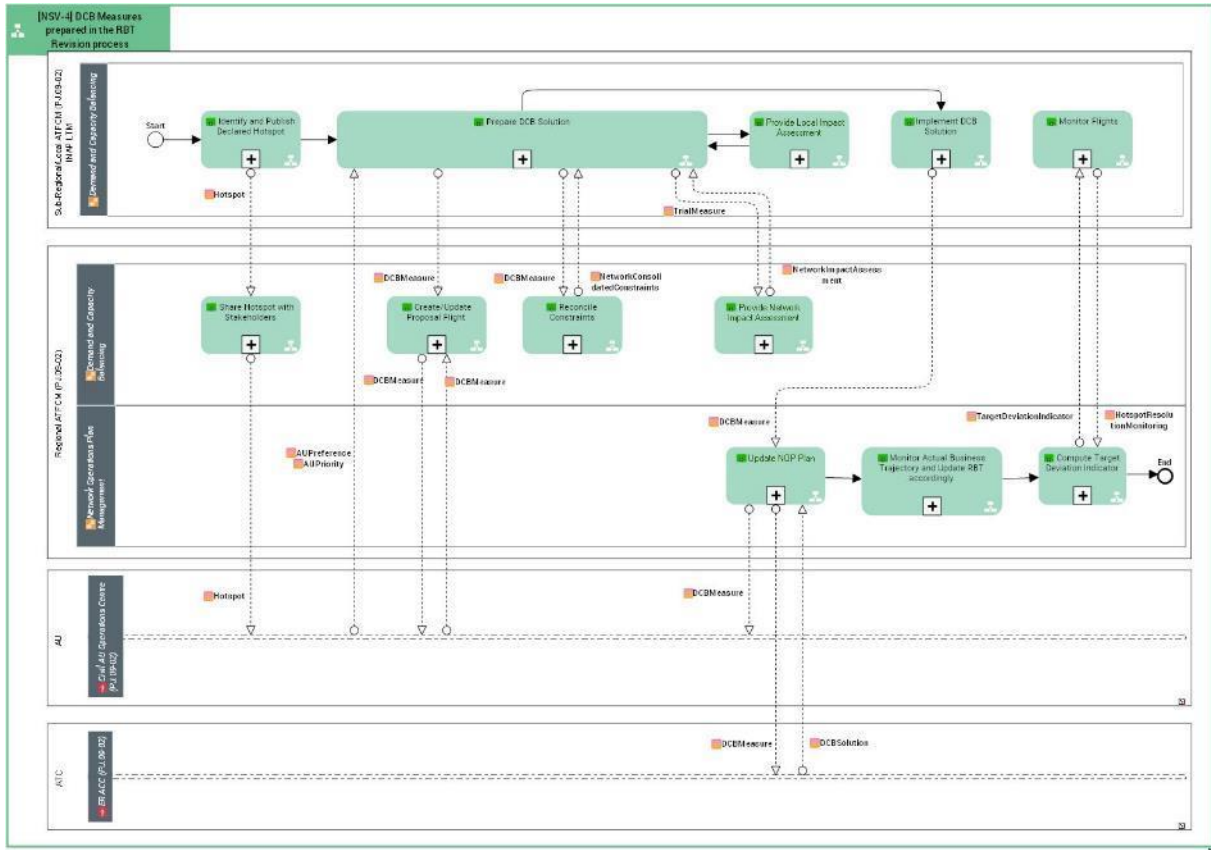


**Figure 20 [NSV-4] DCB Measures prepared in the RBT Revision process**

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**Figure 21 [NSV-4] DCB Measures prepared in the SBT Elaboration process (Execution Phase)**
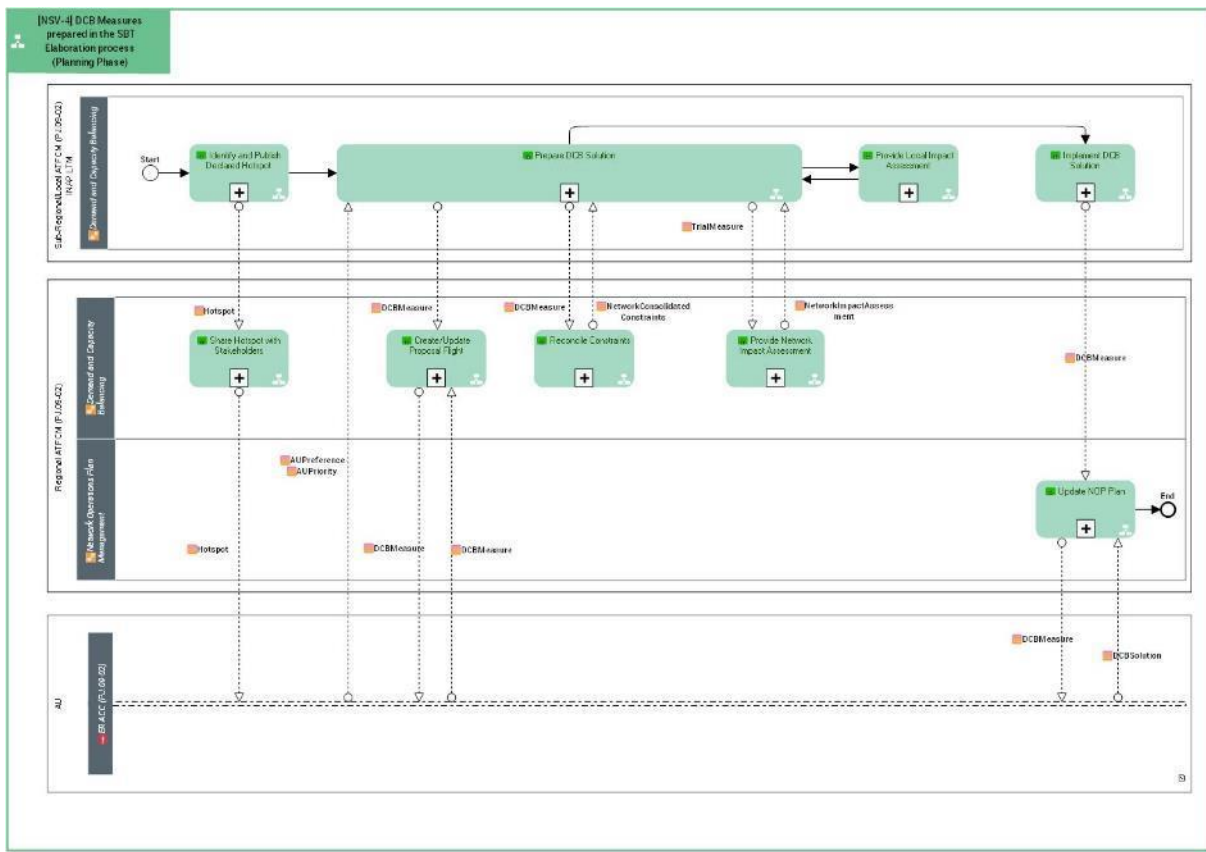
**Figure 22 [NSV-4] DCB Measures prepared in the SBT Elaboration process (Planning Phase)**

## 4.1.5 Resource Composition

The Table 10 introduces the Functional Blocks-Enablers mapping.

These Functional Blocks are part of Technical Systems as described below.

The **ATFCM Technical System** supports the regional, sub-regional and local Air Traffic Flow and Capacity Management functions.

| Functional Block | Description |
|---|---|
| Cooperative Scenario Planning | Groups all functions related to planning and managing scenarios. These functions cover the regional and local levels, a scenario being elaborated at local level and its impacts being analysed at regional level. The preparation of scenarios is based on CDM processes between the local impacted areas and the regional level. |
| Demand and Capacity Balancing | Groups all functions related to Demand and capacity balancing in short-term planning phases. It covers the regional and local levels, a DCB measure or a regulation |

| | being decided at local levels and its impact being analysed at Regional level. |
|---|---|
| Network Operations Plan Management | Groups all functions related to network operation plan management covering a regional aspect of the network information management system. |
| | The goal is to provide an overview of the ATFCM situation from strategic planning to real time operations with ever increasing accuracy up to and including the day of operations. The data is accessible online by stakeholders for consultation and update as and when needed, subject to access and security controls |
| | The NOP is also updated taking into account the actual traffic situation and real time flow and capacity management. |
| Traffic Demand Management | Groups all functions related traffic demand management at regional and local level covering regional or local aspect of the demand management during strategic, pre tactical and tactical phase. |
| | At strategic level it is based on statistical information based on similar days in the past, as well as economical models (STATFOR). As the time move close to day of operation, modelled data are replaced by real information provided by Aircraft Operators and airports. |

**Table 10 ATFCM Technical System Functional Blocks description**
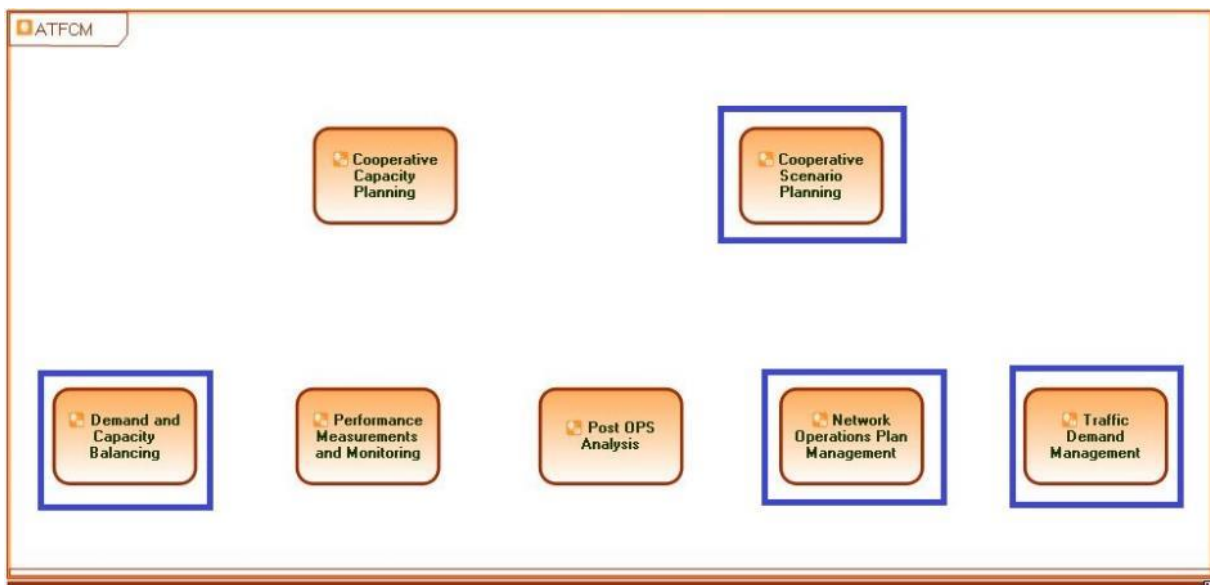


**Figure 23 ATFCM Technical System All Functional Blocks**

The ASM Implements the airspace design and management functions.

| Functional Block | Description |
|---|---|
| Cooperative Airspace Management | This FB groups all functions for Airspace management, at local, sub-regional and regional levels. These functions support the development and co-ordination of planning activities (at local and regional levels) related to the use of the Airspace (ATS Route Network and ATC Sector configuration), in en-route and terminal airspace. |
| Cooperative Airspace Design | This FB groups all functions related to Airspace Design supporting the development and co-ordination of design activities (at local and regional levels) of the ATS Route Network and ATC Sectors, in en-route and terminal airspace |

**Table 11 ASM Functional Blocks description**
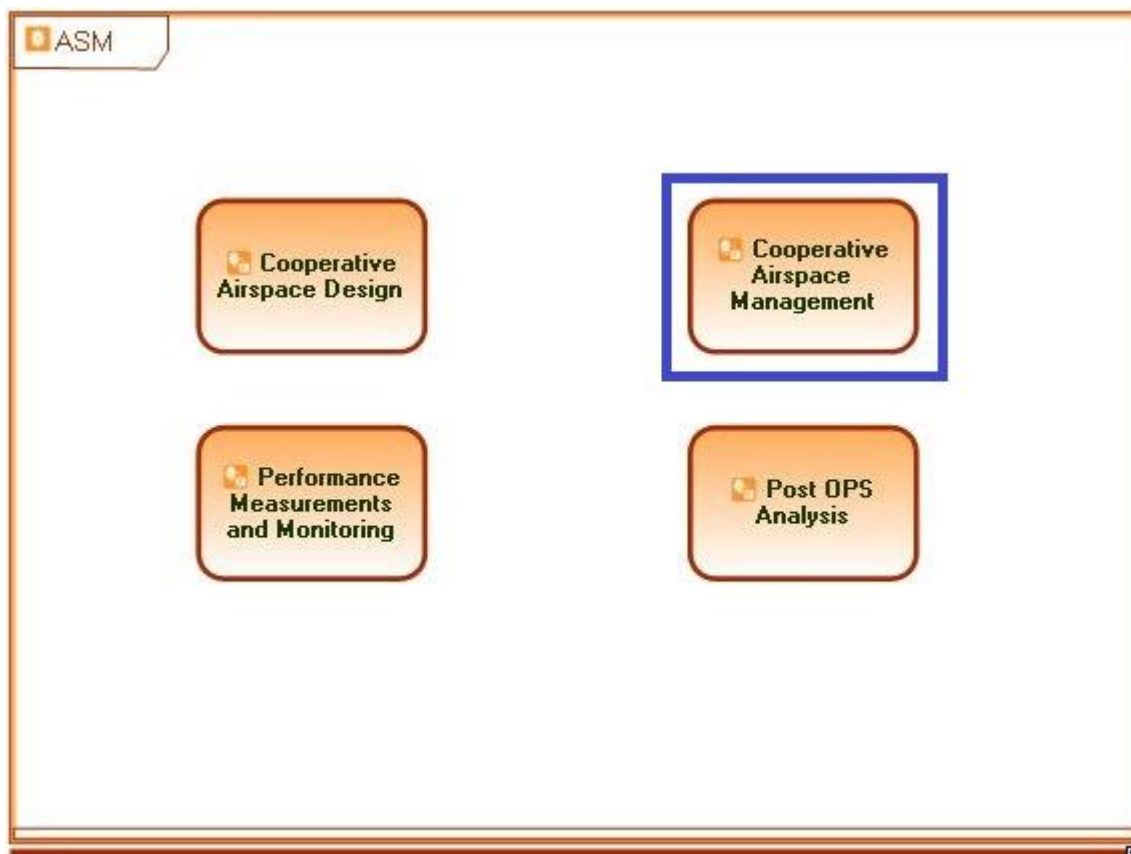


**Figure 24 ASM All Functional Block**

The **En-Route/Approach ATC** gathers the ground based automated means, used in En-Route and Approach ATC Centres, to support the air traffic controllers in the provision of the following main Air Traffic Services

| Functional Block | Description |
|---|---|
| Local Traffic Complexity Management | The Local Traffic Complexity Management functional block calculates traffic complexity within predefined airspace volumes and derives the constituent factors contributing to complexity to facilitate the identification of measures that could be taken to adjust either traffic flows or the airspace sectorization to optimise the efficiency of the ATC/ATM services of En-route/Approach ATC Centres in high traffic density airspace. Additionally, What-if sector configurations can also be submitted to determine their effect on traffic complexity. |
| Operational Supervision ER/APP ATC | The Operational Supervision functional block allows ACC/Approach Supervisor and Flight Data Operator the to manage the operational configuration, according to traffic demand, and react in case of system fault, re-assigning and distributing available resources in order to maintain adequate safety levels and quality of service. |
| Support Functions ER/APP | The Support functions functional block encompasses the following support functions:<br><br>Recording: to select the data to be recorded and to record these data.<br><br>•Data Analysis Function: provide a data analysis facility on on-line and for recorded data.<br><br>•Data Playback Function: enable to play-back situations from recorded data.<br><br>•Configuration Management: providing system version deployment support, the means to assist software and data deployment.<br><br>•Managing off-line Environment data: provide tools to create, modify, check consistency, compile from different sources, distribute onto sub-systems all the off-line data (airspace definition, air traffic data…) that are required for the systems. Enable Off-line data to be managed both at a national level and at a local level.<br><br>•Managing on-line Environment data: enable On-line management such as data capture from external clients (Note: manual modification of on-line data is addressed in operational supervision function) |

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| | • Exchanging environment data with external client: distribute Environment data to external clients.

• Managing system time through interface with an external time reference system. |

**Table 12 En-Route/Approach ATC Functional Blocks descriptions**
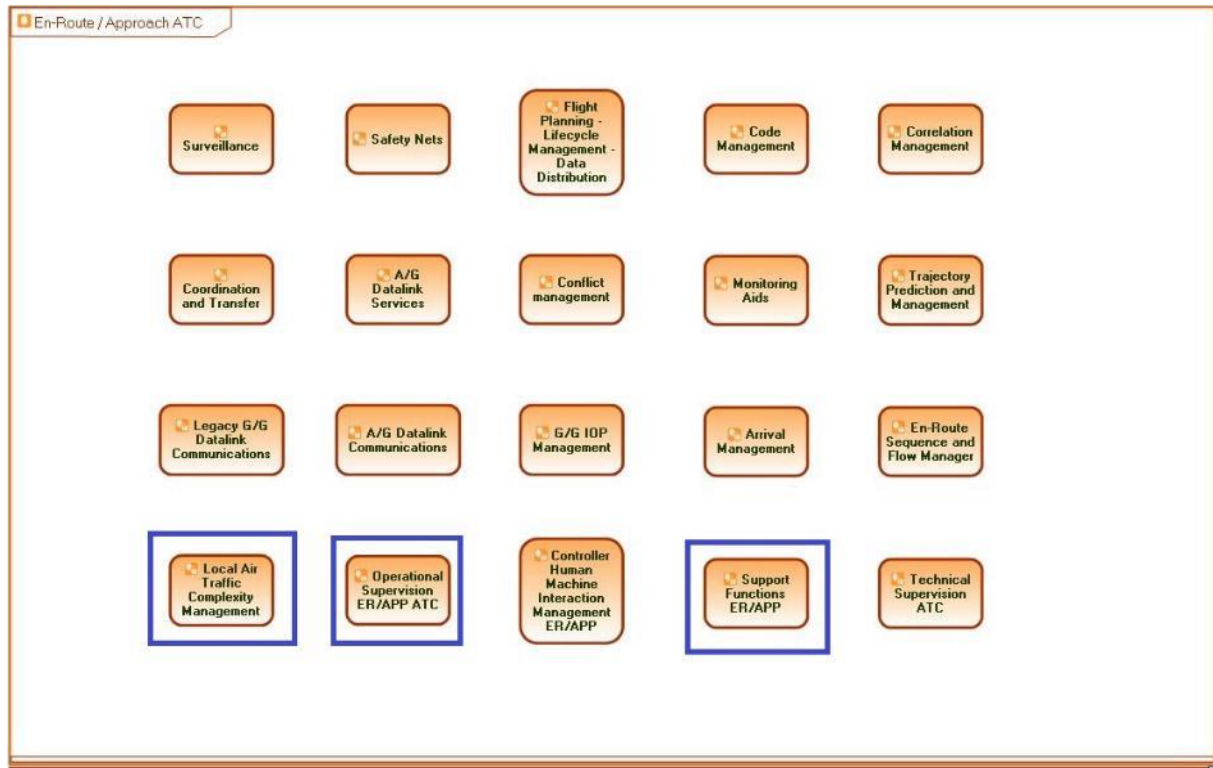


**Figure 25 En-Route/Approach ATC All Functional Blocks**

The **Civil AU Flight Operations Centre (FOC)** supports Airspace Users performing manned or unmanned flight operations of civil aircraft (as defined by ICAO).
The FOC Technical System represents the 'Flight Operations' domain as part of the whole operations of the Airspace User. The domain 'Flight Operations' covers all activities that deal with the flights operated by the Airspace Users. These activities refer to the medium- and short-term planning and the execution phases of the flights.

| Functional Block | Description |
|---|---|
| Operations Management | The Operations Management covers all activities within FOC system that deal with the whole set of flights operated by the AU. The activities cover the medium- and short-term planning as well as the execution phases of the flights |
| Communication Management | The Communication Management provides the technical means for the communication with the flight crew and the Aircraft, with the other ATM actors, and with other |

| | external data and service providers. Moreover it provides the means for the communication if the FOC acts as data or service provider |
|---|---|
| Flight Management | The Flight Management covers all activities within FOC system that deal with a particular flight. The activities are executed in the short-term planning and the execution phases of the flight |

**Table 13 Civil AU Flight Operations Centre (FOC) Functional Blocks description**
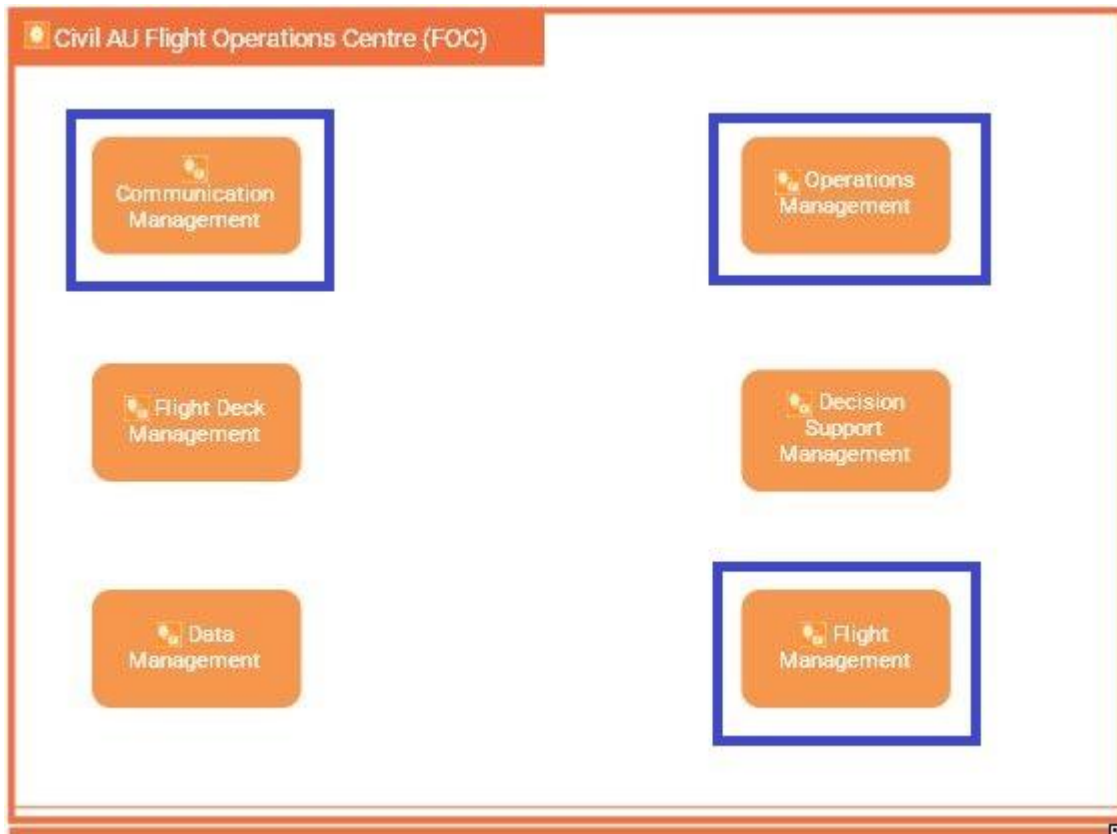


**Figure 26 Civil AU Flight Operations Centre (FOC) All Functional Blocks**

The **AIM** implements functionalities to collect, process, validate and verify, store, integrate, exchange and deliver quality-assured aeronautical data and aeronautical information (static and dynamic).

| Functional Block | Description |
|---|---|
| Aeronautical Information Distribution | This Functional block covers the activities necessary to make the required aeronautical information available to the end user in different form and formats (i.e. paper, file format (e.g. PDF file), text or digital message and dataset). |

**Table 14 AIM Functional Blocks descriptions**
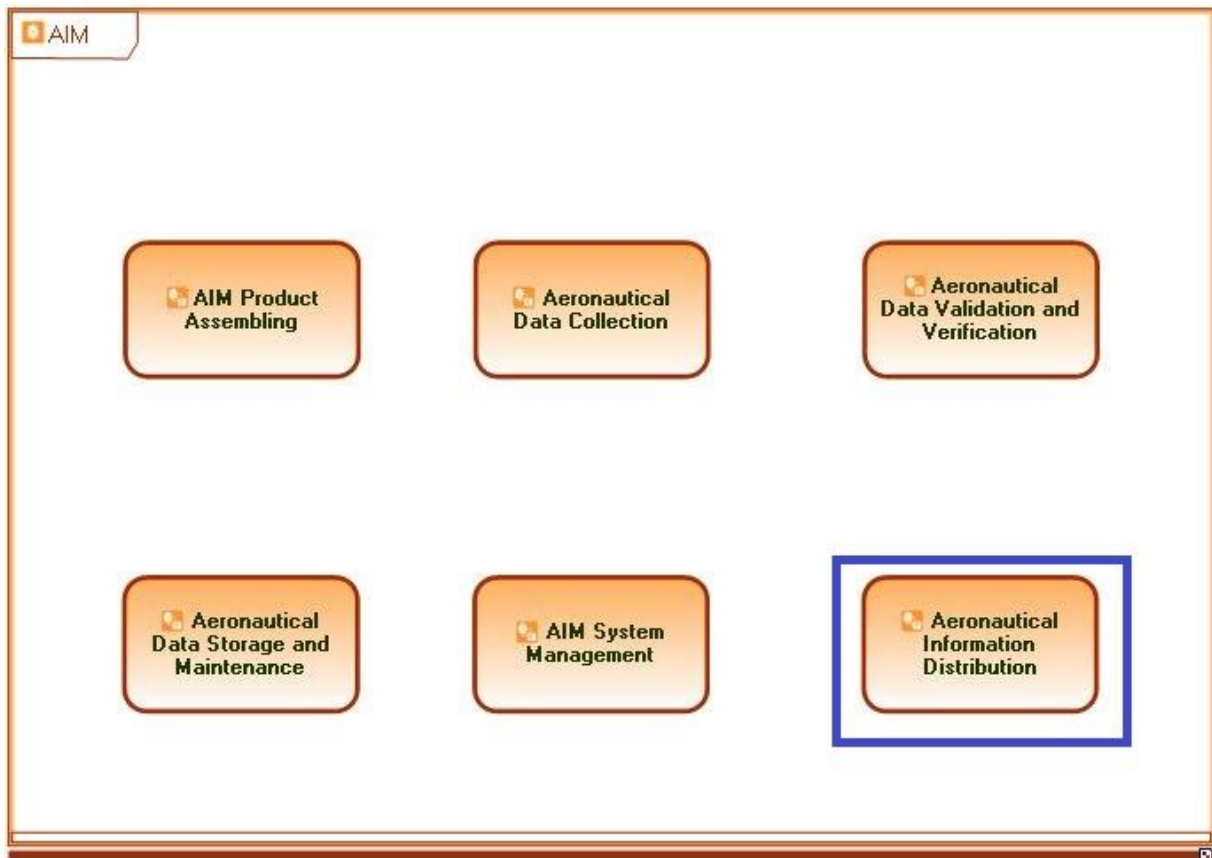
**Figure 27 AIM All Functional Blocks**

## 4.1.6 Service view

Several services have been developed or used. This section described these services.

The Appendix A provide a complete description of the developed/used services.

### 4.1.6.1 Dynamic Airspace Configuration – related services

| Service Name | Developed by the solution | Comments |
|---|---|---|
| DACATCVolumes | N | This service is developed by PJ07-S40 |
| DACeDACPublication | N | This service is developed by PJ07-S40 |
| **DACPerformanceTargets** | **Y** | |
| NMAirspaceAvailability | N | NM already existing service |
| NMAirspaceStructure | N | NM already existing service |
| NMFlightManagement | N | NM already existing service |

| | N | NM already existing service |
|---|---|---|
| NMMeasures | N | NM already existing service |
| NMPublish-Subscribe | N | NM already existing service |
| NMTacticalUpdates | N | NM already existing service |
| NMTrafficCounts | N | NM already existing service |

**Table 15 Services in DAC context**

### 4.1.6.2 HotSpot Management – related services

| Service Name | Developed by the solution | Comments |
|---|---|---|
| HotspotManagementService | N | |
| HotspotMonitoring | Y | |
| ObtainConsolidatedImbalances | Y | |
| RegisterDCBMeasure | Y | |

**Table 16 Services in HotSpot Management context**

### 4.1.6.3 INAP Function – related services

| Service Name | Developed by the solution | Comments |
|---|---|---|
| RejectDCBSolution | Y | |
| RegisterDCBMeasure | Y | |
| Refresh4DSituation | Y | |
| ProposeDCBMeasure | Y | |
| ObtainDCBSolution | Y | |
| ObtainAUWishes | Y | |
| FindDCBMeasureOpportunities | Y | |
| AssessDCBMeasureImpact | Y | |

**Table 17 Services in INAP Function context**

### 4.1.6.4 Target Time Management – related services

| Service Name | Developed by the solution | Comments |
|---|---|---|
| AssessDCBMeasureImpact | Y | |

| HotspotManagementService | N | |
|---|---|---|
| HotspotMonitoring | Y | |
| ObtainAUWishes | Y | |
| ProposeDCBMeasure | Y | |
| RegisterDCBMeasure | Y | |

**Table 18 Services in Target Time Management context**

## 4.2 Functional and non-Functional Requirements

[REQ]

| Identifier | REQ-09-W2-44-TS-0100.0010 |
|---|---|
| Title | Retrieve EDAC |
| Requirement | The WOC support system shall allow to retrieve the EDAC from the NOP |
| Status | <Validated> |
| Rationale | In order to updated SBT according to last information on sector configurations and ATFCM measures, the WOC needs to retrieve last EDAC information update |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0100.0020 |
| <SATISFIES> | <Enabler> | |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0100.0020 |
|---|---|

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| Title | The Regional ATFCM shall receive final sector configurations and ATFCM measures |
|---|---|
| Requirement | The Regional ATFCM shall receive sector configurations and ATFCM measures |
| Status | <Validated> |
| Rationale | ARES information is received from DAC-ASM Function by NM-Asm function<br>Sector config information is received by NM-ATFCM function from DAC-ATFCM |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0060 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IER.0060 |
| <SATISFIES> | <Enabler> | AIMS-04 |
| <SATISFIES> | <Enabler> | AIMS-22 |
| <SATISFIES> | <Enabler> | SWIM-APS-03b |
| <ALLOCATED_TO> | <Functional block> | WOC System |

[REQ]

| Identifier | REQ-09-W2-44-TS-0100.0030 |
|---|---|
| Title | The Regional ATFCM Technical System shall produce EDAC |
| Requirement | EDAC production shall be based on ARES allocation plan and Sector configuration |
| Status | <Validated> |
| Rationale | Production of the updated EDAC information at any time it is needed<br>The EDAC production shall be performed upon reception of the ARES allocation plan OR any updates |

| Category | <Functional> |
|----------|--------------|

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|---------------------|------------|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0060 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0110 |
| <SATISFIES> | <Enabler> | NIMS-04 |
| <SATISFIES> | <Enabler> | NIMS-30 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | NM_Produce_EDAC |

[REQ]

| Identifier | REQ-09-W2-44-TS-0100.0040 |
|------------|---------------------------|
| Title | The Regional ATFCM Technical system shall publish the EDAC |
| Requirement | NOP's Airspace publication process shall integrate EDAC published information<br>All EDAC subscribers shall receive the new EDAC publication message |
| Status | <Validated> |
| Rationale | EDAC is a part of the NM-NOP airspace publication process |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|---------------------|------------|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0060 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IER.0040 |
|---|---|---|
| <SATISFIES> | <Enabler> | SWIM-APS-03b |
| <SATISFIES> | <Enabler> | PRO-010 |
| <ALLOCATED_TO> | <Functional block> | Network Operations Plan Management |
| <ALLOCATED_TO> | <Function> | NM_Produce_EDAC |

[REQ]

| Identifier | REQ-09-W2-44-TS-0100.0050 |
|---|---|
| Title | The Civil AU Operations Centre shall be able to retrieve EDAC information from the NOP |
| Requirement | The Civil AU Operations Centre(see FOC actor) actor shall be able to retrieve EDAC information from the NOP |
| Status | <Validated> |
| Rationale | The Civil AU Operations Centre is informed upon each publication from the NOP |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IER.0010 |
| <SATISFIES> | <Enabler> | |
| <ALLOCATED_TO> | <Functional block> | DAC tools |

[REQ]

| Identifier | REQ-09-W2-44-TS-0200.0030 |
|---|---|

| Title | Receive coordination request |
|---|---|
| Requirement | The WOC system shall be able to receive and assess a coordination on ASM volumes from other DAC systems |
| Status | <Validated> |
| Rationale | WOC system is part of the CDM to be able to find the best compromise when inconsistencies between Network Airspace Configuration and ASM volumes are detected |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0140 |
| <SATISFIES> | <Enabler> | |
| <ALLOCATED_TO> | <Functional block> | Information and Communication Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0200.0040 |
|---|---|
| Title | Transmit adapted ASM volumes |
| Requirement | The WOC system shall be able to transmit adapted ASM volumes during a CDM process |
| Status | <Validated> |
| Rationale | WOC system is part of the CDM to be able to find the best compromise when inconsistencies between Network Airspace Configuration and ASM volumes are detected |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|

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| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0140 |
| <SATISFIES> | <Enabler> | SWIM-APS-03b |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0200.0050 |
|---|---|
| Title | Transmit Mission trajectories and DMA data |
| Requirement | The WOC system shall be able to transmit 4D mission trajectories DMA data set and long-term ARES demands to concerned local DAC systems |
| Status | <Validated> |
| Rationale | To have a global and coherent view of the Traffic and Capacity, Military actor should provide up to date information under their responsibility: situations of reserved military areas (DMA …), long-term ARES demands |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0240.0060 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0240.0070 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0240.0080 |
| <SATISFIES> | <Enabler> | SWIM-APS-03b |
| <ALLOCATED_TO> | <Functional block> | Information and Communication Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0200.0060 |
|---|---|
| Title | Modify SBT takink into account EDAC published information |
| Requirement | On publication of a new EDAC, the FOC system shall be able to re-compute SBTs which cross DCB hotspots so that they avoid these DCB hotspots.<br><br>If the recomputing is not performed in a time-delay parameter previously defined, the concerned SBT trajectories are automatically suspended. |
| Status | <Validated> |
| Rationale | Trajectories need to be updated as soon as new EDAC information is shared between DAC systems |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0100.0021 |
| <SATISFIES> | <Enabler> | ER-APP-ATC-15 |
| <ALLOCATED_TO> | <Functional block> | Operations Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0220.0020 |
|---|---|
| Title | The Regional ATFCM shall compute the daily performance target |
| Requirement | The Regional ATFCM/NOP shall compute the daily performance target following the DAC process integrating Civil AU Operation Centres and State AU Operation Centres coordination |
| Status | <Validated> |
| Rationale | With NOP Traffic planning data and Traffic projections, a Traffic Prediction with uncertainty indicators and confidence Index shall be provided (by DCB or BT management) |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0200 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IER.0100 |
| <SATISFIES> | <Enabler> | NIMS-30 |
| <ALLOCATED_TO> | <Functional block> | Network Operations Plan Management |
| <ALLOCATED_TO> | <Function> | NM_compute_Network_Perf_Indicators |

[REQ]

| Identifier | REQ-09-W2-44-TS-0240.0010 |
|---|---|
| Title | Regional ASM back-end support of the DAC in providing ASP information to WOC |
| Requirement | Regional ASM back-end support tool of the DAC in providing ASP information to WOC |
| Status | <Validated> |
| Rationale | WOC interacts only with DAC in getting ASP status information Regional-ASM is in back-end support to DAC DAC is the coordinator of the process with the State AU Operations Centre in providing ASP status info |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IER.0030 |
| <SATISFIES> | <Enabler> | SWIM-APS-03b |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0300.0020 |
|---|---|
| Title | Receive ARES requests |
| Requirement | The local DAC support system shall allow receiving and processing ARES requests |
| Status | <Validated> |
| Rationale | The ARES requests sent by the WOC support systems shall be processed by the local DAC support system to take them into account to build sector configurations and/or ATFCM measures |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0100.0003 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0240.0090 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0100.0027 |
| <SATISFIES> | <Enabler> | |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0300.0030 |
|---|---|
| Title | Evaluate the various sector configurations |
| Requirement | The local DAC support system shall evaluate the various sector configurations according to its local performance targets previously defined and published by the Sub-Regional ATFCM services. |
| Status | <Validated> |

| Rationale | The best note indicates the best sector configuration to be applied. This evaluation needs to be done on a new ARES request or an unexpected event (weather, staff, …) |
|---|---|
| Category | <Performance> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0020 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0090 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

[REQ]

| Identifier | REQ-09-W2-44-TS-0300.0040 |
|---|---|
| Title | Evaluate the various ATFM measures |
| Requirement | The local DAC support system shall evaluate the various ATFM measures according to its local performance targets. The evaluation relies on different options implemented thanks to a given variation of pre-defined data with pre-defined uncertainty |
| Status | <Validated> |
| Rationale | The best note indicates the best ATFM measures to be applied. This evaluation needs to be done on a new ARES request or an unexpected event (weather, staff, …) To satisfy the different algorithm and functions, Local DAC actor shall defined data parameters to support automation (thresholds, calculation model, Predicted Workload parameters …) to be performed with the desired behaviour, and to perform different type of sector configuration according to different data options. Define Sector Design parameters describe in OSED Chapter …. Define Sector Management parameters describe in OSED Chapter …. |
| Category | <Performance> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0090 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and monitoring |

[REQ]

| Identifier | REQ-09-W2-44-TS-0300.0410 |
|---|---|
| Title | Airspace rules |
| Requirement | The local DAC support tools shall take into account rules and delegations (if there are any) of Airspaces to be used in global Airspace organisation |
| Status | <Validated> |
| Rationale | To have sector configurations that are operationally acceptable (workable and safe) |
| Category | <Performance> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0210.0020 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0110 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0300.0420 |
|---|---|
| Title | Transmit number of opened sectors |
| Requirement | The local DAC support system shall inform NM of the number of open sectors for D-OPS |
| Status | <Validated> |
| Rationale | It allows NM to build or make proposals on sector configurations knowing the number of open positions |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0010 |
| <SATISFIES> | <Enabler> | SWIM-APS-03b |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

[REQ]

| Identifier | REQ-09-W2-44-TS-0300.0430 |
|---|---|
| Title | Transmit ideal sector configuration and ATFCM measures |
| Requirement | Following ASM request, the local DAC support system shall be able to identify hotspots and eligible "ATC volumes" to avoid overloaded (or closed to be overloaded) sectors |
| Status | <Validated> |
| Rationale | This is part of the mission of a local DAC system to build the best sector configuration allowing to face a potential overloaded situation |
| Category | <Functional> |

[REQ Trace]

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| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0150 |
| <SATISFIES> | <Enabler> | SWIM-APS-03b |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0300.0610 |
|---|---|
| Title | New sector configuration in case of imbalance |
| Requirement | The local DAC support system shall be able to propose a new valid sector configuration when a detected imbalance in Demand&Capacity excedes a predefined threshold according to rules put in place by local actors |
| Status | <Validated> |
| Rationale | Dynamic Airspace Configuration shall use the detected imbalance as a trigger to initiate the process of capacity adjustment (trigger data parameters shall be defined by Local DAC/DCB actor). According to variation of traffic, input airspace elements, local parameters including trigger values, the automation module shall select automatic action to be performed and generate orders actions for Sector Configuration (or sector design module for Level 4 implementation), and record actions on supervision timeline management. The automation level shall be chosen in the range (Fully Automated-StepByStep human validation) Actions are recorded on Actions supervision log file. To avoid disruptions on the timeline, DAC process shall manage Airspace configuration in a continuum way from long term planning to execution. Applicable functions will be linked more to uncertainty and less to a given fixe anticipation time. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0040 |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0050 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0030 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0070 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

[REQ]

| Identifier | REQ-09-W2-44-TS-0300.0710 |
|---|---|
| Title | Network Working Position |
| Requirement | The Local DAC system shall include a Network Working Position (NWP) aiming at :<br>- supporting DAC activities<br>- supporting the integration between DCB and DAC activities<br>- supporting a decision-making process driven by performance targets<br>- What-if function<br>- supporting the management of predefined scenarios<br>- allowing applying actions or constraints on selected geographical area |
| Status | <Validated> |
| Rationale | As the use of airspace configuration is part of the DCB solution to provide optimised capacity, the NM working position shall enable to work simultaneously on demand aspects and airspace management aspects. The NWP shall provide a Network Performance Assessment tool in order to assess the impact of DAC measures on the performance at network level but also for the individual actors (Centre, Cluster, Sector ...). NWP shall support predefined scenarios prepared in advance to face to special events or to face to uncertain situation occurred. All stakeholders involved in DAC processes shall have access to DAC functionality via NWP. According to the type and the specificity of the actor a restricted view and functionality will be defined. To tune DAC processes, and adapt it to new situation/event, DAC HMI (NWP) allows to apply new constraints or change parameters on selected area. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IER.0130 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0130 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0060 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0140 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0080 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0160 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

[REQ]

| Identifier | REQ-09-W2-44-TS-0400.0010 |
|---|---|
| Title | Reception of number of opened sectors |
| Requirement | The NM system shall be able to receive and store the number of opened sector for an airspace |
| Status | <Validated> |
| Rationale | It allows NM to build or make proposals on sector configurations knowing the number of open positions |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0010 |
|---|---|---|
| <SATISFIES> | <Enabler> | |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

[REQ]

| Identifier | REQ-09-W2-44-TS-0400.0030 |
|---|---|
| Title | Evaluate the various sector configurations |
| Requirement | The NM system shall evaluate the various local sector configurations according to local pre-defined performance targets associated KPIs to be recorded |
| Status | <Validated> |
| Rationale | The best note indicates the best sector configuration to be applied. This evaluation needs to be done on a new ARES request or an unexpected event (weather, staff, …) |
| Category | <Performance> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0040 |
| <SATISFIES> | <Enabler> | NIMS-30 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

[REQ]

| Identifier | REQ-09-W2-44-TS-0400.0060 |
|---|---|
| Title | Identify ATC volumes protecting the overloaded areas |
| Requirement | Following ASM requests or network performance degradation (below a pre-defined threshold), The NM system shall be able to identify eligible "ATC volumes" protecting overloaded or close to be overloaded sectors. |

| Status | <Validated> |
|---|---|
| Rationale | As for local DAC systems, the NM system shall develop a capacity to avoid any situation leading to a too low overall performance (e.g. regarding a potential overloaded situation) |
| Category | <Performance> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0100.0015 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0400.0150 |
| <SATISFIES> | <Enabler> | NIMS-30 |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0400.0150 |
|---|---|
| Title | Define ATC volumes |
| Requirement | The NM system shall be able to define, identify and specifically represent airspace volumes as "ATC volumes". |
| Status | <Validated> |
| Rationale | An ATC Volume allows to represent a Volume where the traffic in this volume is critic and where ARES located in that volume would have a very bad impact on this traffic. That is the reason an ATC Volume shall be easily identifiable |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|

| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0100.0015 |
| <SATISFIES> | <Enabler> | NIMS-30 |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0400.0310 |
|---|---|
| Title | Network Working Position |
| Requirement | The Regional Manager system shall include a Network Working Position (NWP) subsystem aiming at :<br>- supporting the integration between DCB and DAC activities<br>- supporting a decision-making process driven by performance targets<br>- supporting DAC activities<br>- What-if function<br>- supporting the management of predefined scenarios<br>- allowing applying actions or constraints on selected geographical area |
| Status | <Validated> |
| Rationale | As the use of airspace configuration is part of the DCB solution to provide optimised capacity, the NM working position shall enable to work simultaneously on demand aspects and airspace management aspects. The NWP shall provide a Network Performance Assessment tool in order to assess the impact of DAC measures on the performance at network level but also for the individual actors (Centre, Cluster, Sector …). NWP shall support predefined scenarios prepared in advance to face to special events or to face to uncertain situation occurred. All stakeholders involved in DAC processes shall have access to DAC functionality via NWP. According to the type and the specificity of the actor a restricted view and functionality will be defined. To tune DAC processes, and adapt it to new situation/event, DAC HMI (NWP) allows to apply new constraints or change parameters on selected area. |
| Category | <Performance> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|

| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IER.0130 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0130 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0140 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0080 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0160 |
| <SATISFIES> | <Enabler> | NIMS-30 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing for ATFCM |

[REQ]

| Identifier | REQ-09-W2-44-TS-0400.0510 |
|---|---|
| Title | Airspace configuration monitor structure |
| Requirement | DAC actor shall define a dataset used to monitor the Airspace configurations |
| Status | <Validated> |
| Rationale | DAC needs to associate a monitoring structure to each Airspace configuration |
| Category | <Data> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0170 |
| <SATISFIES> | <Enabler> | AIMS-22 |

| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
|---|---|---|

[REQ]

| Identifier | REQ-09-W2-44-TS-0400.0511 |
|---|---|
| Title | DAC monitors Airspace configurations |
| Requirement | DAC actor shall monitor Airspace configurations from the strategic to deployment phase |
| Status | <Validated> |
| Rationale | DAC shall be able to monitor Airspace configurations deployed as a result of strategic phase, taking into account Network and local performance targets |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0170 |
| <SATISFIES> | <Enabler> | AIMS-22 |
| <SATISFIES> | <Enabler> | AAMS-12 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

[REQ]

| Identifier | REQ-09-W2-44-TS-0400.0520 |
|---|---|
| Title | DAC monitors the local KPIs |
| Requirement | DAC shall monitor local KPIs |
| Status | <Validated> |
| Rationale | DAC shall monitor local KPIs |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0120 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <SATISFIES> | <Enabler> | AIMS-22 |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and monitoring |

[REQ]

| Identifier | REQ-09-W2-44-TS-0400.0521 |
|---|---|
| Title | DAC able to identify local performance degradation |
| Requirement | DAC shall be able to identify situation when local performance KPIs are below the acceptable threshold |
| Status | <Validated> |
| Rationale | In the monitoring process, situation when local performance KPIs are below the acceptable threshold will be identified and proposed for actions |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0120 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <SATISFIES> | <Enabler> | AIMS-22 |

| <ALLOCATED_TO> | <Functional block> | Performance Measurements and monitoring |
|---|---|---|

[REQ]

| Identifier | REQ-S44.W2-SPRINTEROP-INAP.0020 |
|---|---|
| Title | DAC procedure implemented by the DAC system |
| Requirement | DAC system shall support DAC defined procedures |
| Status | <Validated> |
| Rationale | After the DAC procedure are defined, the DAC system will implement the procedures |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0010 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0020 |
| <SATISFIES> | <Enabler> | PRO-010 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0020 |
|---|---|
| Title | Automatic imbalance identification |
| Requirement | DAC system shall implement an automatic imbalances detection algorithm |
| Status | <Validated> |
| Rationale | The DAC tool shall automatically detect imbalances by comparison between available resources and estimated required resources. |

| Category | <Functional> |
|---|---|

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0210 |
| <SATISFIES> | <Enabler> | AAMS-12 |
| <SATISFIES> | <Enabler> | AIMS-22 |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and monitoring |

[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0021 |
|---|---|
| Title | Imbalances HMI |
| Requirement | DAC shall implement a display imbalances HMI |
| Status | <Validated> |
| Rationale | Network imbalances will be displayed in a validated HMI |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0210 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0220 |
| <SATISFIES> | <Enabler> | AIMS-22 |

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[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0030 |
|---|---|
| Title | DAC exploration window |
| Requirement | DAC system shall implement a mechanism allowing the define/refine exploration window |
| Status | <Validated> |
| Rationale | The DAC system shall allow the user to define the exploration window. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0230 |
| <SATISFIES> | <Enabler> | AAMS-12 |
| <SATISFIES> | <Enabler> | AIMS-22 |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and monitoring |

[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0031 |
|---|---|
| Title | Exploration window HMI |
| Requirement | DAC shall implement a define/refine exploration window display |
| Status | <Validated> |
| Rationale | Network imbalances exploration window definition/refinement will be validated by the DAC HMI |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0230 |
| <SATISFIES> | <Enabler> | AIMS-22 |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and monitoring |

[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0040 |
|---|---|
| Title | Decision making support function |
| Requirement | The DAC tool shall implement the following functions in support of the decision-making process to select a new configuration: traffic counts, flight list, ATC workload indicators |
| Status | <Validated> |
| Rationale | Support functions needed for the decision-making tool to select the new configuration. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0240 |
| <SATISFIES> | <Enabler> | AAMS-12 |
| <SATISFIES> | <Enabler> | AIMS-22 |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and monitoring |

[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0090 |
|---|---|
| Title | Display Airspace status |
| Requirement | The DAC support tools shall allow access to Airspace Users to the integrated Airspace Status View to evaluate the current situation concerning their traffic. |
| Status | <Validated> |
| Rationale | This function shall be available to all users (NM, local DAC, Airspace users) not only in a specific system. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IER.0020 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |

[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0110 |
|---|---|
| Title | Sector Management function |
| Requirement | The DAC support tools shall include a Sector Management function which computes the best sector organisation considering : <br> - Elementary sectors (SBB & SAM), <br> - Traffic and constraints (AFUA, FRA, TMA), <br> - Traffic forecast (FBTs), <br> - local characteristics and constraints specific to each local ANSP, <br> - TMA constraints |
| Status | <Validated> |
| Rationale | Sector Management function shall group elementary Airspace elements (Elementary sectors: Sector Building Blocks SBB and Shared Airspace Module SAM) according to traffic and constraint from AFUA, FRA and TMA. It use Traffic forecast (FBTs) and Predicted Workload model on a particular time window to propose an optimum organization balancing |

| | |
|---|---|
| | airspace elementary block (SBB and SAM) on Controller Working Positions. It integrates all constraints to generate an optimum sector configuration for Controller Working Position. Sector Management process shall be adapted to each local ANSP to cope with local characteristic and constraints. Sector Management shall ensure that all local agreements and constraints (LOA, Delegations, ...) and Local ANSP organisation is taken into account. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IER.090 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0040 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0050 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0180 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0070 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0115 |
|---|---|
| Title | Monitor the Sector Management function volatility |
| Requirement | The DAC support tools shall define a process monitoring the Sector management function in order to control/limit changes. |
| Status | <Validated> |
| Rationale | Unstable and large scale reconfiguration shall be avoided and this needs to be kept under control. |

| | |
|---|---|
| | In the first stage, the process is under the human control. The implementation shall assist the human in taking decisions and it shall allow the automation extention |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0010 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |

[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0120 |
|---|---|
| Title | Sector Design function |
| Requirement | The DAC support tools shall include a Sector Design function which allows to build elementary Airspace elements (SBB & SAM) considering: - long-term traffic forecast, - local characteristics and constraints specific to each local ANSP, - TMA constraints |
| Status | <Validated> |
| Rationale | Airspace Design shall create elementary Airspace elements (Sectors Building Blocks: SBB and/or Shared Airspace Module: SAM ) to be manages dynamically by Sector Management. It use large scale traffic and need a validation phase according to level of implementation of DAC (linked to local characteristic and ATCO licencing). The Elementary Airspace elements will be built through a global analysis of the traffic forecast during a long term period |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|

| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0170 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0060 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0190 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0070 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0500.0130 |
|---|---|
| Title | Predicted Workload function |
| Requirement | The DAC support tools shall include a common Predicted Workload function : <br> - using a confidence index to manage imbalance uncertainty <br> - using different criteria such as Entry Count, Occupancy Count, Traffic complexity <br> - being the core/common function used by Sector Design function and Sector Management function and all DAC actors (for a consistent common prediction) <br> - being coordinated with the Integrated Network ATC process |
| Status | <Validated> |
| Rationale | Both ASM and DCB imbalance detection mechanism should be based on the same information and use the same monitoring thresholds to provide consistent imbalance detection and solutions. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0120 |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0130 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0100 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | Cooperative Airspace Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-0600.0110 |
|---|---|
| Title | Network Working Position |
| Requirement | The Airspace User system shall include a Network Working Position (NWP) aiming at :<br>- supporting DAC activities<br>- supporting the integration between DCB and DAC activities<br>- supporting a decision-making process driven by performance targets<br>- What-if function<br>- supporting the management of predefined scenarios<br>- allowing applying actions or constraints on selected geographical area |
| Status | <Validated> |
| Rationale | As the use of airspace configuration is part of the DCB solution to provide optimised capacity, the NM working position shall enable to work simultaneously on demand aspects and airspace management aspects. The NWP shall provide a Network Performance Assessment tool in order to assess the impact of DAC measures on the performance at network level but also for the individual actors (Centre, Cluster, Sector …). NWP shall support predefined scenarios prepared in advance to face to special events or to face to uncertain situation occurred. All stakeholders involved in DAC processes shall have access to DAC functionality via NWP. According to the type and the specificity of the actor a restricted view and functionality will be defined. To tune DAC processes, and adapt it to new situation/event, DAC HMI (NWP) allows to apply new constraints or change parameters on selected area. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-0220.0070 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0130 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0140 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0080 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0160 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <ALLOCATED_TO> | <Functional block> | Operations Management |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0070 |
|---|---|
| Title | Horizontal limits display |
| Requirement | The Controller Human Machine Interaction Management ER/APP shall display unequivocally the horizontal limits of the sector/sectors under control of a determined Controller |
| Status | <Validated> |
| Rationale | Due to the slight and more frequent changes in the sectorisation, the CWP shall have the functionality to show the horizontal limits of a sector unequivocally |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0180 |

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| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| --- | --- | --- |
| <ALLOCATED_TO> | <Functional block> | Controller Human Machine Interaction Management ER/APP |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0080 |
| --- | --- |
| Title | Sector Vertical limits display |
| Requirement | The Controller Human Machine Interaction Management ER/APP shall display unequivocally the vertical limits of the sector/sectors under control of a determined Controller |
| Status | <Validated> |
| Rationale | Due to the slight and more frequent changes in the sectorisation, the CWP shall have the functionality to show the vertical limits of a sector unequivocally |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
| --- | --- | --- |
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0190 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Controller Human Machine Interaction Management ER/APP |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0090 |
| --- | --- |
| Title | Entering AoR A/C display |

| Requirement | The Controller Human Machine Interaction Management ER/APP shall display in a unequivocally way the aircraft that are about to enter the area of responsibility of a Controller |
|---|---|
| Status | <Validated> |
| Rationale | Due to the slight and more frequent changes in the sectorisation CWP shall show the A/C to enter in a Controller AoR |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0200 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Controller Human Machine Interaction Management ER/APP |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0100 |
|---|---|
| Title | Exiting AoR A/C display |
| Requirement | The Controller Human Machine Interaction Management ER/APP shall display in a unequivocally way the aircraft that are about to exit the area of responsibility of a Controller. |
| Status | <Validated> |
| Rationale | Due to the slight and more frequent changes in the sectorisation CWP shall show the A/C to enter in a Controller AoR. |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|

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| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| --- | --- | --- |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0210 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Controller Human Machine Interaction Management ER/APP |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0110 |
| --- | --- |
| Title | A/c TFL display |
| Requirement | The Controller Human Machine Interaction Management ER/APP shall display the Transition Flight Level for each Flight |
| Status | <Validated> |
| Rationale | TFL of A/C will help to monitorise the situation and to tidy up the traffic. |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
| --- | --- | --- |
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0220 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Controller Human Machine Interaction Management ER/APP |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0140 |
| --- | --- |

| Title | Display A/C to be transferred after DAC Sectorisation change |
|---|---|
| Requirement | The Controller Human Machine Interaction Management ER/APP shall display unequivocally those flights that have to be transferred to another Controller when a change in a DAC Sectorisation is occurs |
| Status | <Validated> |
| Rationale | CWP shall help the controllers to identify those flights to be transferred when a change of DAC sectorisation will occur. |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0230 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Controller Human Machine Interaction Management ER/APP |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0150 |
|---|---|
| Title | Display A/C to be assumed due to DAC Sectorisation change |
| Requirement | The Controller Human Machine Interaction Management ER/APP shall display unequivocally those flights that have to be assumed by the Controller due to a change in a DAC Sectorisation |
| Status | <Validated> |
| Rationale | CWP shall help the controllers to identify those flights to be assumed when a change of DAC sectorisation will occur. |
| Category | <HMI> |

[REQ Trace]

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| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0230 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Controller Human Machine Interaction Management ER/APP |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0160 |
|---|---|
| Title | Display A/C pending to be transferred or already handed over when the DAC Sectorisation change occurs |
| Requirement | During the change in a DAC Sectorisation, the Controller Human Machine Interaction Management ER/APP shall display unequivocally the flights that are pending to be handed over and the flights already accepted by the next controller. |
| Status | <Validated> |
| Rationale | CWP shall help the controllers to identify those flights waiting to be handed over and the flights already accepted by the next controller |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0240 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Controller Human Machine Interaction Management ER/APP |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0340 |
|---|---|
| Title | D-OPS/Shift DAC Configuration display |
| Requirement | The Controller Human Machine Interaction Management ER/APP shall display, under request, the different DAC configurations for entire Day of Operations and/or shift |
| Status | <Validated> |
| Rationale | The HMI must show all the expected configurations for better understanding of the D-OPS |
| Category | <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-PRET.0160 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Controller Human Machine Interaction Management ER/APP |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0360 |
|---|---|
| Title | DAC Sectorisation take into account local Resources |
| Requirement | The Operational Supervision ER/APP ATC shall take into account the local resource management for computing the DAC sectorisations |
| Status | <Validated> |
| Rationale | Local resource management should be taken into account (integrated) for the algorithm to propose Sectorisations |
| Category | <Design> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-STRA.0160 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-TACT.0010 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Operational Supervision ER/APP ATC |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0370 |
|---|---|
| Title | DAC Sectorisation validation and activation for the D-OPS |
| Requirement | The Operational Supervision ER/APP ATC shall allow to validate and then activate the DAC configurations for the Day of Operations |
| Status | <Validated> |
| Rationale | Supervisor or LTM should validate the proposals of the tool for the D-OPS |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0030 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Operational Supervision ER/APP ATC |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

EUROPEAN PARTNERSHIP

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the European Union

[REQ]

| Identifier | REQ-09-W2-44-TS-1100.0380 |
|---|---|
| Title | DAC sectorization update with EDAC |
| Requirement | The Operational Supervision ER/APP ATC shall make available the DAC configurations as soon as latest EDAC is updated |
| Status | <Validated> |
| Rationale | EDAC is a main source of information for the algorithms |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-08.01-SPRINTEROP-1130.0002 |
| <SATISFIES> | <Enabler> | ER APP ATC 15 |
| <ALLOCATED_TO> | <Functional block> | Operational Supervision ER/APP ATC |
| <ALLOCATED_TO> | <Function> | f_DAC_Display |

[REQ]

| Identifier | REQ-09-W2-44-TS-CDMP.0010 |
|---|---|
| Title | Strategic CDM |
| Requirement | The technical solution shall provide a Collaborative decision making process from local to regional levels at strategic phase based on performance approach |
| Status | <Validated> |
| Rationale | Performance approach could be in defining strategic optimal point of trade-off between two or more local/network KPAs/KPIs (cost, delay, capacity). That optimum becomes a target to be cascaded down to pre- |

| | tactical and tactical levels as the target being a function of the traffic demand. |
|---|---|
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0090 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CDMP.0020 |
|---|---|
| Title | Pre-tactical CDM |
| Requirement | The technical solution shall provide a Collaborative decision making process from local to regional levels at pre-tactical phase based on performance approach |
| Status | <Validated> |
| Rationale | INAP actors are able to execute the Collaborative decision making process at pretactical phase by using combination of capacity and flow measures from the DCB catalogue eg. Model A, model B, combination of non predefined sectors configuration, regulation... |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0090 |
|---|---|---|
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CDMP.0030 |
|---|---|
| Title | Tactical CDM |
| Requirement | The technical solution shall allow INAP actors to execute the Collaborative decision making process at tactical phase by using combination of capacity and flow measures from the DCB catalogue and taking into account uncertainty, confidence level, time horizon, severity and granularity. |
| Status | <Validated> |
| Rationale | At tactical level the process is not bound by time anymore, but rather by data uncertainty/confidence parameters. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0090 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM |

| | | measures proposed by NM and final ARES |
|---|---|---|
| | | |

[REQ]

| Identifier | REQ-09-W2-44-TS-CDMP.0040 |
|---|---|
| Title | CDM responsability at tactical phase |
| Requirement | During the tactical phase, the technical solution shall allow the LTM to manage the CDM process |
| Status | <Validated> |
| Rationale | The LTM is responsible of the CDM process during the tactical phase |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0090 |
| <SATISFIES> | <Enabler> | AAMS-09a |
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| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CDMP.0050 |
|---|---|
| Title | CDM responsibility at pre-tactical phase |
| Requirement | During the pretactical phase, the technical solution shall allow the ANSP ATFCM unit to manage the CDM process |
| Status | <Validated> |

| Rationale | |
|---|---|
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0090 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CDMP.0060 |
|---|---|
| Title | CDM responsability at strategic phase |
| Requirement | During the strategic phase, the technical solution shall allow the ANSP ATFCM unit to access the CDM process |
| Status | <Validated> |
| Rationale | The ATFCM ANSP unit is an actor of the CDM process during the strategic phase. It must provide information during the uncertainty computation and needs access to results of the what-if function |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0090 |
| <SATISFIES> | <Enabler> | AAMS-09a |

| <SATISFIES> | <Enabler> | AAMS-19 |
|---|---|---|
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0010 |
|---|---|
| Title | Complexity indicator selection |
| Requirement | The system shall allow the LTM/EAP to select the desired complexity indicator to perform the analysis of the traffic situation. |
| Status | <Validated> |
| Rationale | The LTM/EAP might need to know the complexity value provided for all the available complexity indicators within the system, even if these indicators are not the most appropriate for the timeframe selected. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-CMPL.0010 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0020 |
|---|---|

| Title | Complexity filtering |
|---|---|
| Requirement | The system shall allow the LTM/EAP to filter complexity information by traffic flows and individual trajectories. |
| Status | <Validated> |
| Rationale | The LTM/EAP should be able to manually filter certain traffic flows and individual trajectories for complexity assessment. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-CMPL.0020 |
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| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0030 |
|---|---|
| Title | Individual flight complexity contribution |
| Requirement | The technical solutions shall allow the LTM/EAP to select specific flights associated to a time interval and airspace volume from the list of aircraft contributing to complexity to assess the individual contribution of each flight to the global complexity value. |
| Status | <Validated> |
| Rationale | The LTM/EAP shall be aware of the contribution of each flight to the global complexity value in order to select the appropriate flights over which DCB measures (e.g. STAM) will be applied. This fact will increase the efficiency of the solutions proposed and will improve the decision making process. |

| Category | <Functional><Safety> |
|----------|----------------------|

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|--------------------|-----------| 
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-CMPL.0030 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0040 |
|------------|---------------------------|
| Title | Traffic flow complexity contribution |
| Requirement | The technical solution shall allow the LTM/EAP to select specific traffic flows associated to a time interval and airspace volume from the list of traffic flows contributing to complexity to assess the individual contribution of each traffic flow to the global complexity value. |
| Status | <Validated> |
| Rationale | The LTM/EAP shall be aware of the contribution of each traffic flow to the global complexity value in order to select the appropriate flows of traffic over which DCB measures (e.g. STAM) will be applied. This fact will increase the efficiency of the solutions proposed and will improve the decision making process. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|--------------------|-----------| 
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-CMPL.0040 |
|---|---|---|
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0050 |
|---|---|
| Title | Individual flight complexity contribution within traffic flows |
| Requirement | The technical solution shall allow the LTM/EAP to select specific flights associated to a traffic flow to assess the individual contribution of each flight to the global traffic flow complexity value. |
| Status | <Validated> |
| Rationale | The LTM/EAP might be interested in knowing the complexity root cause of the traffic flows contributing to the global complexity. For this reason, the LTM/EAP might need the individual contribution of the flights that belong to the traffic flow under analysis to the traffic flow global complexity value. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-CMPL.0050 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM |

| | | measures proposed by NM and final ARES |
|---|---|---|

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0060 |
|---|---|
| Title | Identification of the most complex flights |
| Requirement | The technical solution shall give the LTM/EAP access to an automatic identification of the flights contributing the most to complexity within a specific airspace volume and timeframe (e.g. ranked list). |
| Status | <Validated> |
| Rationale | In order to make the decision making process quicker and more efficient, the LTM/EAP need to have available an automatic identification of the flights contributing the most to complexity (e.g. by means of a ranked list). This will allow a better identification of the most appropriate flights over which DCB measures should be applied. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-CMPL.0060 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0070 |
|---|---|
| Title | Complexity Contributing Factors |

| Requirement | The technical solution shall give the LTM/EAP access to a detailed analysis of the complexity factors that contribute to the overall airspace complexity. |
|---|---|
| Status | <Validated> |
| Rationale | In order to increase the meaningfulness of the complexity information provided by the INAP tool, the LTM/EAP might need to have access to a detailed break-down of the complexity contributing factors. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-CMPL.0070 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-CMPL.0080 |
| <SATISFIES> | <Enabler> | AAMS-09a |
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| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0080 |
|---|---|
| Title | Complexity what-if assessment |
| Requirement | The technical solution should allow the LTM/EAP to perform complexity what-if assessments. |
| Status | <Validated> |
| Rationale | When proposing a DCB measure, the LTM/EAP might be interested in previously assessing the impact in complexity of the measure application. |

| | This should be done by means of complexity what-if assessment functionalities. |
|---|---|
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.100 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0090 |
|---|---|
| Title | Complexity integration into sector configuration optimisation process. |
| Requirement | The technical solution shall allow the LTM/EAP to consider complexity assessment within the sector configuration optimisation process. |
| Status | <Validated> |
| Rationale | In order to increase the efficiency and granularity of the configuration optimiser solutions proposed, complexity assessment should be integrated into the LTM/EAP sector configuration optimiser. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.120 |
|---|---|---|
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0100 |
|---|---|
| Title | Complexity alerts |
| Requirement | The technical solution shall alert the LTM/EAP when the complexity value is above the established thresholds. |
| Status | <Validated> |
| Rationale | The LTM/EAP awareness of complexity exceeding predefined thresholds needs to be ensured by means of visual alerts displayed in the LTM/EAP's complexity management tool. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0100 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0120 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM |

| | | measures proposed by NM and final ARES |
|---|---|---|
| | | |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0110 |
|---|---|
| Title | Complexity post analysis data storage |
| Requirement | The technical solution shall allow Local DCB actors to perform complexity post-analysis taking into account the stored data. |
| Status | <Validated> |
| Rationale | Post analysis of DCB/DCB solutions efficiency in terms of complexity is needed to identify best practice and deficiencies as an input for operational and strategic decision making. Stored data should include information such as 4D trajectory information, complexity predictions, calculations performed, etc. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.140 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0130 |
|---|---|
| Title | Airspace sectorisation impact in complexity assessment |

| Requirement | The technical solution shall allow the LTM/EAP to perform complexity what-if assessments for different airspace configurations and airspace granularities. |
|---|---|
| Status | <Validated> |
| Rationale | The complexity tool shall provide complexity predictions on-request for different sectorisation scenarios, selected by the LTM/EAP, before they are operationally applied or scheduled. The human operator may be interested in knowing the complexity prediction of a sector configuration, different from the current one, as it would be active in a specific time period in the future. |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.150 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0140 |
|---|---|
| Title | Airspace sectorisation proposal for complexity distribution |
| Requirement | The technical solution shall propose to the LTM/EAP airspace sectorisation changes for the optimisation of complexity distribution. |
| Status | <Validated> |
| Rationale | In order to optimize the distribution of complexity across sectors, the LTM/EAP shall be able to propose more appropriate sector |

| | configurations after performing the adequate complexity what-if analysis. |
|---|---|
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.160 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-CMPL.0150 |
|---|---|
| Title | Airspace information for complexity assessment |
| Requirement | The technical solution shall provide the LTM/EAP updated information regarding airspace configurations, including airspace availability limitations due to weather or special use of airspace reservations (e.g. events) for complexity assessment purposes. |
| Status | <Validated> |
| Rationale | Airspace configuration information and airspace availability limitations are needed so as to obtain accurate complexity estimations (for both predicted/actual complexity values and during what-if assessments). |
| Category | <Functional><Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| | | |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHEL.0010 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| | |
|---|---|
| Identifier | REQ-09-W2-44-TS-CORS.0050b |
| Title | Access to pre-planned DCB measures |
| Requirement | The ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow the user to access pre-planned dDCB and DCB measures for hotspots resolution, assess their impact, and when operationally relevant, implement them as a potential solution. |
| Status | <Validated> |
| Rationale | The INAP shall be able to access pre-planned DCB and DCB measures for hotspots/optispots resolution, assess their impact, and when operationally relevant, implement them as a potential solution |
| Category | <Functional>, <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0130 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <Function> | Provide Local Impact Assessment |

| <ALLOCATED_TO> | <Function> | Provide Network Impact Assessment |
|---|---|---|

[REQ]

| Identifier | REQ-09-W2-44-TS-DCBM.0050 |
|---|---|
| Title | DCB measures |
| Requirement | The system shall allow the INAP actor to implement any measure or combination of measures to solve a demand capacity imbalance during its timeframe of operation |
| Status | <Validated> |
| Rationale | INAP should use any measure or combination of measure from this list : CTOT ( could be applied to individual flights from -6H to -3H prior to their entry in the sector), ground level capping ( from -6H to -40' ), re-routing ( from -2H to -20' ), ground delay ( -6H to -2H), Take-Off Not Before ( from -6H to -2H), Take-Off Not After ( from -6H to -2H), MDI/ADI (Minimum Departure Interval and Average Departure Interval applied to flows from -6H to -2H ), TTA (Target Time of Arrival: from -6H to -2Hr), TTO (Target Time Over:s from -6H to -2Hr), MIT (Miles-In-Trail: from -6H to -3H or from -40' to -20' as a speed regulation), Air Level Capping ( from -2H to -20'), DPI sequence (Departure Planning Information Sequence: from -2H to -20'), speed regulation ( from -40' to -20'), tTTA (tactical Target Time of Arrival: from -2H to -20'), tTTO (tactical Target Time Over: from -40' to -20'), targeted CASA (are applied to specific flows as a mitigation measure to current CASA regulation) |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | nan |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM |

| | | measures proposed by NM and final ARES |
|---|---|---|

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0001 |
|---|---|
| Title | NOP-Spot-coordination |
| Requirement | ATFCM System (located in Regional ATFCM CC) shall be able to consolidate network imbalances & DCB measures, share spots with other NM actors and monitor spot resolution at network level |
| Status | <Validated> |
| Rationale | INAP manage different type of spot categories (Hotspot, Optispot), ensuring the proper planning, implementation and monitoring of the problem resolution. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0010 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Function> | Create Initial Hotspot |
| <ALLOCATED_TO> | <Function> | Create Initial Optispot |
| <ALLOCATED_TO> | <Function> | Prepare and Implement DCB Solution |
| <ALLOCATED_TO> | <Function> | Define Monitoring Threshold |
| <ALLOCATED_TO> | <Function> | Update Spot |
| <ALLOCATED_TO> | <Function> | Monitor Spot |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | APOC |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0011 |
|---|---|
| Title | NOP-TMV-Safety-definition |
| Requirement | At network level, ATFCM System (located in Regional ATFCM CC) shall be able to define two TMV-safety thresholds to be used by each ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) : Sustain and Peak |
| Status | <Validated> |
| Rationale | NOP is defining network imbalances and shall compute the respective thresholds for each ATC sector allowing the best spots resolution |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0020 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0030 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Traffic Monitoring Value |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | APOC |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0012 |
|---|---|
| Title | NOP-TMV-Safety-transmission |
| Requirement | ATFCM System (located in Regional ATFCM CC) shall send to each ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability |

| | Configuration) the two TMV-safety thresholds (Sustain and Peak) for each of its corresponding ATC sector |
|---|---|
| Status | <Validated> |
| Rationale | NOP is communicating the thresholds to each INAP so that INAP is able to take into account these thresholds |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0030 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Network Operations Plan Management |
| <ALLOCATED_TO> | <Function> | Traffic Monitoring Value |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | APOC |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0013 |
|---|---|
| Title | INAP-TMV-Safety |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall compute its own TMV-Safety thresholds at local level based on the ones sent by ATFCM System (allocated in Regional ATFCM CC) |
| Status | <Validated> |
| Rationale | TMV-safety aims at preventing excessive ATC workload and to ensure that the traffic delivered to ATC controllers will always be manageable in the safe limits of workload. It represents the acceptable limits in term of controller workload, and implicitly potential safety risks. TMV-safety are defined with two thresholds (peak, sustain). It defines the context of a |

| | safety issues in nominal situations marked out by a Hotspot. Thus, a hotspot is triggered by TMV (safety marks) violation |
|---|---|
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0030 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Network Operations Plan Management |
| <ALLOCATED_TO> | <Function> | Traffic Monitoring Value |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | APOC |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0017 |
|---|---|
| Title | NOP-TMV-Rate-definition |
| Requirement | At network level, ATFCM System (located in Regional ATFCM CC) shall be able to define the TMV-rate thresholds to be used by each ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) |
| Status | <Validated> |
| Rationale | NOP is defining network imbalances and shall compute the respective thresholds for each ATC sector allowing the best spots resolution |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|

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| | | |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0040 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Functional Block Identifier |
| <ALLOCATED_TO> | <Function> | Traffic Monitoring Value |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | APOC |

[REQ]

| | |
|---|---|
| Identifier | REQ-09-W2-44-TS-HSPT.0018 |
| Title | NOP-TMV-Rate-transmission |
| Requirement | At network level, ATFCM System (located in Regional ATFCM CC) shall send to each ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) the TMV-rate threshold for each of its corresponding ATC sector |
| Status | <Validated> |
| Rationale | NOP is communicating the thresholds to each INAP so that INAP is able to take into account these thresholds |
| Category | <Functional> <IER> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0040 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Network Operations Plan Management |
| <ALLOCATED_TO> | <Function> | Traffic Monitoring Value |

| <ALLOCATED_TO> | <role> | INAP |
|---|---|---|
| <ALLOCATED_TO> | <role> | APOC |
| <ALLOCATED_TO> | <Service> | HotspotMonitoring |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0019 |
|---|---|
| Title | INAP-TMV-Rate |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall compute its own TMV-Rate thresholds at local level based on the ones sent by ATFCM System (located in Regional ATFCM CC) |
| Status | <Validated> |
| Rationale | It defines the optimisation context marked out by an Optispot. Thus, an Optispot is triggered by TMV (rate marks) violation. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0040 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Functional Block Identifier |
| <ALLOCATED_TO> | <Function> | Traffic Monitoring Value |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | APOC |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0021 |
|---|---|

| Title | INAP-share-spot |
|---|---|
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall be able to send to ATFCM System (located in Regional ATFCM CC) any created spot |
| Status | <Validated> |
| Rationale | Different type of TMV generate different type of spot category (hotspot, optispot). Sub-Regional systems must receive newly created spots. |
| Category | <Functional> <IER> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0050 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Traffic Monitoring Value |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | APOC |
| <ALLOCATED_TO> | <Service> | HotspotManagementService |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0060 |
|---|---|
| Title | Define-Monitoring-threshold |
| Requirement | In case a final spot has been defined, ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall define TMV-monitoring threshold to monitor any deviation from the DCB solution |
| Status | <Validated> |
| Rationale | Once the solution has been prepared and implemented, the Spot Final is monitored to ensure that the DCB solution is properly executed and is |

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| | not deviating. In order to support this monitoring, a TMV-monitoring is set. It will trigger an automatic alert in case of deviations. Such monitoring mainly aims at ensuring that the spot resolution is progressing correctly and to take additional corrective actions if necessary. |
|---|---|
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0010 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Monitor Spot |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | APOC |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0064 |
|---|---|
| Title | Define-Monitoring-threshold |
| Requirement | In case a final spot has been defined, ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall monitor the final hotspot and generate alerts should the DCB solution deviate during the execution phase and notify the stakeholders |
| Status | <Validated> |
| Rationale | Once the solution has been prepared and implemented, the Spot Final is monitored to ensure that the DCB solution is properly executed and is not deviating. In order to support this monitoring, a TMV-monitoring is set. It will trigger an automatic alert in case of deviations. Such monitoring mainly aims at ensuring that the spot resolution is progressing correctly and to take additional corrective actions if necessary. |

| Category | <Functional> |
|---|---|

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0020 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0040 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Monitor Spot |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | APOC |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0070 |
|---|---|
| Title | Provision of workload level |
| Requirement | The ATFCM System (located in Sub-regional/Local ATFCM Capability Configuration) shall provide tactical information (sector load, capacity and complexity) for opened sectors. The graphical representation of the complexity and/or workload shall reflect the different values changes (change of colour or thickness). |
| Status | <Validated> |
| Rationale | Sector load, capacity and complexity are key parameters for provision of spot identification services. This information has to be provided by the Sub-regional/Local ATFCM System |
| Category | <Functional> <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|

| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0050 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Evaluate Imbalance |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0090 |
|---|---|
| Title | Monitoring flights affected by a hotspot which experienced a flight plan deviation |
| Requirement | When the list of flights involved in a selected hotspot is displayed, ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall highlight those which have experienced an individual flight deviation from initial flight plan over a TDI (Target Deviation Indication). |
| Status | <Validated> |
| Rationale | The estimation of demand, workload and complexity depend strongly on the filed flight plan. Any changes to the flight plan have to be identified as soon as possible (including changes arising from the actual operation of the flight). |
| Category | <HMI><Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0060 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Monitor Spot |

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| <ALLOCATED_TO> | <role> | INAP |
|---|---|---|

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0100 |
|---|---|
| Title | Timeframe and airspace monitoring selection to assess hotspots |
| Requirement | The ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow the user to configure at any time the timeframe and airspace for which traffic demand, workload, complexity forecast and flight plan deviations (in reference to the TDI ) will be monitored. |
| Status | <Validated> |
| Rationale | The system must provide the user with the flexibility to choose when and where he/she wants to analyse the traffic situation, with indicators such as traffic demand, workload, and complexity forecasts, as well as flight plan |
| Category | <Functional> <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0070 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Apply Imbalance Methodologies |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0160 |
|---|---|
| Title | Key-parameters of the potential hotspot |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall be able to display for a potential hotspot, |

| | under user request, all the different parameters that have been used for its identification (i.e. entry counts, occupancy counts and complexity values) |
|---|---|
| Status | \<Validated\> |
| Rationale | The user need to know the key-parameters to have a better understanding of the spot, and to analyse, based upon their experience, the incidence of the potential hotspot/optispot |
| Category | \<HMI\> \<Functional\> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| \<SATISFIES\> | \<SESAR Solution\> | PJ09-W2-44 |
| \<SATISFIES\> | \<ATMS Requirement\> | REQ-S44.W2-SPRINTEROP-SPOT.0060 |
| \<SATISFIES\> | \<Enabler\> | NIMS-46 |
| \<ALLOCATED_TO\> | \<Functional block\> | Functional Block Identifier |
| \<ALLOCATED_TO\> | \<Function\> | Apply Imbalance Methodologies |
| \<ALLOCATED_TO\> | \<role\> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0200 |
|---|---|
| Title | Definition of potential solution to the hotspot |
| Requirement | The ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC CC) shall provide the facility to allow the user to define candidate solutions for a given hotspot |
| Status | \<Validated\> |
| Rationale | The solution definition process should be able to define and test as many solutions as required, for each detected spot. To ensure that no information is lost the user should be able to access and edit these candidate solutions at any time |
| Category | \<Functional\> \<HMI\> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-DCBM.0020 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Consolidate DCB Measures |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0201 |
|---|---|
| Title | Storing of potential solution to the hotspot -> INAP/CORSE |
| Requirement | The ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC CC) shall provide the facility to allow the user to store candidate solutions for a given hotspot |
| Status | <Validated> |
| Rationale | The solution definition process should be able to define and test as many solutions as required, for each detected spot. To ensure that no information is lost the user should be able to store, access and edit these candidate solutions at any time |
| Category | <Functional> <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-DCBM.0010 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-DCBM.0020 |
| <SATISFIES> | <Enabler> | NIMS-46 |

| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Consolidate DCB Measures |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0202 |
|---|---|
| Title | Edition of potential solution to the hotspot -> INAP/CORSE |
| Requirement | The ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow the user editing or selecting for implementation stored candidate solutions via the hotspot identifier |
| Status | <Validated> |
| Rationale | The solution definition process should be able to define and test as many solutions as required, for each detected spot. To ensure that no information is lost the user should be able to store, access and edit these candidate solutions at any time |
| Category | <Functional> <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-DCBM.0020 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Consolidate DCB Measures |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0290 |
|---|---|
| Title | Exclusion of some flights from the hotspot measure application |

| Requirement | The what-if functionality of ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow (un)select, (un)select flights to exclude them from the potential STAM or regulation |
|---|---|
| Status | <Validated> |
| Rationale | INAP shall be able to select individual flights to exclude them from the potential DCB measures targeting a set of flights (hotspot/optispot measures). This is part of the what-if capabilities required from the system. This also permits the cherry-picking flights. |
| Category | <Functional> <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0010 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Prepare and Implement DCB Measures |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0291 |
|---|---|
| Title | Exclusion of some flights from the hotspot measure application |
| Requirement | The what if functionality of ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC CC) will allow selecting flights to exclude them from the potential STAM or regulation |
| Status | <Validated> |
| Rationale | INAP shall be able to select individual flights to exclude them from the potential DCB measures targeting a set of flights (hotspot/optispot measures). This is part of the what-if capabilities required from the system. This also permits the cherry-picking flights. |

| Category | <Functional> <HMI> |
|----------|-------------------|

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|--------------------|-----------|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0010 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Prepare and Implement DCB Measures |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0300 |
|-----------|---------------------------|
| Title | Selection of the solution for hotspot |
| Requirement | The ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow the user to select and implement any solution or combination of solutions for detected hotspot. |
| Status | <Validated> |
| Rationale | After the assessment process has been completed, INAP shall be able to select the best DCB measure or combination of demand and capacity measures. |
| Category | <Functional> <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|--------------------|-----------|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-DCBM.0030 |

| <SATISFIES> | <Enabler> | NIMS-46 |
|---|---|---|
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Prepare and Implement DCB Solution |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0330 |
|---|---|
| Title | Hotspot declaration |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow the user to declare hotspot using a system automatic interface. |
| Status | <Validated> |
| Rationale | The system should be able to propose automatically a hotspot/optispot. In all cases the spot will need to be confirmed by the user. |
| Category | <Functional>, <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0065 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Create Initial Hotspot |
| <ALLOCATED_TO> | <Function> | Create Initial Optispot |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0340 |
|---|---|
| Title | Automatic Hotspot notification to NM |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow the user to notify a hotspot to another ATFCM System (located in Regional ATFCM Capability Configuration) using a system automatic interface |
| Status | <Validated> |
| Rationale | REQ performed by LTM/EAP support tool |
| Category | <Functional>, <HMI>, <IER> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0070 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Share Hotspot with Stakeholders |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <Service> | RegisterDCBMeasure |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0341 |
|---|---|
| Title | Automatic Hotspot notification to AUs |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow the user to notify a hotspot to a Civil AU Flight Operations Centre (FOC) System using a system automatic interface |
| Status | <Validated> |
| Rationale | REQ performed by LTM/EAP support tool. |

| Category | <Functional> <HMI><IER> |
|---|---|

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0070 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Share Hotspot with Stakeholders |
| <ALLOCATED_TO> | <role> | AU |
| <ALLOCATED_TO> | <Service> | ProposeDCBMeasure |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0350 |
|---|---|
| Title | Hotspot monitoring |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall provide to the user, under request, the data (such as entry counts, occupancy counts or linked complexity) related to a published hotspot |
| Status | <Validated> |
| Rationale | The user must know hotspot/optispot key-parameters such as, entry counts or occupancy counts; thus, he or she could assess if the adopted measure has a positive or negative impact |
| Category | <Functional>, <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0080 |
|---|---|---|
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Monitor Spot |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0360 |
|---|---|
| Title | Hotspot attributes |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall provide to the user for each published hotspot: Traffic volume name, With effect from, Until, Severity, Reason for decision, Status |
| Status | <Validated> |
| Rationale | All users must be able to view the hotspot/optispot and its defining attributes |
| Category | <Functional>, <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0090 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Share Hotspot with Stakeholders |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0370 |
|---|---|
| Title | Hotspot status |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall provide to the user the status for each published hotspot. Following status can be used: Proposed, Coordinated, Abandoned, Implemented, Cancelled |
| Status | <Validated> |
| Rationale | The system will provide spot status information.<br><br>Status can be: Proposed; Coordinated; Abandoned; Implemented; Cancelled |
| Category | <Functional>, <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-09.02-OSED-HSPT.0370 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Share Hotspot with Stakeholders |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0380 |
|---|---|
| Title | Hotspot cancellation |
| Requirement | The ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow the user to select and cancel a hotspot independently of the hotspot status. |
| Status | <Validated> |
| Rationale | REQ performed by LTM/EAP support tool. |
| Category | <Functional> <HMI> |

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[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SPOT.0100 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Update Spot |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-HSPT.0390 |
|---|---|
| Title | Hotspot cancellation notification |
| Requirement | ATFCM System (located in Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall allow the user to automatically notify to Collaborative NOP a hotspot cancellation. |
| Status | <Validated> |
| Rationale | REQ performed by LTM/EAP support tool. |
| Category | <HMI> <IER> <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-09.02-OSED-HSPT.0390 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Update Spot |

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| <ALLOCATED_TO> | <role> | INAP |
|---|---|---|
| <ALLOCATED_TO> | <Service> | RejectDCBSolution |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0020 |
|---|---|
| Title | LTM/EAP information provision to manage activities linked to DCB measures. |
| Requirement | The Local ATFCM System (Sub-Regional/Local ATFCM) shall provide the Information & facility for LTM/EAP to manage the activities linked to DCB measures. |
| Status | <Validated> |
| Rationale | Relevant automation support shall be made available and consistent for the En Route DCB actor(s) (be it the ATSU SUP, LTM, EAP(s), etc..) to be able to perform the whole range of activities linked to DCB roles in ATFCM tactical phase (short-term planning to execution phase). |
| Category | <Functional>, <HMI> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0040 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Prepare LTM DCB Solution |
| <ALLOCATED_TO> | <Function> | Prepare EAP DCB Solution |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0050 |
|---|---|

| Title | Provision of DCB measures (1) |
|---|---|
| Requirement | The Local ATFCM System (Sub-Regional/Local ATFCM) shall provide the facility to share the Traffic Demand & DCB measures information amongst the concerned actors (LTM, EAP, Airspace Manager) to collaborate on the most appropriate DCB measure to implement. |
| Status | <Validated> |
| Rationale | ATC Planner Best placed to determine the Appropriate DCB measure |
| Category | <Functional>, <IER> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0050 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Functional block> | Traffic Demand Management |
| <ALLOCATED_TO> | <Function> | Prepare/Revise DCB Solution and Implement |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <Service> | ProposeDCBMeasure |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0070 |
|---|---|
| Title | Local Situation information |
| Requirement | The Local ATFCM System (Sub-Regional/Local ATFCM) shall provide both the LTM & EAP information on the Local Imbalance, Local DCB measures and NM impact assessment. |
| Status | <Validated> |
| Rationale | To provide Situation Awareness on state of the network |

| Category | <Functional>, <HMI> |
|----------|---------------------|

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|--------------------|-----------| 
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0065 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Analyse DCB Imbalance |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0110 |
|-----------|---------------------------|
| Title | Airspace Types |
| Requirement | The Local ATFCM System (Sub-Regional/Local ATFCM) shall provide Local EAP the facility to implement DCB measures for Free Routing and Fixed route airspace. |
| Status | <Validated> |
| Rationale | To facilitate operating in different environments |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|--------------------|-----------| 
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0070 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

| <ALLOCATED_TO> | <Function> | Prepare/Revise DCB Solution and Implement |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <Service> | ProposeDCBMeasure |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0290 |
|---|---|
| Title | Flights already affected by DCB measures |
| Requirement | ATFCM System (ER/APP ACC and Sub-Regional/Local ATFCM Capability Configuration) shall mark flights that have already been impacted by other DCB measure |
| Status | <Validated> |
| Rationale | Selected flights that have already been impacted by measures shall be remarked, so as not to impose too much penalties to the same flight and as a pre-requisite for synchronization and reconciliation processes, in case more than one measure is applied to the same flight. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0090 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Provide Local Impact Assessment |
| <ALLOCATED_TO> | <Function> | Provide Network Impact Assessment |
| <ALLOCATED_TO> | <Function> | Reconcile Constraints |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0291 |
|---|---|
| Title | Already applied DCB measures details |
| Requirement | ATFCM System (ER/APP ACC and Sub-Regional/Local ATFCM Capability Configuration) shall inform about DCB measures that have already been applied to flights selected for a (Very ) Short Term ATFCM Measure |
| Status | <Validated> |
| Rationale | EAP shall have access to the details concerning the measures that have already been applied to the flight |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0090 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Provide Local Impact Assessment |
| <ALLOCATED_TO> | <Function> | Provide Network Impact Assessment |
| <ALLOCATED_TO> | <Function> | Reconcile Constraints |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0300 |
|---|---|
| Title | Already Regulated Flight Awareness |
| Requirement | ATFCM System (Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall consider whether a flight has already been affected by a DCB measure for synchronisation purposes |

| Status | <Validated> |
|---|---|
| Rationale | Flights impacted by a DCB measures need to be tagged as such in view of the synchronisation or new DCB measures. The Sub-regional ATFCM System is in charge of tracing these changes. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0100 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Provide Local Impact Assessment |
| <ALLOCATED_TO> | <Function> | Provide Network Impact Assessment |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0301 |
|---|---|
| Title | Compatibility with already implemented measures to candidate flight |
| Requirement | ATFCM System (Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) shall assess the compatibility and overlap of (Very) Short-Term ATFCM Measures under preparation with any other DCB measure impacting the candidate flight(s) for synchronisation purposes |
| Status | <Validated> |
| Rationale | ATFCM System (Sub-Regional/Local ATFCM and ER/APP ACC Capability Configuration) is in charge of assessing the compatibility and overlap of Short-Term ATFCM Measures under preparation with any other DCB measure impacting the candidate flight(s) for synchronisation purposes |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0100 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Provide Local Impact Assessment |
| <ALLOCATED_TO> | <Function> | Provide Network Impact Assessment |
| <ALLOCATED_TO> | <role> | INAP |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0400 |
|---|---|
| Title | En-Route/Approach ATC system data sharing |
| Requirement | ATFCM System (ER/APP ACC Capability Configuration) shall be able to send DCB/ATFCM data to any En-Route/Approach ATC System belonging to any sector within its ATSU. |
| Status | <Validated> |
| Rationale | System shall allow the EAP to send DCB/ATFCM data to ATC either requested by him or on EAP initiative |
| Category | <IER> <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0110 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |

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| <ALLOCATED_TO> | <Function> | Implement EAP DCB Solution |
|---|---|---|
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <Service> | ProposeDCBMeasure |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0401 |
|---|---|
| Title | ATC data request |
| Requirement | ATFCM System (ER/APP ACC Capability Configuration) shall be able to receive data requests effectuated by En-Route/Approach ATC System |
| Status | <Validated> |
| Rationale | ATC can request DCB/ATFCM data to EAP |
| Category | <IER> <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0110 |
| <SATISFIES> | <Enabler> | NIMS-46 |
| <ALLOCATED_TO> | <Functional block> | Demand and Capacity Balancing |
| <ALLOCATED_TO> | <Function> | Implement EAP DCB Solution |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <Service> | ProposeDCBMeasure |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0410 |
|---|---|
| Title | (Very) Short-Term ATFCM reception and display |

| Requirement | En-Route/Approach ATC System shall be able to receive and display (Very) Short-Term ATFCM Measures from ATFCM System (ER/APP ACC Capability Configuration) to solve local complex situations |
|---|---|
| Status | <Validated> |
| Rationale | En-Route/Approach ATC System needs ATFCM Measures from ATFCM System (ER/APP ACC Capability Configuration for solving local situations |
| Category | <Functional>, <HMI>, <IER> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0120 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0080 |
| <SATISFIES> | <Enabler> | Enabler Identifier |
| <ALLOCATED_TO> | <Function> | Analyse EAP DCB Measure |
| <ALLOCATED_TO> | <Function> | Implement EAP DCB Measure |
| <ALLOCATED_TO> | <Function> | Delegate Hostpot Resolution |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | ATC |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0411 |
|---|---|
| Title | ATC acceptance/rejection of VSTAM |
| Requirement | En-Route/Approach ATC system shall provide automated support for ATC acceptance/rejection of a (very) Short-Term ATFCM measure. It shall be able to send feedback regarding the PC measure acceptance/rejection to the ATFCM System (ER/APP ACC Capability Configuration). |
| Status | <Validated> |

| Rationale | En-Route/Approach ATC system shall be able to send feedback regarding the PC measure acceptance/rejection to the ATFCM System (ER/APP ACC Capability Configuration). |
|---|---|
| Category | <Functional> <IER> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0120 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0080 |
| <SATISFIES> | <Enabler> | Enabler Identifier |
| <ALLOCATED_TO> | <Function> | Analyse EAP DCB Measure |
| <ALLOCATED_TO> | <Function> | Implement EAP DCB Measure |
| <ALLOCATED_TO> | <Function> | Delegate Hostpot Resolution |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | ATC |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0412 |
|---|---|
| Title | Planned and tactical coordination in VSTAM implementation |
| Requirement | En-Route/Approach ATC system shall provide automated support for planned and tactical coordination when implementing (Very) Short Term ATFCM measures |
| Status | <Validated> |
| Rationale | Short Term ATFCM measures are implemented based on En-Route/Approach ATC system support |
| Category | <Functional> <IER> |

[REQ Trace]

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| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0120 |
| <SATISFIES> | <Enabler> | Enabler Identifier |
| <ALLOCATED_TO> | <Function> | Analyse EAP DCB Measure |
| <ALLOCATED_TO> | <Function> | Implement EAP DCB Measure |
| <ALLOCATED_TO> | <Function> | Delegate Hostpot Resolution |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | ATC |

[REQ]

| Identifier | REQ-09-W2-44-TS-INAP.0413 |
|---|---|
| Title | VSTAM related feedback |
| Requirement | When PC controller needs to decide whether accepts or rejects V-STAM proposed, En-Route/Approach ATC system shall be able to provide automated support for analysis and decision making (e.g. what-if). |
| Status | <Validated> |
| Rationale | PC controller decides whether accepts or rejects V-STAM proposed, En-Route/Approach ATC system based on automated support for analysis and decision making (e.g. what-if). |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-INAP.0120 |
| <SATISFIES> | <Enabler> | Enabler Identifier |
| <ALLOCATED_TO> | <Function> | Analyse EAP DCB Measure |

| <ALLOCATED_TO> | <Function> | Implement EAP DCB Measure |
| --- | --- | --- |
| <ALLOCATED_TO> | <Function> | Delegate Hostpot Resolution |
| <ALLOCATED_TO> | <role> | INAP |
| <ALLOCATED_TO> | <role> | ATC |

[REQ]

| Identifier | REQ-09-W2-44-TS-IPMS.0090 |
| --- | --- |
| Title | Uncertainty |
| Requirement | The technical solution shall present uncertainty to the DCB actor in the tool used to monitor the evolution of traffic. |
| Status | <Validated> |
| Rationale | This tool should integrate an uncertainty calculator which accounts for the main sources of uncertainty: timeframe, type of spot, trajectory prediction uncertainty, quality of information. Its use is very important in the decision-making process performed in the what-if function. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
| --- | --- | --- |
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-IPMS.0090 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0010 |
|---|---|
| Title | DCB within ATM performance data from NOP |
| Requirement | The technical solution shall allow the LTM/EAP to evaluate the efficiency of the DCB measures through all ATM phases against the assigned performance targets |
| Status | <Validated> |
| Rationale | In order to evaluate the efficiency of the Dynamic Airspace Configuration to the traffic at all levels of decision making, specific performance targets will be defined and used, delivered by the NOP. The analysis of the performance is used to adapt constraints and processes to improve the sectorisation processes and take decisions. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0010 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <SATISFIES> | <Enabler> | NIMS-04 |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | Compute_Local_Perf_Indicators |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0020 |
|---|---|
| Title | Performance Indicators from NOP |
| Requirement | The technical solution shall allow the LTM/EAP to assess airspace solutions according to the Performance Indicators from NOP and as a trade-off between the benefits and costs for the different actors |
| Status | <Validated> |

EUROPEAN PARTNERSHIP

Co-funded by the European Union

| Rationale | As capacity measures impact flights/airspace configuration, the solution shall be a fair trade-off between the benefit and cost of the airspace solution and the benefit and cost for the Airspace users and the wider community. Either benefits or costs are defined according to both global performance criteria and local criteria and are converted in KPIs. Capacity measures basically avoid the trajectory penalization for the airspace users (i.e. demand measures), but the cost of a Capacity measure could be higher than the cost of the problem itself. To compare efficiency of possible solutions capacity and demand measures need to apply performance analysis within DCB context. |
|---|---|
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0020 |
| <SATISFIES> | <Enabler> | AAMS-13 |
| <SATISFIES> | <Enabler> | NIMS-04 |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0030 |
|---|---|
| Title | Network Impact Methodology |
| Requirement | The technical solution shall allow NM to develop a Performance Impact assessment methodology to compare performance results between actors in DCB processes. |
| Status | <Validated> |
| Rationale | In order to be able to compare performance results between actors, a global methodology and tool/service will be provided to assess performance impact by the NOP. |
| Category | <Performance>, <Design> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0030 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0040 |
|---|---|
| Title | Performance Indicator for What-If and negotiation |
| Requirement | The technical solution shall provide the LTM/EAP with relevant performance KPIs negotiated with involved actors. |
| Status | <Validated> |
| Rationale | As DCB measures are to be selected based on performance driven criteria, specific KPIs and supporting tools shall be provided to the LTM/EAP to enable performance impact assessment considering both global and local perspective. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0040 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |

| <ALLOCATED_TO> | <Function> | nan |
|---|---|---|

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0050 |
|---|---|
| Title | NM support performance Indicator |
| Requirement | The technical solution shall provide the LTM/EAP with performance targets and indicators supported by a what-if function from the Network Performance Impact Assessment. |
| Status | <Validated> |
| Rationale | The NM shall provide a Network Performance Assessment tool in order to assess the impact of DCB measures on the performance at network level but also for the individual actors (Centre, Cluster, Sector …) |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0050 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0060 |
|---|---|
| Title | Local performance data parameters |
| Requirement | The technical solution shall allow the LTM/EAP to define and assess their appropriate performance indicators and metrics. |
| Status | <Validated> |

| Rationale | DCB process shall be associated to specific performance indicators and metrics to be integrated in the performance framework. Private (local) indicator shall stay private and only available for local Actor. |
|---|---|
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0060 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0070 |
|---|---|
| Title | NM and Fuel Efficiency KPI |
| Requirement | The technical solution shall provide the LTM/EAP with fuel efficiency information during the decision-making process. |
| Status | <Validated> |
| Rationale | NM measures the Fuel Efficiency to be available when the LTM/EAP assesses the measures to be taken according to the benefit and cost analysis for the different actors. Fuel efficiency is especially relevant when considering demand measures, since capacity measures are transparent for the Airspace Users. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0070 |
|---|---|---|
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0080 |
|---|---|
| Title | NM and Predictability KPI |
| Requirement | The technical solution shall provide the LTM/EAP with Predictability (Flight duration variability) information during the decision-making process. |
| Status | <Validated> |
| Rationale | NM measures the Predictability (i.e. Flight duration variability, against RBT) to be available when the LTM/EAP assesses the measures to be taken according to the benefit and cost analysis for the different actors. Predictability is especially relevant when considering demand measures, since capacity measures are transparent for the Airspace Users. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0080 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0090 |
|---|---|
| Title | NM and Punctuality KPI |
| Requirement | The technical solution shall provide the LTM/EAP with Punctuality information during the decision-making process. |
| Status | <Validated> |
| Rationale | NM measures the Punctuality (i.e. % AOBT within +/- 3 minutes of SOBT) to be available when the LTM/EAP assesses the measures to be taken according to the benefit and cost analysis for the different actors. Punctuality is especially relevant when considering demand measures, since capacity measures are transparent for the Airspace Users. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0090 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0100 |
|---|---|
| Title | KPIs to assess Local Performance targets |
| Requirement | The technical solution shall provide the LTM/EAP with KPIs corresponding to daily Local Performance Targets for a given sector configuration and list of DCB measures. |
| Status | <Validated> |
| Rationale | To ensure that the DCB solution is compliant with daily local performance targets, the corresponding KPIs associated to the solution shall be evaluated. |

| Category | <Functional> |
|----------|--------------|

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|---------------------|------------|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0100 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0110 |
|------------|---------------------------|
| Title | KPIs to assess Network Performance targets |
| Requirement | The technical solution shall provide the LTM/EAP with KPIs corresponding to daily Network Performance Targets provided by the NM and given a set of sector configurations and a list of DCB measures. |
| Status | <Validated> |
| Rationale | To ensure that the DCB solution is compliant with daily network performance targets, the corresponding KPIs associated to the solution shall be evaluated. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|---------------------|------------|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0110 |
| <SATISFIES> | <Enabler> | nan |

| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0120 |
|---|---|
| Title | Produce daily network performance targets |
| Requirement | The technical solution shall produce (for NM) daily network performance targets from the Network Operations Performance Plan |
| Status | <Validated> |
| Rationale | The daily network performance targets are derived from the periodical global performance targets and the performances already accomplished since the beginning of the period. |
| Category | <Performance><Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0120 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0130 |
|---|---|
| Title | Produce daily local performance targets |
| Requirement | The technical solution shall produce (for Local manager) daily local performance targets from the periodical high level performance targets defined by the HLAPB |

| Status | \<Validated\> |
|---|---|
| Rationale | The local network performance targets are derived from the periodical global performance targets and the performances already accomplished since the beginning of the period. |
| Category | \<Performance\>\<Functional\> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| \<SATISFIES\> | \<SESAR Solution\> | PJ09-W2-44 |
| \<SATISFIES\> | \<ATMS Requirement\> | REQ-S44.W2-SPRINTEROP-KPAI.0130 |
| \<SATISFIES\> | \<Enabler\> | nan |
| \<ALLOCATED_TO\> | \<Functional block\> | Performance Measurements and Monitoring |
| \<ALLOCATED_TO\> | \<Function\> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0140 |
|---|---|
| Title | DCB solutions compliant with performance targets |
| Requirement | The technical solution shall allow the LTM/EAP to plan and develop Dynamic Airspace Configurations that meet defined Network and Local operational performance targets |
| Status | \<Validated\> |
| Rationale | DAC solutions proposed by Local DACs shall be compliant with daily performance targets. |
| Category | \<Performance\>\<Functional\> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| \<SATISFIES\> | \<SESAR Solution\> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0140 |
|---|---|---|
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0150 |
|---|---|
| Title | Performance monitoring |
| Requirement | The technical solution shall monitor (for the LTM/EAP)Airspace configurations deployed as a result of strategic phase (taking into account Network and local performance) |
| Status | <Validated> |
| Rationale | The daily local performance targets shall be monitored (to detect deviations) and recorded for post-ops analysis |
| Category | <Performance><Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0150 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-KPAI.0160 |
|---|---|

| Title | Evaluate sector configuration |
|---|---|
| Requirement | The technical solution shall allow the LTM/EAP to evaluate the impact of sector configuration(s) (i.e. capacity measures) and/or ATFM measures (i.e. demand measures) and check their consistency with its local performance targets |
| Status | <Validated> |
| Rationale | The INAP need to be able to understand if the capacity plan is still valid or if action is required to modify/update the capacity plan based on better information and that the capacity plan still meets the local performance |
| Category | <Performance><Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-KPAI.0160 |
| <SATISFIES> | <Enabler> | nan |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | nan |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHEL.0010 |
|---|---|
| Title | What-Else service enabled by AI Techniques |
| Requirement | The What-Else Service shall implemented using the latest developments in the AI Techniques field |
| Status | <Validated> |
| Rationale | What-Else Service should help INAP actors in the selection of the optimal DCB measures (capacity measures, demand measures, or a combination of both), generated by a computational agent-based-model through the application of artificial intelligence techniques such as Deep Learning or Reinforcement learning.<br>It should aim at reducing some of the inconsistencies in the current |

| | |
|---|---|
| | operation from human subjectivity and varying experience, processing historic data with AI/ML technique. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHEL.0010 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0020 |
|---|---|
| Title | What-If service as enabler of DCB measures |
| Requirement | What-If Service shall allow the simulations of the expected impact and efficiency of DCB measures |
| Status | <Validated> |
| Rationale | What-If Service shall allow DCB actors to make decisions on the most appropriate solution (that could be capacity and/or demand measure (s)) at the right level of granularity |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0020 |
|---|---|---|
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0030 |
|---|---|
| Title | What-If Tool at Strategic & Pre-Tactical levels |
| Requirement | What-If Tool shall allow at Strategic & Pre-Tactical levels the ANSP ATFCM Unit to find new sectorisation, matching the demand with acceptable level of performance. |
| Status | <Validated> |
| Rationale | What-If Tool shall allow at Strategic & Pre-Tactical levels the ANSP ATFCM Unit to find new sectorisation, matching the demand with acceptable level of performance, allowing it to coordinate with civil and military airspace users the implementation of priority rules for a specific airspace situation |
| Category | <Performance><Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0030 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM |

| | | measures proposed by NM and final ARES |
|---|---|---|
| | | |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0040 |
|---|---|
| Title | What-If Service for the INAP environment |
| Requirement | What-If Service shall allow automated support for imbalance detection and hotspot resolution, as far as INAP concept is concerned. |
| Status | <Validated> |
| Rationale | What-If Service shall support INAP environment to find adequate solutions, including airspace configuration as primary option, to avoid measures on flows and trajectories. |
| Category | <Design><Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0040 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0050 |
|---|---|
| Title | What-If Service exchanges |
| Requirement | The What-If service should allow the exchange of the actions and measures to be taken with the impacted actors through the appropriate CDM mechanisms. |

| Status | <Validated> |
|--------|-------------|
| Rationale | Though it does not affect the effectiveness of the what if service per se, the What-If service should be connected to CDM mechanisms for even more efficiency and comes as a complement. |
| Category | <Functional> <Data> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|--------------|---------------------|------------|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0050 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0060 |
|------------|---------------------------|
| Title | What-If Service from Pre-Tactical to Tactical phase |
| Requirement | The What-If service shall allow the end user to decide, during the different time horizons, from the Pre-Tactical to Tactical Phase (up to a range of value or discretion for each ACC) what are the measures with higher effectiveness and performance with regards to the resolution of a declared hotspot. |
| Status | <Validated> |
| Rationale | The What-If service shall incorporate both airspace management measures and demand measures to allow the end user to decide, during the different time horizons, from the Pre-Tactical to Tactical Phase (up to a range of value or discretion for each ACC) what are the measures with higher effectiveness and performance with regards to the resolution of a declared hotspot. The What-If service should also allow the exchange of the actions and measures to be taken with the impacted actors through the appropriate CDM mechanisms. |

| Category | <Performance><Functional> |
|---|---|

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0060 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0070 |
|---|---|
| Title | What-If Service as a complement of the Imbalance Prediction and Monitoring Service |
| Requirement | The What-If service shall monitor available staff, traffic, workload and complexity within defined airspace volumes. |
| Status | <Validated> |
| Rationale | The What-If service will be a paramount asset to complement the Imbalance Prediction and Monitoring Service: by monitoring available staff, traffic, workload and complexity within defined airspace volumes, overload situations should be avoided as much as possible and/or adequate solutions to complexity issues derived from the assessment performed should be found with the support of the What-If Service. The output will be useful for the integration of DAC into INAP processes. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|

| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
|---|---|---|
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0070 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0110 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0080 |
|---|---|
| Title | What-If Service customization |
| Requirement | The What-If Service shall allow customization for each type of DCB measure (capacity or demand) at different time horizons, to answer to the different and specific needs of the operator in order to assess the performance of the resolution proposal. |
| Status | <Validated> |
| Rationale | The customisation includes mainly the capacity of the service to take into account the various demands from the catalogue with regards to their time horizons but also habits and constraints of the ACC. This requirement allows to ensure the service is correctly tuned to support effectively the ACC in the way of working by providing as much adherence as possible to the operating method |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |

| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0080 |
|---|---|---|
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0100 |
|---|---|
| Title | What-If service on Capacity Measures |
| Requirement | The service shall allow the What-If on the available capacity (predefined acceptable configurations, available configurations based on other constraints, assessment of DAC configurations before their activation on the CWP), by providing the capability of designing a configuration in terms of split, collapse, change of configuration, SAM, flexible boundaries. |
| Status | <Validated> |
| Rationale | This service supports operational personnel in identifying the best sector configuration at the whole airspace level or at ACC level and, within an ACC, at sector level, to manage the demand. The What-If service, according to the DCB timeline, shall support the LTM/EAP to take airspace management measures including both airspace configuration actions (by selecting different airspace volumes defined in the strategic phase, grouping them and defining the outcome airspace volume as operational sector/CAB), and airspace refinement elements (by redefining the vertical and lateral boundaries of the operational sectors/CAB and even of the airspace volume, using flexible boundaries and the definition of VSAMs, in line with gaining flexibility and dynamicity). After the definition of the new airspace configuration or of the airspace design refinement, the What-if functionality shall reassess the different performance indicators. Once completed the what-if process, the user shall be able to implement the change from the What-If tool. |
| Category | <Performance><Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0100 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0110 |
|---|---|
| Title | What-If Function for the best sector configuration |
| Requirement | The What-if function shall support LTM, EAP, NM in identifying the best sector configuration at the whole airspace level or at ACC level and, within an ACC, at sector level, to manage the demand. |
| Status | <Validated> |
| Rationale | The What-If service, according to the DCB timeline, shall support the INAP to take airspace management measures including both airspace configuration actions (by selecting different airspace volumes defined in the strategic phase, grouping them and defining the outcome airspace volume as operational sector/CAB), and airspace refinement elements (by redefining the vertical and lateral boundaries of the operational sectors/CAB and even of the airspace volume, using flexible boundaries and the definition of VSAMs, in line with gaining flexibility and dynamicity).<br>After the definition of the new airspace configuration or of the airspace design refinement, the What-if functionality shall reassess the different performance indicators. Once completed the what-if process, the user shall be able to implement the change from the What-If tool. This requirement is a new requirement developed within the solution 44. |
| Category | <Performance> <Functional> |

[REQ Trace]

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| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0110 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0120 |
|---|---|
| Title | What-If service on Demand Measures |
| Requirement | The service shall allow the What-If on demand and trajectory measures such as MCP-Ground Delay, Level-Capping, Horizontal Re-Routing (both at flight and flow levels, ground and airborne). |
| Status | <Validated> |
| Rationale | The What-If service shall allow the LTM/EAP to select individual flights from the list and change manually one or more of their trajectory elements in order to simulate and assess the impact on demand, workload, complexity indicators and/or other kind of performance indicators.<br>Once completed the what-if process, the user shall be able to select a combination of measures on individual flights and/or traffic flows, and he/she shall be able to select both the candidate flow and the STAM measures to be proposed for implementation. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0120 |

| <SATISFIES> | <Enabler> | AAMS-09a |
| --- | --- | --- |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0140 |
| --- | --- |
| Title | What-If service on ATFM Scenarios (Level-capping and Horizontal Rerouting) |
| Requirement | The service shall allow the What-If on the application of ATFM scenarios published in the NOP. |
| Status | <Validated> |
| Rationale | The what-if service shall be as complete as possible when exploring all options and gather all known and defined measures, included the ATFM scenarios |
| Category | <Functional> <Design> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
| --- | --- | --- |
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0140 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0150 |
|---|---|
| Title | What-If service on ATFM Regulation |
| Requirement | The service shall allow the What-If on the application of ATFM Regulations, simulating the impact of different regulation time windows and regulation rates. |
| Status | <Validated> |
| Rationale | The What-If service shall allow the LTM/EAP to simulate the impact of different Regulation Durations and Regulation Rates. |
| Category | <Functional> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0150 |
| <SATISFIES> | <Enabler> | AAMS-09a |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-09-W2-44-TS-WHIF.0160 |
|---|---|
| Title | What-If service access through an HMI |
| Requirement | The What-If services shall be accessible through an HMI, with functionalities allowing their launch, as well as the presentation of their results. |

| Status | <Validated> |
|---|---|
| Rationale | The What-If shall rely on the service functionalities, closely linked to the HMI, as the LTM/EAP shall propose a solution, assess the impact and the benefits of that solution in terms of performance indicators and finally, implement it.<br>Therefore, the What-If tool shall display, on the one hand, the starting airspace design and on the other hand, the foreseen trajectories and, from that point on, the HMI shall let the user propose the capacity and demand measures according to the DCB timeline. |
| Category | <Functional> <Design> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-WHIF.0160 |
| <SATISFIES> | <Enabler> | AAMS-19 |
| <ALLOCATED_TO> | <Functional block> | DAC tools |
| <ALLOCATED_TO> | <Function> | DAC tool impact assessment of sector configuration, ATFCM measures proposed by NM and final ARES |

[REQ]

| Identifier | REQ-S44-W2-TS-SAF.0040 |
|---|---|
| Title | LTM/EAP complexity calculation status awareness |
| Requirement | The LTM/EAP shall have an access to the information whether complexity calculation is in progress or done |
| Status | <Validated> |
| Rationale | The LTM/EAP shall have an access to the information whether complexity calculation is in progress or done (previously Wave 1 PJ09 REQ-09.01-OSED-CPX.0340) |
| Category | <Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SAF.0040 |
| <SATISFIES> | <Enabler> | |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |
| <ALLOCATED_TO> | <Function> | |

[REQ]

| Identifier | REQ-S44-W2-TS-SAF.0040 |
|---|---|
| Title | LTM/EAP hotspot resolution loss awareness |
| Requirement | The LTM/EAP shall be alerted in case of the loss of the Impacted hotspot resolution status functionality |
| Status | <Validated> |
| Rationale | The LTM/EAP shall be alerted in case of the loss of the Impacted hotspot resolution status functionality (previously Wave 1 PJ09 REQ-09.02-OSED-SAF.0010 |
| Category | <Safety> |

[REQ Trace]

| Relationship | Linked Element Type | Identifier |
|---|---|---|
| <SATISFIES> | <SESAR Solution> | PJ09-W2-44 |
| <SATISFIES> | <ATMS Requirement> | REQ-S44.W2-SPRINTEROP-SAF.0010 |
| <SATISFIES> | <Enabler> | |
| <ALLOCATED_TO> | <Functional block> | Performance Measurements and Monitoring |

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| <ALLOCATED_TO> | <Function> | |

# 5  Recommendation for Implementation

This section provides recommendations (optional requirements) that cover the core DCB functionality required by a DAC system. It focusses on a subset of the currently available DCB implementation needed by DAC, with some extensions added to meet DAC specific requirements.

## 5.1  Regional ATFCM B2B Interface Recommendations

These Regional ATFCM service requirements give a clear idea how the DAC system documented in the TS/IRS should interact and collect data from a regional network manager system.

All the interfaces detailed below are based on the B2B services made available on Eurocontrol's prototyping platforms as used by on-going exercises and activities. These are made compatible with the NM B2B service interfaces wherever possible, although in some cases the services documented here may be simplified versions (this is to provide as much clarity in this document as possible).

Normally these services will be made available to "local solutions" as depicted below (although they are generally available to any client). Basic data types for the attributes listed below are as specified in the NM B2B FlowServices reference manual. The NM B2B Request/Reply protocol is preserved for convenience.

### 5.1.1  Traffic Count Services

Traffic counts services support the monitoring of ENTRY or OCCUPANCY counts by delivering flight lists and counts relating to the specified elements of the system.

Traffic counts are also able to be carried out against different network manager 'datasets' and are able to return aggregated counts and/or counts by sub-groups.

Furthermore, in the event that thresholds defined in the system (see capacity plans) are exceeded, traffic counts are also able to return Alerts if the client specified them as part of the service request.

- o  TrafficCountsByAerodrome
- o  TrafficCountsByAerodromeSet
- o  TrafficCountsByAircraftOperator
- o  TrafficCountsByAirspace
- o  TrafficCountsByKeys
- o  TrafficCountsByPoint
- o  TrafficCountsByTrafficVolume
- o  TrafficCountsByMeasure

#### 5.1.1.1  TrafficCounts

##### 5.1.1.1.1  TrafficCountsRequest

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The system should allow the request TrafficCountsRequest as a generic (inheritable) request with the following query parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| Dataset | Mandatory | | The NM dataset for which counts are requested (FORECAST, OPERATIONAL, SIMULATION) | |
| TrafficWindow | Mandatory | | Defines the period of time over which counts were requested | |
| IncludeProposalFlights | Mandatory | | Specifies whether the selected count must include proposal flights, or only real flights. If proposal flights are included, they should replace the corresponding real flights in the count. | |
| TrafficTypes | Mandatory | | Specifies the (set of) type(s) of traffic to be counted (DEMAND, REGULATED DEMAND, LOAD) | |
| ComputeSubTotals | Mandatory | | Boolean flag to specify if sub totals should be returned in the count. If false then for each traffic type selected a single total is returned. If true then for each traffic type selected detailed sub-totals are returned (ATC_ACTIVATED, IFPL, PFD, RPL, SUSPENDED, TACT_ACTIVATED_WITHOUT_FSA, TACT_ACTIVATED_WITH_FSA) | |
| CountsInterval | Mandatory | | The way that the counts should be carried out (duration and step) | |

Notes:

- All specific traffic counts relating to any system element inherit from the generic TrafficCountsRequest which requires the user to define all of the common count parameters. Each specific traffic count is extended to define the system element on which the counts should be filtered (e.g. Aerodrome, Airspace etc.).

- As an abstract call, TrafficCountsRequest cannot be called directly.

### 5.1.1.2 TrafficCountsByAerodrome

#### 5.1.1.2.1 TrafficCountsByAerodromeRequest

The system should allow the TrafficCountsByAerodromeRequest request with the following query parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| Aerodrome | Mandatory | | The ICAO ID of the aerodrome for which the count should be carried out | |
| AerodromeRole | Mandatory | | The type of traffic to count for the aerodrome (i.e. ARRIVAL, DEPARTURE or BOTH) | |

The TrafficCountsByAerodromeRequest request should execute an ENTRY traffic count for the specified aerodrome, counting traffic conforming to the user defined aerodromeRole (i.e. ARRIVAL, DEPARTURE or BOTH) during the specified period and for the user defined step interval.

Notes:

- Aerodrome counts of type OCCUPANCY are not supported

Inherits:

- TrafficCountsRequest

#### 5.1.1.2.2 TrafficCountsByAerodromeReply

The system should reply in response to the TrafficCountbyAerodromeRequest with the following parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| See TrafficCountsReplyData | Mandatory | | (Usually pulled from TrafficCountsReply) | |

The TrafficCountsByAerodromeReply should return some or all of the TrafficCountsReplyData according to the parameters sent by the request

Inherits:

- common::Reply

### 5.1.1.3 TrafficCountsByAerodromeSet

#### 5.1.1.3.1 TrafficCountsByAerodromeSetRequest

The system should allow the TrafficCountsByAerodromeSetRequest request with the following query parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| AerodromeSet | Mandatory | | The ID of the aerodrome set for which the count should be carried out | |
| AerodromeRole | Mandatory | | The type of traffic to count for the aerodrome (i.e. ARRIVAL, DEPARTURE or BOTH) | |

The TrafficCountsByAerodromeSetRequestRequest should execute an ENTRY traffic count for the specified aerodrome set, counting traffic conforming to the user defined aerodromeRole (i.e. ARRIVAL, DEPARTURE or BOTH) during the specified period and for the user define step interval.

Notes:

- Aerodrome counts of type OCCUPANCY are not supported

Inherits:

- TrafficCountsRequest

#### 5.1.1.3.2 TrafficCountsByAerodromeSetReply

The system should reply in response to the TrafficCountsByAerodromeSetRequest with the following parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| See TrafficCountsReplyData | Mandatory | | (Usually pulled from TrafficCountsReply request) | |

The TrafficCountsByAerodromeSetReply should return some or all of the TrafficCountsReplyData according to the parameters sent by the request.

Inherits:

- common::Reply

### 5.1.1.4  TrafficCountsByAircraftOperator

#### 5.1.1.4.1  TrafficCountsByAircraftOperatorRequest

The system should allow the TrafficCountsByAircraftOperatorRequestrequest with the following query parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| AirlineOperator | Mandatory | | The ID of the airline operator for which the count should be carried out | |
| CalcluationType | Mandatory | | Indicates what is the calculation type of the count (i.e. ENTRY or OCCUPANCY) | |

The TrafficCountsByAircraftOperatorRequest request should execute a traffic count of the specified type for an aircraft operator during the specified period and for the user define step interval.

Notes:

- Counts of type ENTRY and OCCUPANCY are supported

Inherits:

- TrafficCountsRequest

#### 5.1.1.4.2  TrafficCountsByAircraftOperatorReply

The system should reply in response to the TrafficCountsByAircraftOperatorRequest with the following parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| See TrafficCountsReplyData | Mandatory | | (Usually pulled from TrafficCountsReply request) | |

The TrafficCountsByAircraftOperatorReply should return some or all of the TrafficCountsReplyData according to the parameters sent by the request

Inherits:

- common::Reply

### 5.1.1.5  TrafficCountsByAirspace

#### 5.1.1.5.1  TrafficCountsByAirspaceRequest

The system should allow the TrafficCountsByAirspaceRequest request with the following query parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---------|--------|-----------------|------------|--------------------------|
| Airspace | Mandatory | | The ID of the airspace for which the count should be carried out | |
| AalcluationType | Mandatory | | Indicates what is the calculation type of the count (i.e. ENTRY or OCCUPANCY) | |

The TrafficCountsByAirspaceRequest request should execute a traffic count of the specified airspace during the specified period and for the user define step interval.

Notes:

- Counts of type ENTRY and OCCUPANCY are supported

Inherits:

- TrafficCountsRequest

#### 5.1.1.5.2  TrafficCountsByAirspaceReply

The system should reply in response to the TrafficCountsByAirspaceRequest with the following parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---------|--------|-----------------|------------|--------------------------|
| See TrafficCountsReplyData | Mandatory | | (Usually pulled from TrafficCountsReply request) | |

The TrafficCountsByAirspaceReply should return some or all of the TrafficCountsReplyData according to the parameters sent by the request.

Inherits:

- common::Reply

### 5.1.1.6 TrafficCountsByPoint

#### 5.1.1.6.1 TrafficCountsByPointRequest

The system should allow the TrafficCountsByPointRequest request with the following query parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| Point | Mandatory | | The ID of the point for which the count should be carried out | |
| FlightLevelRange | Mandatory | | The range in which the flight levels should be over the point to be included in the count | |

The TrafficCountsByPointRequest request should execute an ENTRY traffic count of the specified point during the specified period and for the user define step interval.

Notes:

- Counts of type OCCUPANCY are not supported for point counts

Inherits:

- TrafficCountsRequest

#### 5.1.1.6.2 TrafficCountsByPointReply

The system should reply in response to the TrafficCountsByPointRequest with the following parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| See TrafficCountsReplyData | Mandatory | | (Usually pulled from TrafficCountsReply request) | |

The TrafficCountsByPointReply reply should returns some or all of the TrafficCountsReplyData according to the parameters sent by the request

Inherits:

- common::Reply

### 5.1.1.7 TrafficCountsByTrafficVolume

#### 5.1.1.7.1 TrafficCountsByTrafficVolumeRequest

The system should allow the TrafficCountsByTrafficVolumeRequest request with the following query parameters:

| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| TrafficVolume | Mandatory | | The ID of the Traffic Volume for which the count should be carried out | |
| CalcluationType | Mandatory | | Indicates what is the calculation type of the count (i.e. ENTRY or OCCUPANCY) | |
| ComputeOTMVAlerts | Optional | | Boolean to indicate if alerts should be returned (max and sustained threshold as described previously). | |
| ComputeFlowCounts | Optional | | Indicates if traffic counts need to be computed by linked or associated flows. By default (i.e. if computeFlowCounts is not specified), traffic counts are not computed by flow. (Types are ASSOCIATED or LINKED) | |

The TrafficCountsByTrafficVolumeRequest Request should execute a traffic count of the specified Traffic Volume during the specified period and for the user define step interval.

Notes:

- Counts of type ENTRY and OCCUPANCY are supported

- OCCUPANCY counts for traffic volumes are only supported for traffic volumes that are defined on an airspace element.

Inherits:

- TrafficCountsRequest

#### 5.1.1.7.2 TrafficCountsByTrafficVolumeReply

The system should reply in response to the TrafficCountsByTrafficVolumeRequest with the following parameters:

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| Element | Needed | Suggested Value | Definition | Default if not specified |
|---|---|---|---|---|
| See TrafficCountsReplyData | Mandatory | | (usually pulled from TrafficCountsReply request) | |

Notes:

- o Returns some or all of the TrafficCountsReplyData according to the parameters sent by the request.

Inherits:

- o common::Reply

# 6 Assumptions

[…]

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# 7 References and Applicable Documents

## 7.1 Applicable Documents

Content Integration

### Content Integration

[1]  B.04.01 D138 EATMA Guidance Material

[2]  EATMA Community pages

[3]  SESAR ATM Lexicon

### Content Development

[4]  PJ19 - D2.5 : SESAR Concept of Operations (CONOPS 2019)

[5]  D2.1.001_SESAR Solution PJ09-W2-44 SPR INTEROP OSED_00.01.01

[6]  D2.1.005_SESAR Solution PJ09-W2-44-V3 Intermediate VALP_00.00.04

### System and Service Development

[7]  08.01.01 D52: SWIM Foundation v2

[8]  08.01.01 D49: SWIM Compliance Criteria

[9]  08.01.03 D47: AIRM v4.1.0

[10]  08.03.10 D45: ISRM Foundation v00.08.00

[11]  B.04.03 D102 SESAR Working Method on Services

[12]  B.04.03 D128 ADD SESAR1

[13]  B.04.05 Common Service Foundation Method

### Performance Management

[14]  B.04.01 D108 SESAR 2020 Transition Performance Framework

[15]  B.04.01 D42 SESAR2020 Transition Validation

[16]  B.05 D86 Guidance on KPIs and Data Collection support to SESAR 2020 transition.

[17]  16.06.06-D68 Part 1 –SESAR Cost Benefit Analysis – Integrated Model

[18]  16.06.06-D51-SESAR_1 Business Case Consolidated_Deliverable-00.01.00 and CBA

[19]  Method to assess cost of European ATM improvements and technologies, EUROCONTROL (2014)

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[20]   ATM Cost Breakdown Structure_ed02_2014

[21]   Standard Inputs for EUROCONTROL Cost Benefit Analyses

[22]   16.06.06_D26-08 ATM CBA Quality Checklist

[23]   16.06.06_D26_04_Guidelines_for_Producing_Benefit_and_Impact_Mechanisms

## Validation

[24]   03.00 D16 WP3 Engineering methodology

[25]   Transition VALS SESAR 2020 - Consolidated deliverable with contribution from Operational Federating Projects

[26] European Operational Concept Validation Methodology (E-OCVM) - 3.0 [February 2010]

## System Engineering

[27]   SESAR 2020 Requirements and Validation Guidelines

## Safety

[28]   SESAR, Safety Reference Material, Edition 4.0, April 2016

[29]   SESAR, Guidance to Apply the Safety Reference Material, Edition 3.0, April 2016

[30]   SESAR, Final Guidance Material to Execute Proof of Concept, Ed00.04.00, August 2015

[31]   SESAR, Resilience Engineering Guidance, May 2016

## Human Performance

[32]   16.06.05 D 27 HP Reference Material D27

[33]   16.04.02 D04 e-HP Repository - Release note

## Environment Assessment

[34]   SESAR, Environment Reference Material, alias, "Environmental impact assessment as part of the global SESAR validation", Project 16.06.03, Deliverable D26, 2014.

[35]   ICAO CAEP – "Guidance on Environmental Assessment of Proposed Air Traffic Management Operational Changes" document, Doc 10031.

## Security

[36]   16.06.02 D103 SESAR Security Ref Material Level

[37]   16.06.02 D137 Minimum Set of Security Controls (MSSCs).

[38]   16.06.02 D131 Security Database Application (CTRL_S)

# 7.2  Reference Documents

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[1]  ED-78A GUIDELINES FOR APPROVAL OF THE PROVISION AND USE OF AIR TRAFFIC SERVICES SUPPORTED BY DATA COMMUNICATIONS. [2]

[2]  D4.1.023 V2 Final OSED Sol PJ09.03, June 2019, Edition 00.02.01

[3]  D3.1.070 PJ09.02 V2 VALR, September 2019, Edition 01.02.00

[4]  D1.2 PJ09 Final Project Report, November 2019, Edition 01.00.00

[5]  D3.1.041 PJ09.02 TS IRS Edition 00.02.01

[6]  D2.1.020 SESAR Solution 08.01 SPR-INTEROP-OSED for V2, July 2019, Edition 03.00.01

[7]  D2.1.030 PJ08.01 V2 TS-IRS ed_00.01.07

[8]  COTTON consortium, H2020 project Grant Agreement 783222, "D4.2 Validation Report", 2019

[9]  COTTON consortium, H2020 project Grant Agreement 783222, "D2.2 - Innovative complexity and workload assessment to support future Capacity Management processes in TBO" 2019

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# Appendix A    Service Description Document (SDD)

# Appendix B    Appendix B Exercises Availability Notes

The Exercises' Availability Notes are two standalone deliverables:

- D2.1.006 contains the Availability Notes of the exercises 001, 002, 003 and 004
- D2.1.106 contains the Availability Notes of the exercises 005, 006 and 007

It has been decided that the Technical Specification document is the container of the Availability Notes for the Data Pack while the Technical Specification team is not the owner of the Availability Notes.

**The current version of the document is built for the Technical Specifications purposes only. It doesn't contain the Availability Notes that will be embedded in the TS Data Pack version only**

## B.1  Availability Notes for EXEs 01/02/03/04 Deliverable D2.1.006
N/A for the current version

## B.2  Availability Notes for EXEs 05/06/07 Deliverable D2.1.106
N/A for the current version

**-END OF DOCUMENT-**

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