

SESAR Solution PJ07-W2-40 Final TS/IRS for V3

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PJ.07-W2-40

OPTIMISED AIRSPACE USER OPERATIONS

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Abstract

This document provides the final V3 TS/IRS for Solution PJ07-W2-40 “Initial 4D Mission Trajectory development with integrated Dynamic Mobile Areas (DMA) type 1 and type 2 supported by automation and dynamic civil-military CDM”, conducted in the context of SESAR2020 Wave 2. It provides the future *architecture* technical specifications of the Solution.

This TS/IRS is based on the concepts developed in the [4]PJ07-W2 - D4.1.004: SESAR Solution PJ07-W2-40 final SPR-INTEROP/OSED for V3 (01.00.01) and is aligned with the validation exercise as described by [5] PJ07-W2 - D4.1.009: SESAR Solution PJ07-W2-40 final VALP for V3 (01.00.00) and the results of the validation exercise as described in [14] PJ07-W2 - D4.1.007: SESAR Solution PJ07-W2-40 Validation Report (00.00.06). Therefore, the maturity of the TS/IRS is V3/TRL6.

The document aims also at building *technical specification* within the scope of PJ.07-W2-40. The technical requirements are provided in the dedicated chapter.

The SESAR Solution is built upon wave 1 results of the PJ08-01 and PJ07-03 SESAR 2020 Wave 1 Solutions.

The future architecture is developed following the European Air Traffic Management Architecture (EATMA) methodology in line with the [1] D2.15 PJ19-W2: EATMA Guidance (2020) Edition 01.00.00 (June 2021).

Table of Contents

Abstract.....	4
1 Executive summary	8
2 Introduction.....	9
2.1 Purpose of the document	9
2.2 Scope	9
2.3 Intended readership	9
2.4 Background.....	10
2.5 Structure of the document.....	10
2.6 Glossary of terms.....	11
2.7 Acronyms and Terminology	18
3 SESAR Solution Impacts on Architecture	27
3.1 Target Solution Architecture.....	27
3.1.1 SESAR Solution(s) Overview	27
3.1.1.1 Deviations with respect to the SESAR Solution(s) definition.....	29
3.1.1.2 Relevant Use Cases.....	29
3.1.1.3 Applicable standards and regulations	31
3.1.2 Capability Configurations required for the SESAR Solution	32
3.2 Changes imposed by the SESAR Solution on the baseline Architecture	33
4 Technical Specifications.....	35
4.1 Functional architecture overview (general introduction for all solutions)	35
4.1.1 Resource Connectivity view	35
4.1.1.1 Resource Infrastructure view (of the NSV-2).....	36
4.1.2 Resource Orchestration view (all NSV-4s linked to the NSV-1).....	36
4.1.2.1 [NSV-4] Develop early flight intent for iMT with DMA type 1 and 2	39
4.1.2.2 [NSV-4] Mission Trajectory Management with DMA type 1 and 2	42
4.1.2.3 [NSV-4] Trajectory Management with planning ATM constraints (TTO).....	44
4.1.3 Resource Composition	46
4.1.3.1 ASM (PJ.07-W2-40).....	46
4.1.3.1.1 Composition	46
4.1.3.1.2 System Interfaces Diagram	46
4.1.3.2 ATFCM (PJ.07-W2-40).....	47
4.1.3.2.1 Composition	47
4.1.3.2.2 System Interfaces Diagram	48
4.1.3.3 State AU Wing Operations Centre (WOC) (PJ.07-W2-40).....	49
4.1.3.3.1 Composition	49
4.1.3.3.2 System Interfaces Diagram	50
4.1.4 Service view.....	50
4.1.4.1 Service description	50
4.1.4.2 Service Provisioning.....	51
4.1.4.3 Service Realization.....	52

4.1.4.3.1	Interaction DACATCVolumes.State AU Operations Centre (WOC)_CC and Sub-Regional/Local ATFCM_CC.....	52
4.1.4.3.2	Interaction DACATCVolumes.Sub-Regional/National ASM_CC and Sub-Regional/Local ATFCM_CC	53
4.1.4.3.3	Interaction DACCoordination.Regional ATFCM_CC and Sub-Regional/Local ATFCM_CC.	54
4.1.4.3.4	Interaction DAC_ARESBroker.State AU Operations Centre (WOC)_CC and Sub-Regional/National ASM_CC	55
4.1.4.3.5	Interaction TTOProposal.State AU Operations Centre (WOC)_CC and Sub-Regional/Local ATFCM_CC	56
4.2	Functional and non-Functional Requirements	57
4.2.1	State AU Operations Centre (WOC) related Requirements	57
4.2.1.1	Functional Block “Information and Communication Management”	58
4.2.1.1.1	Function WOC Ground/Ground communication from/to Sub-Regional/National ASM ...	58
4.2.1.1.2	Function WOC Ground/Ground communication from/to Sub-Regional/Local ATFCM	62
4.2.1.2	Functional Block “Flight Data Support Management”	65
4.2.1.2.1	Function Flight Constraints Management.....	65
4.2.1.2.2	Function Navigation Data Maintenance	65
4.2.1.3	Functional Block “Flight Planning”	67
4.2.1.3.1	Function Trajectory Generation.....	67
4.2.1.3.2	Function Operational Flight Plan Generation	80
4.2.1.3.3	Function Flight Plan Filing	94
4.2.1.4	Functional Block Schedule Management	96
4.2.1.4.1	Function ARES Scheduling.....	96
4.2.2	Sub-Regional/National ASM related requirements.....	116
4.2.3	Sub-Regional/Local ATFCM related requirements	120
5	Recommendation for Implementation.....	126
6	Assumptions	128
7	References and Applicable Documents	129
7.1	Applicable Documents	129
7.2	Reference Documents.....	130

List of Tables

Table 1: Glossary	18
Table 2: Acronyms and terminology	26
Table 3: SESAR Solution PJ.07-W2-40 Scope and related Functional Blocks/roles & Enablers	29
Table 4 PJ.07-W2-40 Operational Use Cases.....	30
Table 5 PJ.07-W2-40 Operational Models.....	31
Table 6: List of Capability Configuration required for the SESAR Solution	32
Table 7: Changes imposed by the Solution PJ.07-W2-40 on the baseline Architecture	34
Table 8: List of Function descriptions required for the SESAR Solution.....	39

Table 9 : Roles and related Functional blocks and functions in Develop early flight intent process.... 41

Table 10: Roles and related Functional blocks and functions in Mission trajectory management with DMA type 1 and 2 process 43

Table 11: Roles and related Functional blocks and functions in Trajectory Management with planning ATM constraints (TTO) process 45

List of Figures

Figure 1: NSV-1 Mission Trajectories Management with integrated DMA Type 1 and Type 2..... 35

Figure 2: NSV-2 Mission Trajectories Management with integrated DMA Type 1 and Type 2..... 36

Figure 3: NSV-4 Develop early flight intent for iMT with DMA type 1 and 2 40

Figure 4: NSV-4 Mission Trajectory Management with DMA type 1 and 2 42

Figure 5 : NSV-4 Trajectory Management with planning ATM constraints (TTO)..... 44

Figure 6 ASM composition 46

Figure 7 : ASM System Interface Diagram..... 46

Figure 8 ATFCM composition 47

Figure 9 : ATFCM System Interface Diagram..... 48

Figure 10 State AU Wing Operations Centre composition..... 49

Figure 11 : State AU Wing Operations Centre System Interface Diagram 50

Figure 12: State AU Technical System 58

1 Executive summary

This document contains the Technical Specifications for PJ.07-W2-40. The Solution PJ07-W2-40 is built upon SESAR 2020 wave 1 results of the PJ08-01 and PJ07-03 SESAR Solutions.

The focus of the Solution PJ07-W2-40 is the definition, integration and further validation of the operational concept elements of iMT (initial Mission Trajectory) and AFUA (Advanced Flexible Use of Airspace), aiming at a V3/TRL6 level of maturity of the integrated management of iMT with DMA type 1 and type 2 in sub-regional/local Airspace Management- Air Traffic Flow Management (ASM-ATFCM) planning processes, specifically:

- iMT with integrated DMA type 1 and type 2 definition and development.
- iSMT with DMA type 1 and type 2 participation in sub-regional/local ASM-ATFCM based civil-military collaborative decision-making (CDM).

The baseline of PJ07-W2-40 architecture is a merge of the architectures built during the SESAR 2020 wave1 by the PJ08-01 and PJ07-03 solutions. They have been adapted and changed when necessary, in order to reflect the scope of PJ.07-W2-40 (e.g. Sub-regional/National scope). Some new architecture elements have been implemented in order to cope with the new features validated by the Solution (e.g. TTO proposal negotiation). On the Technical Requirements level, the starting point is also based on the SESAR 2020 wave1 requirements.

The key value point of the solution PJ-07-W2-40 in the scope of Optimised Airspace Users Operations project is a demonstration of the validation results with required V3/TRL6 maturity. The validation results will pave the way to new operating methods and operational activities underpinned by system technical prototypes facilitating integration of iMT with DMA type 1 and type 2 into new operational environment transiting from Time based to Trajectory based operations.

The focus of the Wave2 new features is on:

- Provide automatic support necessary to facilitate impact assessments and decisions concerning the integration of DMA type 1 and type 2 definition and allocation in both mission trajectory development and airspace configuration processes and systems.
- Development of new features to support the definition, management and negotiation (through CDM processes) of the integrated military ATM demand composed of iMT 3D profile and DMA type 1 and type 2 whilst taking on board the static areas as well.
- Adequate automatic support necessary to implement new operating methods with focus on the development the iMT data set (from early flight intent to iShared MT) and DMA flexible parameters (e.g. activation time, location, time over entry point, and flight level band) with associated thresholds.
- Development of new features to support the level of priority associated to a DMA (of type 1 and type 2) to define constraints related to specific parameters.
- Development of new features to support the modification of the mission trajectory applying the concept of TTO (Target Time Over) to respond to, either military mission requirements or airspace capacity optimization needs.

2 Introduction

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 40 of the PJ.07-W2-OAUO project. This TS/IRS document corresponds to the final development level of the PJ.07-W2-40 SPR-INTEROP/OSED document [4].

The main purposes of the TS/IRS tasks 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 PJ.07-W2-40 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.

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.

All the TS/IRS works are in line with the EATMA methodology described by the [1] D2.15 PJ19-W2: EATMA Guidance (2020) Edition 01.00.00 (June 2021) and they are performed under the MEGA technical environment thus ensuring the coherency on the SESAR Solution data-pack level.

2.2 Scope

This TS/IRS document provides the requirements specification, covering functional, non-functional and interface requirements related to SESAR Solution 40 of the PJ.07-W2-OAUO project V3 target phase. Functional, non-functional and interface requirements should be derived from the Operational requirements developed in the SPR-INTEROP/OSED 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.

2.3 Intended readership

The intended audience of this document consist of:

- PJ.07 Solutions; all solutions part of Project 07 should have a close collaboration to ensure a consolidated approach to their common validation threads
- PJ.09-W2-44, which is a complementary solution concerning the validation of DMA performance benefits, addressing the integration of DMA type 1 into Dynamic Airspace Configurations (DAC)
- PJ.19.02, in charge of the SESAR conceptual documents in SESAR 2020 Wave 2
- PJ.19.04, which will collect outputs of the validation exercises for consolidation and will perform the performance gap analysis
- Key stakeholders who will benefit from the deployment of the Solution:
 - Military and Civil Airspace Users
 - Air Navigation Service Providers, particularly Airspace Managers (AMCs) and Air Traffic Flow and Capacity Managers (FMPs)
 - Network Manager, indirectly from improved sub-regional/local processes

2.4 Background

The Solution PJ-07-W2-40 is a successor of two solutions PJ.07-03 Mission Trajectory Driven Processes and PJ.08-01 Dynamic Airspace Configuration developed and validated in SESAR 2020 wave 1 to various maturity levels. It consolidates validation results and evolves with new concept of DMA type 1 and type 2 integrated into iMT management.

This TS/IRS is based on the results of the deliverables from SESAR 2020 wave 1 work packages contributing to Mission Trajectory and Dynamic Mobile Area concepts. Current TS/IRS is based on:

- [22] D2.1.030 SESAR Sol. 08.01 Technical Specification (TS/IRS) for V2 Ed 00.01.05
- [23] D2.1.080 SESAR Activity PJ.18-01a Technical Specification (TS/IRS) for V3/TRL6 Ed 02.00.02

2.5 Structure of the document

The document is structured as follows:

- Chapter 1 provides the executive summary.
- Chapter 2 provides a general introduction to the solution, including purpose, scope, the intended audience and the background.
- Section 3 provides the impact of the PJ.07-W2-40 solution on the system architecture.
- Section 4 describes the Functional Architecture and Technical Requirements.
- Section 5 describes the Implementation Options.
- Section 6 provides the Assumptions.

- Appendix A 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
ATM actors	A person, organisation or technical system authorised/licensed to act within the ATM System. Several ATM actors can perform a role. One ATM actor can perform several roles.	SESAR
ATM community	Organizations, agencies or entities that may participate, collaborate and cooperate in the planning, development, use, regulation, operation and maintenance of the ATM system.	ICAO Doc.9854
Aeronautical Information Service	A service established within the defined area of coverage responsible for the provision of aeronautical information/data necessary for the safety, regularity and efficiency of air navigation.	ICAO, ANNEX15
Aircraft Identification	A group of letters, figures or a combination thereof which is either identical to, or the coded equivalent of, the aircraft call sign to be used in air-ground communications, and which is used to identify the aircraft in ground-ground or air traffic services communications. Note. The aircraft identification is also referred to as flight identification.	ICAO Doc.9924
Airspace Management	Means a planning function with the primary objective of maximising the utilisation of available airspace by dynamic time-sharing and, at times, the segregation of airspace among	Regulation (EC) No 549/2004

Term	Definition	Source of the definition
	various categories of airspace users on the basis of short-term needs;	
Airspace Reservation	Means a defined volume of airspace temporarily reserved for exclusive or specific use by categories of users;	Regulation (EC) No 2150/2005
Airspace Restriction	means 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');	Regulation (EC) No 2150/2005
Airspace Structure	means a specific volume of airspace designed to ensure the safe and optimal operation of aircraft;	Regulation (EC) No 2150/2005
Air Traffic	All aircraft in flight or operating on the manoeuvring area of an aerodrome (ICAO)	ICAO Doc.4444
Air Traffic Service airspace	Airspaces of defined dimensions, alphabetically designated, within which specific types of flights may operate and for which air traffic services and rules of operation are specified	ICAO Doc.4444
Air Traffic Service Reporting Office	A unit established for the purpose of receiving reports concerning air traffic services and flight plans submitted before departure.	ICAO Doc.4444
Air Traffic Management	means the aggregation of the airborne and ground-based functions (air traffic services,	Regulation (EC) No 549/2004

Term	Definition	Source of the definition
	airspace management and air traffic flow management) required to ensure the safe and efficient movement of aircraft during all phases of operations;	
Air Traffic Service	A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).	ICAO Doc.4444
Air Traffic Services Unit	means a generic term meaning variously, air traffic control unit, flight information centre, aerodrome flight information service unit or air traffic services reporting office	ICAO Doc.4444
Appropriate ATS authority	The authority designated by State responsible for providing air traffic services in the airspace over the territories of States, over the high seas, or over territories of undetermined sovereignty. ATS authorities belong to the same or different States.	ICAO Doc.4444
ASM Solution	An ASM solution is a formalized request for conflict-free re-allocation in space and/or time of the elements of airspace structure initiated by ASM actor in order to optimize an airspace configuration that ensures conflict-free operations and meets the performance expectations and objectives of the operational stakeholders. The ASM solution contains proposals for reconfiguring/locating and/or activating dynamic elements of airspace structure within flexible thresholds provided by operational	OSED PJ07-40-W2

Term	Definition	Source of the definition
	stakeholders and triggers CDM process between ATM actors concerned.	
ATM system	A system that provides ATM through the collaborative integration of humans, information, technology, facilities and services, supported by air and ground- and/or space-based communications, navigation and surveillance	ICAO Doc.9854
Civil-Military coordination	Means the interaction between civil and military authorities and components of ATM referred to in Article 3(1) necessary to ensure safe, efficient and harmonious use of the airspace	Commission Implementing Regulation (EU) 2019/123
Controlled airspace	An airspace of defined dimensions within which air traffic control service is provided in accordance with airspace classification Note-Controlled airspace is a generic term that covers ATS airspace classes A,B,C,D and E	ICAO Doc.4444
Controlling Military Unit	Any fixed or mobile military unit handling military air traffic and/or pursuing other activities, which owing to their specific nature, may require an airspace reservation or restriction.	Regulation (EC) No 2150/2005
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	SESAR 2020 Concept Of Operations Edition 2017

Term	Definition	Source of the definition
	<p>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.</p> <p>There are two types of DMA that have been identified for Step 2:</p> <p>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).</p> <p>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.</p>	
Early flight intent	<p>Early flight intents are a set of data provided by an Airspace User to express its intentions to use the airspace. This set of data includes a first level of trajectory description.</p>	MT detailed concept
Flight Intent	<p>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.</p>	ICAO Doc.9854
Formation Flight	<p>A flight consisting of more than one aircraft which, by prior arrangement between the pilots, operates as a single aircraft with</p>	EUROCONTROL Specifications for harmonised Rules for Operational Air Traffic

Term	Definition	Source of the definition
	regard to navigation and position reporting, as well as clearances issued by ATC.	(OAT) under Instrument Flight Rules (IFR) inside controlled airspace of the ECAC Area (EUROAT)
Flight Plan	Specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft (ICAO Doc 4444).	ICAO Doc 4444
General Air Traffic (GAT)	All movements of civil aircraft, as well as all movements of State aircraft (including military, customs and police aircraft) when these movements are carried out in conformity with the procedures of the ICAO; (REGULATION (EC) No 549/2004)	Regulation (EC) No 549/2004
Improved OAT Flight Plan (iOAT FPL)	The iOAT FPL is a structured formalised flight plan based on the ICAO model flight plan form that aggregates information on military IFR flights and is shared with all pertinent ATM and relevant non-ATM actors in a harmonised format.	EUROCONTROL Guidelines for a harmonised and improved OAT FPL (New)
Military activity/exercise	A military tactical event requiring multi-agency (i.e. civil - military coordination) and/or cross border coordination which potentially requires temporary ASM measures that has an impact at network level.	Mission Trajectory Detailed Concept
Military tactical control	Actions of a qualified (military) controller in his / her area of responsibility (e.g. ARES, QRA), who guides the military aircraft towards the point (time or space) where the pilots take responsibility for the mission and / or continue to monitor the position of the military aircraft	EUROCONTROL Guidelines for a harmonised and improved OAT FPL (New)
Network Manager NM	means the body entrusted with the tasks necessary for the execution of the functions referred to in Article 6 of Regulation (EC) No 551/2004;	Commission Implementing Regulation (EU) 2019/123

Term	Definition	Source of the definition
Non-ATM actor	A person, organisation or technical system authorised to interact with ATM system to obtain information about IFR flight through FPL and use it for further monitoring and control.	EUROCONTROL Guidelines for a harmonised and improved OAT FPL (New)
Non-standard Formation	A formation that is operating outside the limits of a standard military formation. A non-standard formation requires ATC approval	EUROCONTROL Specifications for harmonised Rules for Operational Air Traffic (OAT) under Instrument Flight Rules (IFR) inside controlled airspace of the ECAC Area (EUROAT)
Operational Air Traffic (OAT)	All flights, which do not comply with the provisions stated for GAT and for which rules and procedures have been specified by appropriate national authorities. OAT can include civil flights such as test-flights, which require some deviation from ICAO rules to satisfy their operational requirements.	EUROCONTROL Specifications for harmonised Rules for Operational Air Traffic (OAT) under Instrument Flight Rules (IFR) inside controlled airspace of the ECAC Area (EUROAT)
Operational stakeholders	Means the civil and military airspace user's civil and military air navigation service providers and airport operators, which operate in the airspace of ICAO EUR region where Member States are responsible for the provision of air traffic services.	Commission Implementing Regulation (EU) 2019/123
Standard Military Formation	A formation of aircraft flying under IFR in which each wingman aircraft will stay within 1 NM horizontally and 100 ft vertically of the lead aircraft.	EUROCONTROL Specifications for harmonised Rules for Operational Air Traffic (OAT) under Instrument Flight Rules (IFR) inside controlled airspace of the ECAC Area (EUROAT)
Target Time Over (TTO)	TTO is a planning ATM constraint relevant to a computed time over a	PJ.07-W2-40 SPR-INTEROP/OSED

Term	Definition	Source of the definition
	<p>point along the MT profile or over the entry/exit point of ARES. It adjusts and/or fixates the planned ETO that specific point in order to respond to ATC sector capacity optimization needs. It results from a CDM process between sub-regional/local DAC and WOC functions, in the short-term ATM planning phase [D-1 to D], on the iSMT integrated into the traffic demand (distributed by NM via the iOAT FPL).</p> <p>A TTO consists of a nominal value and tolerance window around the nominal value. TTO tolerance window is based on accuracy and precision of the calculated trajectory and supports tactical adjustments of MT in the execution phase. When TTO is assigned to an ARES entry/exit point, it enables a time buffer (could be defined based on national rules and procedures) to be used tactically for ARES pre-activation/de-activation allowing ATC to ensure de-confliction with any non-participating traffic.</p>	
<p>Wing Operations Centre (WOC)</p>	<p>The Wing Operations Centre is a generic term, which designates the operational processes and services directly related to the military airspace users and linked to Mission Trajectories and other aerial activities. The definition avoids detailing the diverse organisational structures existing in Europe; therefore, it is considered to be a function</p>	<p>Mission Trajectory Detailed Concept</p>

Table 1: Glossary

2.7 Acronyms and Terminology

Term	Definition
A/C	Aircraft
ACC	Area Control Centre or Area Control
ADR	Aeronautical Data Repository
AFUA	Advanced Flexible Use of Airspace
AIM	Aeronautical Information Management
AIP	Aeronautical Information Provider
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information System
AIXM	Aeronautical Information Exchange Model
AM	Airspace Manger
AMC	Airspace Management Cell
ANS	Air Navigation Service
ANSP	Air Navigation Service Provider
AO	Aircraft Operator
AOC	Aircraft Operations Centre
AOI	Area of Interest
AOR	Area of Responsibility
APP	Approach
ARES	Airspace Reservation
ARO	Air Traffic Services Reporting Office
ASHTAM	NOTAM relating to volcanic and/or dust activity
ASM	Airspace Management
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATCU	Air Traffic Control Unit

Term	Definition
ATFCM	Air Traffic Flow and Capacity Management
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATS	Air Traffic Services
ATSU	Air Traffic Services Unit
AU	Airspace User
AUP	Airspace Use Plan
B2B	Business-to-Business
BT	Business Trajectory
CACD	Central Airspace and Capacity Database
CADF	Centralised Airspace Data Function (ECAC)
CAP	Capacity
CASA	Computer Assisted Slot Allocation System
CAT	Category
CBA	Cost Benefit Analysis
CBA	Cross-Border Area
CC	Capability Configuration
CDM	Collaborative Decision Making
CFMU	Central Flow Management Unit
CHMI	Collaboration Human Machine Interface
CMC	Civil-Military Coordination
CNS	Communication Navigation and Surveillance
COM	Aeronautical telecommunication service
CONOPS	Concept of Operations
CPDLC	Controller-Pilot Data Link Communications

Term	Definition
CPR	Correlated Position Report
CR	Change Request
CRC	Control & Reporting Centre
CTA	Control Area
CTP	Combat Training Program
CWP	Controller Working Position
DAC	Dynamic Airspace Configuration
DCB	Demand Capacity Balancing
dDCB	Dynamic Demand and Capacity Balancing
DDR	Demand Data Repository
DMA	Dynamic Mobile Area
EAD	European AIS Database
eAMI	electronic Aeronautical Management Information
EATMA	European ATM Architecture
EATMS	European Air Traffic Management System
EAUP	European Airspace Use Plan
EC	Executive Controller (also referred to as Radar Controller)
ECAC	European Civil Aviation Conference
EET	Estimated Elapsed Time
EFI	Early Flight Intent
eFPL	Extended Flight Plan
EMP	Electromagnetic Pulse
EOBT	Estimated Off Block time
E-OCVM	European Operational Concept Validation Methodology
EPP	Extended Projected Profile

Term	Definition
ER ACC/APP	En-route Area Control Centre/Approach
ERNIP	En-Route Network Improvement Plan
ETFMS	Enhanced Tactical Flow Management System
EUUP	European Updated Use Plan
FAB	Functional Airspace Block
FD	Flight Deck
FDP	Flight Data Processing
FDPS	Flight Data Processing System
FL	Flight Level
FF-ICE	Flight and Flow Information for a Collaborative Environment
FMP	Flow Management Position
FMS	Flight Management System
FOC	Flight Operations Centre
FPL	Flight Plan
GAT	General Air Traffic
HLAPB	High-Level National / Sub-regional Airspace Policy Body
HPAR	Human Performance Assessment Report
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ID	Identification
IER	Information Exchange Requirement
IFPS	Integrated Initial Flight Plan Processing System
IFPZ	IFPS Zone
iMT	Initial Mission Trajectory
INTEROP	Interoperability Requirements

Term	Definition
iOAT FPL	Improved Operational Air Traffic Flight Plan
IOP	Interoperability Protocol
iRMT	Initial Reference Mission Trajectory
iSMT	Initial Shared Mission Trajectory
ISRM	Information Services Reference Model
KPA	Key Performance Area
KPI	Key Performance Indicator
LTCM	Local Traffic Complexity Management
MDT	Mission Development Trajectory
MEPS	Military Engagement Plan for SESAR
MET, METEO	Meteo, Meteorological
MILO	Military Liaison Officer
MOE	Military Operational Environment
N/A	Not Applicable
NM	Network Manager
NMF	Network Management Function
NMOC	Network Manager Operations Centre
NOP	Network Operations Plan
NOTAM	Notice to Airman
NOV	NAF Operational View
NSOV	NAF Service Oriented View
NSV	NAF System View
OAUO	Optimized Airspace User Operations
OAT	Operational Air Traffic
OATTS	Operational Air Traffic Transit Service

Term	Definition
OE	Operational Environment
OI	Operational Improvement
OSED	Operational Service and Environment Definition
PAR	Performance Assessment Report
PENS	Pan-European Network Service
PI	Performance Indicator
PRD	Predictability
PRR	Performance Review Report
PRU	Performance Review Unit
QRA	Quick Reaction Alert
RAD	Route Availability Document
RBT	Reference Business Trajectory
REQ	Requirement
RTSA	Real Time Status of ARES
SAC	Safety Criteria
SAR	Safety Assessment Report
SAR	Search and Rescue
SBT	Shared Business Trajectory
SDD	Service Description Document
SecAR	Security Assessment Report
SESAR	Single European Sky ATM Research Programme
SID	Standard Instrument Departure
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SPR	Safety and Performance Requirements
STAM	Short-Term ATFCM Measures

Term	Definition
STAR	Standard Instrument Arrival
SWIM	System Wide Information Management
TAD	Technical Architecture Description
TAFMO	Tactical Flow Management Operations
TM	Trajectory Management
TMA	Terminal Manoeuvre Area
TRA	Training Area
TRL	Technology Readiness Level
TS	Technical Specification
TSA	Temporary Segregated Airspace
TTA	Target Time of Arrival
TTO	Target Time Over
UC	Use Case
UDPP	User Driven Prioritization Process
UUP	Updated Use Plan
VALP	Validation Plan
VALR	Validation Report
VALS	Validation Strategy
VP	Validation Plan
VPA	Variable Profile Area
VR	Validation Report
VS	Validation Strategy
WOC	Wing Operations Centre
WP	Way Point
WP	Work Package

Term	Definition
XML	Extended Markup Language

Table 2: Acronyms and terminology

3 SESAR Solution Impacts on Architecture

3.1 Target Solution Architecture

3.1.1 SESAR Solution(s) Overview

This document represents the Technical Specification (TS/IRS), describing the requirements related to the implementation of the PJ.07-W2-40 “Initial 4D Mission Trajectory development with integrated Dynamic Mobile Areas (DMA) type 1 and type 2 supported by automation and dynamic civil-military CDM” prototypes inside the Project PJ07 W2 “Optimised airspace users operations”.

Solution PJ.07-W2-40 has been set up to further address and integrate the outstanding Research and Development (R&D) Needs related to MT driven processes and DMA type 1 and type 2 of SESAR 2020 wave1. MT management needs were validated partially V3 in PJ07-03 “Mission Trajectory Driven Processes”, while DMA type 1 and 2 management in DAC was validated V2 in PJ08.01 “Management of Dynamic Airspace Configurations”.

The objective of the R&D activity is to improve the use of airspace capacity for both civil and military users and the efficiency of airspace management by introducing more automation and increased flexibility in the civil-military coordination. This will deliver improvements to the planning phase of the mission trajectory, including the connection of MT management with the booking of ARES (in the context of this solution DMA type 1 and type 2), for which the WOC will be the key actor. The coordination between WOC and national/local ASM and ATFCM actors is a key element for this R&D activity.

The following table introduces the list of Enablers associated to the Operational Improvements addressed by the PJ.07-W2-40 SESAR solution.

OI Steps ID	Functional Blocks/Role impacted by the SESAR Solution (from EATMA)	Enabler ID	Enabler Title	Enabler Coverage
AUO-0210 Participation in CDM through iSMT and Target Time (TTO) negotiation	Flight planning	AOC-ATM-14	Upgrade of WOC system to handle improved OAT flight plans	<ul style="list-style-type: none"> • Use
	Information and Communication Management (WOC)			
	Information and Communication Management (ASM)	AOC-ATM-20	Sharing of trajectory data between AOC/WOC and the ATM world using B2B web services	<ul style="list-style-type: none"> • Use
	Cooperative ASM (local)	MIL-0105	CDM data integrated into the Wing Operations Centre Mission Support System	<ul style="list-style-type: none"> • Develop
		MIL-0106	Wing Operations Centre Mission Support System enhanced to support the CDM process	<ul style="list-style-type: none"> • Develop • Develop
		PRO-076	Procedures for the iSMT in the CDM process	
AOM-0304-B Integrated management of Mission Trajectory in trajectory-based operations environment	Flight planning	AAMS-16a	Airspace management functions equipped with tools able to deal with free-routing	<ul style="list-style-type: none"> • Use
	Information and Communication Management (WOC)			
	Information and Communication Management (ASM)	AAMS-16b	Airspace management system equipped with tools able to deal with flexible use of airspace	<ul style="list-style-type: none"> • Use
	Cooperative ASM (local)	MIL-0108	Exchange of specific MT data (ARES description) in standard format	<ul style="list-style-type: none"> • Develop
AOM-0208-B Dynamic Mobile Areas (DMA) of types 1 and 2	Information and Communication Management (ASM)	AAMS-16a	Airspace management functions equipped with tools able to deal with free-routing	<ul style="list-style-type: none"> • Use
	Cooperative ASM (local)			

OI Steps ID	Functional Blocks/Role impacted by the SESAR Solution (from EATMA)	Enabler ID	Enabler Title	Enabler Coverage
		MIL-AOC-ATM-0108a	Integration of DMA type 1 and 2 into the development of MT	<ul style="list-style-type: none"> Develop
AUO-0216	Flight planning Shared Mission Information and Trajectory Data Information and Communication Management (WOC) Information and Communication Management (ASM) Cooperative ASM (local)	MIL-AOC-ATM-0108b	WOC mission support system enhanced to enable converting DMA type 1 and 2 data into the standard format	<ul style="list-style-type: none"> Develop

Table 3: SESAR Solution PJ.07-W2-40 Scope and related Functional Blocks/roles & Enablers

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

None.

3.1.1.2 Relevant Use Cases

Operational Use Cases are developed in [4] PJ07-W2 - D4.1.004: SESAR Solution PJ07-W2-40 final SPR-INTEROP/OSED for V3 (01.00.01). Table 4 below refers to the finalized use cases.

Operational Use Case	Description	Covering MEGA models	NSV4
UC WOC-01	Define and share Early Flight Intent (EFI) with DMA type 1 and 2	[NOV-5] Develop early flight intent for MT with DMA Type 1 and 2 (D-7-D-1)	[NSV-4] Develop early flight intent for iMT with DMA type 1 and 2
UC ASM-02	Collect and analyse EFI with DMA type 1 and 2		
UC ASM-03	De-conflict EFI with DMA type 1 and 2		
UC WOC-04	Analyse and Update EFI with DMA type 1 and 2		
UC WOC-05	Analyse and refine DMA type 1 and 2 versus ATC volumes	[NOV-5] Allocate ARES DMA Type 1 and 2 (D-1 – D-Ops)	[NSV-4] Mission Trajectory Management with DMA type 1 and 2
UC ASM-06	CDM for allocation of DMA type 1 and 2		
UC ASM-07	Integration of the allocated DMA type 1 and 2 into DAC and publication		
UC-WOC-08	Share iSMT with DMA type 1 and 2	[NOV-5] Sharing Mission Trajectory iSMT	

UC-ATFCM-09	Local impact assessment of iSMT with DMA type 1 and 2 and local ATFCM solutions (TTO proposal)	[NOV-5] iSMT Management with planning ATM constraint (TTO) (D-1-H-ops)	[NSV-4] Trajectory Management with planning ATM constraints (TTO)
UC ASM-10	CDM on local ATFCM solutions (TTO proposal) to iSMT with DMA type 1 and 2		
UC-ASM-10a	TTO over point along iSMT profile		
UC-ASM-10b	TTO over entry/exit point of ARES DMA type 1 and 2		
UC-WOC-11	Revise Update iSMT with local ATFCM solution		

Table 4 PJ.07-W2-40 Operational Use Cases

The **Error! Reference source not found.** below summarizes the MEGA operational models covering the scope of the solution PJ.07-W2-40.

NOV5 diagram	Description
Develop early flight intent for iMT with DMA type 1 and 2	This section describes the operating methodology of the iMT development and operational activities provided by the pertinent nodes in medium-short term planning phase. The iMT development includes the definition of the 4D trajectory and definition of the ARES when dictated by the mission objectives. The focus is on the definition of ARES based on DMA type 1 and 2 design principle for a specific mission type requiring airspace reservation along the trajectory profile at the predefined geographic location in accordance with mission specific objectives. The need for airspace reservation is usually defined by the military AU seven days prior the day of operations. DMA type 1 and 2 definition starts simultaneously with Trajectory definition in accordance with actual mission requirements for the day of operations.
Allocate DMA type 1 and 2 (D-1 ≥ t ≥ D-Ops)	This section describes the operating method relevant to CDM on ARES (DMA type 1 and 2) allocation and involves pertinent nodes performing operational activities. The ARES (DMA type 1 and 2) allocation is based on historical data and collaborative planning results as well as collaboration between respective nodes to ensure optimal balance between civil and military demand and efficient airspace user operations with minimum impact on the ATM network performance. CDM on ARES (DMA type 1 and 2) allocation starts after analysis demand of other airspace users and latest updates regarding traffic flows and ATC sector configuration supported by the following operational activities conducted by the nodes.
Sharing Mission Trajectory iSMT (1 day to 1 hour before EOBT)	This operating method has been described in the scope of initial trajectory management in Nov-5 iSMT Management in Short Term in Wave 1 and therefore, indicates already validated process but it is necessary to demonstrated smooth transition from EFI development to the moment when WOC

NOV5 diagram	Description
	starts sharing mission related information in the form of iOAT FPL with all ATM actors concerned.
iSMT Management with planning ATM constraints (TTO) ($D-1 \leq t \leq H-Ops$)	<p>This section describes the operating method relevant to the application and management of the planning ATM constraint to iSMT with allocated ARES (DMA type 1 and 2) and involves pertinent nodes performing operational activities.</p> <p>The target time may apply to either allocated ARES (DMA type 1 and 2) or to the iSMT flight route when such trajectory is eligible to constraint management in the planning phase. Target time over entry/exit point of the selected DMA type ore over significant point along flight route may solve conflict and support optimisation of the local performance targets. The TTO may have minimum impact on the mission objectives while facilitating the accommodation of additional traffic within predefined ATC volume if proposed time value does not exceed the threshold of flexible parameters associated with allocated ARES (DMA type 1 and 2).</p>

Table 5 PJ.07-W2-40 Operational Models

3.1.1.3 Applicable standards and regulations

The following documents provide standards applicable but not require updates/changes:

- ICAO Doc 4444 ATM/501 (ATS message type 'FPL'), last version available.
- Eurocontrol IFPS Users Manual, last version available¹
- Eurocontrol IFPS and RPL Dictionary of Messages, last version available²
- EUROCONTROL Specification for Airspace Management (ASM) Support System Requirements supporting the ASM processes at local and FAB level
- ICAO Manual on system wide information management (SWIM) concept, Doc 10039 AN/511
- AIXM 5.1 - XML Schema (XSD)

At this stage of R&D activities there are regulations identified to be subject of updates. The current Commission regulation (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace covers the operating methods and procedures proposed by the solution.

¹ Ibid 1

² Ibid 1

3.1.2 Capability Configurations required for the SESAR Solution

Table 6 contains the technical architecture of solution PJ07-W2-40.

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.07-W2-40 'Mission Trajectories Management with integrated Dynamic Mobile Areas type 1 and type 2'	Sub-Regional/National ASM	En-route		Airspace Management Sub-Regional/National	Civil-Military Airspace Management Cell (civil side); Civil-Military Airspace Management Cell (military side); ANSP-MIL-AMC ANSP-CIV-AMC
	Sub-Regional/Local ATFCM	En-route	Collaborative Network Management; SWIM-based Information Dissemination; Trajectory Information Synchronisation;	Air Traffic Flow and Control Management Sub-Regional/Local	Civil ATS Approach Service Provider; Civil ATS En-Route Service Provider; ANSP-MIL-ER ANSP-CIV-ER
	State Operations Centre(AU WOC)	En-route		Airspace User Operations WOC	Military Wing Operations Centre;

Table 6: List of Capability Configuration required for the SESAR Solution

3.2 Changes imposed by the SESAR Solution on the baseline Architecture

Table 7 contains the changes imposed by the Solution PJ.07-W2-40 on the baseline Architecture:

Enabler	Element type	Element name	Impact	Change
MIL-0108 (CR)	Exchange of specific MT data (ARES description) in standard format			
	Function	Analyse and Update DMA type 1 and 2 Request	Introduce	
	Function	Create Early Flight Intent	Introduce	
	Function	Make counter-proposal on DMA Type 1 and 2 updates	Introduce	
	Function	Update DMA Type 1 and 2	Introduce	
MIL-AOC-ATM-0108a (CR)	Integration of DMA type 1 and 2 into the development of MT			
	Function	Analyse and Update DMA type 1 and 2 Request	Introduce	
	Function	Create Early Flight Intent	Introduce	
	Function	Make counter-proposal on DMA Type 1 and 2 updates	Introduce	
	Function	Update DMA Type 1 and 2	Introduce	
MIL-AOC-ATM-0108b (CR)	WOC mission support system enhanced to enable converting DMA type 1 and 2 data into the standard format			
	Function	Share ARES Data	Introduce	
MIL-0105 (CR)	CDM data integrated into the Wing Operations Centre Mission Support System			
	Function	Analyse TTO Proposal	Introduce	TTO is a new concept for the military flight plan
	Function	Receive TTO Proposal	Introduce	TTO is a new concept for the military flight plan
	Function	Reject TTO Proposal	Introduce	TTO is a new concept for the military flight plan
MIL-0106 (CR)	Wing Operations Centre Mission Support System enhanced to support the CDM process			

Enabler	Element type	Element name	Impact	Change
	Function	Update Flight Intent	Introduce	Update the flight intent taking into account TTO, which is a new concept for the military flight plan

Table 7: Changes imposed by the Solution PJ.07-W2-40 on the baseline Architecture

4 Technical Specifications

4.1 Functional architecture overview (general introduction for all solutions)

The approach adopted by the PJ07-W2-40 is to start from the existing SESAR Wave 1 material and together with the operational experts involved in operational concept development, to develop:

- The Resource Connectivity diagram (NSV-1) based on the Operational Interactions diagram (NOV-2),
- System Functionality Diagrams (NSV-4) based on Operational Process Models (NOV-5) developed by the PJ07-W2-40 SPR-INTEROP/OSED team.

4.1.1 Resource Connectivity view

The Resource Connectivity diagram is used to highlight the relationships between different elements of the System layer (Technical Systems, Capability Configurations). It is the baseline for the service definition.

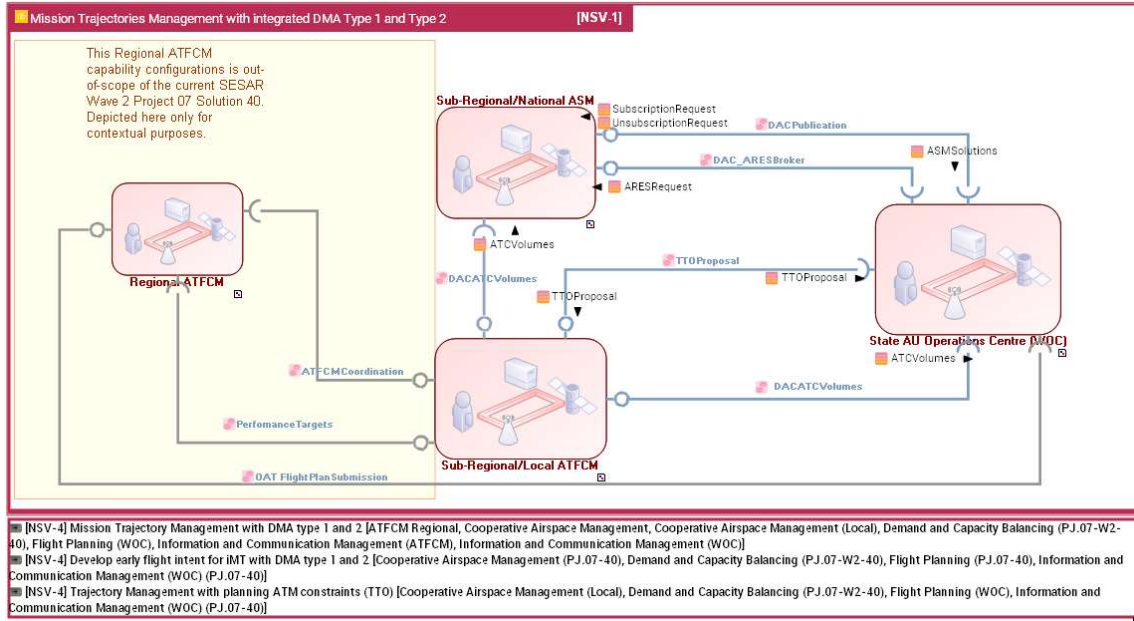


Figure 1: NSV-1 Mission Trajectories Management with integrated DMA Type 1 and Type 2

The Resource connectivity diagram highlights the fact that only the Sub-Regional/National ASM and Sub-Regional/Local ATFCM Capability Configurations are addressed by Solution PJ.07-W2-40. Regional Capability Configurations (Regional ASM/ATFCM) are out of the scope of this solution.

4.1.1.1 Resource Infrastructure view (of the NSV-2)

The Resource Infrastructure diagram is used to describe how the systems interact at infrastructure level.

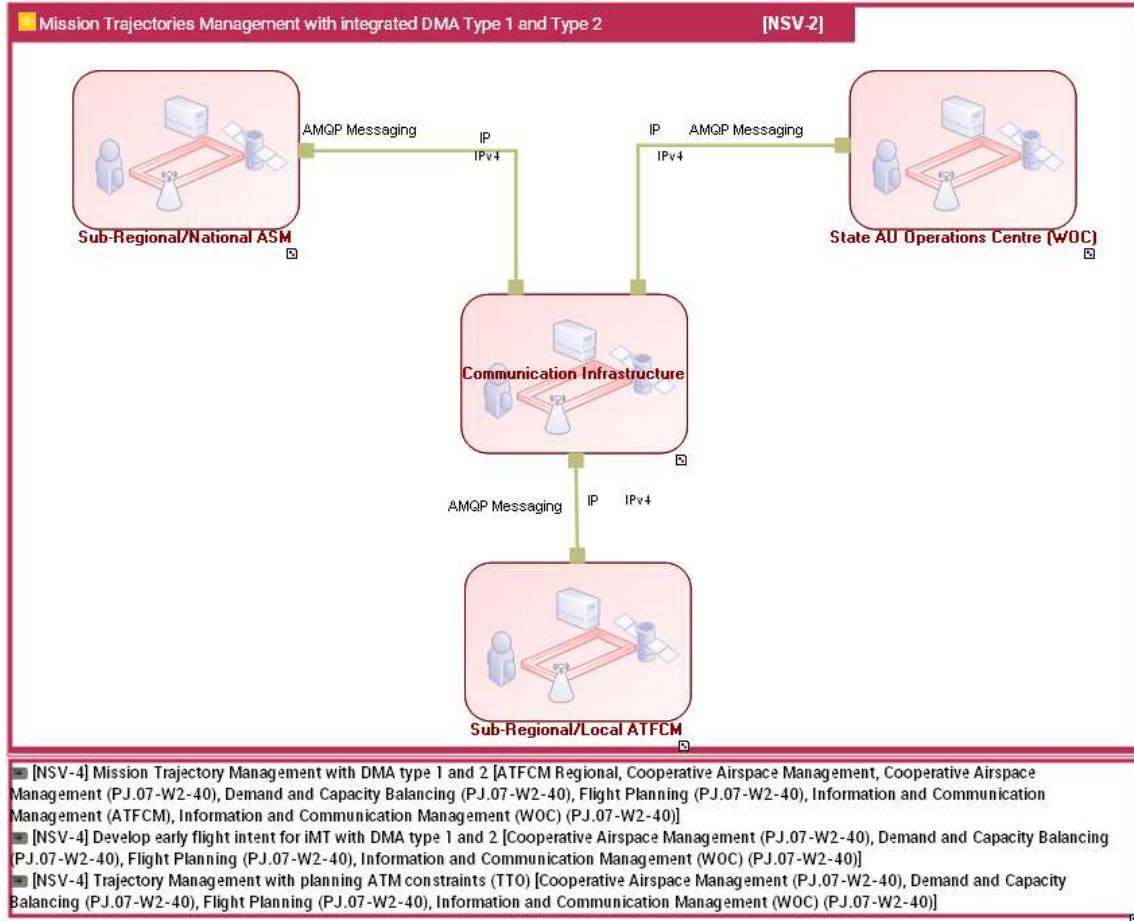


Figure 2: NSV-2 Mission Trajectories Management with integrated DMA Type 1 and Type 2

4.1.2 Resource Orchestration view (all NSV-4s linked to the NSV-1)

The chapters below show the three NSV-4 views developed in the scope of solution PJ.07-W2-40. Table 7 lists all the functions related to these NSV-4 diagrams.

Function	Description
Analyse and Update DMA type 1 and 2 Request	WOC analyses and updates DMA type 1 and 2 request according to the ASM Solution

Function	Description
Analyse DMAs from Early Flight Intent	DAC (ASM Sub-regional/National) evaluates the impact of ARES/DMAs request. ARES/DMAs requests and ATC volumes are visualized in the system, DAC (ASM Sub-regional/National) identifies the optimisation of the ARES/DMAs vs ATC Volumes.
Analyse TTO Proposal	WOC analyses the TTO Proposal with respect to the feasibility of the mission and the mission effectiveness
Assess ASM Solutions	WOC assesses the received ASM solutions with respect to mission feasibility and mission effectiveness.
Cherry pick iSMT/SBT eligible for TTO	With the flexibility provided by DMA type 1 and 2, TTO supports the alleviation of traffic demand on ATC sector load throughout the optimization of traffic demand to cope with the ATC planning capabilities and constraints. ATFCM will have the opportunity to cherry pick the mission trajectories for which TTO generates a reduction of ATC sector overload.
Collect and analyse flight schedules	WOC receives a weekly flight schedule and analyses objectives and operational requirements per mission in order to develop Early Flight Intent(s).
Collect and aggregate requests for DMA type 1 and 2	DAC (ATFCM Sub-regional/local) receives and processes Early Flight Intent EFI with DMA Type 1 and 2 in the formalised format.
Create ATC volumes	Based on the historical traffic flows DAC (ATFCM Sub-regional/local) defines ATC Volumes.
Create Early Flight Intent	Based on the intention to use a defined volume of airspace and on the analysis of ATC Volumes, WOC defines the DMA type 1 and 2 and creates the 'Early Flight Intent'.
Finalise the Early Flight Intent	WOC finalises development of the Early Flight Intent with updated DMA type 1 and 2
Generate Operational Flight Plan	From the created or updated Mission Trajectory WOC generates the Operational Flight Plan
Generate/Update Trajectory	After the finalisation or update of the Flight Intent WOC generates or updates the Mission Trajectory
Integrate in the DAC and publish DMA type 1 and 2 in the NOP	Sub-regional/Local ATFCM integrates the ASM Solution and publishes DMA type 1 and 2 in the NOP
Make counter-proposal on DMA Type 1 and 2 updates	In case that the ASM Solutions don't meet the WOC objectives, WOC makes a counter-proposal on DMA Type 1 and 2 updates

Function	Description
Manage ASM solutions	DAC (ASM Sub-regional/National) creates and sends the ASM Solution for DMA type 1 and 2 to WOC.
Provide Local Impact Assessment	DAC (Sub-regional/Local ATFCM) provides Local Impact Assessment with respect to a TTO proposal
Receive ASM Solutions	WOC receives the ASM Solutions from the DAC (ASM Sub-regional/National).
Receive ATC Volumes	WOC receives the ATC Volumes from the ATFCM Sub-regional/local.
Receive DMA Type 1 and 2 Update	DAC (ASM Sub-regional/National) receives the DMA Type 1 and 2 Update from the WOC.
Receive Early Flight Intent	DAC (ASM Sub-regional/National) receives the Early Flight Intent from the WOC.
Receive TTO Proposal	WOC receives the TTO Proposal from DAC (Sub-regional/Local ATFCM)
Receive TTO Proposal Rejection	DAC (Sub-regional/Local ATFCM) receives the rejection to a TTO Proposal from WOC
Refine/Update DMA type 1 and 2 Request	WOC refines/updates DMA type 1 and 2 with the latest mission planning updates.
Reception of the validated iSMT/iRMT	DAC (Sub-regional/Local ATFCM) receives the validated iSMT/iRMT from Regional ATFCM
Reject ASM Solutions	DAC (Sub-regional/Local ATFCM) receives the validated iSMT/iRMT from Regional ATFCM
Reject TTO Proposal	WOC rejects the TTO Proposal due to negative impact on the mission
Select missions requiring DMA type 1 and 2	From the flight schedules WOC selects those missions requiring the request of DMA type 1 or 2
Share ARES data	<p>WOC sends the Early Flight Intent to the ASM Sub-regional/National. EFI includes the following data:</p> <ul style="list-style-type: none"> - Aerodrome (Departure/Arrival) - ARES description/designator (for the intended Airspace to be used) - Time/Duration of the activity (including Date) - Aircraft Type - Mission Type - Priority Information <p>Number of Aircraft in the mission</p>

Function	Description
Share ASM Solutions	DAC (ASM Sub-regional/National) sends to WOC the ASM Solution for DMA type 1 and 2 in case of negative impact on civil traffic (local KPIs). ASM solution includes a new proposal of the DMA allocation/time/altitude.
Share ATC Volumes	DAC (ATFCM Sub-regional/local) sends ATC Volumes to WOC.
Share ATC volumes based on historical data on traffic flows and ATC sector load	DAC (ATFCM Sub-regional/local) sends ATC Volumes to WOC. Due to the long time in advance they are based historical data until traffic flows and sector loads are populated with real planned flight intents.
Share simulation results	Submits to WOC simulation results of the conflict-free configuration and updates DAC database for further updates of DMA Type 1 and 2.
Share TTO Proposal	DAC (Sub-regional/Local ATFCM) shares the TTO Proposal to the WOC
Simulate allocation of DMA type 1 and 2 conflict-free of ATC volumes	DAC (ATFCM Sub-regional/local) simulates the allocation of DMA type 1 and 2 conflict-free of ATC volumes
Update DMA Type 1 and 2	WOC updates the DMA Type 1 and 2 according to the received ASM Solutions.
Update Flight Intent	WOC updates the Flight Intents according to the received ASM Solutions.

Table 8: List of Function descriptions required for the SESAR Solution

Note: The WOC functions “Create Early Flight Intent” and “Refine/Update DMA type 1 and 2 Request” correspond to a single technical implementation and a single data exchange content and format. The technical function allows the WOC operator to send a request to use a segregated/restricted volume of airspace both when the request definition is in progress (Create Early Flight Intent) and when the request definition is mature (Refine/Update DMA type 1 and 2 Request). The functional split of the technical function has been added for clarity purposes with respect to the operational concept and activities defined in the SPR-INTEROP/OSED.

4.1.2.1 [NSV-4] Develop early flight intent for iMT with DMA type 1 and 2

The technical Use Case (UC) “Develop early flight intent for iMT with DMA type 1 and 2” (see figure below) depicts the concerted functional blocks and functions and its linking resource interactions to cover the technical process for the request and negotiation of the early flight intent (EFI). EFI is a set of DMAs with departure and destination aerodrome and therefore EFI request and DMA request have the same format.

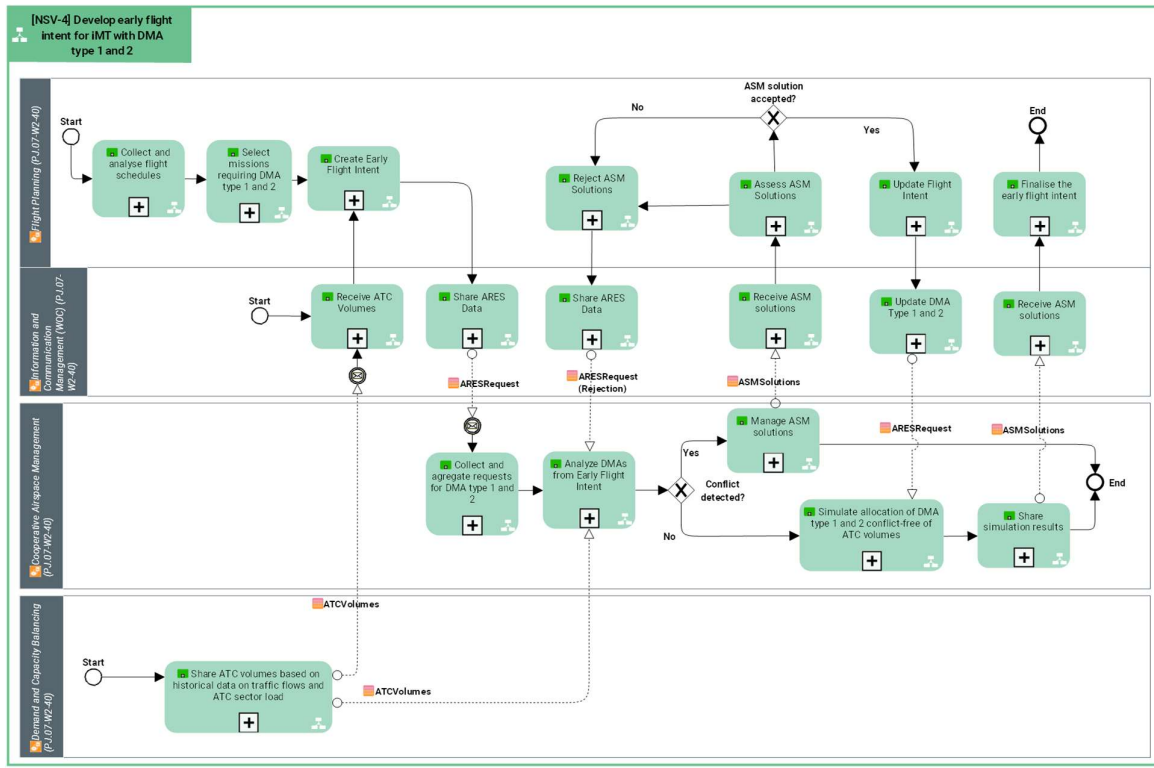


Figure 3: NSV-4 Develop early flight intent for iMT with DMA type 1 and 2

The table here below lists, for each Role, the related functional block and functions developed in order to cover the technical process “Develop early flight intent for iMT with DMA type 1 and 2”. The description of each function is provided in Table 8: List of Function descriptions required for the SESAR Solution.

Role	Functional Block	Function	Capability Configuration
National Airspace Manager	Cooperative Airspace Management (PJ.07-W2-40)	Analyse DMAs from Early Flight Intent; Collect and aggregate requests for DMA type 1 and 2; Manage ASM solutions; Share simulation results; Simulate allocation of DMA type 1 and 2 conflict-free of ATC volumes;	State AU Operations Centre(WOC)
Local Flow Manager	Demand and Capacity Balancing (PJ.07-W2-40)	Share ATC volumes based on historical data on traffic flows	Sub-Regional/Local ATFCM

Role	Functional Block	Function	Capability Configuration
		and ATC sector load;	
Mission Planner	Flight Planning (PJ.07-W2-40)	Assess ASM Solutions; Collect and analyse flight schedules; Create Early Flight Intent; Finalise the early flight intent; Reject ASM Solutions; Select missions requiring DMA type 1 and 2; Update Flight Intent;	State AU Operations Centre(WOC)
Mission Planner	Information and Communication Management (WOC) (PJ.07-W2-40)	Receive ASM solutions; Receive ASM solutions; Receive ATC Volumes; Share ARES Data; Share ARES Data; Update DMA Type 1 and 2;	State AU Operations Centre(WOC)

Table 9 : Roles and related Functional blocks and functions in Develop early flight intent process

4.1.2.2 [NSV-4] Mission Trajectory Management with DMA type 1 and 2

The technical Use Case (UC) "Mission Trajectory Management with DMA type 1 and 2" (see figure below) depicts the concerted functional blocks and functions and its linking resource interactions to cover the technical process for the request, negotiation and allocation of the ARES (DMA type 1 and 2) and the generation of the iOAT FPL.

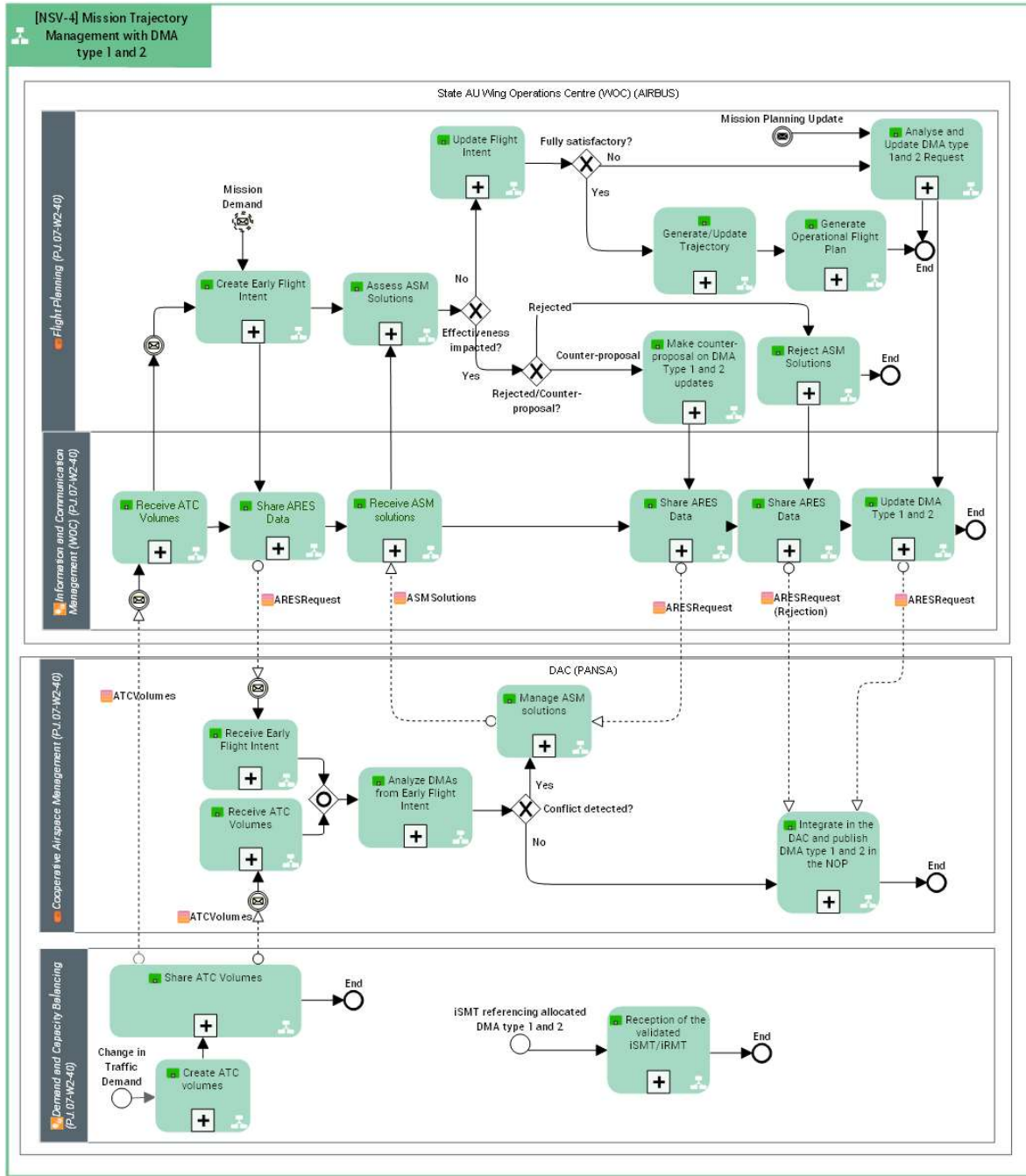


Figure 4: NSV-4 Mission Trajectory Management with DMA type 1 and 2

The table here below lists, for each Role, the related functional block and functions developed in order to cover the technical process “Mission Trajectory Management with DMA type 1 and 2”. The description of each function is provided in Table 8: List of Function descriptions required for the SESAR Solution.

Role	Functional Block	Function	Capability Configuration
National Airspace Manager	Cooperative Airspace Management (PJ.07-W2-40)	Analyse DMAs from Early Flight Intent; Integrate in the DAC and publish DMA type 1 and 2 in the NOP; Manage ASM solutions; Receive ATC Volumes; Receive Early Flight Intent;	State AU Operations Centre(WOC)
Local Flow Manager	Demand and Capacity Balancing (PJ.07-W2-40)	Create ATC volumes; Reception of the validated iSMT/iRMT; Share ATC Volumes;	Sub-Regional/Local ATFCM
Mission Planner	Flight Planning (PJ.07-W2-40)	Analyse and Update DMA type 1 and 2 Request; Assess ASM Solutions; Create Early Flight Intent; Generate Operational Flight Plan; Generate/Update Trajectory; Make counter-proposal on DMA Type 1 and 2 updates; Reject ASM Solutions; Update Flight Intent;	State AU Operations Centre(WOC)
Mission Planner	Information and Communication Management (WOC) (PJ.07-W2-40)	Receive ASM solutions; Receive ATC Volumes; Share ARES Data; Share ARES Data; Share ARES Data; Update DMA Type 1 and 2;	State AU Operations Centre(WOC)

Table 10: Roles and related Functional blocks and functions in Mission trajectory management with DMA type 1 and 2 process

4.1.2.3 [NSV-4] Trajectory Management with planning ATM constraints (TTO)

The technical Use Case (UC) "Trajectory Management with planning ATM constraints (TTO)" (see figure below) depicts the concerted functional blocks and functions and its linking resource interactions to cover the technical process relevant to the application and management of the planning ATM constraint to ISMT with allocated ARES (DMA type 1 and 2).

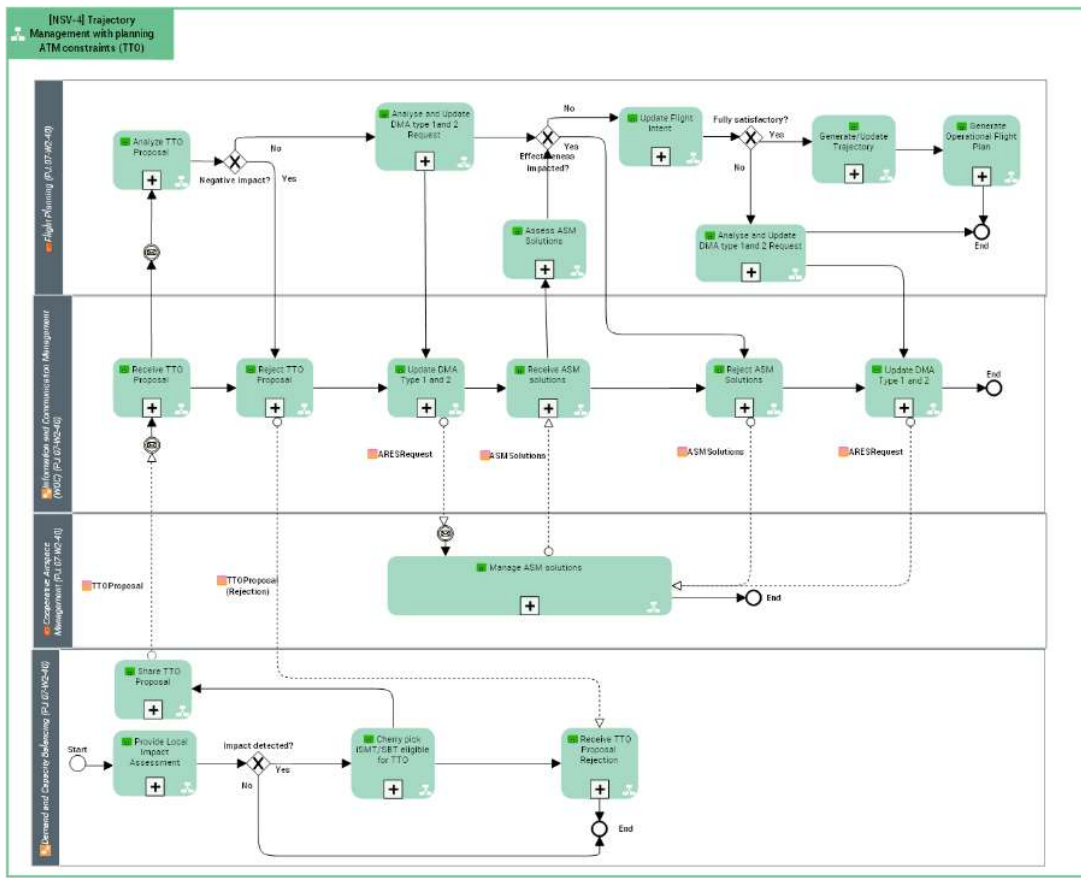


Figure 5 : NSV-4 Trajectory Management with planning ATM constraints (TTO)

The table here below lists, for each Role, the related functional block and functions developed in order to cover the technical process "Trajectory Management with planning ATM constraints (TTO)". The description of each function is provided in Table 8: List of Function descriptions required for the SESAR Solution.

Role	Functional Block	Function	Capability Configuration
National Airspace Manager	Cooperative Airspace Management (PJ.07-W2-40)	Manage ASM solutions;	State AU Operations Centre(WOC)
Local Flow Manager	Demand and Capacity Balancing (PJ.07-W2-40)	Cherry pick iSMT/SBT eligible for TTO; Provide Local Impact Assessment; Receive TTO Proposal Rejection; Share TTO Proposal;	Sub-Regional/Local ATFCM
Mission Planner	Flight Planning (PJ.07-W2-40)	Analyse and Update DMA type 1 and 2 Request; Analyse and Update DMA type 1 and 2 Request; Analyse TTO Proposal; Assess ASM Solutions; Generate Operational Flight Plan; Generate/Update Trajectory; Update Flight Intent;	State AU Operations Centre(WOC)
Mission Planner	Information and Communication Management (WOC) (PJ.07-W2-40)	Receive ASM solutions; Receive TTO Proposal; Reject ASM Solutions; Reject TTO Proposal; Update DMA Type 1 and 2; Update DMA Type 1 and 2;	State AU Operations Centre(WOC)

Table 11: Roles and related Functional blocks and functions in Trajectory Management with planning ATM constraints (TTO) process

4.1.3 Resource Composition

4.1.3.1 ASM (PJ.07-W2-40)

Implements the airspace design and management functions.

4.1.3.1.1 Composition

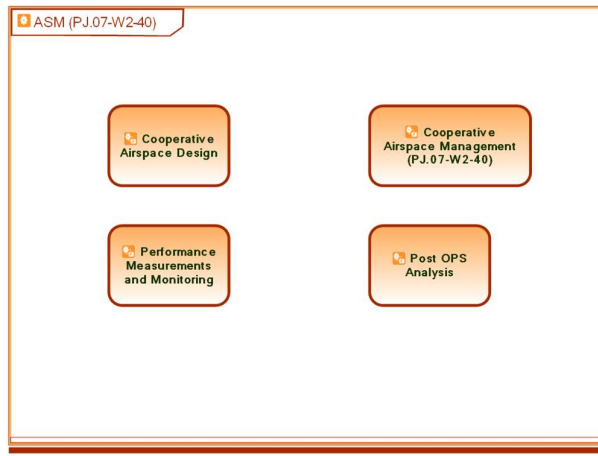


Figure 6 ASM composition

4.1.3.1.2 System Interfaces Diagram

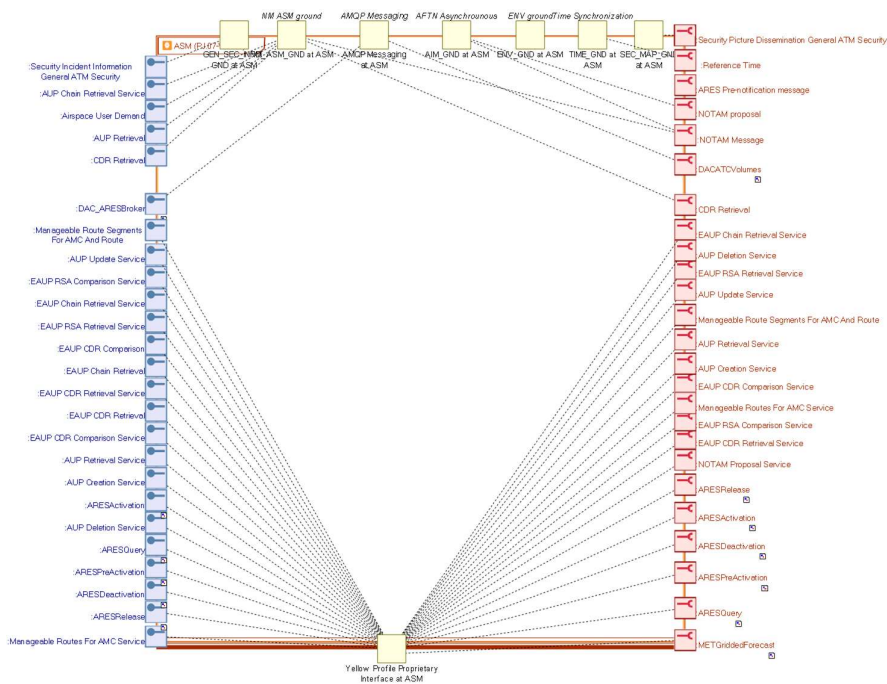


Figure 7 : ASM System Interface Diagram

4.1.3.2 ATFCM (PJ.07-W2-40)

Supports the regional, sub-regional and local Air Traffic Flow and Capacity Management functions.

4.1.3.2.1 Composition

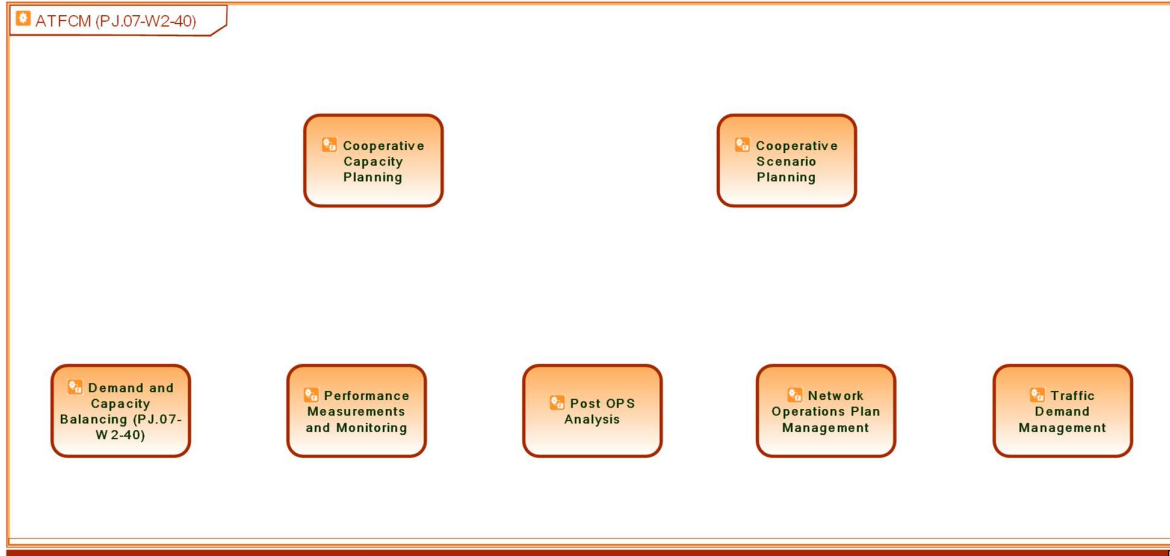


Figure 8 ATFCM composition

4.1.3.2.2 System Interfaces Diagram

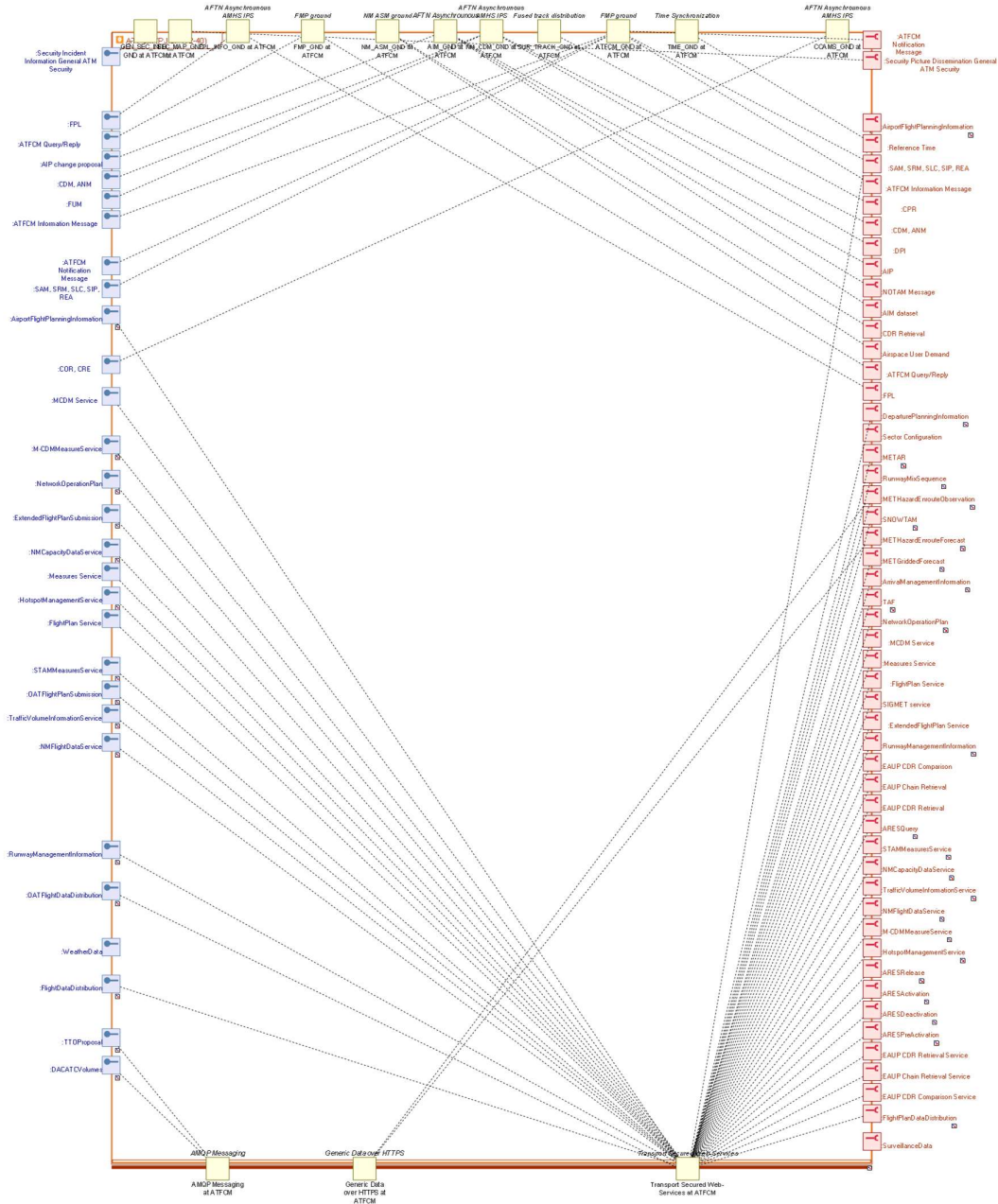


Figure 9 : ATFCM System Interface Diagram

4.1.3.3 State AU Wing Operations Centre (WOC) (PJ.07-W2-40)

Supports State Airspace Users (this term includes Military Airspace Users, Border Police Airspace Users, etc. and Military Aircraft Operators), which are performing all kind of manned or unmanned flight operations, in the management of their operations.

The WOC system supports State Airspace Users also in the management of ICAO compliant flight operations when they operate state aircraft using civil air traffic rules.

4.1.3.3.1 Composition

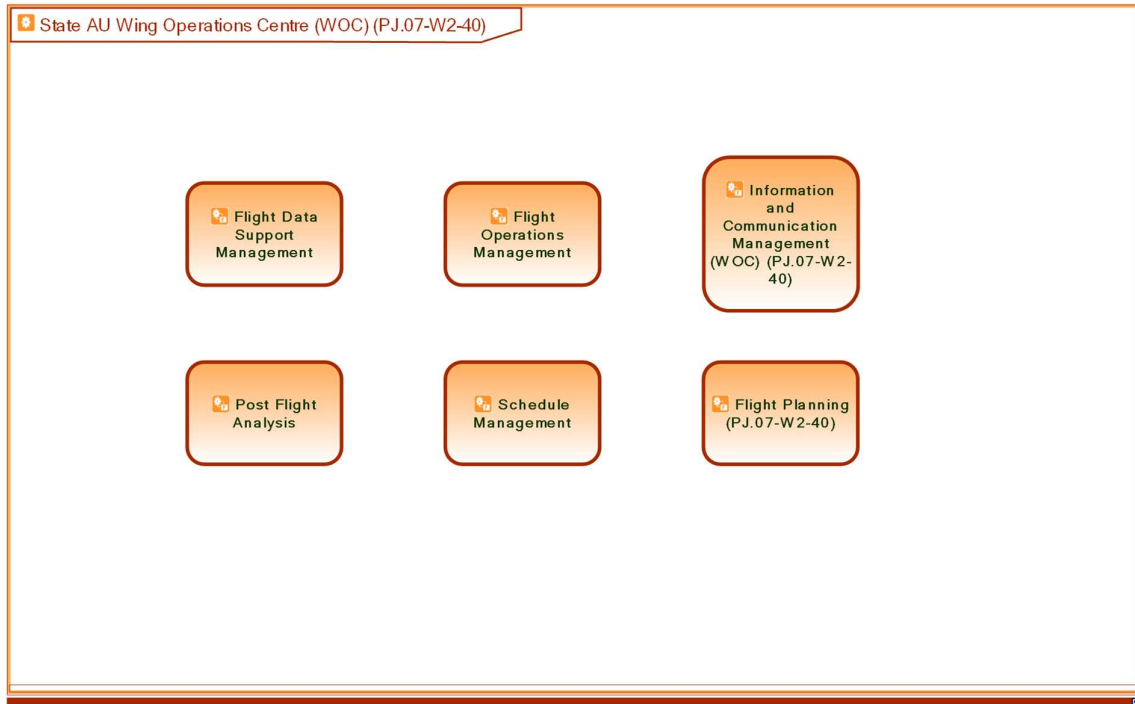


Figure 10 State AU Wing Operations Centre composition

4.1.3.3.2 System Interfaces Diagram

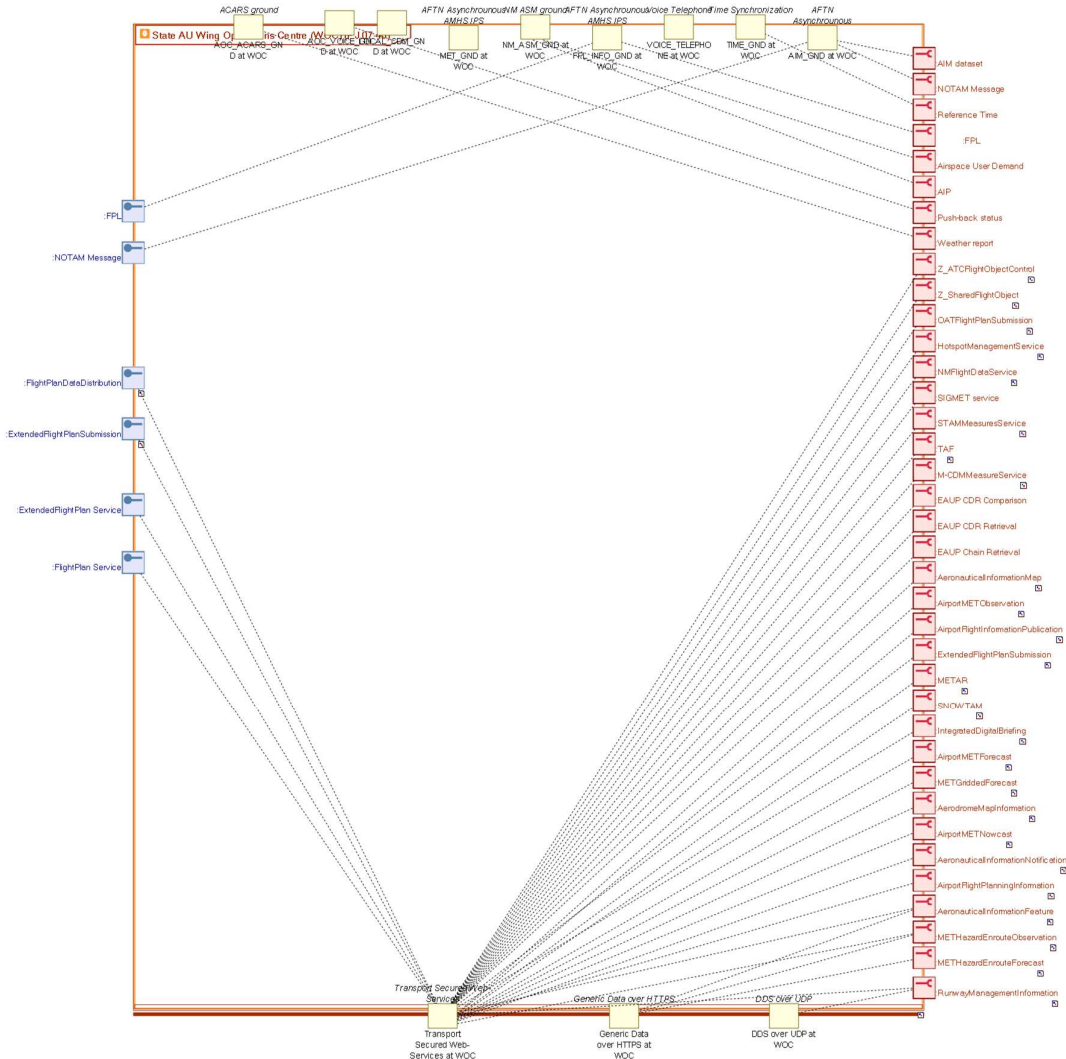


Figure 11 : State AU Wing Operations Centre System Interface Diagram

4.1.4 Service view

4.1.4.1 Service description

Service	Service description
DACATCVolumes	Logical service model for the ATC Volumes exchanges It encompasses one Interface : ATCVolumesInterface which allows to call to the provideATCVolumes operation
DAC_ARESBroker	Logical service model for DAC_ARESBroker service. It is used to request airspace reservations. It has only one interface:

	ARESDefineInterface to define the details of the requested airspace
DACPublication	Logical service model for DACPublication service. It is used for the exchange of ASM Solutions. It has two interfaces: Subscribe containing Subscribe/Unsubscribe operations PubUpd containing Publish/Update operations
TTOProposal	Logical service model for the TTOProposal service. It is used to propose a change of the TTO for a Mission Trajectory. It has only one interface: TTOProposallInterface for the delta of the TTO

4.1.4.2 Service Provisioning

Interaction	Consumer CC	Consumer System	Provider CC	Provider System
DACPublication.State AU Operations Centre (WOC)_CC and Sub-Regional/National ASM_CC	State AU Operations Centre (WOC)	State AU Wing Operations Centre (WOC)	Sub-Regional/National ASM	ASM
DACATCVolumes.Sub-Regional/National ASM_CC and Sub-Regional/Local ATFCM_CC	Sub-Regional/National ASM	ASM	Sub-Regional/Local ATFCM	ATFCM
DAC_ARESBroker.State AU Operations Centre (WOC)_CC and Sub-Regional/National ASM_CC	State AU Operations Centre (WOC)	State AU Wing Operations Centre (WOC)	Sub-Regional/National ASM	ASM
DACATCVolumes.State AU Operations Centre (WOC)_CC and Sub-Regional/Local ATFCM_CC	State AU Operations Centre (WOC)	State AU Wing Operations Centre (WOC)	Sub-Regional/National ATFCM	ATFCM
TTOProposal.State AU Operations Centre (WOC)_CC and Sub-Regional/Local ATFCM_CC	State AU Operations Centre (WOC)	State AU Wing Operations Centre (WOC)	Sub-Regional/Local ATFCM	ATFCM

4.1.4.3 Service Realization

4.1.4.3.1 Interaction DACATCVolumes.State AU Operations Centre (WOC)_CC and Sub-Regional/Local ATFCM_CC

System Port: AMQP Messaging at Sub-Regional/Local ATFCM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at State AU Operations Centre_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at Sub-Regional/National ASM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

Service Interface Definition	
ATCVolumesInterface	
Standard	MEP, Security Configuration, Interface Bindings

DACATCVolumes.YP.AMQP Messaging binding	
---	--

4.1.4.3.2 Interaction DACATCVolumes.Sub-Regional/National ASM_CC and Sub-Regional/Local ATFCM_CC

System Port: AMQP Messaging at Sub-Regional/Local ATFCM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at State AU Operations Centre_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at Sub-Regional/National ASM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

Service Interface Definition
ATCVolumesInterface

Standard	MEP, Security Configuration, Interface Bindings
DACATCVolumes.YP.AMQP Messaging binding	

4.1.4.3.3 Interaction DACCoordination.Regional ATFCM_CC and Sub-Regional/Local ATFCM_CC

System Port: AMQP Messaging at Sub-Regional/Local ATFCM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at State AU Operations Centre_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at Sub-Regional/National ASM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

4.1.4.3.4 Interaction DAC_ARESBroker.State AU Operations Centre (WOC)_CC and Sub-Regional/National ASM_CC

System Port: AMQP Messaging at Sub-Regional/Local ATFCM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at State AU Operations Centre_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at Sub-Regional/National ASM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

Service Interface Definition	
ARESDefineInterface	
Standard	MEP, Security Configuration, Interface Bindings
ARESActivationInterface.YP.WS SOAP	MEPs Supported: SRR

	PSPUSH PSPULL Security Configuration: Interface Binding Traceability: REQ-14.01.04-TS-0901.0790 REQ-14.01.04-TS-0901.0795 REQ-14.01.04-TS-0901.0304 REQ-14.01.04-TS-0901.0305 REQ-14.01.04-TS-0901.0325
--	---

4.1.4.3.5 Interaction TTOProposal.State AU Operations Centre (WOC)_CC and Sub-Regional/Local ATFCM_CC

System Port: AMQP Messaging at Sub-Regional/Local ATFCM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at State AU Operations Centre_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

System Port: IP_GND at Communication Infrastructure_CC

Protocol Stack	Protocol
IP	

System Port: AMQP Messaging at Sub-Regional/National ASM_CC

Protocol Stack	Protocol
AMQP Messaging	
	AMQP 1.0
	TLS 1.2

Service Interface Definition	
TTOProposalInterface	
Standard	MEP, Security Configuration, Interface Bindings
TTOProposalInterface.YP.AMQP Messaging binding	

4.2 Functional and non-Functional Requirements

The requirements task was on-going following the project development.

4.2.1 State AU Operations Centre (WOC) related Requirements

The purpose of this section is to provide requirement for the State AU Operations Centre (WOC) Technical System. They are related to the reservation of airspace, the planning of missions and the filing of iOAT FPL.

The following figure shows the functional breakdown of the WOC Technical System. It is based on the functional breakdowns in SESAR 1 WP11.1, SESAR2020 Wave 1 PJ.07-03 and PJ.08-01. Only the white functions are addressed by the following requirements.

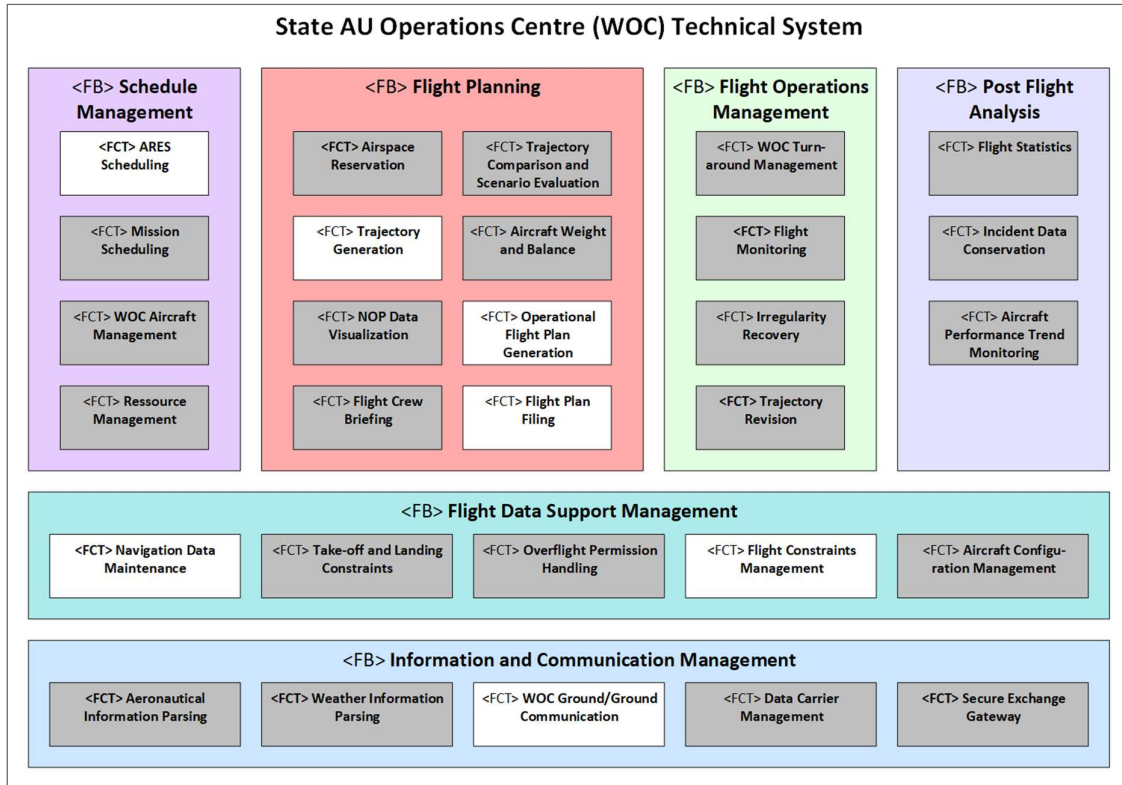


Figure 12: State AU Technical System

Note: As highlighted in §4.1.2.1, there is no technical difference between an EFI request and a DMA type 1 and 2 request. Therefore the requirements in the sections below only make reference to the request of ARES (DMA type 1 and 2).

4.2.1.1 Functional Block “Information and Communication Management”

4.2.1.1.1 Function WOC Ground/Ground communication from/to Sub-Regional/National ASM

[REQ]

Identifier	REQ-07-W2-40-TS-IE04.3000
Title	Connect to ASM Technical System (CC Sub-Regional/National ASM) via Internet
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall establish a connection with the ASM Technical System (CC Sub-Regional/National ASM) via the Internet.

Status	<Validated>
Rationale	Connection to ASM Technical System (CC Sub-Regional/National ASM) via Internet. Alternative way: PENS
Category	<interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1003
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1004
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1005
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1006
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	WOC Ground/Ground Communication
<ALLOCATED_TO>	<Service>	DAC_ARESBroker
<ALLOCATED_TO>	<Enabler>	MIL-0106
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108b
<ALLOCATED_TO>	<Enabler>	MIL-0108

[REQ]

Identifier	REQ-07-W2-40-TS-IE04.3020
Title	Communicate via B2B interface (compatible to SWIM Profile) with ASM Technical System (CC Sub-Regional/National ASM)
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall communicate with the ASM Technical System (CC Sub-Regional/National ASM) via B2B interface.
Status	<Validated>

Rationale	Connection between WOC and ASM Technical System (CC Sub-Regional/National ASM) implemented with an ad hoc exchange platform developed using REST API gateway.
Category	<interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1003
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1004
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<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-SC05.1004
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	WOC Ground/Ground Communication
<ALLOCATED_TO>	<Service>	DAC_ARESBroker
<ALLOCATED_TO>	<Enabler>	MIL-0106
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108b
<ALLOCATED_TO>	<Enabler>	MIL-0108

[REQ]

Identifier	REQ-07-W2-40-TS-IE04.3030
Title	XML format for exchange of information with ASM Technical System (CC Sub-Regional/National ASM)
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall use the XML format to exchange information with the ASM Technical System (CC Sub-Regional/National ASM).
Status	<Validated>

<p>Rationale</p>	<p>The ASM Technical System (CC Sub-Regional/National ASM) will provide a publish/subscribe mechanism to exchange airspace reservation information in XML format.</p> <p>Information to be exchanged:</p> <ul style="list-style-type: none"> - ARES (DMA 1 and 2) reservation information <p>An ad hoc exchange platform was developed using API (JSON) format.</p>
<p>Category</p>	<p><interoperability></p>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1003
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1004
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<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO04.1005
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO04.1006
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	WOC Ground/Ground Communication
<ALLOCATED_TO>	<Service>	DAC_ARESBroker
<ALLOCATED_TO>	<Enabler>	MIL-0105
<ALLOCATED_TO>	<Enabler>	MIL-0106
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108b
<ALLOCATED_TO>	<Enabler>	MIL-0108

4.2.1.1.2 Function WOC Ground/Ground communication from/to Sub-Regional/Local ATFCM

[REQ]

Identifier	REQ-07-W2-40-TS-IE04.5000
Title	Connect to ATFCM Technical System (CC Sub-Regional/Local ATFCM) via Internet
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall establish a connection with the ATFCM Technical System (CC Sub-Regional/Local ATFCM) via the Internet.
Status	<Validated>
Rationale	Connection to ATFCM Technical System (CC Sub-Regional/Local ATFCM) via Internet. Alternative way: PENS
Category	<interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1007
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	WOC Ground/Ground Communication
<ALLOCATED_TO>	<Service>	DACATCVolumes
<ALLOCATED_TO>	<Service>	TTOProposal
<ALLOCATED_TO>	<Enabler>	PRO-076
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-IE04.5020
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Title	Communicate via B2B interface (compatible to SWIM Profile) with ATFCM Technical System (CC Sub-Regional/Local ATFCM)
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall communicate with the ATFCM Technical System (CC Sub-Regional/Local ATFCM) via B2B interface (compatible to Yellow SWIM Profile).
Status	<Validated>
Rationale	Connection between WOC and ATFCM Technical System (CC Sub-Regional/Local ATFCM) implemented with an ad hoc exchange platform developed using REST API gateway.
Category	<interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1007
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-SC05.1003
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-SC05.1004
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	WOC Ground/Ground Communication
<ALLOCATED_TO>	<Service>	DACATCVolumes
<ALLOCATED_TO>	<Service>	TTOProposal
<ALLOCATED_TO>	<Enabler>	PRO-076
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-IE04.5030
------------	---------------------------

Title	XML format for exchange of information with ATFCM Technical System (CC Sub-Regional/Local ATFCM)
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall use the XML format to exchange information with the ATFCM Technical System (CC Sub-Regional/Local ATFCM).
Status	<Validated>
Rationale	<p>The ATFCM Technical System (CC Sub-Regional/Local ATFCM) will provide a publish/subscribe mechanism to exchange the volumes with a significant load of complex traffic (ATC Volumes) and the TTO proposal in XML format.</p> <p>Information to be exchanged:</p> <ul style="list-style-type: none"> - ATC Volumes - TTO proposal <p>The lack of the INNOVE platform during the validation exercise prevented the use of the standard NM B2B interface description. Instead, an ad hoc exchange platform was developed using API (JSON) format.</p> <p>Despite this limitation, data was correctly exchanged. Consequently, the requirement can be considered as Validated.</p>
Category	<interoperability>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1007
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE04.1008
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<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO04.1003

<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO04.1007
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	WOC Ground/Ground Communication
<ALLOCATED_TO>	<Service>	DACATCVolumes
<ALLOCATED_TO>	<Service>	TTOProposal
<ALLOCATED_TO>	<Enabler>	PRO-076
<ALLOCATED_TO>	<Enabler>	MIL-0105
<ALLOCATED_TO>	<Enabler>	MIL-0106

4.2.1.2 Functional Block “Flight Data Support Management”

4.2.1.2.1 Function Flight Constraints Management

4.2.1.2.2 Function Navigation Data Maintenance

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.3077
Title	Provide static aeronautical information
Requirement	<p>Within the outlines of the mission area, the State AU Wing Operations Centre (WOC) Technical System shall read the following static aeronautical information from the State AU Wing Operations Centre (WOC) Technical System database and provide this information to the interface to the operator:</p> <ul style="list-style-type: none"> - Aerodromes - Airspaces - Points (NAVAIDs, waypoints) - Routes (ATS routes, Conditional routes, TACAN routes) - SID/STAR
Status	<Validated>

Rationale	<p>The State AU Wing Operations Centre (WOC) Technical System database may contain numerous information.</p> <p>Only information located within the mission area shall be provided to the HMI.</p>
Category	<Functional><Safety><Security>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-SC05.1001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-SC05.1002
<ALLOCATED_TO>	<Functional block>	Flight Data support Management
<ALLOCATED_TO>	<Role>	AIS Static Data Operator
<ALLOCATED_TO>	<Function>	Navigation Data Management
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.3303
Title	Provide DMA Type 1 and 2 information
Requirement	<p>Within the outlines of the mission area, the State AU Wing Operations Centre (WOC) Technical System shall read the DMA Type 1 and 2 information from the State AU Wing Operations Centre (WOC) Technical System database and provide this information to the interface to the operator.</p>
Status	<Validated>

Rationale	<p>The State AU Wing Operations Centre (WOC) Technical System database may contain numerous information.</p> <p>Only information located within the mission area shall be provided to the HMI.</p>
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2013
<ALLOCATED_TO>	<Functional block>	Flight Data support Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Navigation Data Management
<ALLOCATED_TO>	<Enabler>	MIL-0106

4.2.1.3 Functional Block “Flight Planning”

4.2.1.3.1 Function Trajectory Generation

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4009
Title	Display AIXM information

Requirement	<p>Upon operator request, the State AU Wing Operations Centre (WOC) Technical System shall display at least the following aeronautical information received from AIM Technical System (CC Regional AIM) in AIXM 5.1 XML schema:</p> <ul style="list-style-type: none"> • Aerodromes • Airspaces • Points (NAVAIDS, waypoints) • Routes (ATS, CDR, TACAN) • SID/STAR • CDR availability • ARES status • NOTAMs
Status	<Validated>
Rationale	<p>AIM Technical System will include information from EAD + CACD in AIXM 5.1 XML schema.</p> <p>Storage of data in FB 'Flight Data Support Management'.</p>
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	AIS Dynamic Data Operator
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4082
Title	Add data to a 'mission data set'

Requirement	The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to the operator to add the following data to a 'mission data set': - Aircraft configuration data - Tactical data - ARES data - ICAO flight plan data - 4D trajectory data - Flight performance data - Other data
Status	<Validated>
Rationale	The mission data set comprises all information/data that is collected during the mission planning, mission execution and post flight analysis.
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4084
Title	Select aeronautical object types

Requirement	The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to the operator to select aeronautical object types within the mission area and display attribute data of these objects.
Status	<Validated>
Rationale	The FB 'Flight Planning' shall visualize all aeronautical object types available for the mission area and selected by the operator.
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4085
Title	Define 2D flight route
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to the operator to define graphically a 2D flight route within the geographical background of the mission area.
Status	<Validated>

Rationale	<p>Auto-routing function: Calculate route using points (waypoints, nav aids) and route legs based on current static aeronautical information from AIM Technical System.</p> <p>Note: The selected 2D route needs to contain at least a start point (e.g. departure aerodrome) and an end point (e.g. destination aerodrome) but may also include points or ATS route segments.</p>
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4086
Title	Calculate flight route automatically using IFR En-route data
Requirement	Upon operator request, The State AU Wing Operations Centre (WOC) Technical System shall calculate an 'efficient' 4D flight route using effective IFR En-route data and a selected 2D flight route.
Status	<Validated>

Rationale	<p>Auto-routing function: Calculate route using points (waypoints, nav aids) and route legs based on current static aeronautical information from AIM Technical System.</p> <p>Note: The selected 2D route needs to contain at least a start point (e.g. departure aerodrome) and an end point (e.g. destination aerodrome) but may also include points or ATS route segments.</p>
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4087
Title	Calculate flight route automatically using EAUP/EUUP information
Requirement	If the State AU Wing Operations Centre (WOC) Technical System calculates an 'efficient' 4D flight route, the State AU Wing Operations Centre (WOC) Technical System shall avoid all ARES that is active at the time of flight except that ARES allocated to the own mission.
Status	<Validated>
Rationale	Auto-routing function: calculate waypoints and route legs based on current dynamic information from AUP/UUP or AIM Technical System
Category	<Functional>

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.6087
Title	Calculate flight route automatically using AUP/UUP information
Requirement	If the State AU Wing Operations Centre (WOC) Technical System calculates an 'efficient' OAT 4D flight route, the State AU Wing Operations Centre (WOC) Technical System shall use DCT.
Status	<Validated>
Rationale	Auto-routing function: calculate waypoints and route legs based on current dynamic information from EAUP/EUUP or AIM Technical System (CC Regional AIM)
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4088
Title	Calculate flight route using the corresponding aeronautical information from AIM
Requirement	For calculation of the 4D flight route, the State AU Wing Operations Centre (WOC) Technical System shall use the corresponding aeronautical information from AIM.
Status	<Validated>
Rationale	Use of current data from AIM Technical System (CC Regional AIM). Consider temporality information within the AIXM 5.1 XML schema data for the time of the flight.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4089
Title	Modify calculated flight route

Requirement	<p>The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to the operator to modify a calculated 4D flight route as follows:</p> <ul style="list-style-type: none"> - Add/modify/delete points of the route - Add/modify/delete times for points of the route - Add/modify/delete speeds for points of the route - Add/modify/delete altitudes for points of the route - Add/modify/delete flight rules for points of the route - Add/modify/delete OAT/GAT indicator for points of the route - Add/modify/delete Stay indicator (ARES/aerodrome/holding) and stay duration for points of the route
Status	<Validated>
Rationale	Define 4D route
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4090
Title	Calculate 4D trajectory

Requirement	<p>The State AU Wing Operations Centre (WOC) Technical System shall calculate a 4D trajectory based on the calculated 4D route and the following attributes defined by the operator:</p> <ul style="list-style-type: none"> - Times for points of the route - Speeds for points of the route - Altitudes for points of the route - Flight rules for points of the route - OAT/GAT indicator for points of the route - Stay indicator (ARES/aerodrome/holding) and stay duration for points of the route if applicable - Aircraft configuration
Status	<Validated>
Rationale	Calculate 4D trajectory
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4091
Title	Calculate 4D trajectory using the corresponding aeronautical information from AIM
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall use the corresponding aeronautical information from AIM for calculation of the 4D trajectory.
Status	<Validated>

Rationale	Use of current data from AIM Technical System (CC Regional AIM)
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4092
Title	Modify 4D trajectory
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to the operator to modify the attributes of a 4D trajectory.
Status	<Validated>
Rationale	Modify 4D trajectory
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning

<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4093
Title	Calculate take-off for 4D trajectory
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall calculate the take-off time of a 4D trajectory as follows: Take-off time = EOBT + default taxi time
Status	<Validated>
Rationale	NM (IFPS) uses default taxi times for airports. This information is provided via the ENV data. Take-off time is calculated as EOBT + Taxi time. All EETs refer to take-off time. Therefore the State AU Wing Operations Centre (WOC) Technical System needs to calculate the correct take-off time.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4094
Title	Calculate EET for 4D trajectory
Requirement	<p>If an operator defines an Estimated Elapsed Time for a point of a 4D trajectory, the State AU Wing Operations Centre (WOC) Technical System shall calculate the Estimated Elapsed Time for a point of a 4D trajectory as follows:</p> <p>EET (relative time) = Absolute time of the point – Absolute time of take-off</p>
Status	<Validated>
Rationale	<p>NM (IFPS) uses default taxi times for airports. This information is provided via the ENV data.</p> <p>Take-off time is calculated as EOBT + Taxi time.</p> <p>All EETs refer to take-off time.</p> <p>Therefore the State AU Wing Operations Centre (WOC) Technical System needs to calculate the correct take-off time.</p>
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4302
Title	DMA Type 1 and 2 as ARES type in trajectories

Requirement	The State AU Wing Operations Centre (WOC) Technical System shall enable the operator to refer to DMA Type 1 and 2 in the route of a trajectory.
Status	<Validated>
Rationale	DMAs are referenced by name in the STAY clause of the route description in an OAT FPL. The route point preceding the STAY clause is the entry point whereas the route point succeeding the STAY clause is the exit point of the DMA.
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Trajectory Generation
<ALLOCATED_TO>	<Enabler>	MIL-0106

4.2.1.3.2 Function Operational Flight Plan Generation

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4095
Title	Create 'improved OAT flight plan' data set
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to the operator to create an 'improved OAT flight plan' data set by filling an 'iOAT flight plan form'.
Status	<Validated>

Rationale	<p>“Create” means to create a flight plan data set used to derive the FPL message.</p> <p>Flight Plan with details based on the selected route respectively on the developed mission (MT) and in accordance with</p> <ul style="list-style-type: none"> - ICAO Doc 4444 ATM/501 (ATS message type 'FPL'), last version available. - NOP/B2B Reference Manual for release, last version available. - Eurocontrol IFPS User Manual, last version available. - Eurocontrol IFPS and RPL Dictionary of Messages, last version available.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4096
Title	Store 'iOAT flight plan' data set
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to the operator to store an 'iOAT flight plan' data set.
Status	<Validated>

Rationale	Store 'iOAT flight plan' data set e.g. for later transmission and recording
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4097
Title	Modify 'improved OAT flight' data set
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to the operator to modify an 'iOAT flight plan' data set.
Status	<Validated>
Rationale	Modify 'iOAT flight plan' data set
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator

<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4098
Title	Delete 'improved OAT flight plan' data set
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to the operator to delete an 'iOAT flight plan' data set.
Status	<Validated>
Rationale	Delete 'iOAT flight plan' data set
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4099
Title	Provide fields for 'iOAT flight plan' data set i.a.w. NOP/B2B Reference Manual

Requirement	The interface to the operator to create an 'iOAT flight plan' data set shall provide for the 'iOAT flight plan form' the following three sections: - ICAO FPL data (as in ICAO Doc. 4444), (mandatory). - 4D trajectory (UP4DT), (optional) - Flight performance data (optional)
Status	<Validated>
Rationale	- NOP/B2B Reference Manual and European ATM Service Description for the OATFlightPlanSubmission Service for release (last version). - ICAO Doc 4444 ATM/501, last version available. - European ATM Service Description for the OATFlightPlanSubmission Service, last version available. Note: Versions and editions of aforementioned documents are referenced as "last version available." as there might be more current versions available depending on the date of implementation of the system.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4100
Title	Provide fields for 'iOAT flight plan' data set i.a.w. ICAO Doc 4444 ATM/501

Requirement	The interface to the operator to create an 'improved OAT flight plan' data set shall provide for the 'ICAO FPL data' section of the 'iOAT flight plan form' all fields as specified in ICAO Doc 4444 ATM/501.
Status	<Validated>
Rationale	<ul style="list-style-type: none"> - NOP/B2B Reference Manual for release (last version available). - OSED 07.06.02 Vol. 1 for Step 1 - ICAO Doc 4444 ATM/501, last version available. <p>Note: Versions and editions of aforementioned documents are referenced as "last version available." as there might be more current versions available depending on the date of implementation of the system.</p>
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4101
Title	Validate operator inputs into 'iOAT flight plan form' i.a.w. ICAO 4444
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall validate the inputs of the operator into all fields of the 'iOAT flight plan form' i.a.w. in ICAO Doc 4444 ATM/501.
Status	<Validated>

Rationale	Validation of compliance with ICAO Doc. 4444, last version available.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4102
Title	Allow inputs into 'iOAT flight plan form'

Requirement	<p>The State AU Wing Operations Centre (WOC) Technical System shall allow the operator the following inputs into the 'iOAT flight plan form' in addition to ICAO Doc 4444 ATM/501 and IFPS and RPL Dictionary of Messages:</p> <ul style="list-style-type: none"> - Field Type 8: Indication of RPAS type: 'L' for civil, 'P' military - Field Type 15: Indication of OAT/GAT parts of the route - Field Type 15: Insertion of ARES-Entry Point and related time - Field Type 15: Insertion of STAY-ARES indicator, related time and ARES identifier with related upper and lower flight levels - Field Type 15: Insertion of ARES-Exit Point and related time - Field Type 15: Insertion of STAY-AERODROME indicator, related time and aerodrome identifier - Field Type 16: Insertion of times exceeding 24 hours - Field Type 18: Indication of OAT status in sub-field 'EUR' - Field Type 18: Formation information in sub-field 'FOR' - Field Type 18: Formation aircraft type Information in sub-field 'TYP' - Field Type 18: STAY information in sub-field 'STAYINFO' - Field Type 18: Diplomatic clearance information in sub-field 'DCN' - Field Type 18: RPAS Pilot in command information in sub-field 'PIC' - Field Type 18: Information about number of persons on board in sub-field 'POB' (for military transport aircraft) - Field Type 18: Information about fuel endurance in sub-field 'END' (for military transport aircraft)
Status	<Validated>
Rationale	<p>REQ-07.06.02-OSED-0005.0018 through REQ-07.06.02-OSED-0005.0049</p> <p>Eurocontrol IFPS and RPL Dictionary of Messages for VP-716.</p> <p>The military indication in Field Type 8 and the OAT/GAT indication in Field Type 15 in conjunction with the OAT indicator in Field Type 18 (sub-field 'EUR') will allow designation of flights of military aircraft as either pure OAT or mixed GAT/OAT flights.</p>
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier

<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4103
Title	Validate operator inputs into 'iOAT flight plan form' i.a.w. IFPS documents
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall validate the inputs of the operator into all fields of the 'iOAT flight plan form' i.a.w. IFPS documents.
Status	<Validated>
Rationale	Validation of compliance with the following documents: - NOP/B2B Reference Manual, last version available. - Eurocontrol IFPS User Manual, last version available. - Eurocontrol IFPS and RPL Dictionary of Messages, last version available.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator

<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4104
Title	Take-over of data from ARES allocation into 'iOAT flight plan form'
Requirement	<p>Upon operator request, the State AU Wing Operations Centre (WOC) Technical System shall populate the fields of the 'iOAT flight plan form' with the following data from a selected mission data set (based on the ARES request that has been allocated):</p> <ul style="list-style-type: none"> - Departure aerodrome (Field Type 13) - Destination aerodrome (Field Type 16) - Number of aircraft (Field Type 9) - ARES Identifier(s) (Field Type 18) - Timeframe of ARES usage (Field Type 15) - Lower Flight Level of ARES usage (Field Type 15) - Upper Flight Level of ARES usage (Field Type 15)
Status	<Validated>
Rationale	After ARES has been allocated (via EAUP/EUUP), the flight plan form can be populated and a FPL message can be sent (i.e. the flight plan can be filed).
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4105
Title	Notify operator if iOAT FPL includes ARES with status different to "Allocated"
Requirement	If the operator orders the State AU Wing Operations Centre (WOC) Technical System to file an 'improved OAT flight plan' including ARES, the State AU Wing Operations Centre (WOC) Technical System shall verify if the ARES referenced in the 'improved OAT flight plan' data set has a status of "Allocated".
Status	<Validated>
Rationale	When the EAUP/EUUP has been published, the ARES is allocated. Before, the allocation is not granted and hence the ARES cannot be referenced in the iOAT FPL.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.6105
Title	Notify operator if iOAT FPL includes ARES with status different to "Allocated"

Requirement	If the status of the ARES referenced in the 'improved OAT flight plan' data set has a status different to "Allocated", the State AU Wing Operations Centre (WOC) Technical System shall notify the operator.
Status	<Validated>
Rationale	When the EAUP/EUUP has been published, the ARES is allocated. Before, the allocation is not granted and hence the ARES cannot be referenced in the iOAT FPL.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4106
Title	Take-over of flight performance data into 'iOAT flight plan' data set
Requirement	Upon operator request, the State AU Wing Operations Centre (WOC) Technical System shall populate the 'Flight performance data' section of the 'iOAT flight plan form' with flight performance data.
Status	<Validated>

Rationale	<p>The performance data within the iOAT flight plan is optional.</p> <p>The Flight Performance Data will be provided either as climb and descent performance profiles or as total weight of aircraft as part of the 4D trajectory.</p> <p>It contains a climb profile and a descent profile as specified in - NOP/B2B Reference Manual, last version available.</p>
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2015
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2020
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4107
Title	Take-over of mission data for 'iOAT flight plan' data set
Requirement	<p>Upon operator request, the State AU Wing Operations Centre (WOC) Technical System shall populate the following fields of the 'iOAT flight plan form' with the following data derived from a selected mission data set (based on 4D trajectory data):</p> <ul style="list-style-type: none"> - Departure aerodrome and time (Field Type 13) - Route (Field Type 15) - Destination aerodrome and total elapsed time (Field Type 16)
Status	<Validated>
Rationale	Extraction of FPL relevant data from 4D trajectory

Category	<Functional>
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[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator
<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4108
Title	Take-over of data from 4D trajectory for 'iOAT flight plan' data set
Requirement	Upon operator request, the State AU Wing Operations Centre (WOC) Technical System shall populate the '4D trajectory' section of the 'iOAT flight plan form' with data from a selected mission data set (based on 4D trajectory data).
Status	<Validated>
Rationale	Take-over of data from 4D trajectory for 'iOAT flight plan' data set
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator

<ALLOCATED_TO>	<Function>	Operational Flight Plan Generation
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans

4.2.1.3.3 Function Flight Plan Filing

Regional ATFCM is out of scope for Solution 40 and therefore NM was not part of the validation exercise. Requirements concerning the management of iOAT flight plan are still in the scope but does not require any validation because they were validated in the scope of PJ.07-03. Solution 40 is using the iOAT flight plan only for supporting the TTO proposal validation.

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.4109
Title	Generate Creation/Submission request from 'iOAT flight plan' data set
Requirement	Upon operator request, the State AU Wing Operations Centre (WOC) Technical System shall generate a FilingRequest(FlightPlanCreationRequest)/requestOATFPLSubmission(improvedOatFpl) from the 'iOAT flight plan' data set.
Status	<validated>

<p>Rationale</p>	<p>Generation of creation/submission request.</p> <p>iOAT flight plan may be filed either in XML schema or ATS message format.</p> <p>Filing can be done either via NM B2B/OATFlightPlanSubmission Service interface or via AMHS/AFTN.</p> <p>At the time of writing this requirement, the 'European ATM Service Description for the OATFlightPlanSubmission Service' document within ISRM Iteration 2.0 was available in version 00.02.01, but the OATFlightPlanSubmission service itself was not available. Hence, the request names from the 'NM20.5 Flight Services' document and the 'European ATM Service Description for the OATFlightPlanSubmission Service' document are used in parallel.</p> <p>Flight Plan with details based on the selected route respectively on the developed mission (MT) and in accordance with</p> <ul style="list-style-type: none"> - ICAO Doc 4444 ATM/501 (ATS message type 'FPL'), last version available. - NOP/B2B Reference Manual, last version available. - Eurocontrol IFPS User Manual, last version available. - Eurocontrol IFPS and RPL Dictionary of Messages, last version available. - European ATM Service Description for the OATFlightPlanSubmission Service. <p>This requirement was validated V2 in the validation exercises of PJ.07-03 and needs to be revalidated with respect to the use of DMA Type 1 and 2</p>
<p>Category</p>	<p><Functional></p>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2009
<ALLOCATED_TO>	<Functional block>	Flight Planning
<ALLOCATED_TO>	<Role>	Flight Data Operator

<ALLOCATED_TO>	<Function>	Flight Plan Filing
<ALLOCATED_TO>	<Enabler>	AOC-ATM-14_Upgrade of WOC system to handle improved OAT flight plans AOC-ATM-20_Sharing of trajectory data between AOC/WOC and the ATM world using B2B web services

4.2.1.4 Functional Block Schedule Management

4.2.1.4.1 Function ARES Scheduling

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5000
Title	Request of mission planning with airspace reservation
Requirement	<p>The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to allow the authorized operators to request mission planning with ARES (DMA type 1 and 2) containing the following information:</p> <ul style="list-style-type: none"> - Aerodrome (Departure/Arrival) - ARES description (location, size) - Distance to a reference point (for DMA Type 1) - Time/Duration of the activity (including Date) - Priority Information - Flexibility parameters (time, location, altitude block)
Status	<Validated>
Rationale	Military authorized operators (ex: air force units) should provide up to date mission requirements information using the interface provided by the WOC.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Function>	ARES Scheduling
<ALLOCATED_TO>	<Role>	Flight Crew
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5010
Title	Mission planning with airspace reservation status
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to allow the authorized operators to follow the status of the mission planning and airspace reservation request.
Status	<Validated>
Rationale	Military authorized operators (ex: air force units) should be informed about the status of the request (rejected, validated, pending) using the interface provided by the WOC.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Function>	ARES Scheduling
<ALLOCATED_TO>	<Role>	Flight Crew
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5020
Title	Mission planning with airspace reservation (with DMA type 1 and 2) requests analysis.
Requirement	<p>The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to allow the operator to analyse mission planning and airspace reservation (including DMA type 1 et 2) requests by displaying the following mission objectives and requirements specific to DMA configuration and geographical location:.</p> <ul style="list-style-type: none"> - Aerodrome (Departure/Arrival) - ARES description (location, size) - Position Distance to a reference point (for DMA Type 1) - Time/Duration of the activity (including Date) - Priority Information - Flexibility parameters (time, location, altitude block)
Status	<Validated>
Rationale	The Mission planner receives weekly/daily flight schedules and analyses objectives and operational requirements per mission type using the interface provided by the WOC.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2013
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Function>	ARES Scheduling
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5030
Title	Create/update airspace reservation (with DMA type 1 and 2)
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall allow the operator to select missions requiring DMA type 1 and 2 and create/update the airspace reservation request.
Status	<Validated>
Rationale	The Mission planner analyses objectives and operational requirements per mission type in order to initiate/update the development of the airspace reservation request for missions requiring DMA type 1 and 2.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2013
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Function>	ARES Scheduling
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5040
Title	Define DMA type 1 and 2 flexibility parameters

Requirement	<p>The State AU Wing Operations Centre (WOC) Technical System shall provide an interface to allow the operator to define the following DMA type 1 and 2 flexibility parameters before submitting the demand to the Sub-regional/National ASM system:</p> <ul style="list-style-type: none"> • Flight Band: <ul style="list-style-type: none"> - FL min - FL max - FL band size min • Activation Period: <ul style="list-style-type: none"> - Earliest activation time - Latest de-activation time - Minimum duration • Position: <ul style="list-style-type: none"> - Distance min (to a reference point or DMA) - Distance max (to a reference point or DMA) - Start bearing - End bearing
Status	<Validated>
Rationale	<p>The Mission Planner needs to define the following flexibility parameters that will be used in the CDM process with the Regional/National ASM system.</p> <p>-</p>
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2002

<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Function>	ARES Scheduling
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5050
Title	Define DMA type 1 and 2 priority
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall allow the operator to assign a priority level to the DMA type 1 and 2.
Status	<Validated>
Rationale	The Mission planner analyses the mission criticality and assigns a priority level (from high to low: P1, P2, P3) to DMA type 1 and 2.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2002
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Function>	ARES Scheduling
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU05.5060
Title	Create/update airspace reservation (with DMA type 1 and 2)

Requirement	Upon operator request, the State AU Wing Operations Centre (WOC) Technical System shall analyse the mission and airspace reservation requirements together with the ATC volumes location in order to automatically define the location of the DMA type 1 and 2.
Status	<Validated>
Rationale	The WOC algorithm should at first locate the DMA (in time and position) in compliance with airspace reservation requirements c. Secondly the WOC algorithm should, as far as possible, locate the DMA (in time and position) without impacting on the ATC Volumes.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2003
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2010
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2013
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Function>	ARES Scheduling
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU05.5070
Title	Define 3D DMA type 1 and 2 using graphical interface

Requirement	<p>The State AU Wing Operations Centre (WOC) Technical System shall provide a graphical interface to:</p> <ul style="list-style-type: none"> - Allow the Mission Planner to design and modify graphically a 3D DMA type 1 and 2 within the geographical location and compliant DMA configuration requirements. - Allow the Mission Planner to easily move (horizontally and vertically), resize (FL max, FL min, FL Band) and reshape the DMA type 1 and 2 using a 2D/3D map display.
Status	<Validated>
Rationale	The operator should be able to modify the DMA automatically generated by the WOC algorithm using a graphical interface.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2003
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2004
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	ARES Scheduling
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5080
Title	Define 3D DMA type 1 and 2 using graphical interface

Requirement	<p>When using the graphical interface to design a 3D DMA type 1 and 2, the State AU Wing Operations Centre (WOC) Technical System shall show an alert the operator when:</p> <ul style="list-style-type: none"> - The DMA is outside the geographical defined location (min and max distance to a reference point and bearing) and/or - The DMA is not compliant with operational requirements (size, distance to reference point) and/or - The DMA is in conflict with an ATC volume.
Status	<Validated>
Rationale	The Mission Planner needs to know if the DMA is outside the configuration parameters provided by the air force unit and/or in conflict with an ATC volume. In any case, the alert should not prevent the Mission Planner from creating the DMA.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2003
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2004
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	ARES Scheduling
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5100
Title	Transmit ARES requests/updates with DMA type 1 and 2.
Requirement	Upon operator request, the State AU Wing Operations Centre (WOC) Technical System shall be able to transmit new/updated ARES requests (DMA type 1 and 2) to Sub-Regional/local ASM system.
Status	<Validated>
Rationale	All Sub-Regional/local ASM actors need to be informed of any new ARES (DMA type 1 and 2) request/update.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2005
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5110
Title	Receive ATC Volumes
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall be able to receive ATC volumes data from the Sub-regional/local ATFCM system.
Status	<Validated>
Rationale	ATC Volumes are taken into account by the WOC system to locate the DMA type 1 and 2. The objective is to avoid the ATC Volumes, but the priority is given to the mission operational requirements and the DMA configuration requirements (location and size).

Category	<Functional>
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[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2004
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Service>	DACATCVolumes
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	MIL-0106

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5120
Title	Avoid conflict with ATC Volumes
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall take into account the ATC volumes information to find the DMA type 1 and 2 location.
Status	<Validated>
Rationale	The objective is that the DMA 1 and 2 location is not in conflict with the ATC Volumes, but the priority is given to the mission operational requirements and the DMA configuration requirements (location and size).
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2004
<ALLOCATED_TO>	<Functional block>	Schedule Management

<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5130
Title	ATC Volumes 2D/3D map display
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall display the ATC volumes in the 2D/3D map display.
Status	<Validated>
Rationale	The Mission Planner needs to know the ATC Volumes location when designing graphically the DMA type 1 and 2.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2004
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5140
Title	Analyse impact of ATC Volumes on DMA type 1 and 2.
Requirement	Upon reception of ATC Volumes, the State AU Wing Operations Centre (WOC) Technical System shall calculate and display the impact on DMA type 1 and 2 already defined. The WOC shall alert the operator and allow him to analyse the impact.

Status	<Validated>
Rationale	The Sub-Regional/local ASM system can send updated information about ATC volumes. The Mission Planner needs to be informed in order to check the impact on the DMA type 1 and 2. The WOC technical system will show the impact in a graphical display.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2004
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5150
Title	Analyse impact of ASM solution
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall calculate the impact of the ASM solution sent by the Sub-regional/National ASM system and provide an interface to the operator to analyse this impact.
Status	<Validated>
Rationale	The WOC should display the new DMA type 1 and 2 characteristics contained in the ASM solution with respect to the initial demand and the compliance or not with each of the DMA flexibility parameters.
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2006
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1002
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	MIL-0106
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5160
Title	Reject ASM solution
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall allow the operator to reject the ASM solution sent by the Sub-regional/National ASM system.
Status	< Validated>
Rationale	The Mission Planner rejects the ASM solution when it has a negative impact on the mission effectiveness. The rejection message is sent by the WOC to the concerned Sub-Regional/National ASM system.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2007
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2014
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation

<ALLOCATED_TO>	<Enabler>	MIL-0106
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5165
Title	Accept ASM solution
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall allow the operator to accept the ASM solution sent by the Sub-regional/National ASM system.
Status	<Validated>
Rationale	The Mission Planner accepts the ASM solution if it has no negative impact on mission effectiveness.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2008
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	MIL-0106
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

REQ]

Identifier	REQ-07-W2-40-TS-FU04.5170
Title	Refine/update DMA Type 1 and 2 request with ASM solution

Requirement	If the operator accepts the ASM solution, the State AU Wing Operations Centre (WOC) Technical System shall automatically refine/update the DMA Type 1 and 2 request in line with ASM solution parameters.
Status	<Validated>
Rationale	When the Mission Planner accepts the ASM solution, a refined/updated DMA Type 1 and 2 request is created and sent to the Sub-regional/National ASM system.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2008
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2011
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	MIL-0106
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5180
Title	Provide counter proposal on the ASM solution
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall allow the operator to provide a counter proposal to the ASM solution sent by the Sub-regional/National ASM system.
Status	<Validated>

Rationale	Based on the ASM solution sent by the Sub-regional/National ASM system, the Mission Planner should be able to modify the DMA type 1 and 2 parameters using a graphical 2D/3D interface. The objective is to define a counter proposal and initiate CDM with local Airspace manager via the Sub-regional/National ASM system.
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2012
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2011
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	MIL-0106
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU05.5190
Title	Store ARES requests with DMA type 1 and 2 data sets
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall store ARES requests with DMA type 1 and 2 data sets exchanged with the Sub-Regional/National ASM system
Status	<Validated>
Rationale	Store ARES requests with DMA type 1 and 2 data sets data set exchanges e.g. for later KPI calculation and recording
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2001
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Enabler>	MIL-0106
<ALLOCATED_TO>	<Enabler>	MIL-AOC-ATM-0108a

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5200
Title	Receive TTO proposal
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall be able to receive TTO proposal for iSMT over way/significant point and over DMA entry/exit point from the Sub-regional/local ATFCM system.
Status	<Validated>
Rationale	The Mission planner is informed by the State AU Wing Operations Centre (WOC) Technical System when a TTO proposal is received.
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2016
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2017
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation

<ALLOCATED_TO>	<Enabler>	PRO-076
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[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5210
Title	Analyse impact of TTO proposal
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall calculate the impact of the TTO proposal sent by the Sub-regional/Local ATFCM system on the mission and provide an interface to the operator to analyse this impact.
Status	<Validated>
Rationale	The Mission planner is informed by the State AU Wing Operations Centre (WOC) Technical System when a TTO proposal is received and performs the impact assessment.
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2018
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	PRO-076

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5220
Title	Reject TTO proposal
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall allow the operator to reject the TTO proposal sent by the Sub-regional/Local ATFCM system.

Status	<Validated>
Rationale	The Mission Planner rejects the TTO proposal when it has a negative impact on the mission effectiveness. The rejection message is sent by the WOC to the concerned Sub-regional/Local ATFCM system.
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2019
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	PRO-076

[REQ]

Identifier	REQ-07-W2-40-TS-FU04.5230
Title	Accept TTO proposal
Requirement	The State AU Wing Operations Centre (WOC) Technical System shall allow the operator to accept the TTO proposal solution sent by the Sub-regional/Local ATFCM system.
Status	<Validated>
Rationale	The Mission Planner accepts the TTO proposal if it has no negative impact on mission effectiveness.
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier

<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP04.2018
<ALLOCATED_TO>	<Functional block>	Schedule Management
<ALLOCATED_TO>	<Role>	Mission Planner
<ALLOCATED_TO>	<Function>	Airspace Reservation
<ALLOCATED_TO>	<Enabler>	PRO-076

4.2.2 Sub-Regional/National ASM related requirements

[REQ]

Identifier	REQ-07-W2-40-TS-FU01.0004
Title	Receive Early Flight Intent
Requirement	Sub-regional/National ASM system shall be able to allow DAC receive the Early Flight Intent from the WOC and share DAC historical data.
Status	<Validated>
Rationale	<p>'Information and Communication Management' is responsible for interfacing with other technical systems. Data from external systems such as aeronautical information, traffic flows, ACC sectorisation, ARES data is received for further processing. Airspace management data is provided to other systems including ATM system and WOC system. Airspace Use Plan (AUP) is sent to other systems.</p> <p>Main Functions of this FB are:</p> <ul style="list-style-type: none"> - Collect Initial ARES/DMA's request
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1001

<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2001
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Service>	DAC_ARESBroker
<ALLOCATED_TO>	<Function>	Receive Early Flight Intent
<ALLOCATED_TO>	<Enabler>	AAMS-16b

[REQ]

Identifier	REQ-07-W2-40-TS-FU01.0001
Title	Receive/send/update ASM Solutions
Requirement	ASM local system shall be able to allow DAC send/receive/update to/from WOC the ASM Solution for DMA type 1 and 2.
Status	<Validated>
Rationale	<p>'Information and Communication Management' is responsible for interfacing with other technical systems. Data from external systems such as aeronautical information, traffic flows, ACC sectorisation, ARES data is received for further processing. Airspace management data is provided to other systems including ATM system and WOC system. Airspace Use Plan (AUP) is sent to other systems.</p> <p>Main Functions of this FB are:</p> <ul style="list-style-type: none"> - Collect Initial ARES/DMA's request - Share ASM Solutions.
Category	<Functional><Safety>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1003
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1004
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1005

<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1006
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1008
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1009
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Service>	DAC_ARESBroker
<ALLOCATED_TO>	<Service>	DACPublication
<ALLOCATED_TO>	<Function>	Receive ASM Solutions Rejection
<ALLOCATED_TO>	<Enabler>	AAMS-16b

[REQ]

Identifier	REQ-07-W2-40-TS-FU01.0002
Title	Analyze DMAs from Early Flight Intent
Requirement	ASM local system shall be able to visualize ARES/DMAs requests and ATC Volumes.
Status	<Validated>
Rationale	<p>Most of the Functions performed by ASM Systems are developed by Cooperative Airspace Management Functional Block. This FB performs the Functions aimed at Airspace management at all levels (Regional, Sub-Regional and Local). These Functions consist mainly of impact assessment of ARES and sector configuration changes Volume collection, provision and coordination of ARES/DMA and ASM requests and elaboration of the daily airspace plan. The coordination with all relevant actors in terms of airspace volumes is also covered by this FB.</p> <p>DAC evaluates the impact of ARES/DMAs request and identifies optimisation on ARES/DMAs vs ATC Volumes.</p>
Category	<Functional><Safety><Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40

<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1001
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-SF06.0001
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1003
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1009
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1010
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management (Local)
<ALLOCATED_TO>	<Function>	Analyze DMAs from Early Flight Intent
<ALLOCATED_TO>	<Enabler>	AAMS-16b

[REQ]

Identifier	REQ-07-W2-40-TS-FU01.0003
Title	Manage ASM solutions
Requirement	ASM local system shall be able to analyse/optimize ARES/DMAs requests and ATC Volumes.
Status	<Validated>
Rationale	Most of the Functions performed by ASM Systems are developed by Cooperative Airspace Management Functional Block. This FB performs the Functions aimed at Airspace management at all levels (Regional, Sub-Regional and Local). These Functions consist mainly of impact assessment of ARES and sector configuration changes Volume collection, provision and coordination of ARES/DMA and ASM requests and elaboration of the daily airspace plan. The coordination with all relevant actors in terms of airspace volumes is also covered by this FB.
Category	<Functional><Safety><Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1003
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1004

<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE01.1001
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE01.1002
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE01.1003
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE01.1004
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2004
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-SF06.0001
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-SF06.0002
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<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1004
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1005
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1006
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1007
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1008
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1009
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1010
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1011
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management (Local)
<ALLOCATED_TO>	<Function>	Manage ASM Solutions
<ALLOCATED_TO>	<Enabler>	AAMS-16b

4.2.3 Sub-Regional/Local ATFCM related requirements

[REQ]

Identifier	REQ-07-W2-40-TS-FU02.0001
Title	Share ATC Volumes
Requirement	ATFCM local system shall be able to allow DACs to send ATC Volumes to WOC and to ASM local system
Status	<Validated>

Rationale	<p>'Information and Communication Management' is responsible for interfacing with other technical systems. Data from external systems such as aeronautical information, traffic flows, ACC sectorisation, ARES data is received for further processing. Airspace management data is provided to other systems including ATM system and WOC system. Airspace Use Plan (AUP) is sent to other systems.</p> <p>Main Functions of this FB are:</p> <ul style="list-style-type: none"> - Share ATC Volumes - Collect Initial ARES/DMA's request - Share ASM Solutions
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO01.1001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO01.1004
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO01.1005
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2003
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO03.1001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO03.1002
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO03.1003
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE03.1001
<ALLOCATED_TO>	<Service>	DACATCVolume
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Enabler>	AAMS-16b
<ALLOCATED_TO>	<Function>	Share ATC Volumes

[REQ]

Identifier	REQ-07-W2-40-TS-FU02.0002
Title	Receive Early Flight Intent
Requirement	ATFCM local system shall be able to allow DAC receive the Early Flight Intent from the WOC and share DAC historical data.
Status	<Validated
Rationale	<p>'Information and Communication Management' is responsible for interfacing with other technical systems. Data from external systems such as aeronautical information, traffic flows, ACC sectorisation, ARES data is received for further processing. Airspace management data is provided to other systems including ATM system and WOC system. Airspace Use Plan (AUP) is sent to other systems.</p> <p>Main Functions of this FB are:</p> <ul style="list-style-type: none"> - Share ATC Volumes - Collect Initial ARES/DMAs request - Share ASM Solutions
Category	<Functional>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1001
<SATISFIES>	< ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2001
<ALLOCATED_TO>	<Functional block>	Information and Communication Management
<ALLOCATED_TO>	<Service>	DAC_ARESBroker
<ALLOCATED_TO>	<Function>	Receive Early Flight Intent
<ALLOCATED_TO>	<Enabler>	AAMS-16b

[REQ]

Identifier	REQ-07-W2-40-TS-FU02.0003
Title	Create TTO Proposal based on ATC sectors capacity needs and iSMT received from WOC
Requirement	ATFCM local system shall be able to allow DAC defines TTO Proposal
Status	<Validated>
Rationale	<p>Most of the Functions performed by ASM Systems are developed by Cooperative Airspace Management Functional Block. This FB performs the Functions aimed at Airspace management at all levels (Regional, Sub-Regional and Local). These Functions consist mainly of impact assessment of ARES and sector configuration changes Volume collection, provision and coordination of ARES/DMA and ASM requests and elaboration of the daily airspace plan. The coordination with all relevant actors in terms of airspace volumes is also covered by this FB.</p> <p>TTO is a planning ATM constraint relevant to a computed time over a point along the MT profile or over the entry/exit point of ARES. When TTO is assigned to an ARES entry/exit point, it enables a time buffer (could be defined based on national rules and procedures) to be used tactically for ARES pre-activation/de-activation.</p>
Category	<Functional><Safety><Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP01.1005
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2004
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2005
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2006
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2007
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-OP03.2008
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO03.1007
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO03.1008

<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IO03.1009
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE03-1003
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-IE03.1004
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<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1008
<SATISFIES>	<ATMS Requirement>	REQ-07-W2-40-SPRINTEROP-PF04.1009
<ALLOCATED_TO>	<Enabler>	PRO-076
<ALLOCATED_TO>	<Service>	TTOProposal
<ALLOCATED_TO>	<Enabler>	AOC-ATM-20

[REQ]

Identifier	REQ-07-W2-40-TS-FU02.0004
Title	Create ATC Volumes
Requirement	ATFCM local system shall be able to allow DAC defines ATC volumes based on historical traffic flows.
Status	<Validated>
Rationale	Most of the Functions performed by ASM Systems are developed by Cooperative Airspace Management Functional Block. This FB performs the Functions aimed at Airspace management at all levels (Regional, Sub-Regional and Local). These Functions consist mainly of impact assessment of ARES and sector configuration changes Volume collection, provision and coordination of ARES/DMA and ASM requests and elaboration of the daily airspace plan. The coordination with all relevant actors in terms of airspace volumes is also covered by this FB.
Category	<Functional><Safety><Performance>

[REQ Trace]

Relationship	Linked Element Type	Identifier
<ALLOCATED_TO>	<SESAR Solution>	PJ.07-W2-40
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<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management (Local)
<ALLOCATED_TO>	<Enabler>	AAMS-16b
<ALLOCATED_TO>	<Function>	Create ATC Volumes

5 Recommendation for Implementation

It is important to highlight that the WOC requirements related to ARES requests and the distribution of ATC volumes, ASM solutions and TTO proposal refer to the details of the REST API developed by PANSAs. For the time being this web based REST API from PANSAs is the only already implemented and deployed Service Interfaces. But it differs from the service descriptions in EATMA as they were not updated since SESAR1. Therefore the WOC prototype has implemented a connection to this REST API. The main parts of this API had been validated via INNOVE in SESAR2020 Wave 1 PJ.08-01.

In addition, the WOC requirements related to OAT Flight plan submission and distribution refer to the details of NM Flight Services. Due to the absence of Regional ATFCM (NM) in the Solution 40 Validation Exercise they were not in the scope of validation with references to DMA type 1 and 2. For the time being the web based NM Flight Services are the only already implemented and deployed Service Interfaces. But they differ from the service descriptions in EATMA as they were not updated since SESAR1. Therefore the WOC prototype has implemented a connection to these NM Flight Services which had been validated in SESAR2020 Wave 1 PJ.07-03.

The prototypes have been implemented in this context and the scenarios were executed in the Solution PJ.07-W2-40 V3 Validation Exercise.

The following recommendations for system support improvements in the next phase (V4) of solution 40 validation have been identified in [14] PJ07-W2 - D4.1.007: SESAR Solution PJ07-W2-40 Validation Report (00.00.06), and are reminded here:

- With the proposed tool prototypes, in WOC there is no technical support for the visualisation of the flexible parameters for the MT with integrated DMAs (available only in the ASM tool s) when TTO is introduced into the negotiation process. For the WOC operators it would be useful to have a set of flexible parameters also for MT (e.g. suitable entry or exit points).
- In case of the dependency of different DMAs (i.e. when multiple DMAs are linked to a trajectory or when one DMA is linked to multiple trajectories), the information should be contained in the description of such DMAs within an aggregated HMI in WOC (preferably graphical visualization of impacted DMAs and trajectories) in order to improve the efficiency of the negotiation process.
- The service supporting the information exchange between ASM/DAC and WOC tools on DMA data set as well as the HMI of the tools need to be upgraded in order to provide the operators the possibility to visualise the specific changes during the CDM and not the whole DMA data set.
- The WOC MSS should provide a fully integrated ASM and MT tools interface supporting the assessment and negotiation of changes to both ASM and trajectory profile elements.
- An HMI support should be provided in WOC allowing comparison of the trajectory(ies) recalculated with TTO proposal with the initial one(s) (i.e., automatic recalculation and visualization of the new trajectory based on the TTO input).
- The WOC ASM tool to be upgraded to provide an automatic recalculation of the DMA parameters changed by the application of TTO.
- The WOC tool HMI should allow to rotate the DMA in order to have more visibility of the changes. Currently the rotation is only available through modification of coordinates.

- The CAT tool should provide the support to automatically identify/ pre-select optimal areas for airspace volumes so that to better support the assessments of the operators.

6 Assumptions

The new operating concept and therefore, the technical specifications described in this document, will only work when the majority of MIL Airspace Users is using DMAs for airspace reservation wherever it is applicable and referencing them in OAT FPL. Otherwise the dynamic capacity balancing won't be possible. The same prerequisite applies for TTO proposals to mitigate traffic hot spots.

Another assumption is that the information exchange interfaces developed and used in this solution will become a standard for all State Airspace Users.

7 References and Applicable Documents

7.1 Applicable Documents

This TS/IRS complies with the requirements set out in the following documents:

Content Integration

- [1] D2.15 PJ19-W2: EATMA Guidance (2020) Edition 01.00.00 (June 2021)
- [2] SESAR ATM Lexicon

Content Development

- [3] PJ19 - D2.5 : SESAR Concept of Operations (CONOPS 2019)
- [4] PJ07-W2 - D4.1.004: SESAR Solution PJ07-W2-40 final SPR-INTEROP/OSED for V3 (01.00.01)
- [5] PJ07-W2 - D4.1.009: SESAR Solution PJ07-W2-40 final VALP for V3 (01.00.00)

System and Service Development

- [6] 08.01.01 D52: SWIM Foundation v2
- [7] 08.01.01 D49: SWIM Compliance Criteria
- [8] 08.01.03 D47: AIRM v4.1.0
- [9] 08.03.10 D45: ISRM Foundation v00.08.00
- [10] B.04.03 D102 SESAR Working Method on Services
- [11] B.04.03 D128 ADD SESAR1
- [12] B.04.05 Common Service Foundation Method

Performance Management

- [13] SESAR Performance Framework ed_01_00_01 - 2019

Validation

- [14] PJ07-W2 - D4.1.007: SESAR Solution PJ07-W2-40 Validation Report (00.00.06)

System Engineering

- [15] SESAR 2020 Requirements and Validation Guidelines

Safety

- [16] SESAR Performance Framework ed_01_00_01

Human Performance

[17] SESAR Human Performance Guidance Materials

Environment Assessment

[18].SAM EUROCONTROL Safety Assessment Methodology V2.1
(<https://www.eurocontrol.int/tool/safety-assessment-methodology>)

[19]SESAR Safety Reference Material - latest edition accessible in STELLAR Program Library

Security

[20]

7.2 Reference Documents

[21]ED-78A GUIDELINES FOR APPROVAL OF THE PROVISION AND USE OF AIR TRAFFIC SERVICES SUPPORTED BY DATA COMMUNICATIONS.³

[22]D2.1.030 SESAR Sol. 08.01 Technical Specification (TS/IRS) for V2 Ed 00.01.05

[23]D2.1.080 SESAR Activity PJ.18-01a Technical Specification (TS/IRS) for V3/TRL6 Ed 02.00.02

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