



WP11.1 FOC - Interoperability Requirements (INTEROP) Step 1 & 2 as available

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Abstract

This INTEROP document describes the interoperability requirements in the context of Step 1 and what is available from Step 2 of the SESAR V&V Storyboard viewed from the FOC system and Civil Airspace user's perspective. The purpose of this document is to describe the interoperability requirements for interfacing a FOC with the NM, ATC systems, States and authorities, and other Civil Airspace Users facilities. The connection of the FOC with those systems will enable the Civil Airspace User operations through all phases of the Business Trajectory Lifecycle, including the execution phase. This is the final edition of the INTEROP document. This version is based on the information available at the time this document was developed.

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Executive summary

The present document includes the interoperability requirements from an FOC perspective. It links the specifications done in the P11.01.02 Final FOC OSED [6] with the specifications that are included in the P11.01.03 TS document [7]. It has to be pointed out that the relation between the three documents, this INTEROP document on the one hand and the OSED as well as the TS on the other hand, needs to be considered as a whole. While the OSED describes operational scenarios, processes and services the TS describes the technical functions and techniques that ensure the ability to perform those use cases, processes and services. Besides that the OSED is already defining relevant information exchange requirements that establish the link between the AU's FOC with other ATM domains and in last consequence with their respective capability configurations. The present INTEROP establishes the link between the operational needs described in the OSED and the technical functions and facilities that are used in the TS to describe what the FOC is required to perform and to provide. Hence the INTEROP mentions which information is exchanged between the FOC capability configuration and all other relevant ATM capability configurations. Besides that it links all exchanged information with the functions that need to be provided by the FOC; that are further described in the P11.01.03 TS document.

This INTEROP document as well as the OSED document can then be used to define information flows and data exchange services that will be used in the TS document to describe what information is exchanged between the FOC Capability Configurations (CC) and all other ATM Capability Configurations and what is required in the FOC to provide and process respective information.

At this stage the revised development approach – which is a bottom up approach – impacts the content of this document. As all functions required in the FOC are already defined in the P11.01.03 TS document [8] they are already used in this INTEROP document to mention certain information exchanges between the FOC and other capability configurations. Besides that it needs to be mentioned that, while chapter 2 is referring to all information flows between the FOC and all other capability configurations, the requirements listed in chapter three are only referring to area on which the fly4D consortium was focussing during the last years of work. That means that the requirements in chapter 3 are referring to the areas of interest “Business Trajectory (including Trajectory Management Framework)”, “Free Route”, “Aeronautical Information Management and Meteorology”, “User Driven Prioritisation Process” and “Advanced Flexible Use of Airspace”. This approach allows keeping the requirements listed in chapter 3 on a high maturity level.

1 Introduction

1.1 Purpose of the document

The purpose of this INTEROP document is to provide interoperability requirements that ensure the on-going collaboration between the FOC and the capability configurations of all other ATM stakeholders such as:

- The Network Manager;
- Air Navigation Service Providers;
- States and Authorities;
- Other AU Systems; and
- The Aircraft.

The INTEROP complements the FOC OSED [6] by defining the minimum technical and functional requirements that provide the basis for ensuring compatibility among identified elements of all involved systems using a specific technology imposed as a design constraint (therefore captured as a requirement).

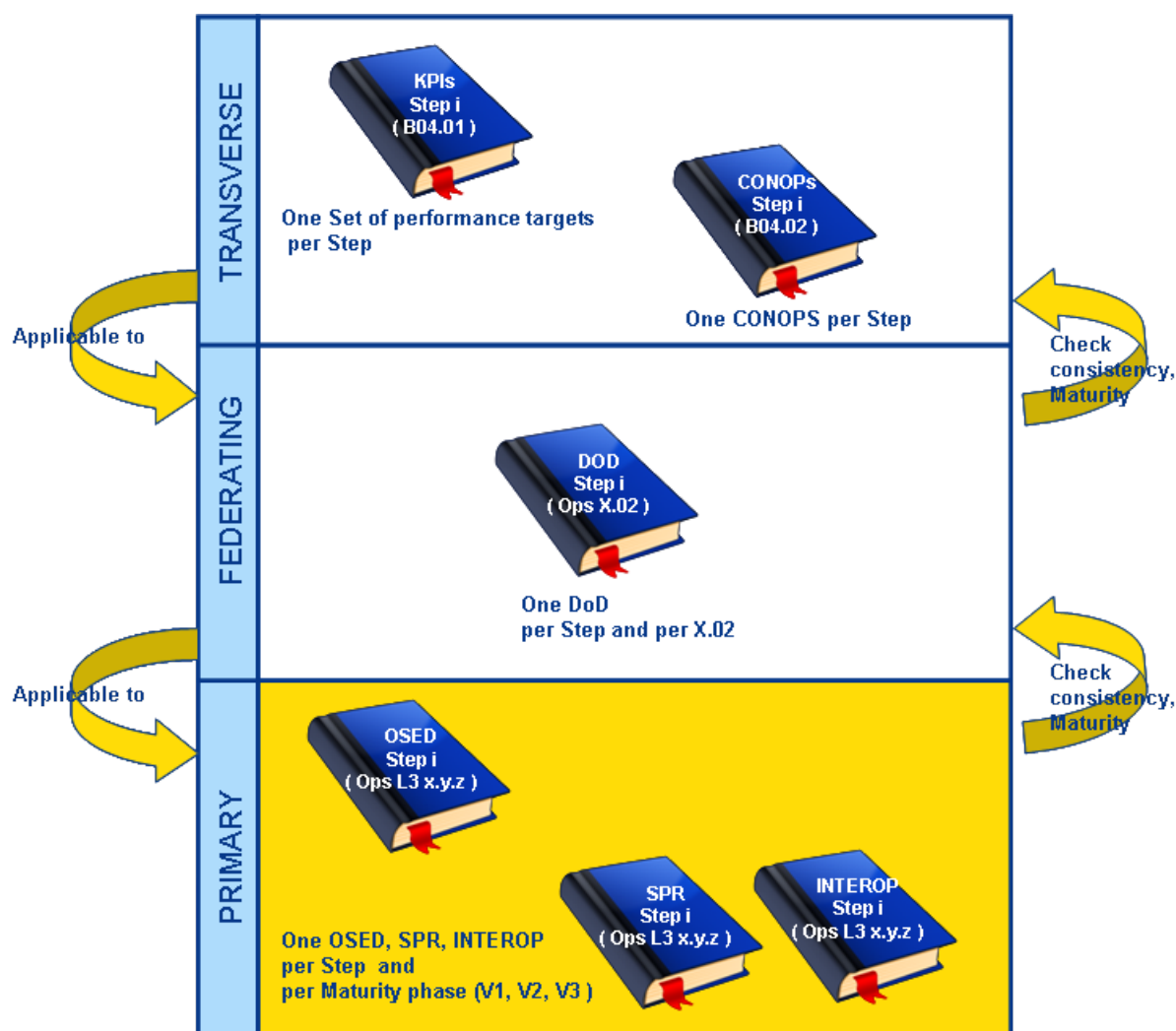


Figure 1: INTEROP document with regards to other SESAR deliverables

In Figure 1, the Steps are driven by the OI Steps addressed by the project in the Integrated Roadmap document.

This INTEROP details the operational concept for the Operational Focus Areas (OFA) referenced to Dataset 16 [5]:

- **Enabling Area 02.01.02:** AIM / MET (Aeronautical Information Management / Meteorology),
- **Enabling Area 03.01.01:** TMF Trajectory Management Framework and System interoperability with air and ground data sharing,
- **Operational Focus Area 03.01.03:** Free Routing
- **Operational Focus Area 03.01.04:** Business and Mission Trajectory, and
- **Operational Focus Area 05.03.01:** Airspace Management and AFUA,
- **Operational Focus Area 05.03.06:** UDPP (User Driven Prioritisation Process).

1.2 Intended readership

The following projects are the focused group of readers of this document:

- **ENB02.01.02:** SESAR members working within this enabling area and related projects for consolidation and as input for their related projects,
- **ENB03.01.01:** SESAR members working within this enabling area and related projects for consolidation and as input for their related projects,
- **OFA03.01.03:** SESAR members working within this operational focus area and related projects for consolidation and as input for their related projects,
- **OFA03.01.04:** SESAR members working within this operational focus area and related projects for consolidation and as input for their related projects,
- **OFA05.03.01:** SESAR members working within this operational focus area and related projects for consolidation and as input for their related projects.
- **OFA05.03.06:** SESAR members working within this operational focus area and related projects for consolidation and as input for their related projects.
- **WP08:** Projects members specifying information exchange services for consolidation and as input for their work,
- **WPB:** Members of transverse and federating projects for architecture and performance modelling;

1.3 Inputs from other projects

P07.06.02 (for UDPP and BMT (including TMF)), P04.03 (for FR) and P07.05.04 (for AFUA) were the main contributors providing operational concepts and description of target architecture.

1.4 Glossary of terms

Glossary and definition of terms can be found in the "SESAR Lexicon" [4].

For a better readability, terms that are used frequently in this document are explained again below.

Term	Definition	Source
Advanced Flexible Use of Airspace	An airspace management concept in which airspace is managed as a single entity and in which there are no fixed structures and airspace reservations for special airspace activity are allocated in real time.	SESAR Consortium (2007) CONOPS Acronyms and Definitions, Task 2.2.2 - Milestone 3

Term	Definition	Source
Airspace Management	The process by which airspace options are selected and applied to meet the needs of the ATM community.	ICAO, Doc 9882 Manual on Air Traffic Management System Requirements 2008, 1st ed., p. F-1
Airspace User	<p>An Airspace User is an organization operating aircraft (in terms of: aerial vehicle). The organization includes the pilots of the aircraft.</p> <p>Airspace Users include:</p> <ul style="list-style-type: none"> • Civil airspace users: airlines (i.e. those engaged in commercial air transport like passenger, mail and cargo services), aerial work, air taxi operators, business aviation, private air transport, sporting and recreational aviation etc.; • Military airspace users: military forces that operate under the sole authority of a state government. <p>Two classifications of flight operations are considered:</p> <ul style="list-style-type: none"> • ICAO-compliant manned or unmanned flight operations; • ICAO non-compliant manned or unmanned flight operations. <p>ICAO-compliant flight operations are those conducted in accordance with ICAO provisions (e.g. SARPs, PANS). Civil airspace users realise ICAO-compliant manned or unmanned flight operations whereas military airspace users realise usually ICAO non-compliant manned or unmanned flight operations. Military airspace users realise ICAO-compliant manned or unmanned flight operations when they operate State aircraft using civil air traffic rules.</p>	WP11.1
ASHTAM	A special series NOTAM notifying by means of a specific format change in activity of a volcano, a volcanic eruption and/or volcanic ash cloud that is of significance to aircraft operations	ATM Lexicon
BIRDTAM	specialized NOTAM providing information regarding bird strike risk or warning	ICAO
Extended Flight Plan	Includes the ICAO Flight Plan and the 4D trajectory computed by the Flight Operation Centre (FOC).	ATM Lexicon
ETOPS	Extended Range Twin Engine Operation: Extended range operations by aircraft with two turbine power units (ETOPS or EROPS) are flights where the flight time at the one power-unit inoperative cruise speed (in ISA and still air conditions), from a point on the route to an adequate alternate aerodrome, is greater than the threshold time approved by the State of the Operator. (ICAO Vocabulary).	ICAO

Term	Definition	Source
Flight Operations Centre (FOC)	Flight Operations Centre is a part (department, employee) of an Airspace User or a system used by an Airspace User providing services and support like operational control, flight planning, pre-flight briefing, in-flight support and post-flight analysed in accordance to AU's Operational Manual and Standard Operational Procedures.	WP11.1
Free Route	Operational concept consisting of the two sub-concepts Direct Routing and Free Routing.	Derived from 4.7.2 Free Route OSED Step 1
Free Routing	The ability for Airspace User to plan/re-plan a route according to the User defined segments.	SJU Free Route Task Force final report
Free Routing Airspace (FRA)	Airspace defined laterally and vertically, allowing Free Routing with a set of entry/exit features. Within this airspace, flights remain subject to air traffic control.	SJU Free Route Task Force final report
	A specified airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) way points, without reference to the ATS route network, subject to airspace availability. Within this airspace, flights remain subject to air traffic control. (Note: In the ERNIP Part 1, the term used is Free Route Airspace instead of Free Routing Airspace)	ERNIP Part 1
Shared Business Trajectory	The trajectory published by the Airspace User that is available for collaborative ATM planning purposes. The refinement of the SBT/SMT is an iterative process. The final form of the SBT/SMT becomes the Reference Business or Mission Trajectory (RBT/RMT) and is part of the filed flight plan.	ATM Lexicon
SNOWTAM	A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format	ATM Lexicon
User Driven Prioritisation Process	A process during periods of reduced capacity in which the service provider declares the available capacity and users, interacting collaboratively and collectively with the provider, propose specific flights to fill it.	P07.06.02

1.5 Acronyms and Terminology

Term	Definition
4D	Four Dimensional
A/G	Air-Ground
ADR	Aeronautical Data Repository
AFUA	Advanced Flexible Use of Airspace

Term	Definition
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIXM	Aeronautical Information Exchange Model
ARES	Airspace Reservation/Restriction
ASM	Airspace Management
ATCO	Air Traffic Controller
ATC	Air Traffic Control
ATFCM	Air Traffic Flow & Capacity Management
ATM	Air Traffic Management
ATMS	Air Traffic Management System
ATS	Air Traffic Service
AU	Airspace User
AUP	Airspace Use Plan
BMT	Business/Mission Trajectory
BT	Business Trajectory
CC	Capability Configuration
CCS	Capacity Constraint Situation
CDM	Collaborative Decision Making
CDR	Conditional Routing
CNS	Communication, Navigation & Surveillance
EATMA	European ATM Architecture
EAUP	European Airspace Use Plan
ECAC	European Civil Aviation Conference
EFPL	Extended Flight Plan
ENB	Enabler
EOBT	Estimated Off-Block Time
ERNIP	European Route Network Improvement Plan

Term	Definition
FCT	Function
FDA	Fleet Delay Apportionment
FOC	Flight Operations Centre
FPL	Flight Plan
GRIB	Gridded Binary
ICAO	International Civil Aviation Organization
ID	Identifier
IER	Information Exchange Requirement
INTEROP	Interoperability Requirements
IRS	Interface Requirements Specification
IRSM	Information Service Reference Model
MET	Meteorology/ Meteorological
METAR	Meteorological Aviation Routine Weather Report
NM	Network Manager
NMF	Network Manager Function
NOTAM	Notice to Airmen
OC	Operating Credit
OFA	Operational Focus Area
OI	Operational Improvement or OPERATING INDEX
OSD	Operational Service and Environment Definition
PANS	Procedures of Air Navigation Services
PANS-ATM	Procedures of Air Navigation Services – Air Traffic Management
PTR	Profile Tuning Restrictions
RBT	Reference Business Trajectory
REJ	Reject Message
REQ	Requirement
RSA	Restricted Airspace

Term	Definition
RTSA	Real Time Status of Airspace
SARPs	Standards and Recommended Practices
SBT	Shared Business Trajectory
SESAR	Single European Sky ATM Research Programme
SESAR Programme	The programme which defines the Research and Development activities and Projects for the SJU.
SFC	Sub-function
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SJU Work Programme	The programme which addresses all activities of the SESAR Joint Undertaking Agency.
STAM	Short-Term ATFCM Measures
SWIM	System Wide Information Management
SWIM TI	SWIM Technical Infrastructure
TAD	Technical Architecture Description
TAF	Terminal Area Forecast
TOBT	Target Off-Block Time
TS	Technical Specification
TSAT	Target Start-up Approval Time
TTA	Target Time of Arrival
TTO	Target Time Over
TTOT	Target Take-off Time
TWR	(Control) Tower
UDPP	User Driven Prioritisation Process
UIBT	User In Block Time (prioritisation given by User)
UOBT	User Off Block Time (prioritisation given by User)
WOC	Wing Operations Centre
WP	Work Package
XML	Extensible Mark-up Language

2 System Description

The Flight Operation Centre, as part of the Civil AU Operations interacts with the majority of capability configurations within the ATM system. The FOC requires certain information and services from other ATM stakeholders to be able to perform certain processes and functions. Besides this the FOC delivers information to the other ATM stakeholders; respectively other capability configurations that are required to effectively and efficiently perform their processes and functions. Figure 2 gives a brief overview of all capability configurations outside the Civil AU Operations, but including the Civil Aircraft¹ capability configuration as well. The relation between the FOC and other capability configurations will only be described on a very high level in this document. For more information on this topic please see the Technical Architecture Document provided by P11.01.03 [7].

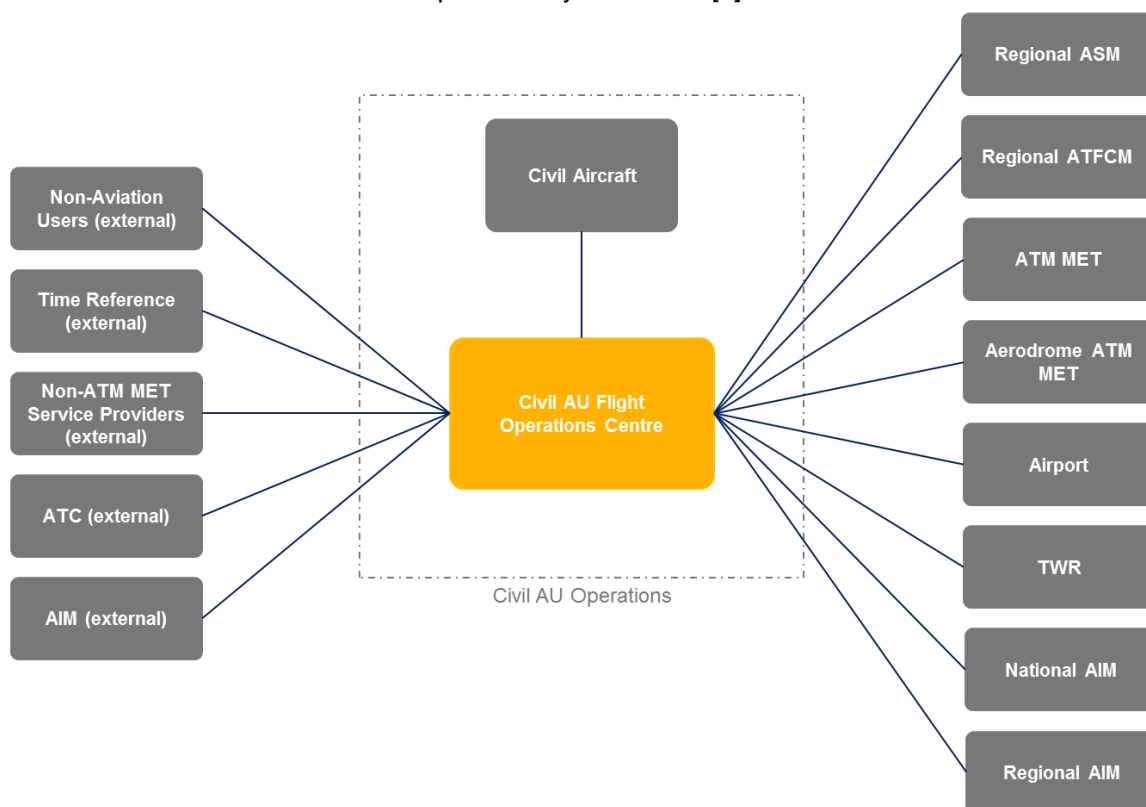


Figure 2: Relation of the FOC to capability configurations within the European ATM Resource Architecture

The capability configurations that have a relation with the FOC can be divided into capability configurations that are part of the European ATM system and external capability configurations. External capability configurations are marked by “(external)” in Figure 2. The term external capability configuration refers to all capability configurations that are either by nature not part of the ATM system (e.g. “Time Reference (external)” or located outside the ECAC area. All these external capability configurations have been arranged on the left side of Figure 2, CCs of the European ATM system have been located on the right hand side, on top (as part of the Civil AU Operations) the CC Civil Aircraft can be found.

The FOC acts as information and service consumer of as well as information and service provider for all of these capability configurations.

Depending on the respective FOC function certain information and services of the respective CC are required or will be provided. That means that the number of relating CCs as well as the information and services used from or provided to the respective CC depends on the described FOC function. The following chapters will give an overview about used and provided information and services in relation of the areas of interest that have been used in the P11.01.02 Step 1 & 2 OSED [6].

¹ The Civil Aircraft belongs to the Civil AU Operations too.

In the context of the SESAR Programme the FOC interacts with the capability configurations listed and described in the following sub-sections. Besides that the following sub sections will mention the information that is exchanged. The descriptions will mainly refer to elements that are available EATMA 7.0 version but might also include elements that are not available in EATMA 7.0 yet.

2.1 Civil Aircraft

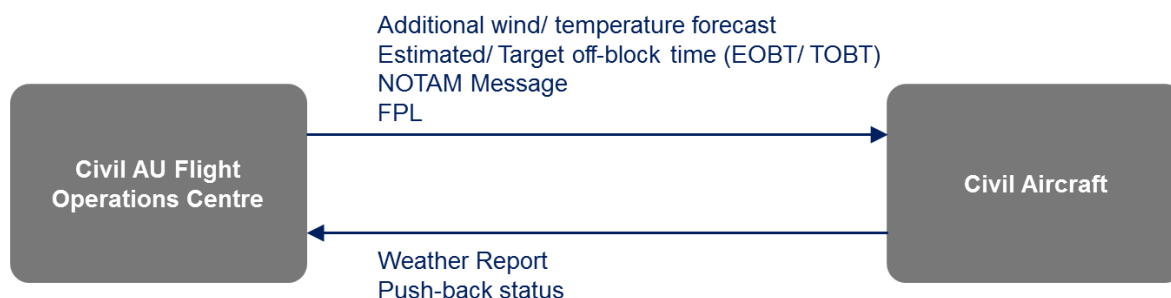


Figure 3: Interoperability between the FOC and the Civil Aircraft Capability Configuration

The FOC will use Weather Reports as well as the Push-back status within the Flight Monitoring function (FCT). The Weather Report information will be used in the context of the Data Monitoring sub-function (SFC) to check whether the weather conditions deviate from the estimated ones. The Push-back status will be used in the context of the Trajectory adherence monitoring SFC to check whether the flight is executed in accordance with the RBT.

Each of the SFC mentioned above might trigger the Flight and Trajectory Planning FCT that will use the received Push-back information as well as provided Weather report information for the planning of a trajectory.

The Configuration Capability Civil Aircraft is the user of the data provided by FOC. The FOC system performs filtering of the data related to the executed trajectory and according preselected filtering criteria (airport, time, lateral/vertical limits, etc.). The FOC is the provider of the IntegratedDigitalBriefing service, and it is sending updates of the NOTAM and Airspace structure to the Flight Deck. The information is sent in XML format using AIXM standard.

In Step 2 it is expected the usage of the A-G SWIM (SWIM Purple Profile).

2.2 Regional ASM



Figure 4: Interoperability between FOC and Regional ASM Capability Configuration

The FOC will use EAUP RSA, EAUP CDR, EAUP Chain related information but also Real Time Status of Airspace information from the Regional ASM CC within the Flight Monitoring FCT/ Data Monitoring SFC to assess whether changes of such data would impact any of the flights planned by the AU. Besides that the EAUP related information is also used by the Flight and Trajectory Planning FCT to plan trajectories in accordance with the European Airspace Use Plan (EAUP).

2.3 Regional ATFCM

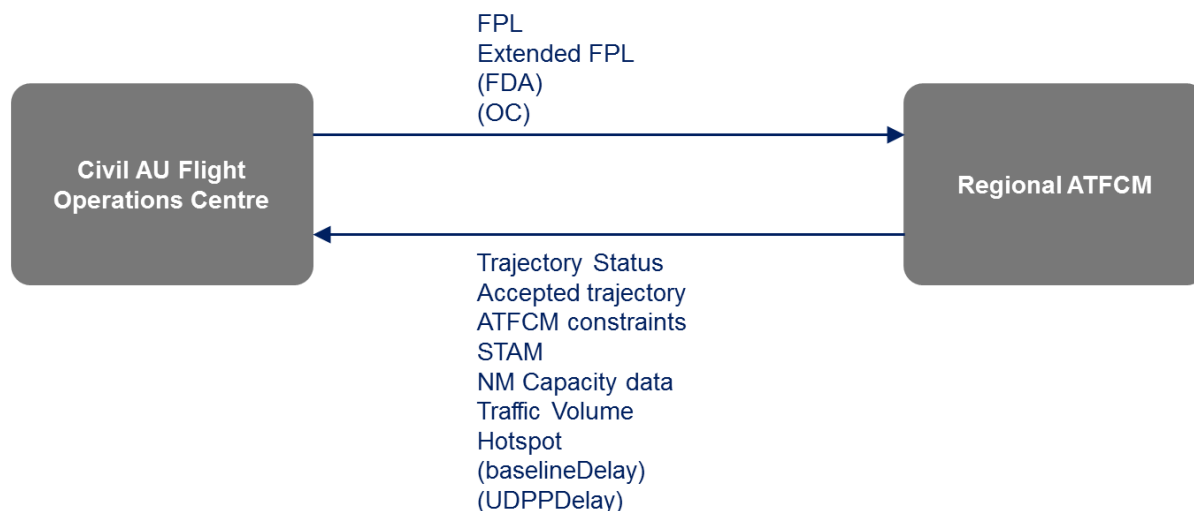


Figure 5: Interoperability between the FOC and the Regional ATFCM Capability Configuration

ATFCM constraints and STAM will be used by the Flight and Trajectory Planning FCT for the planning of trajectories as well as in the Flight Monitoring FCT; respectively Data Monitoring SFC. The Flight Monitoring FCT will also monitor the Trajectory Status and the Accepted trajectory that are provided by the ATFCM CC too. This monitoring might trigger the Flight and Trajectory Planning in case that a trajectory has been suspended.

In case of a what-if assessment the Flight and Trajectory Planning FCT will use the NM Capacity data, Traffic Volume data as well as Hotspot data to plan trajectories in accordance with this information.

The FPL and Extended FPL data that is provided to the Regional ATFCM CC will be provided by the Flight and Trajectory Planning FCT.

Based on UDPP specific information (Baseline Delay and UDPP delay UOBT/UIBT) received from Regional ATFCM, the Civil AU Flight Operations Centre will calculate optimized flight specific preferences and priorities in order to reduce the cost impact caused by ATFCM constraints. According to the UDPP rules the corresponding calculated FDA values and Operational Credits for individual flights will be submitted from the Civil AU Flight Operations Centre to Regional ATFCM. This process might have multiple iterations.

2.4 ATM-MET

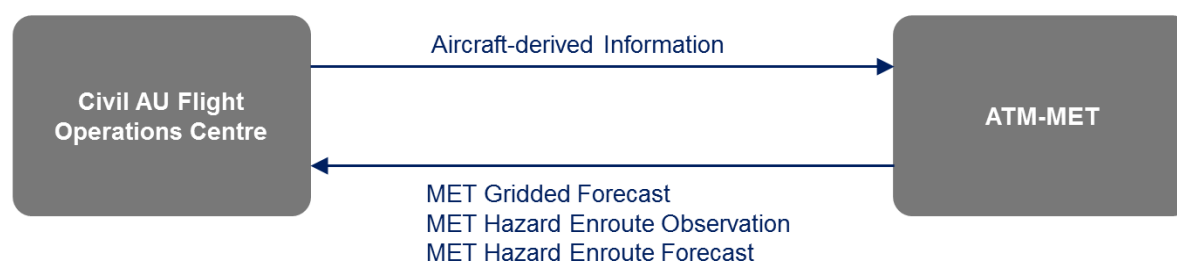


Figure 6: Interoperability between the FOC and the ATM-MET Capability Configuration

MET Gridded Forecast, MET Hazard Enroute Observation and MET Hazard Enroute Forecast information will be used by the Flight and Trajectory Planning function when trajectories are planned, in the Flight Monitoring FCT or more particular Data Monitoring SFC to assess whether changes of the meteorological conditions require might have impact onto a flight and the trajectory planned for it.

Updated MET Gridded Forecast, MET Hazard Enroute Observation and MET Hazard Enroute Forecast information will – if required – be used by the Flight Deck Support FCT (Briefing SFC as well as Dynamic Data Provision SFC) to inform flight crews about the meteorological conditions en-route. MET Gridded Forecast, MET Hazard Enroute Observation and MET Hazard Enroute Forecast information will firstly be processed by the Data Processing and Notification FCT.

The Data Processing and Notification FCT will provide Aircraft-derived Information (meteorological data) that has been reported by the aircraft.

2.5 Aerodrome ATM MET



Figure 7: Interoperability between the FOC and the Aerodrome ATM-MET Capability Configuration

Airport MET Forecast, Airport MET Observation, Airport MET Nowcast, SNOWTAM, METAR and TAF information will be used by the Flight and Trajectory Planning function when trajectories are planned, in the Flight Monitoring FCT or more particular Data Monitoring SFC to assess whether changes of the meteorological conditions require might have impact onto a flight and the trajectory planned for it. Updated Airport MET Forecast, Airport MET Observation, Airport MET Nowcast, SNOWTAM, METAR and TAF information will – if required – be used by the Flight Deck Support FCT (Briefing SFC as well as Dynamic Data Provision SFC) to inform flight crews about the meteorological conditions at the airports

2.6 Airport



Figure 8: Interoperability between the FOC and the Airport Capability Configuration

In the current representation of EATMA (v.7) the Airport CC only provides the Target Off Block Time Setting and the Airport Flight Information Publication. Besides that further information on the airport milestones as TSAT, taxi-out times, taxi-in time etc. is expected to be provided by the airport. Such information would be used by the Flight and trajectory planning FCT to plan trajectories in accordance with such provisions. Besides that the Data Monitoring SFC within the Flight Monitoring FCT will trace changes of such information to assess whether a change suspends the planned trajectory. Furthermore such information might be provided to the flight crews through the Flight Deck Support FCT.

In principle the FOC should also provide FPL; respectively Extended FPL information to the Airport as planned in the Flight and Trajectory FCT. This might be required by the Airports to better plan the

departure and arrival sequences and to plan the ground facility and parking stands for the whole traffic that can be expected. Further updates with regard to that are expected in EATMA in the context of SESAR2020.

2.7 TWR



Figure 9: Interoperability between the FOC and the TWR Capability Configuration

Airport MET Forecast, Airport MET Observation, Airport MET Nowcast, SNOWTAM, METAR and TAF information will be used by the Flight and Trajectory Planning function when trajectories are planned, in the Flight Monitoring FCT or more particular Data Monitoring SFC to assess whether changes of the meteorological conditions require might have impact onto a flight and the trajectory planned for it.

Updated Airport MET Forecast, Airport MET Observation, Airport MET Nowcast, SNOWTAM, METAR and TAF information will – if required – be used by the Flight Deck Support FCT (Briefing SFC as well as Dynamic Data Provision SFC) to inform flight crews about the meteorological conditions at the airports.

AirportMETInducedCapacityReduction and RunwayManagementInformation will be used by the Data Monitoring SFC within the Flight Monitoring FCT to assess whether any change of this information requires further actions to be taken. Those actions might mainly be performed in the Operations Control SFC and UDPP SFC that will try to react on those changes by increasing certain priorities of concerned flights, but might also trigger the Flight and Trajectory Planning if a trajectory re-planning is assumed to be more appropriate.

2.8 National AIM

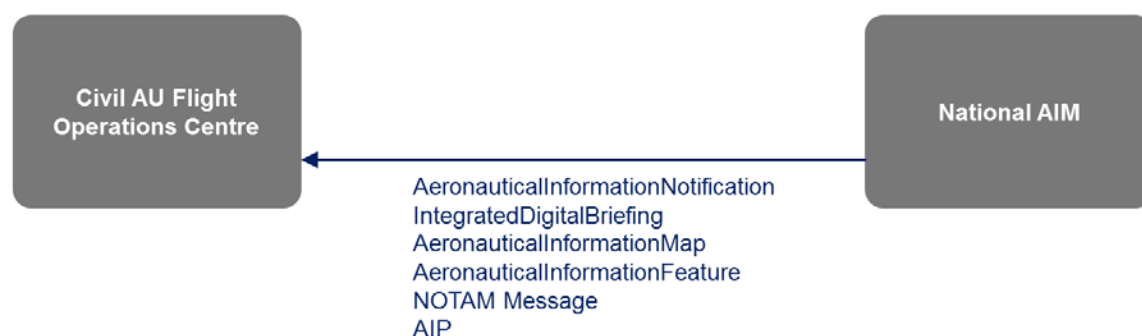


Figure 10: Interoperability between the FOC and the National AIM Capability Configuration

The FOC will use the data received via the services AeronauticalInformationNotification, AeronauticalInformationMap, and AeronauticalInformationFeature in the Flight and Trajectory Planning FCT as well as in the Flight Monitoring FCT. The information received is used as basis for the trajectory calculation but also later in order to check in the flight monitoring whether there have been changes which might eventually require action. Furthermore, relevant data is also made available to

the Flight Deck by the Dynamic Data Provision SFC of the Flight Deck Support FCT (via the A/G Communication function).

This is also valid for the data received in NOTAM messages and the data retrieved from the AIP.

The Integrated Digital Briefing service is used in the Flight Deck Support Function and in there in the Briefing subfunction. This is especially important for General Aviation and Business Aviation.

2.9 Regional AIM

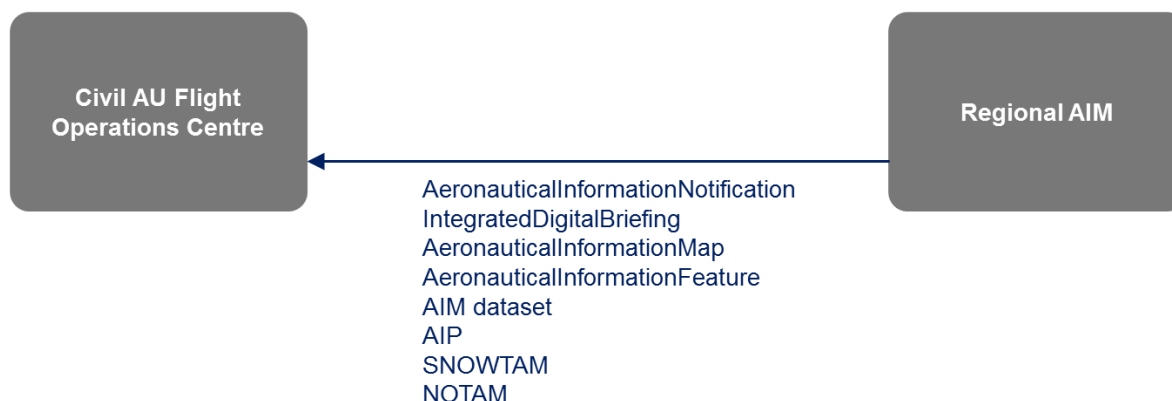


Figure 11: Interoperability between the FOC and the Regional AIM Capability Configuration

Similar to the National AIM the FOC will use the data received via the services AeronauticalInformationNotification, AeronauticalInformationMap, and AeronauticalInformationFeature in the Flight and Trajectory Planning FCT as well as in the Flight Monitoring FCT. The information received is used as basis for the trajectory calculation but also later in order to check in the flight monitoring whether there have been changes which might eventually require action. Furthermore, relevant data is also made available to the Flight Deck by the Dynamic Data Provision SFC of the Flight Deck Support FCT (via the A/G Communication function).

This is also valid for the data received in NOTAM messages and the data retrieved from the AIP.

The Integrated Digital Briefing service is used in the Flight Deck Support FCT and in there in the Briefing SFC. This is especially important for General Aviation and Business Aviation.

The Configuration Capability AIM is part of the AIM Domain System (DS AIM) and will provide aeronautical information and static and dynamic airspace and NOTAM data. Within DS AIM the ADR (Aeronautical Data Repository) shall act as a single source for aeronautical and airspace management information, providing all data according to one common standard.

The ADR is the source of digital NOTAM. The FOC will request the ADR for NOTAM, BIRDTAM, ASHTAM and SNOWTAM. Aeronautical information will be sent in XML format using AIXM standard.

In Step 2 it is expected that the G-G SWIM will be used (SWIM Yellow Profile).

2.10 Time Reference (External)



Figure 12: Interoperability between the FOC and the Time Reference Capability Configuration

The reference time received from an external time reference is used in all functions and subfunctions in which time-dependent information is used. This is necessary to ensure that there is no ambiguity in the time (both internal to the FOC but also with regard to external stakeholders).

2.11 Non-ATM MET Service Providers (External)



Figure 13: Interoperability between the FOC and the Non-ATM MET Service Providers (External) Capability Configuration

Significant Weather Observation, Significant Weather Forecast and GRIB information will be used by the Flight and Trajectory Planning FCT when trajectories are planned, in the Flight Monitoring FCT or more particular Data Monitoring SFC to assess whether changes of the meteorological conditions require might have impact onto a flight and the trajectory planned for it.

Updated Significant Weather Observation, Significant Weather Forecast and GRIB information will – if required – be used by the Flight Deck Support FCT (Briefing SFC as well as Dynamic Data Provision SFC) to inform flight crews about the meteorological conditions en-route.

Significant Weather Observation, Significant Weather Forecast and GRIB information will firstly be processed by the Data Processing and Notification FCT.

2.12 ATC (External)



Figure 14: Interoperability between the FOC and the ATC (External) Capability Configuration

The Flight and Trajectory Planning FCT provides (via the SWIM TI function or the G/G Communication function) the flight plan to the ATC (External) in the context of flight plan filing.

2.13 AIM (External)

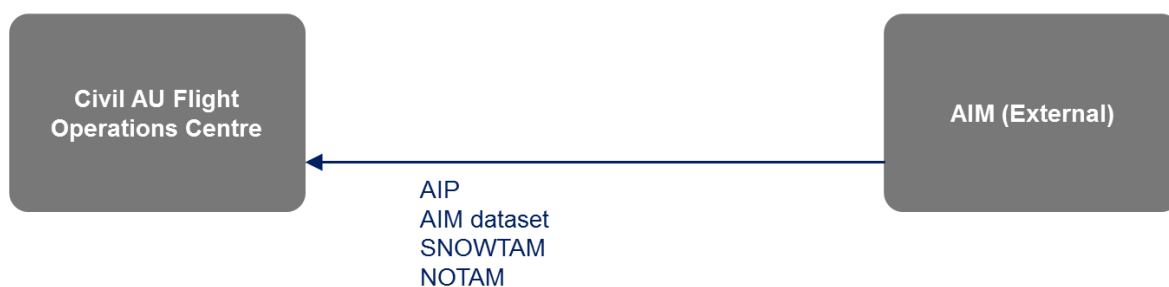


Figure 15: Interoperability between the FOC and the AIM (External) Capability Configuration

Similar to National and Regional AIM, the FOC will use the AIP data, the AIM dataset, the SNOWTAM and the NOTAM messages in the Flight and Trajectory Planning FCT as well as in the Flight Monitoring Function. The information received is used as basis for the trajectory calculation but also later in order to check in the flight monitoring whether there have been changes which might eventually require action. Furthermore, relevant data is also made available to the Flight Deck by the Dynamic Data Provision SFC of the Flight Deck Support Function (via the A/G Communication function).

3 Interoperability Requirements

The requirements listed in the sections below follow the structure chosen in the Final FOC Step 1 & 2, as available, OSED [6]. The structure includes the following areas of interest where the fly4D consortium focussed within the last few years: Business Trajectory (including Trajectory Management Framework), Free Route, Aeronautical Information Management, Advanced Flexible Use of Airspace, User Driven Prioritization Process.

While chapter 2 describes all information exchanges with the other capability configurations and links them with the functions of the FOC, the following sections will only list requirements that are related to the areas of interests in which the fly4D consortium was involved in.

While the requirements will only be listed without further allocation to sub-chapters their requirement IDs will inform about their affiliation to a certain area of interest.

The interoperability requirement ID numbering is based on the following rules:

Requirements will use the following ID-key:

REQ-11.01.02-INTEROP-nnnn.mmmm:

Where ‘nnnn’ describes the affiliation to an area of interest in accordance with Table 1;

nnnn	Area of interest
0001	Business Trajectory (including Trajectory Management Framework)
0002	Free Route
0003	Aeronautical Information Management
0004	Advanced Flexible Use of Airspace
0005	User Driven Prioritization Process

Table 1: Requirement allocation to area of interest

and ‘mmm’ is used as a unique number identifying the single requirements. The numbering is started individually for every area of interest group. The counting interval is 10 (ten).

3.1 Requirements for ATS CNS/ATM Applications

[REQ]

Identifier	REQ-11.01.02-INTEROP-0001.0010
Requirement	The FOC CC shall provide Extended FPL data to the Regional ATFCM CC
Title	Provision of EFPL
Status	<Validated>
Rationale	The EFPL will be used for different CDM processes established between the Civil AU operations and the Network Operations. These processes include the <ul style="list-style-type: none"> - Maintenance of the SBT; - Revision of RBT, and - What-if/ CDM assessment.
Category	<Interoperability>
Validation Method	<Live Trial><Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0010	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0020	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB03.01.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.04	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0001.0020
Requirement	The FOC CC shall be able to process 'Trajectory Status' information provided by the Regional ATFCM CC.
Title	Extended FPL validation result – Trajectory Status
Status	<In Progress>
Rationale	If the FOC sends an Extended FPL to the Network Operations the data will be validated. Upon the validation a Trajectory status, which is either 'valid' or 'invalid' will be provided to the Extended FPL provider.
Category	<Interoperability>
Validation Method	<Live Trial><Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0030	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB03.01.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.04	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0001.0030
Requirement	The FOC CC shall be able to process the 'Accepted Trajectory' information provided by the Regional ATFCM CC.
Title	Extended FPL validation result – Accepted Trajectory
Status	<In Progress>
Rationale	If the FOC sends an Extended FPL to the Network Operations the data will be validated. As in some case the provided trajectory needs to be adapted to consider e.g. PTRs .the Network Operations will return the trajectory as it was accepted by it.
Category	<Interoperability>
Validation Method	<Live Trial><Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0030	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB03.01.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.01	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0001.0040
Requirement	The FOC CC shall be able to process the 'ATFCM Constraints' information provided by the Regional ATFCM CC.
Title	Extended FPL validation result – ATFCM Constraints
Status	<In Progress>
Rationale	If the FOC sends an Extended FPL to the Network Operations the data will be validated. In case that the trajectory in the Extended FPL has been rejected the Network Operations will provide the ATFCM constraint information related to constraints that prevent the acceptance of the trajectory.

	In case that the trajectory in the Extended FPL has been accepted but NM has to adapt it due to PTRs that have to be integrated the Network Operations node will provide respective PTR as ATFCM constraint information.
Category	<Interoperability>
Validation Method	<Live Trial><Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0030	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB03.01.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.01	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0001.0050
Requirement	The FOC CC shall be able to process the 'NM Capacity Data' information provided by the Regional ATFCM CC.
Title	What-if assessment – NM Capacity Data
Status	<In Progress>
Rationale	In case that the Network Operations is requesting the assessment of a certain traffic scenario to find a collaborative solution to resolve e.g. a hotspot a what-if assessment will be initiated. AUs that want to participate in such a what-if assessment will be required to process certain scenario data and to provide Extended FPL or FPL data in accordance with such information. The information referred to in this requirement specifies the capacity that is available in a certain airspace volume.
Category	<Interoperability>
Validation Method	<Live Trial><Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0030	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB03.01.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.01	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0001.0060
Requirement	The FOC CC shall be able to process the 'Traffic Volume' information provided by the Regional ATFCM CC.
Title	What-if assessment – Traffic Volume
Status	<In Progress>
Rationale	In case that the Network Operations is requesting the assessment of a certain traffic scenario to find a collaborative solution to resolve e.g. a hotspot a what-if assessment will be initiated. AUs that want to participate in such a what-if assessment will be required to process certain scenario data and to provide Extended FPL or FPL data in accordance with such information. The information referred to in this requirement specifies the demand that is expected in a certain airspace volume.
Category	<Interoperability>
Validation Method	<Live Trial><Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0030	<Full>

<APPLIES_TO>	<Operational Focus Area>	ENB03.01.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.01	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0001.0070
Requirement	The FOC CC shall be able to process the 'Hotspot' information provided by the Regional ATFCM CC.
Title	What-if assessment – Hotspot
Status	<In Progress>
Rationale	In case that the Network Operations is requesting the assessment of a certain traffic scenario to find a collaborative solution to resolve e.g. a hotspot a what-if assessment will be initiated. AUs that want to participate in such a what-if assessment will be required to process certain scenario data and to provide Extended FPL or FPL data in accordance with such information. The information referred to in this requirement specifies areas where the traffic volume is estimated to exceed the expected capacity at this location.
Category	<Interoperability>
Validation Method	<Live Trial><Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0030	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB03.01.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.01	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0001.0080
Requirement	The FOC CC shall be able to process the 'STAM' information provided by the Regional ATFCM CC.
Title	SBT suspension - STAM
Status	<In Progress>
Rationale	The Network Operations function will assess whether a trajectory that has been provided by the FOC CC can still be accommodated in the airspace. If not the Network Operations will create a Short Term ATM Measure to resolve the issue. This STAM is not an ATFCM constraint but rather an advisory how the AU could adapt the planned trajectory to comply with the reason behind the STAM.
Category	<Interoperability>
Validation Method	<Live Trial><Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0030	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB03.01.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.01	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0001.0090
Requirement	Information provided by the Regional ATFCM CC shall be processed in real time.
Title	SBT validation response time
Status	<In Progress>
Rationale	NM shall send validation responses in real time after receiving the SBT via the functional block communication management
Category	<Performance>

Validation Method	<Live Trial><Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSD-BMT1.0030	<Full>

[REQ]

Identifier	REQ-11.01.02-INTEROP-0002.0010
Requirement	The FOC CC shall be able to process the 'Free Routing Airspace Volume Availability' provided by the National AIM CC.
Title	Provision of the Free Routing Airspace Volume Availability by National AIM
Status	<In Progress>
Rationale	In order to be able to calculate a valid Free Route trajectory, the FOC is required to know the Free Routing Airspace Volume Availability.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSD-FRA3.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRFP.0102	<Full>
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0002.0020
Requirement	The FOC CC shall be able to process the 'Free Routing Airspace Volume Availability' provided by the Regional AIM CC.
Title	Provision of the Free Routing Airspace Volume Availability by Regional AIM
Status	<In Progress>
Rationale	In order to be able to calculate a valid Free Route trajectory, the FOC is required to know the Free Routing Airspace Volume Availability.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSD-FRA3.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRFP.0102	<Full>
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0002.0030
Requirement	The FOC CC shall be able to process the 'Free Routing Airspace Time Availability' provided by the National AIM CC.
Title	Provision of the Free Routing Airspace Time Availability by National AIM
Status	<In Progress>
Rationale	In order to be able to calculate a valid Free Route trajectory, the FOC is required to know the Free Routing Airspace Time Availability.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-FRA3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRFP.0103	<Full>
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0002.0040
Requirement	The FOC CC shall be able to process the 'Free Routing Airspace Time Availability' provided by the Regional AIM CC.
Title	Provision of the Free Routing Airspace Time Availability by Regional AIM
Status	<In Progress>
Rationale	In order to be able to calculate a valid Free Route trajectory, the FOC is required to know the Free Routing Airspace Time Availability.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-FRA3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRFP.0103	<Full>
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0002.0050
Requirement	The FOC CC shall be able to process the 'Free Routing Airspace flight planning rules' provided by the National AIM CC. The flight planning rules include: <ul style="list-style-type: none"> Allowed segment lengths (minimum/maximum) Usable points for flight planning Entry/exit conditions (both horizontal and vertical)
Title	Provision of the Free Routing Airspace flight planning rules by National AIM
Status	<In Progress>
Rationale	In order to be able to calculate a valid Free Route trajectory, the FOC is required to know the flight planning rules applicable in the Free Routing Airspace.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-FRA3.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRFP.0104	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRFP.1002	<Full>
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0002.0060
Requirement	The FOC CC shall be able to process the 'Free Routing Airspace flight planning rules' provided by the Regional AIM CC. The flight planning rules include: <ul style="list-style-type: none"> Allowed segment lengths (minimum/maximum) Usable points for flight planning Entry/exit conditions (both horizontal and vertical)
Title	Provision of the Free Routing Airspace flight planning rules by Regional AIM
Status	<In Progress>
Rationale	In order to be able to calculate a valid Free Route trajectory, the FOC is

	required to know the flight planning rules applicable in the Free Routing Airspace.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-FRA3.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRFP.0104	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-04.07.02-SPR-FRFP.1002	<Full>
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.03	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0004.0010
Requirement	The FOC CC shall be able to process the 'Real Time Status of Airspace' provided by the Regional ASM.
Title	Provision of the Real Time Status of Airspace by Regional ASM
Status	<In Progress>
Rationale	In order to be able to react to short term changes in the ARES status, the FOC needs to have this Real Time Status of Airspace information.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-FUA3.0010	<Full>
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0010
Requirement	The functional block <Data Management> shall be able to send request for AIM data (D-NOTAM) to data provider via functional block <Communication Management>
Title	AIM data request
Status	<In Progress>
Rationale	The functional block <Data Management> needs to define and send the demand for AIM data in accordance with relevant RBT/SBT, using SWIM
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0010	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<ALLOCATED_TO>	<Functional block>	Communication Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0020
Requirement	The request for AIM data shall use XML-based message format
Title	AIM data format
Status	<In Progress>
Rationale	The Functional Block <Data Management> needs to define and send the

	AIS data demand in structured message format suitable for machine processing
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0010	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<ALLOCATED_TO>	<Functional block>	Communication Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0030
Requirement	The format of the AIM data shall be AIXM
Title	AIXM data format
Status	<In Progress>
Rationale	The XXX functional block needs to receive the AIM data from data provider via SWIM in AIXM format
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0010	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<ALLOCATED_TO>	<Functional block>	Communication Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0040
Requirement	The Functional Block <Data Management> shall receive AIM data from data provider via Functional Block <Communication Management> on request/reply and publish/subscription basis
Title	AIM data receiving
Status	<In Progress>
Rationale	The Functional Block <Data Management> needs to receive the AIM data from data provider (via Functional Block <Communication Management>) in accordance with a previously initiated request or subscription.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0010	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<ALLOCATED_TO>	<Functional block>	Communication Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0050
Requirement	The Functional Block <Data Management> shall provide AIM data to other Functional Blocks of the FOC system on request
Title	AIM data to other FB's of the FOC system

Status	<In Progress>
Rationale	The Functional Block <Data Management> is receiving, processing, storing and distributing all data required in the other Functional Blocks.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0040	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0050	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0020	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Data Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0060
Requirement	The AIM data shall be available from the source within 60 seconds since the request has been received.
Title	Response time
Status	<In Progress>
Rationale	The AIM data originator shall send reply within 60 seconds since the request from functional block <Communication Management> has been received
Category	<Performance>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0010	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<ALLOCATED_TO>	<Functional block>	Communication Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0070
Requirement	The Functional Block <Flight Management> shall provide on request the briefing package (ePIB) to the user performing Flight and Trajectory Planning
Title	ePIB for Flight and Trajectory planning
Status	<In Progress>
Rationale	The Functional Block <Flight Management> shall provide the briefing package (ePIB) to the user which is performing the Flight and Trajectory Planning, to gain knowledge about all related AIM/MET information that could have influence on the flight trajectory building process.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0050	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0060	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0070	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0080	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0030	<Full>

<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0080
Requirement	The Functional Block <Flight Management> shall provide on request the briefing package (ePIB) to the user performing pre-flight briefing
Title	ePIB for Flight and Trajectory planning
Status	<In Progress>
Rationale	The Functional Block <Flight Management> shall provide the briefing package (ePIB) to the user which is performing the pre-flight briefing, to gain knowledge about all related AIM/MET information that could have influence on the planned flight trajectory.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0050	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0060	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0070	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0080	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0040	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0090
Requirement	The Functional Block <Flight Management> shall provide on request the briefing package (ePIB) to the user performing on-board briefing
Title	ePIB for Flight and Trajectory planning
Status	<In Progress>
Rationale	The Functional Block <Flight Management> shall provide the briefing package (ePIB) to the user which is performing the on-board briefing, to gain knowledge about all related AIM/MET information that could have influence on the planned flight trajectory, including updates
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0030	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0040	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0050	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0060	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0070	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0080	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0050	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0003.0100
Requirement	The on-board electronic device shall meet the interoperability criteria to be able to provide uninterrupted information to the Flight Crew during flight execution (connectivity, hardware, software).
Title	EID criteria

Status	<In Progress>
Rationale	The electronic on-board electronic device that is used on-board by Flight Crew during flight execution shall be able to send and receive data (connectivity), to display these data (software, hardware)
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-11.01.02-OSED-AIM3.0030	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0040	<Full>
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-AIM1.0050	<Full>
<APPLIES_TO>	<Operational Focus Area>	ENB02.01.02	N/A
<ALLOCATED_TO>	<Functional block>	Flight Management	N/A

[REQ]

Identifier	REQ-11.01.02-INTEROP-0005.0010
Requirement	The Functional Block <Data Management> shall receive information about CCS/HSPT from ATFCM via Functional Block <Communication Management>
Title	Receive CCS/HSPT information
Status	<In Progress>
Rationale	Initiate UDPP rules in FOC
Category	<Interoperability>
Validation Method	<Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<ALLOCATED_TO>	<Functional block>	Communication Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA 05.03.06	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-UDPP1.0020	<Full>

[REQ]

Identifier	REQ-11.01.02-INTEROP-0005.0020
Requirement	The Functional Block <Data Management> shall receive information about baseline delay for individual flights effected by CCS/HSPT from ATFCM via Functional Block <Communication Management>
Title	Receive base line delay information
Status	<In Progress>
Rationale	Enable FOC to perform cost calculation
Category	<Interoperability>
Validation Method	<Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<ALLOCATED_TO>	<Functional block>	Communication Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA 05.03.06	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-UDPP1.0040	<Full>

[REQ]

Identifier	REQ-11.01.02-INTEROP-0005.0030
Requirement	The Functional Block <Data Management> shall receive OI information for published CCS/HSPT from ATFCM via Functional Block <Communication Management>
Title	OI information

Status	<In Progress>
Rationale	Enable FOC to perform SFP processes
Category	<Interoperability>
Validation Method	<Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<ALLOCATED_TO>	<Functional block>	Communication Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA 05.03.06	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-UDPP1.0040	<Full>

[REQ]

Identifier	REQ-11.01.02-INTEROP-0005.0040
Requirement	The functional block communication management shall transmit FDA and OC values to ATFCM received via functional block data management
Title	AU UDPP data exchange
Status	<In Progress>
Rationale	Enable the FOC to partizipate in UDPP process
Category	<Interoperability>
Validation Method	<Real Time Simulation><Shadow Mode>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Data Management	N/A
<ALLOCATED_TO>	<Functional block>	Communication Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA 05.03.06	N/A
<SATISFIES>	<ATMS Requirement>	IER-11.01.02-OSED-UDPP1.0030	<Full>

3.2 Dynamic functions / operations

Dynamic functions/ operations have not been identified yet. This chapter might be updated within SESAR 2020.

3.3 Unique characteristics

No characteristics have been identified that require a unique handling for the FOC.

4 References

4.1 Applicable Documents

This INTEROP complies with the requirements set out in the following documents:

- [1] Template Toolbox 03.01.03
<https://extranet.sesarju.eu/Programme%20Library/SESAR%20Template%20Toolbox.dot>
- [2] Requirements and V&V Guidelines 03.01.00
<https://extranet.sesarju.eu/Programme%20Library/Requirements%20and%20VV%20Guidelines.doc>
- [3] Templates and Toolbox User Manual 03.01.01
<https://extranet.sesarju.eu/Programme%20Library/Templates%20and%20Toolbox%20User%20Manual.doc>
- [4] EUROCONTROL ATM Lexicon
<https://extranet.eurocontrol.int/http://atmlexicon.eurocontrol.int/en/index.php/SESAR>

4.2 Reference Documents

- [5] WPB.01 Integrated Roadmap Latest version
- [6] D11.01.02-1cb-D08-Final FOC Step 1 & 2, as available, OSED, Edition 00.01.01;
https://extranet.sesarju.eu/WP_11FW/Project_11.01.02/Project%20Plan/03%20-%20Deliverables/FOC/Step%202/OSED%20Working%20Version%20-%20external%20review/D11.01.02-1cb-D08-Final%20FOC%20Step%201%20and%20Step%202,%20as%20available,%20OSED.doc
- [7] D11.01.03-D19, Technical Architecture Description; Edition 01.00.00;
https://extranet.sesarju.eu/WP_11FW/Project_11.01.03/Project%20Plan/Deliverables/P11.01.03%20-%20D19%20-%20Civil%20AU%20Operations%20Centre%20TAD_00.01.00.doc
- [8] D11.01.03 D24 Technical Specification Step 1 and Step 2 for FOC system (including IRS requirements); Edition 01.00.00;
https://extranet.sesarju.eu/WP_11FW/Project_11.01.03/Project%20Plan/Deliverables/D24%20-%20D11%201%203-TS%20-%20Technical%20Specification%20Step%201%20and%20Step%202%20for%20FOC%20System%20-%20Edition%2001.00.00.doc
- [9] P04.07.02 - D63 - Free Route Safety and Performance Requirements (SPR) for Step 1, Edition 00.01.00b
[https://extranet.sesarju.eu/releasehome/OFA03.01.03/Working%20Library/OFA%2003.01.03%20Deliverables/OFA%20SPR%20Step%201/04.07.02-D63%20Free%20Route%20Safety%20and%20Performance%20Requirements%20\(SPR\)%20for%20Step%201%20v00.01.00b.docx](https://extranet.sesarju.eu/releasehome/OFA03.01.03/Working%20Library/OFA%2003.01.03%20Deliverables/OFA%20SPR%20Step%201/04.07.02-D63%20Free%20Route%20Safety%20and%20Performance%20Requirements%20(SPR)%20for%20Step%201%20v00.01.00b.docx)

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