



Advanced Flexible Use of Airspace Safety and Performance Requirements for Step 1

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Abstract

This document describes the Safety and Performance Requirements in relation with the SESAR Advanced Flexible Use of Airspace concept. The concept is addressed by SESAR Solution #31. The main concept elements described by these requirements are airspace organisation and management, airspace reservation, airspace allocation, airspace activation/de-activation, post-ops analysis (including KPA-KPIs). The document is reflecting the results from VP-015, VP-016, VP-017, VP-710 and VP-717 validation exercises.

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Executive summary

The Safety and Performance Requirements (SPR) document is related to the SESAR Project 07.05.04 Flexible Airspace Management in Step 1.

This document summarizes the operational concept of the Advanced Flexible Use of Airspace, which is addressed by **SESAR Solution #31**: "Variable profile military reserved areas and enhanced (further automated) civil-military collaboration".

This SPR document includes a description of the Operational Services associated to this concept for long term planning, medium-short term planning and execution phases - from airspace definition, planning of civil traffic/military operations from weeks ahead up to their execution - and related to post-operational analysis - having "lessons learned" from the past.

The safety and performance requirements are described, ordered by the operational service they are related to:

- Airspace Organisation & Management Operational Service. The requirements describe:
 - Airspace actors at national level and the way airspace should be organised for a better performance without hampering safety;
 - Definition of Variable Profile Area (VPA) airspace as well as legacy non-VPA airspace, both of them being called ARES for Area Reservation/Restriction.

The Key Performance Indicators requirements, stated in this part as the evaluators of airspace organisation and management, propose measurements of horizontal distances/vertical profiles flown by liners for fuel economy, airspace management (ASM) efficiency, mission efficiency, volume of segregated airspace, usage of allocated airspace by the military as well as third party aircraft.

- The airspace reservation operational service and the airspace allocation operational service describe requirements on the conditions leading to a stabilised airspace allocation map, including conflict management.
- The airspace activation/de-activation service describes requirements on the conditions for a safe activation / de-activation of ARES, including ad-hoc airspace.
- The post-ops analysis operational service describes requirements on the general guidelines to elaborate Key Performance Areas (KPA) and Key Performance Indicators (KPIs).
- The Information Exchange requirements table takes the equivalent table from the OSED and adds the safety and requirements attributed to it.

This document reflects the requirements update in D45 AFUA OSED and the update stemming from all validation activities in Step 1 AFUA.

The validation activities are considered to achieve V3 maturity level, however some gaps have been identified and some recommendations have been made to be undertaken in V4.

1 Introduction

1.1 Purpose of the document

This SPR document provides the safety and performance requirements for Services related to the operational Processes defined in OSED for Advanced Flexible Use of Airspace in Step 1 (Ref. [6]). The SPR also provides their allocation to Functional Blocks. They shall identify the requirements needed to fulfil each Key Performance Area (KPA) and include, or reference, the sources justifying those requirements. This document is used to provide the basis for ensuring that these SPR requirements are applicable during initial implementation and continued operation.

This document reflects the requirements update in D45 AFUA OSED [6] and the update stemming from all validation activities in Step 1 AFUA (as reported in D52 "Step 1 FAM Validation Report (VALR)") [22] and WOC Step 1 validation (as reported in D26 WP11.1 WOC Validation Report for VP-789) [23].

1.2 Scope

This document supports the operational services and concept elements identified in the OSED [6].

This SPR is allocated to OFA 05.03.01 Airspace Management and AFUA. It is linked for Step 1 to:

- OI AOM-0202-A Automated Support for strategic, pre-tactical and tactical Civil-Military Coordination in Airspace Management (ASM).
- OI AOM-0206-A Flexible and modular ARES in accordance with the VPA design principle

This SPR is today compliant with Integration Roadmap DS14 [12].

The performance requirements are defined using the top-down principle, originating at B.04.01 level, cascaded down from strategic targets to Ops 07.02 level and subsequently to primary projects.

Performance requirements considered in this document shall apply to Services in the scope of the Operational Focus Area (OFA) addressed by the OSED.

The requirements developed in this document show traceability to the requirements described in the corresponding OSED and particularly to the Performance Requirements expressed in the OSED, which show traceability to the higher level KPAs through Detailed Operational Description (DOD), as represented in Figure 1.

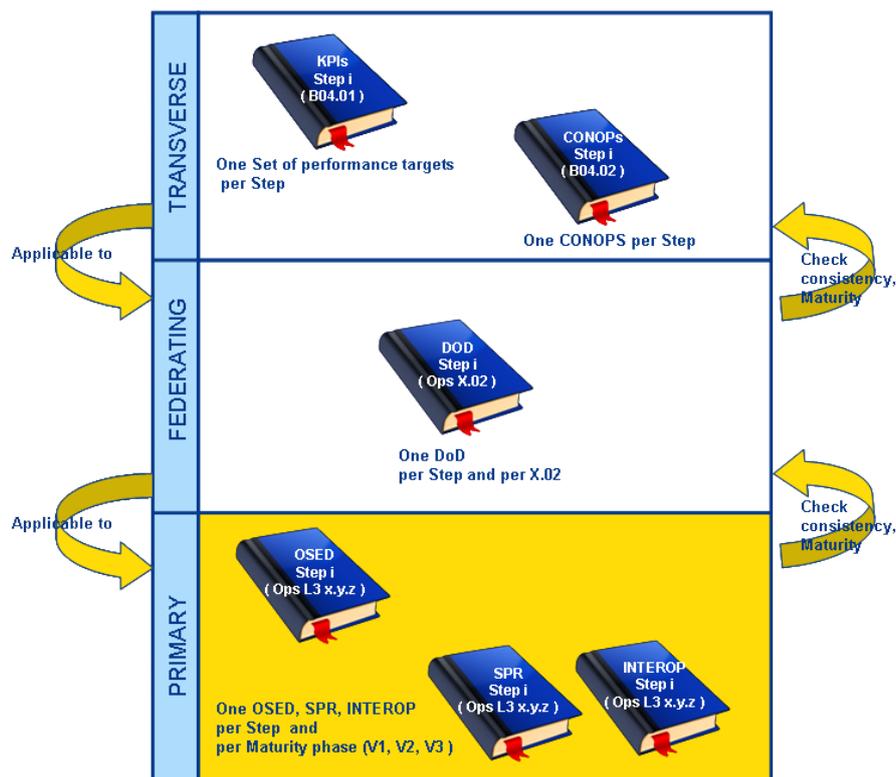


Figure 1: SPR document with regards to other SESAR deliverables

In Figure 1, the Steps are driven by the OI Steps addressed by the project in the Integrated Roadmap document [12].

The concept of AFUA is part of the Network Operations concept developed by SWP 07.02.

1.3 Intended readership

The intended readership for this document is the following:

- P 07.05.04 Members to provide the reference set of operational requirements related to the AOM-0206-A (Flexible Military Airspace Structures);
- P10.05.01 for the development of INTEROP requirements and prototypes;
- SWP7/13 for consolidation into the Network Operations concept;
- P4.2 and P4.5 for the consistency between planning and execution;
- WP 07.02 for architecture and performance modelling and transverse projects;
- P 08.01.03 for modelling associated data and services;
- SWP11.01 to readership in order to show the connection to FOC/WOC
- P16.06.01 for safety support and coordination;
- P16.06.02 for security support and coordination;
- P16.06.05 for human performance support and coordination;
- B05 Performance Expert

1.4 Structure of the document

The structure of the document is as follows:

Section 1: Introduces the document purpose, the scope, the intended audience, the background, the structure (this section) and includes the glossary of terms and acronyms and terminology.

Section 2: Summarizes the operational concept based on the descriptions provided in the corresponding OSED (Ref. [6]).

Sections 3: Provides the Safety and Performance Requirements and shows traceability to the operational requirements (applicable to Processes and Services (P&S)) as described in the OSED.

Section 4: Lists the Applicable and Referenced Documents.

1.5 Background

SESAR Development Phase has been broken down into Work Packages (WP), each of these WPs is broken down into Projects.

Work Package 7/13 (WP7/13) is related to Network Operations. This Work Package gathers WP 07 and 13 projects still in Execution following the IBAFO 2013 merger process. WP7/13 includes the following projects:

- Project 07.02 Network Federating View
- Project 07.05.04 Flexible Airspace Management
- Project 07.06.01 NOP
- Project 07.06.02 Optimised Airspace User Operations
- Project 13.02.02 AIM
- Project 13.02.03 Enhanced DCB

This SPR is related to 7.5.4 Advanced Flexible Use of Airspace (AFUA) Project.

Three steps have been defined for the implementation of the AFUA concept:

- **Step 1:** Implementation of modular airspace reservations/restrictions with the implementation of Variable Profile Area (VPA).
- **Step 2:** Implementation of Mission Trajectory and Dynamic Mobile Areas DMA 1&2. Mission Trajectory
- **Step 3:** Implementation of the Mission Trajectory and Dynamic Mobile Areas DMA 3.

This SPR is related to Step 1 implementation.

This project will define the procedures for establishing and managing modular VPA - including the shared use of - and ad-hoc airspace (defined in the corresponding OSED) structures taking into account the military requirements as well as network functionality.

The project will provide automated Collaborative Decision Making (CDM) encompassing: modular airspace management for the long term planning phase; airspace planning/allocation when developing mission trajectories involving airspace reservation needs, including mobile areas.

To provide intermediate practical short term steps in the evolution from today's Air Traffic Management (ATM) system to the SESAR target system, one of the early actions of the project will be

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to start the integration of the AFUA in Network Operations by providing the real status of airspace to network managers, initially in the Network Manager Operations Centre (NMOC).

To provide long term evolution to the SESAR target concept, one of the final actions of the project will be to integrate airspace reservation demands in all mission trajectory planning phases, especially in the Shared Mission Trajectory (SMT)/Reference Mission Trajectory (RMT) data (Flight Object), in order to trigger an automated airspace allocation process through automated CDM processes during planning phases and automated airspace status/display processes during flight execution (Reference Mission Trajectory).

Flexible Use of Airspace (FUA) is an airspace management concept described by the International Civil Aviation Organisation (ICAO) and developed by EUROCONTROL according to which airspace should not be designated as either purely civil or purely military airspace, but should rather be considered as one continuum in which all users' requirements have to be accommodated to the maximum extent possible.

The FUA is defined by the (EC) Regulation N°2150/2005 of 23 December 2005 [13]. The concept of FUA is governed by the following principles:

- coordination between civil and military authorities shall be organised for long term planning, medium-short term planning and execution phases of airspace management through the establishment of agreements and procedures in order to increase safety and flexibility of aircraft operations;
- consistency between airspace management, air traffic flow management and air traffic services shall be established and maintained at the three levels of airspace management enumerated in the point above in order to ensure, for the benefit of all users, efficiency in airspace planning, allocation and use;
- the airspace reservation for exclusive or specific use of categories of user shall be a temporary nature, applied only during limited periods of time based on actual use and released as soon as the activity having caused its establishment ceases;
- member States shall develop cooperation for the efficient and consistent application of the concept of flexible use of airspace across national borders and/or the boundaries of flight information regions, and shall in particular address cross-border activities; this cooperation shall cover all relevant legal, operational and technical issues;
- air traffic services units and users shall make the best use of the available airspace.

Member States shall also ensure that systems are in place to permit a mutual provision of airspace data to allow the real-time activation, de-activation or re-allocation of the airspace allocated during the medium/short term planning phase.

However, the FUA concept, adopted throughout Europe, has been interpreted differently. Consequently, the procedures applied by these countries vary considerably creating inconsistencies and limiting the efficiency of civil/military coordination and Network performances.

- Since the application of the Regulation, the concept of FUA was improved through several initiatives proposed by EUROCONTROL and coached by the stakeholders through the Airspace Management Sub Group (ASM SG) and associated task forces. European States also took initiatives to improve the FUA at national level.

Input from the SESAR Development phase:

- Advanced Flexible Use of Airspace OSED Step 1 [6]

Other inputs are described in chapter 4.

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1.6 Glossary of terms

Term	Description
Airspace Configuration	Is a pre-defined and coordinated organisation of routes and /or terminal routes and their associated airspace structures (including temporary airspace reservations, if appropriate) and ATC sectorisation.[16]
Airspace Reservation	A defined volume of airspace temporarily reserved for exclusive or specific use by categories of users. [13].[16]
Ad hoc airspace	Not pre-defined airspace structures [16]
Airspace Configuration:	Is a pre-defined and coordinated organisation of ATS routes of the ARN and /or terminal routes and their associated airspace structures, including airspace reservations/restrictions (ARES), if appropriate, and ATC sectorisation.[16]
Airspace Restriction	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). [13].
Airspace Structure	A specific volume of airspace designed to ensure the safe and optimal operation of aircraft [13].
Advanced Airspace Management System (AAMS)	System enables to accommodate real-time functions and dialogues for dynamic airspace allocation and to generate/distribute planned airspace usage information.[17]
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 [13].
Cross Border Airspace	An airspace structure extending across national borders and/or the boundaries of flight information regions [13].
Real time airspace status (RTSA)	A RTSA message relates to the execution phase. It addresses an evaluation process performed at a specific time triggered by a specific event concerning the ARES status (activation, de-activation, modification) to match the existing plan (AUP / UUP) to the actual life performance. Identified delta will initiate a new plan. In addition it also addresses any change to existing plans (AUP / UUP) prior to their execution in real time, triggered by an event on the day of operation.[17]
Variable Profile Area	VPA is a new airspace design principle based on flexible allocation and management of small fixed predefined modules of airspace. These modules are designed to fulfil airspace users needs individually or as a combination of modules as an ARES, dependant on individual mission profiles.[17]

Table 1: Glossary of terms

1.7 Acronyms and Terminology

Term	Definition
AA	Approved Agency
AAMS	Advanced Airspace Management System
AAS	Advanced Airspace Scheme (Schéma évolué de l'espace aérien)
ACC	Area Control Centre
ACM	Air Combat Manoeuvres
ADD	Architecture Definition Document
ADU	Air Defence Unit
AFUA	Advanced Flexible Use of Airspace
AHC	Aircraft Handling Characteristics
AIP	Aeronautical Information Publication

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Term	Definition
AIRAC	Aeronautical Information Regulation and Control (Régularisation et contrôle de la diffusion des renseignements aéronautiques)
AMC	Airspace Management Cell
ANSP	Air Navigation Service Provider
AO	Aircraft Operator
AOLO	Aircraft Operators Liaison Officer
AOM	Airspace Organisation and Management
APW	Area Proximity Warning
ARES	Airspace Reservation/Restriction
ASM	Airspace Management
ASM SG	Airspace Management Sub Group
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATFCM	Air Traffic Flow and Capacity Management
ATM	Air Traffic Management
ATS	Air Traffic Services
AU	Airspace User
AUP	Airspace Use Plan
BFM	Basic Fighter Manoeuvres
CBA	Cross Border Area
CBO	Cross Border Operation
CDM	Collaborative Decision Making
CDR	Conditional Route
CFMU	Central Flow Management Unit
CONOPS	Concept of Operations
CIAM	CFMU Interface for Airspace management
CTA	Control Area
CTR	Control Zone
CWP	Controller Working Position
D	Danger Area
DCB	Demand Capacity Balancing
DMA	Dynamic Mobile Area
DMEAN	Dynamic Management of the European Airspace Network (Gestion dynamique du réseau aérien européen)
DOD	Detailed Operational Description
DOW	Description of Work
E-ATMS	European Air Traffic Management System
EAUP	European Airspace Use Plan
EC	European Commission
EFIR/EUIR	European Flight Information Region / European Upper Information Region
ECAC	European Civil Aviation Conference (Conférence européenne de l'Aviation civile)
ETFMS	Enhanced Tactical Flow Management System
EUROAT	EUROCONTROL Specification for harmonized Rules for Operational Air Traffic under Instrument Flight Rules (IFR) inside controlled Airspace of the ECAC Area
EUUP	European Update airspace Use Plan
FAB	Functional Airspace Block
FBZ	Flight plan Buffer Zone
FIR	Flight Information Region
FMP	Flow Management Position
FOC	Flight Operations Centre
FPL	Flight Plan
FPS	Flight Planning System

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Term	Definition
FRA	Free Route Airspace
FUA	Flexible Use of Airspace
GAT	General Air Traffic
HLAPB	High Level Airspace Policy Body
iADS	Intelligent ATFCM Design Solutions
ICAO	International Civil Airspace Organisation
INTEROP	Interoperability Requirements
IER	Information Exchange Requirements
IFPS	Integrated Initial Flight Plan Processing System (Système intégré de traitement initial des plans de vol)
IFR	Instrument Flight Rules
IRS	Interface Requirements Specification
KPI	Key Performance Indicator
NM	Network Manager
NM ENV	Network Manager environmental database
NMF	Network Management Function
NMOC	Network Manager Operations Centre
NIMS	Network Information Management System
NOP	Network Operation Plan
OAT	Operational Air Traffic
OATTS	Operational Air Traffic Transit Service - système de transit COM-IFR
OCD	Operational Concept Description
OFA	Operational Focus Area
OI	Operational Improvement
OSED	Operational Services and Environment Definition
P	Prohibited Area
RBT	Reference Business Trajectory
RMT	Reference Mission Trajectory
RTSA	Real Time Status of Airspace
SBT	Shared Business Trajectory
SES	Single European Sky
SESAR	Single European Sky ATM Research Programme
SESAR JU	SESAR Joint Undertaking
SESAR Programme	The programme which defines the Research and Development activities and Projects for the SJU.
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SJU Work Programme	The programme which addresses all activities of the SESAR Joint Undertaking Agency.
SMT	Shared Mission trajectory
SOA	Service-Oriented Approach / Architecture (SESAR)
SPR	Safety and Performance Requirements
SUUP	Special UUP
SWIM	System Wide Information Management
TAD	Technical Architecture Description
TRA	Temporary Reserved Area
TRAMON	TRAffic MONitoring
TS	Technical Specification
TSA	Temporary Segregated Area
UDPP	User Driven Prioritisation Process
UIR	Upper Information Region
UUP	Updated Airspace Use Plan
VFR	Visual Flight Rules
VPA	Variable Profile Area
WOC	Wing Operation Centre

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Table 2: Acronyms and Terminology

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2 Summary of Operational Concept (from OSED)

This SPR details the Safety and Performance Requirements of AFUA in **Step 1**.

Advanced Flexible Use of Airspace (P07.05.04) contributes to five Operational Improvements (OIs). However, this SPR refers only to:

- **AOM-0206-A:** Flexible Military Airspace Structures
- **AOM-0202-A** Automated Support for Real Time Civil-Military Coordination in Airspace Management.

The other operational improvements will be developed respectively in **Step 2** and **Step 3**.

Relevant OI Steps ref. (coming from the definition phase)	Operational Focus Area name	Story Board Step	Master or Contributing (M or C)	Contribution to the OI short description
AOM-0206-A Flexible Military Airspace Structures	Airspace Management & AFUA	1	M	The implementation of new AFUA structures provides more flexibility to the military and better responds to their airspace needs. The flexible construction of these airspaces limits the constraints on the other airspace users.
AOM-0202-A Automated Support for Real Time Civil-Military Coordination in Airspace Management;	Airspace Management & AFUA	1	M	Civil-military coordination for Airspace Management (ASM) is enhanced by automated exchange of ASM-data in real time

Table 3: List of relevant OIs within the OFA

2.1 Description of the Concept Element

2.1.1 Air Traffic Management (ATM) Phases and Airspace Management Levels

ATM consists of four phases:

- Long Term Planning
- Medium-Short Term Planning
- Trajectory Execution
- Post Flight Processes

Long Term Planning

The long term issues of the activities concerned to the Development of the Business/Mission trajectories (e.g. business plans, resources, budget planning, historical data, performance targets, demand forecasts, trends, options, facilities).

Medium-Short Term Planning

All activities concerned to the planning of Shared Business/Mission trajectories (e.g. resource allocations, airspace organizations adoption and mode of operations, network operations plan, adjustments or refinements of assets and budgets).

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Trajectory Execution

All activities concerned to the agreement and execution of the Reference Business/Mission Trajectories. It includes the monitoring of events applying service refinements or adjustments needed in order to maintain the stability of NOP.

Post Flight Processes

The period after the conclusion of the flight (on block), e.g. Performance Analysis.

Airspace Management (ASM) is organized in three levels:

- ASM Level 1: long term planning phase
- ASM Level 2: medium-short term planning phase
- ASM Level 3: execution phase

ASM Level 1 - National and International Airspace Policy

Long term planning ASM at ASM Level 1 consists of a joint civil and military process within a national High Level Airspace Policy Body (HLAPB), which formulates the national ASM policy and carries out the necessary long term planning work, taking into account national and international airspace users' requirements.

ASM Level 2 - Day-to-Day Allocation of Airspace

Medium-short term planning - ASM Level 2 consists of the day-to-day management and temporary allocation of airspace through national or sub-regional AMCs and in coordination with the central Flow Management Unit (CFMU).

ASM Level 3 - Real Time Use of Airspace

Execution - ASM Level 3 consists of the real time activation, deactivation or real time reallocation of the airspace allocated at ASM Level 2 and the resolution of specific airspace problems and/or traffic situations between civil and military ATS units and/or controlling military units and/or controllers, as appropriate.

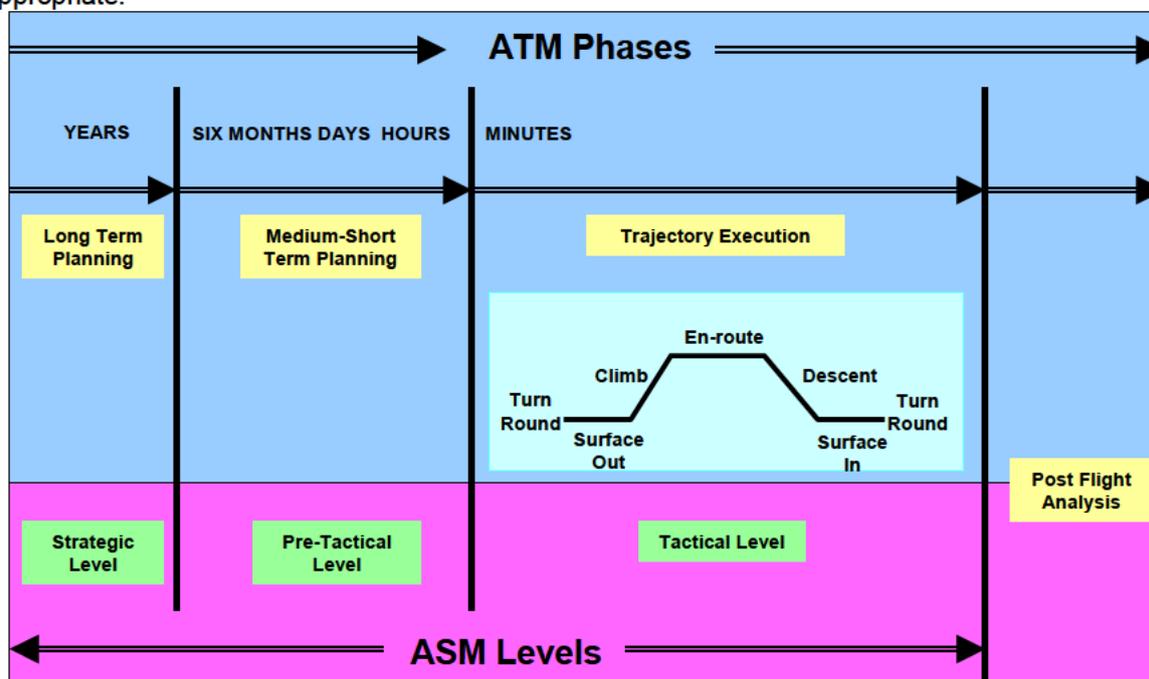


Figure 2: ATM Phases and ASM levels

2.1.2 Advanced Flexible Use of Airspace Concept

The concept of AFUA intends to provide more flexibility by allowing dynamic airspace management in all phases of the operations, from initial planning to the execution phase, taking into account local traffic characteristics.

AFUA structures are designed to fulfil military needs and better share the constraints with other airspace users. In order to improve network efficiency the airspace sharing between civil and military users is reinforced by Dynamic Mobile Area (DMA) in Step 2.

The cooperation between armed forces and civil and military users is reinforced by the implementation of Cross Border Operations (CBO) and Cross Border Area (CBA).

Automated processes are in place at ground and airborne levels (Wing Ops, Air Traffic Control (ATC) Systems, Airspace Management Cell (AMC), Air Defence Centres, Aircraft Equipage, etc.) in order to make the Reference Mission Trajectory (RMT) execution (automated activation/deactivation and ground / airborne displays) consistent with airspace allocation process.

2.1.3 Expected Operational Improvements

The expected operational improvements are:

- A harmonized airspace structure design dependent on the different types of mission;
- Continuous planning process enabled by system support and sharing of information;
- Harmonised Collaborative Decision Making (CDM) processes enabled by information sharing process, common automated tools and standard procedures;
- Automated display of future airspace demand and coordination of airspace status changes (at ground and airborne level) during mission planning as a traffic prediction;
- Automated display of airspace status and coordination of airspace status changes (at ground and airborne level) during mission execution;
- Dynamic modification of airspace structure and associated route network;
- Moving medium/short term planning phase of airspace management into the day of operations.
- 'What if' tool functions designed to enhance collaborative decision making between civil and military Local Network Management agencies (iADS)
- Easily interpretable visual display which allows Local Network Management agencies to understand fully the impact of airspace allocation decisions and provides the ability to fine tune airspace allocation in order to make best use of available airspace (e.g. iADS);.
- Mutual awareness of airspace demand and the factors affecting the demand, as well as a graphical 'what- if' function to simulate changes to requested bookings and aircraft routings, improves coordination and allows airspace capacity to be optimized for the benefit of both civil and military airspace users at local level, as well as contributing to network level optimization.

2.1.4 Expected Benefits

Implementing AFUA concept should provide benefits in different areas:

- **Safety:** the sharing of the airspace planning and the real status will provide common situation awareness to all ATM actors.
- **Environmental sustainability:** the flexibility provided by the implementation of modular areas will offer more plannable airspace. It will contribute to reduce emissions through the use of more optimum trajectories.
- **Capacity:** facilitating the sharing of use of military training areas will increase the capacity when and where needed for the benefit of civil airspace users. The ARES will be more easily adapted to the real need providing additional airspace for the other airspace users.
- **Efficiency:** The military will have the real volume of airspace needed for each of their missions. Defining the segregated areas based on mission requirements will provide more airspace available for the other airspace users and more options for optimal routings.

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- **Civil-Military cooperation & coordination:** The implementation of VPA will offer several combinations of modules to allocate the requested volume of airspace and additional opportunities to accommodate traffic flow demand with military mission needs. It should facilitate the negotiation process to allocate ARES. The implementation of VPA will provide opportunities to accommodate traffic flow demand with military mission needs and will improve efficiency.

2.2 Description of Operational Services

The ATM network management service group assures stability of the whole ATM network coping with the traffic demand and also threats such as weather phenomena and loss of significant assets as airports or runways for whatever reason.

The operational service family associated is **Demand and Capacity Balancing (DCB) Service Family** that ensures the most efficient balance between capacity and demand. It concerns looking for optimisation of available resources in readiness to introduce mitigation measures to maintain the ATM network stability.

The following Operational Services have been defined (from OSED):

Long term planning phase

- **AOM:** to create airspace based on airspace user needs. This Operational Service includes the following Information Services:
 - **VPA ARES/single ARES creation:** to accommodate airspace user needs when an ARES is needed.
- **Airspace Reservation:** to book an ARES. This Operational Service includes the following Application Services:
 - **Airspace Booking:** to reserve an ARES following an approval chain.

Medium-short term planning phase

- **Airspace Allocation:** to solve conflicts, negotiate and allocate an ARES. This Operational Service includes the following Application Services:
 - **Conflict Management:** to solve any booking conflict in a specific approval chain.
 - **Airspace Negotiation:** to negotiate reservation of an ARES between civil and military.
 - **Airspace Allocation:** to complete the process of reservation by allocating one airspace to one airspace user.

Execution phase

- **Airspace Activation/De-activation:** to activate or de-activate an ARES that was allocated. This Operational Service includes the following Application Services:
 - **Airspace Activation:** to provide in real time status of an airspace allocated in the Airspace Reservation Process.
 - **Airspace De-activation:** to inform the ATM actors when ARES is to be/is de-activated, either because an activity is complete in ARES, or because an activity ends prematurely in ARES.

Post Flight Analysis

- **Post Ops Analysis:** to analyse post flights data for network improvement. This Operational Service includes the following Application Services:
 - **Planning Efficiency Analysis:** to compare the initial planning with the real activity.
 - **Flight Efficiency Analysis:** to compare the initial Flight plan with the executed one.

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- **Mission Effectiveness Analysis:** to compare the total flight time into ARES. To assess if the volume of airspace allocated was sufficient for the mission.
- **Capacity Analysis:** to compare the initial capacity declared by the Air Navigation Service Provider (ANSP) with real one.
- **Environment Sustainability:** to compare optimum trajectory trajectories with the executed one.

2.3 Description of Operational Environment

As defined in the SESAR concept, the airspace is treated as a single continuum. Any specific airspace users' need which imposes operational constraints in both space and time will be accommodated through ARES.

In **Step 1**, those volumes of airspace remain fixed airspace. ARES are defined at ASM level 1 and published. The implementation of VPA design ensures more flexibility in airspace management by providing multiple combinations. The airspace is dynamically managed to provide the most efficient network plan.

The planning phase and part of the execution phase (activation/de activation of airspace) are considered in this SPR, as well as post-ops analysis.

Definition and execution of routes and trajectories are not considered in this SPR, as they are considered as a consequence of airspace planning, although a negotiation will occur with those services.

3 Requirements¹

This section describes the Safety and Performance Requirements. The SPR requirements show traceability to the operational requirements (applicable to Processes and Services (P&S)) as described in the OSED (Ref. [6]).

The SPR requirements are applicable to the System Functions, Application and Information Services invoked by the Operational Services referred to in the OSED.

This section is structured per Operational Service (P&S), and subdivided into Application and Information Services.

Requirements are not quantitative ones because describing a concept.

3.1 Airspace Organisation & Management (AOM) Operational Service²

This Operational Service concerns the **ASM long term planning phase**.

3.1.1 Variable Profile Area (VPA) Creation Information Service

3.1.1.1 Safety Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0070
Requirement	In case one or several computers parts of a system dedicated to airspace management and containing static VPA data do crash, after computers have been restarted, - no loss of data shall occur inside the system - no loss of data integrity with other systems shall occur - the system shall trigger automatically sending/retrieving of external messages that did not occur because of the crash
Title	Airspace management-dedicated computer crash recovery and static VPA data/messages
Status	<Validated>
Rationale	Loss of data/data integrity/messages in the long term planning phase may hamper flight safety when arriving in the execution phase. Not computer crash itself for airspace management, because the actual VPA creations are only unexpectedly frozen when the crash occurs.
Category	<Performance><Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Design	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0026	<Full>

¹In this section there are several requirements in status "Deleted". Reason for that is that during the document development, either the requirement has been moved into OSED (considered to be operational/functional during reviews), or the content was considered for not relevant anymore or obsolete. The status of all requirements was consolidated during a dedicated meeting.

² There are several requirements that do not state clearly the role of the operational actor as operationally, multiple actors can use the same or different functionalities of the named systems.

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3.1.1.2 Performance Requirements

3.1.1.2.1 Introduction

An important task at ASM Levels is the continuous monitoring of the efficiency of the application of the AFUA Concept. This section contains information regarding AFUA indicators developed and used for the assessment of the efficiency of the national application of the AFUA Concept.

EUROCONTROL Specification for the Application of the Flexible Use of Airspace (FUA) [19] recommends that national HLABP should apply the following key performance areas/indicators, where applicable (see: PERF-REQU-03):

- a) airspace efficiency (FUA application, adherence to optimum airspace dimensions, utilisation of airspace, efficient booking system);
- b) mission effectiveness (economic impact of transit, impact of airspace location on training);
- c) flexibility (training in non-segregated areas, release of airspace, accommodation of short notice civil and military needs).

In order to ensure above mentioned the HLABP should:

- a) establish joint civil/military processes for the periodic (at least yearly) assessment of airspace efficiency and effectiveness of procedures at all three ASM Levels;
- b) ensure the definition and application of FUA Key Performance Areas (KPA) and Indicators (KPI) to monitor ATM performance against civil and military airspace users' needs at national and network level;
- c) assess FUA effectiveness in terms of the impact on civil and military airspace users, ATM service provision and civil/military co-ordination;
- d) ensure the use of KPAs of safety, capacity, cost-effectiveness and environmental sustainability to measure the efficient and flexible use of airspace procedures and operations.

Apart from those FUA indicators EUROCONTROL, in cooperation with stakeholders, developed and implemented PRISMIL (Pan-European Repository of Information Supporting Military) performance management system.

PRISMIL, with its eight KPIs, complements civil-military ATM performance-based partnership both at national and pan-European level.

FUA indicators

The development of FUA indicators for the assessment of the efficiency of the application of the FUA concept in the European Civil Aviation Conference (ECAC) States started with the work in the Ad-Hoc Group on FUA Indicators (AHGOFI) and continued in the FUA DG. The methods and algorithms described hereafter are based on what was developed by the AHGOFI and FUA DG and agreed by the Airspace (and) Navigation Team (ANT) in regard to FUA Indicators development.

The FUA indicators are developed in the broader context of the monitoring of the ATM performances against civil and military airspace users' needs and for the assessment of EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - (EUROCONTROL-GUID-140, Edition

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3.0 Page 7-2) the FUA effectiveness in terms of impact on civil and military airspace users, ATM services provision and civil/military co-ordination.

Two categories of indicators were developed - the FUA Use Rates (FUR) indicators and the Flight Economy Indicators (FEI).

The FUA Use Rates indicators are meant to provide information about the rate of availability of the FUA airspace structures and about the interest of the users in those structures.

The Flight Economy Indicators provide information about the possible economy gained or lost - in terms of distance, flying time or fuel consumption - to be expected by the users while using FUA airspace structures.

Relevant documents where the KPA-KPIs and/or these requirements come from are:

- EUROCONTROL Specifications for the Application of the Flexible Use of Airspace – Edition 1.1 - 10/01/2009 [EUROCONTROL-SPEC-0112] [19]
- European Route Network Improvement Plan (ERNIP) Part 3 Airspace Management Guidelines -The ASM Handbook Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, Edition Number : 5.1 Edition Date : 23/10/2014 Status: Released Issue
- EUROCONTROL Civil-Military Performance Measurement Handbook, edition 2 (PRISMIL) (Ref. [15])
- COMMISSION REGULATION (EU) No 691/2010 of 29 July 2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services (Ref. [14])

3.1.1.2.2 General Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0001
Requirement	High Level Airspace Policy Bodies (HLAPB) shall apply commonly VPA design principles in European airspace design.
Title	Common principle of VPA creation in European airspace
Status	<Deleted>
Rationale	Deleted as they are moved in the OSED Reqs as new requirements Existence of VPA principle is necessary for improving Airspace Management Efficiency. Common VPA design principles are necessary for system interoperability throughout European airspace.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0002
Requirement	The HLAPB at National level or Functional Airspace Block (FAB) level shall define the basic and whole modules - size and shape - of VPA as well as non-VPA ARES, taking into account as an important criteria the geographical situation (such as density of population or vicinity of military air base).

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Title	VPA and non-VPA ARES definition by the HLAPB
Status	<Deleted>
Rationale	Deleted as they are moved in the OSED Reqs as new requirements VPA as well as non-VPA ARES definition need to be in accordance with the local context for efficiency reasons. The local context means either national or national and FAB decision process, depending on the location of the VPA/non-VPA ARES and its potential influence on air traffic.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0003
Requirement	The HLAPB shall consider AMC Manageable and non AMC Manageable ARES both for VPA and for non-VPA ARES design.
Title	AMC Manageable and non AMC Manageable ARES
Status	<Deleted>
Rationale	Deleted as they are moved in the OSED Reqs as new requirements A principle of Single European Space (SES) is that airspace is a one continuum
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0005
Requirement	The HLAPB shall subdivide the airspace in order to allow the safe cohabitation of airspace users, where the division is adapted to local context, taking free route airspace as the general rule.
Title	Areas and routes in airspace
Status	<Deleted>
Rationale	Deleted as they are moved in the OSED Reqs as new requirements Free route airspace is a prior condition for flight performance. In the locations where free route airspace would hamper flight performance and/or safety (e.g. because of traffic density) it shall not be applied.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

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Identifier	REQ-07.05.02-SPR-PERF.0006
Requirement	The construction of a VPA shall offer several combinations of module(s), providing airspace users with the same level of safety as fixed airspace, made of non-VPA ARES(es).
Title	VPA construction flexibility
Status	<Validated>
Rationale	The possibility of combining modules gives the possibility to stick as close as possible to airspace users' needs. VPA basically made of a single module will be considered as fixed (non-VPA) airspace.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Design	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0002	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0011	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0012	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0007
Requirement	The VPA and non-VPA ARES design process shall take into account the route network (ATS routes, Conditional Route - CDR, FRA) associated with ARES.
Title	Route network design and VPA/non-VPA ARES design
Status	<Validated>
Rationale	This enables capacity optimization and different airspace allocations and rerouting scenarii
Category	<Performance>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Design	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0002	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0011	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0008
Requirement	An outline coordinates and appropriate lower and upper level shall define the borders of VPA and its grid of modules .
Title	VPA definition
Status	<Deleted>
Rationale	The outline coordinates, lower and upper level of VPA itself and of its grid of modules need to be published in Aeronautical Information Publication (AIP).
Category	<Performance>

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Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0009
Requirement	The activation of a VPA shall enable possibility to use any combination of modules.
Title	VPA construction with any combination of modules
Status	<Deleted>
Rationale	This ensures that airspace will be closely adapted to the mission / set of missions using the VPA for their training, allowing shorter deviations for GAT flights circum navigating around the VPA.
Category	<Performance>
Validation Method	<Fast Time Simulation><Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0010
Requirement	Definition of small VPA module shall provide the flexibility needed to accommodate the traffic demand.
Title	Flexibility for accommodating high density traffic area
Status	<Validated>
Rationale	Smaller modules provide more flexibility, particularly interesting in a high density traffic area (e.g. 15 x 15 NM)
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Design	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0001	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0002	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0011
Requirement	Any module of VPA and a non-VPA ARES shall possess identification - a unique name in any technical system, publication and display method used to portray the areas.
Title	VPA module/non-VPA ARES identification
Status	<Deleted>

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Rationale	The VPA modules/non-VPA ARESEs need to be identified in those systems, and first of all in Aeronautical Information Publication (AIP).
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0013
Requirement	The ASM Support System shall only accept for VPA as well as non-VPA modules vertical prisms with a base made of polygon (i.e. set of only straight lines) or a polyline (i.e. set of straight or curved lines).
Title	Shape of VPA module/non-VPA ARES in ASM Support System
Status	<Deleted>
Rationale	The VPA modules need to have a simple definition and also to be adapted to display on two dimension maps. The shape needs to be adapted for optimisation of high number of volumes in airspace or for optimisation in high density traffic area.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0014
Requirement	For mission performance the base of VPA modules as well as non-VPA areas shall be shaped in order not to have sharp angles (angles below 90°). As an example, VPA with modules shaped like cells of bee hives shall be an efficient VPA.
Title	Optimal module in ASM Support System
Status	<Validated>
Rationale	Mission efficiency and practicability requires not to have sharp angles in VPA module border.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Design	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0001	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0015
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Requirement	For civil air traffic efficiency the base of VPA modules as well as non-VPA areas shall be shaped in a way that longer sides be along the main traffic stream(s) not orthogonal to it/ them.
Title	Optimal module in ASM Support System
Status	<Validated>
Rationale	This will enable shorter deviations (and then less fuel burn) for air traffic circum navigating around the activated VPA as well as non-VPA modules.
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Design	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0001	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0016
Requirement	The ATC System shall only accept for VPA modules vertical prisms with a base made of polygon (i.e. set of only straight lines) or a polyline (i.e. set of straight or curved lines).
Title	Module in ATC System
Status	<Deleted>
Rationale	The VPA modules need to have a simple definition and also to be adapted to display on two dimension maps. The shape needs to be adapted for optimisation of high number of volumes in airspace or for optimisation in high density traffic area.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0017
Requirement	Responsible aviation authorities shall publish VPA areas in the national Aeronautical Information Publication (AIP)
Title	VPA publication
Status	<Validated>
Rationale	This is necessary for every system to know about this VPA.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Design	N/A

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<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0003	<Full>

3.1.1.2.3 KPA-KPI Requirements

3.1.1.2.3.1 General KPA-KPI Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0018
Requirement	The network shall provide data for post operation analysis purposes to the national / European body in charge of monitoring the efficiency of AFUA application in accordance with KPA/KPIs.
Title	KPI calculation/Data provision
Status	<Validated>
Rationale	This gives the possibility to compute KPIs on the whole EFIR/EUIR for KPIs that cannot be aggregated from each country's KPIs
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0019
Requirement	The national / European body in charge of monitoring the efficiency of AFUA application shall access the data saved for post operation analysis purposes.
Title	KPI calculation/Data access
Status	<Validated>
Rationale	This gives the possibility to compute KPA/KPIs on specific EFIR/EUIR ad-hoc regions covered by several European countries.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0041
Requirement	Due to their non real-time nature, the system shall allow possibility to restrain computation of post-analysis KPIs during night-time to avoid overloading computer processing during day-time operations.
Title	KPI calculation/Data access during night time
Status	<Deleted>

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Rationale	Network efficiency
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0020
Requirement	KPIs related to flight paths shall apply to any OAT / GAT flight flying across Single European Sky countries, whatever their departure and destination is (except those OAT flights specifically excluded by member States).
Title	KPI calculation/Flights concerned
Status	<Validated>
Rationale	Confidentiality issues might arise for military flights or missions (even if they most of all apply at the scale of a single training). KPA/KPIs need to be applied on non-domestic flights flying over Europe too.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0021
Requirement	KPIs related to airspace management or flight path computed for the national / European body in charge of monitoring the efficiency of AFUA application shall allow computation for its respective FIR/UIR or a pre-defined area covering the FIR/UIR.
Title	KPI calculation geographical extents
Status	<Validated>
Rationale	Bilateral agreements could extend national FIR / UIRs For certain KPAs, it might be interesting to compute the side effects of neighbouring countries on a single country KPIs.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A

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<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>
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3.1.1.2.3.2 Efficiency

The KPAs described in this part are:

- Environment / Fuel efficiency
- Airspace capacity
- Predictability
- Cost effectiveness in terms of Air Traffic Control services,
- Safety

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0022
Requirement	The national / European body in charge of monitoring the efficiency of AFUA application shall collect the flight plan data planned at ASM level 2 about any OAT/GAT flight to fly across its FIR/UIR, together with the timestamp of this information.
Title	KPI calculation/Access to flight plan data
Status	<Deleted>
Rationale	KPA/KPIs defined in EUROCONTROL Specification for the Application of the Flexible Use of Airspace - Edition 1.1 - 10/01/2009 [EUROCONTROL-SPEC-0112] ?[22] This will give an opportunity to compare ASM level 2 flight plan data with actual flights.
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0023
Requirement	The national / European body in charge of monitoring the efficiency of AFUA application shall collect the actual flight path data about any OAT / GAT flight having actually flown over its FIR/UIR (except those OAT flights specifically excluded by member States).
Title	KPI calculation/Access to actual flight path data
Status	<Deleted>
Rationale	KPA/KPIs defined in EUROCONTROL Specification for the Application of the Flexible Use of Airspace - Edition 1.1 - 10/01/2009 [EUROCONTROL-SPEC-0112] ?[22]
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

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[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0024
Requirement	KPI designated as «Average En Route horizontal deviation fuel burn» shall use for the purpose of the Single European Sky FIR/UIR (EFIR/EUIR) calculation the Great Circle (or if possible more accurate approximation of ideal route), starting from actual exit of ADEP TMA, if inside Single European Sky FIR/UIR, beyond a 40NM distance from ADEP for GAT - 0NM for OAT, or from actual entry into this FIR/UIR, ending at actual ADEST TMA, if inside Single European Sky FIR/UIR, beyond a 40NM distance from ADEST for GAT - 0NM for OAT -, or at actual exit from this FIR/UIR._
Title	KPI calculation/Single European Sky level/Horizontal deviation fuel burn
Status	<Deleted>
Rationale	The Great Circle is the shortest way between two points on a sphere. Horizontal deviation extents from this ideal route are a direct consequence of airspace management. For aircraft, the ideal route as regards fuel consumption also depends on local altitude wind direction and speed, which can be very high. But finding an AFUA KPI-aimed ideal route for each flight taking into account actual winds could have no real operational added value and lead to complicate calculations. A good compromise could be to consider for this calculation a time and possibly surface-averaged North-Stream all over the EFIR/EUIR. If the foreseen end point of the flight path (ADEST TMA) were outside European FIR/UIR (EFIR/EUIR), this KPI would nevertheless consider the foreseen exit point from the EFIR/EUIR as Great Circle end point for the following reason: long-haul flights might need to execute long deviations from their shortest path for certain reasons (crisis...) located outside of the EFIR/EUIR, and this should not introduce a bias into this SES AFUA KPI. The differences (0 to 40 NM circle around ADEP/ADEST) in KPI calculation rules between OAT and GAT are current practices, based on the fact that OAT most often leaves from military airport with much shortest approach/descent flight phases than civil airport.
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

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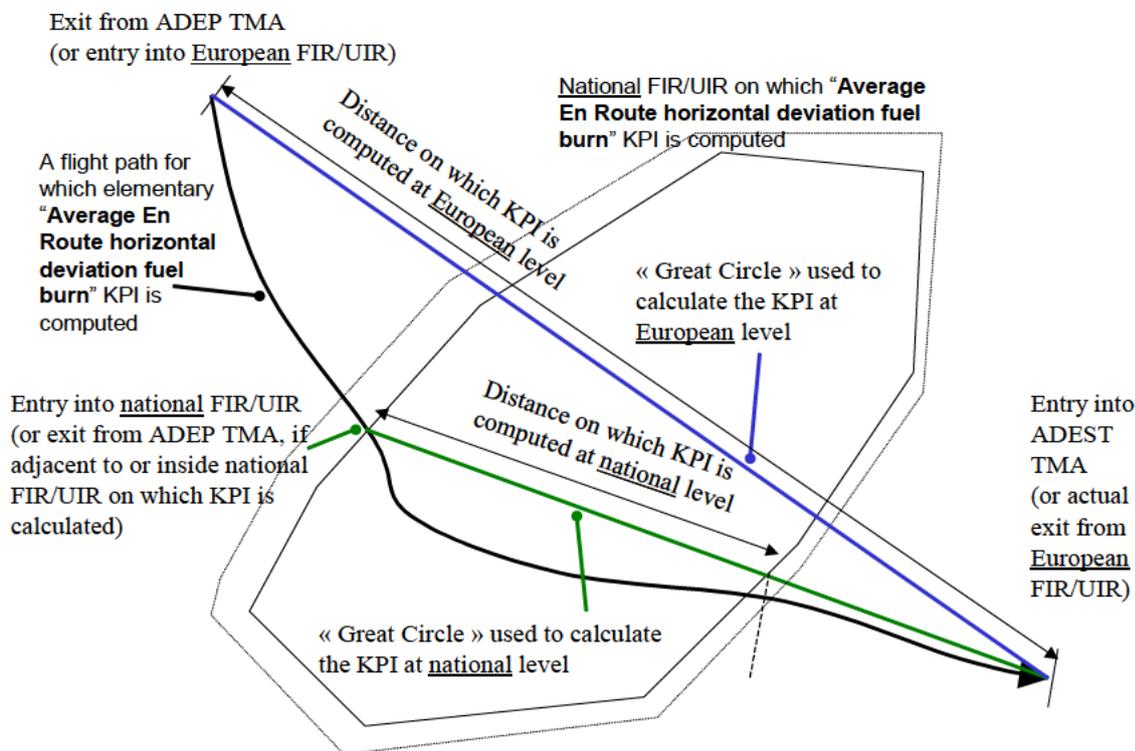


Figure 3: Average En-route horizontal deviation fuel burn KPI calculation at European as well as National level

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0025
Requirement	<p>KPI designated as «Average En Route horizontal deviation fuel burn» shall use for the purpose of the National FIR/UIR calculations the Great Circle,</p> <ul style="list-style-type: none"> - starting from actual exit of ADEP TMA, if inside national FIR/UIR, beyond a 40NM distance from ADEP for GAT - 0NM for OAT -, or from actual entry into this FIR/UIR. - ending at actual ADEST TMA, if inside Single European Sky - not national - FIR/UIR, beyond a 40NM distance from ADEST for GAT - 0NM for OAT -, or at actual exit from the European - not national - FIR/UIR. <p>This KPI (for National FIR/UIR) is computed on the “National” part of this Great Circle.</p>
Title	KPI calculation/National level/Horizontal deviation fuel burn
Status	<Deleted>

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Rationale	<p>The Great Circle is the shortest way between two points on a sphere. Horizontal deviation extents from this ideal route are a direct consequence of airspace management.</p> <p>For aircraft, the ideal route as regards fuel consumption also depends on local altitude wind direction and speed, which can be very high. But finding an AFUA KPI-aimed ideal route for each flight taking into account actual winds could be a non-sense and lead to complicate calculations. A good compromise could be to consider for this calculation a time and possibly surface-averaged North-Stream all over the EFIR/EUIR.</p> <p>Adherence to the Great Circle of a flight path entering into national FIR/UIR should not depend on the past flight path and should depend on the foreseen end point of the flight path, be it inside or outside national FIR/UIR (see image in requirement).</p> <p>Yet, if the foreseen end point of the flight path (ADEST TMA) were outside European FIR/UIR (EFIR/EUIR), this KPI would nevertheless consider the foreseen exit point from the EFIR/EUIR as Great Circle end point for the following reason: long-haul flights might need to execute long deviations from their shortest path for certain reasons (crisis...) located outside of the EFIR/EUIR, and this should not introduce a bias into this SES AFUA KPI.</p> <p>The differences (0 to 40 NM circle around ADEP/ADEST) in KPI calculation rules between OAT and GAT are current practices, based on the fact that OAT most often leaves from military airport with much shortest approach/descent flight phases than civil airport.</p>
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0026
Requirement	<p>KPI designated as « Average En Route vertical deviation fuel burn » for purpose of Single European Sky/National FIR/UIR shall calculate the trajectory actually flown by the aircraft, indicating the difference between:</p> <ul style="list-style-type: none"> - fuel consumption on the flight path (including altitude) actually flown by the airspace user and - fuel consumption on the same horizontal flight path, flown at optimal altitudes with regards to fuel consumption.
Title	KPI calculation/Vertical deviation fuel burn
Status	<Deleted>
Rationale	<p>Any steadily flying aircraft has at any moment an optimal flight altitude that depends (among others) on its aerodynamic features and its current weight/mass.</p> <p>Vertical deviation extents from this ideal route, as regards fuel consumption, are a consequence of airspace management (although less than the horizontal deviation fuel burn KPI).</p>

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Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0027
Requirement	The national / European body in charge of monitoring the efficiency of AFUA application shall collect data about <ul style="list-style-type: none"> • the number of flights entering into, exiting from and located in any ANS sector (TWR TMA or En-Route), • the number of on duty controllers per ANS sector (TWR TMA or En-Route).
Title	KPI calculation/ANS sector flights and on duty controllers
Status	<Deleted>
Rationale	Necessary to evaluate the direct ANS cost per flight
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0028
Requirement	The post-ops flight analysis shall deliver actual flight path data for computation of the KPIs related to Airspace Capacity KPA.
Title	KPI calculation/Airspace capacity KPA/Data source
Status	<Validated>
Rationale	Airspace Capacity KPA is necessary for fine-tuning Airspace Management.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0029
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Requirement	A data collection system shall have a system interface to collect the following data: <ul style="list-style-type: none"> • a given airspace volume: TMA or En-route sector, or national/European UIR/FIR or fully customized volume. • and a given period of time And delivering as output the information about: <ul style="list-style-type: none"> • number of aircraft inside the volume • number of aircraft having entered into the volume • number of aircraft having exited out of the volume
Title	KPI calculation/Airspace volume occupancy and variation
Status	<Validated>
Rationale	These Airspace Capacity KPA data are necessary for fine-tuning Airspace Management.
Category	<HMI><Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0030
Requirement	The KPIs related to Predictability KPA (including flight delay KPIs) shall make comparison between: <ul style="list-style-type: none"> • flight plans coming from the long / medium and short term planning phase and • flight paths actually flown
Title	KPI calculation/Predictability KPA
Status	<Validated>
Rationale	Predictability KPA (including flight delay KPIs) is a recurrent demand from ANSPs.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0031
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Requirement	The KPIs related to Environment/Fuel Burn Efficiency KPA shall compute - directly, using fuel consumption data if available, or - indirectly, using trajectory data, and if available: - averaged meteorological (altitude wind) data - aircraft weight data. Thus two KPIs shall be computed: synthetic and (if available) non synthetic "Average fuel burn per flight" KPIs.
Title	KPI calculation/Fuel Burn Efficiency KPA
Status	<Validated>
Rationale	1. Horizontal deviation KPI: The Great Circle is the shortest way between two points on a sphere. Deviation extents from this ideal route are a direct consequence of airspace management. For aircraft, the ideal route also depends on local altitude wind direction and speed, which can be very high. But finding an AFUA KPI-aimed ideal route for each flight taking into account actual winds could be a non-sense and lead to complicate calculations. A good compromise could be to consider for this calculation a time and possibly surface-averaged North-Stream all over the EFIR/EUIR. 2. Vertical deviation KPI: Any steadily flying aircraft has at any moment an optimal flight altitude that depends (among others) on its aerodynamic features and its current weight/mass.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

3.1.1.2.3.2.1 Airspace use efficiency

3.1.1.2.3.2.1.1 The formula for calculating the Utilization of Airspace by military

- Utilization of Airspace by military
- Airspace capacity allocated (allocated vs. requested)
- Airspace capacity used (used vs. allocated)

Shall be:

Airspace_capacity_allocated_KPI is: $(S(\text{Allocated_Segregated_Volume} \times \text{Time_Allocated})) / (S(\text{Requested_Segregated_Volume} \times \text{Time_Requested}))$

Airspace_capacity_used_KPI is: $(S(\text{Allocated_Used_Volume} \times \text{Time_Used})) / (S(\text{Allocated_Segregated_Volume} \times \text{Time_Allocated}))$.

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- Requested Segregated Volume: is the segregated volume (NM².feet) requested for military use.
- Time Requested: is the time (minutes) requested for military use in segregated volumes.
- Allocated Segregated Volume: is the segregated volume (NM².feet) allocated for military use.
- Time Allocated: is the time (minutes) allocated for military use in segregated volumes.
- Used Segregated Volume: is the actual segregated volume (NM².feet) used for military use training.
- Time Used: is the actual time (minutes) spent for military use in segregated volumes.

The calculation of these KPIs shall be a rolling calculation. "S" means "sum on all the occurrences of airspace request/allocation/use on the whole rolling calculation period". They can be calculated for all ARES together or for one or several specific ARES individually.

3.1.1.2.3.2.1.2 The formula for calculating the Efficient booking procedures

- **Efficient booking procedures by military**
- **Time used vs. time requested**

Shall be:

Efficient_Airspace_Booking_Procedures_KPI = Time_used / Time_requested

- Time used: is the actual time spent for military use.
- Time requested: is the requested time for military use time. If use is extended beyond (both before and after) that requested time, Time Requested is the sum of the requested time plus the overusage time.

3.1.1.2.3.2.1.3 The formula for calculating ARES request/allocation/use

- **Performance of the ASM process with regard to request/allocation/use of ARES**

Shall be:

The coefficient is the product of:

- the degree of fulfilment: relation between booked and allocated use times and expresses up to what degree the booking requests of the military were fulfilled: time allocated / time booked (or requested).
- the compensation factor: through inefficient booking of the military (tu different from ta), a bonus is given to the civil, which reflects a higher degree of fulfilment (the civil made efforts to give airspace to the military for a certain time but they used it only partially) => compensation factor > 1.

This compensation factor is equal to 2 - booking efficiency.

Booking efficiency is

- time used / time allocated if time used < time allocated
- 2 - time used / time allocated if time used > time allocated

As a result, each time airspace is overused, there shall be a possibility to have tu / ta > 1:

- time of airspace use = tu
- time of airspace allocated = ta

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- time of airspace overuse = $t_u - t_a$

Example 1:

- time booked = 240 minutes (4 hours)
- time allocated = 192 minutes
- time used = 216 minutes

Degree of fulfilment = $192/240 = 80\%$

Booking efficiency = $2 \cdot 216\% / 192\%$ because $216\% > 192\% = 200\% - 112.5\% = 87.5\%$

Compensation factor = $200\% - 87.5\% = 112.5\%$

KPI in percent = $112.5\% \cdot 80\% = 90\%$

The civil were not efficient in fulfilling military needs but it was partially compensated by the fact that in the end the civil released more airspace than previously allocated for military use (small bonus for the military).

Example 2:

- time booked = 240 minutes (4 hours)
- time allocated = 216 minutes
- time used = 180 minutes

Degree of fulfilment = $216/240 = 90\%$

Booking efficiency = $180\% / 216\%$ because $180\% < 216\% = 83.3\%$

Compensation factor = $200\% - 83.3\% = 116.7\%$

KPI in percent = $90\% \cdot 116.7\% = 105\%$

The civil were not efficient in fulfilling military needs (which were may be overestimated) but in the same time the military used much less than the time really allocated by the civil (small bonus for the civil).

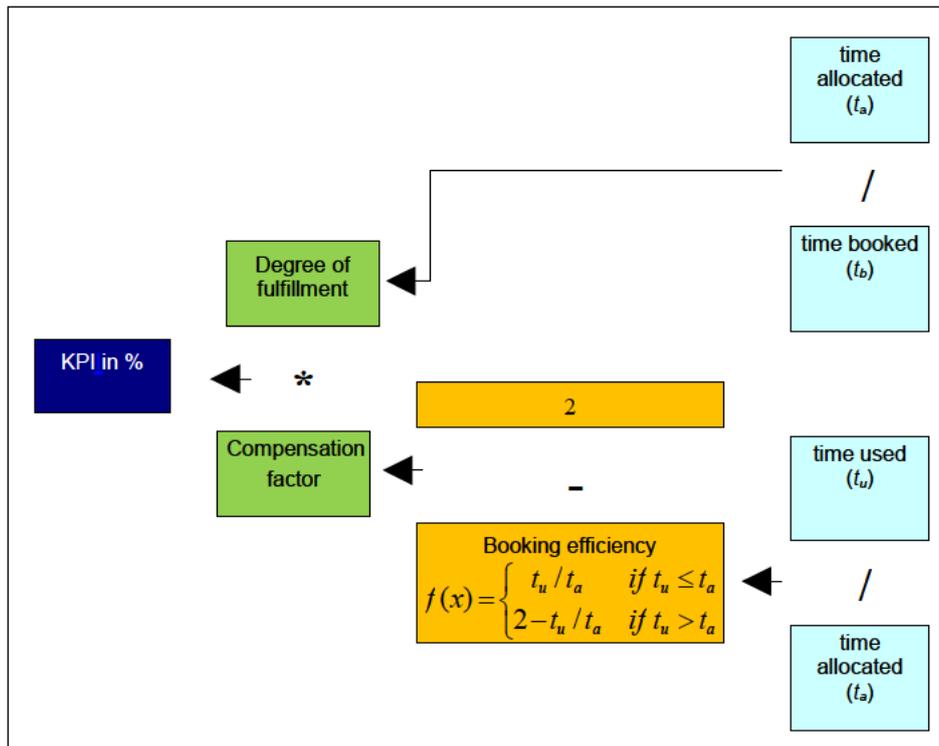


Figure 4: Way of calculating KPI: Performance of the ASM process with regard to request/allocation/use of ARES

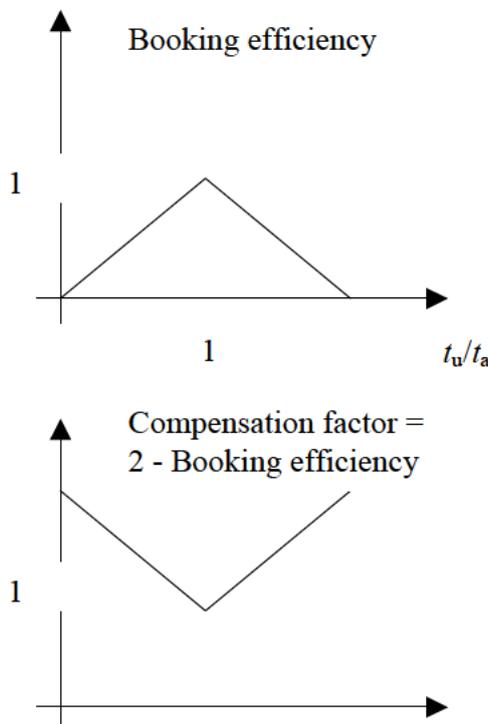


Figure 5: Booking efficiency and Compensation factor

3.1.1.2.3.2.1.4 The formula for calculating the FIR/UIR capacity

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- **FIR/UIR lateral airspace volume capacity**
 - FIR/UIR surface area*time requested vs. available
 - FIR/UIR surface area*time allocated vs. available
 - FIR/UIR surface area*time used vs. available
- **FIR/UIR vertical airspace volume capacity (in feet)**
 - FIR/UIR volume*time requested vs. surface area available
 - FIR/UIR volume*time allocated vs. surface area available
 - FIR/UIR volume*time used vs. surface area available

Shall be:

FIR/UIR lateral airspace volume capacity, pFUh, “h” like “horizontal”):

$$pFUh_Requested = (FIR\text{-}UIR_surface_area_requested \times time_requested) / (FIR\text{-}UIR_surface_area \times time_period)$$

$$pFUh_Allocated = (FIR\text{-}UIR_surface_area_allocated \times time_allocated) / (FIR\text{-}UIR_surface_area \times time_period)$$

$$pFUh_Used = (FIR\text{-}UIR_surface_area_used \times time_used) / (FIR\text{-}UIR_surface_area \times time_period)$$

FIR/UIR vertical airspace volume capacity (in feet), pFUv (“v” like “vertical”):

$$pFUv_Requested = (FIR\text{-}UIR_volume_area_requested \times time_requested) / (FIR\text{-}UIR_surface_area \times time_period)$$

$$pFUv_Allocated = (FIR\text{-}UIR_volume_area_allocated \times time_allocated) / (FIR\text{-}UIR_surface_area \times time_period)$$

$$pFUv_Used = (FIR\text{-}UIR_volume_area_used \times time_used) / (FIR\text{-}UIR_surface_area \times time_period)$$

Where:

- FIR/UIR surface area requested/allocated/used (in nm²) is the ARES surface area requested/allocated/used for training within the FIR/UIR,
- FIR/UIR volume requested/allocated/used (in nm².feet) is the ARES volume requested/allocated/used for training within the FIR/UIR,
- time requested/allocated/used is the time (in minutes) requested/allocated/used for training in ARES within the time period,
- FIR/UIR surface area is the FIR/UIR surface area (in nm²) , and
- time period is the selected time period (in months, years, etc.) over which the capacity needs to be assessed.

Two or more training volumes with overlapping surface areas might be requested for simultaneous use / allocated for simultaneous use / used simultaneously - with no vertical overlapping of course when allocated or used. In this case, for pFUh computation (e.g. yearly) their overlapping surface area shall be counted only once during their overlapping use time(s).

It is suggested that pFUh/pFUv should be computed yearly.

3.1.1.2.3.2.1.5 The formula for calculating ARES dimension

- **ARES dimension and shape use**
 - Optimum vs. allocated ARES dimensions

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Shall be:

$$\text{OvsA} = \min(A/A_0, 1) \times \min(\text{FL}/\text{FL}_0, 1)$$

where:

- A is the ARES surface area (in nm²) used in the mission,
- A₀ is the optimum ARES surface area (in nm²) for the mission defined by national authorities,
- FL is the allocated flight level range, i.e. the difference between the upper and lower FL of the ARES used in the mission,
- FL₀ is the optimum flight level range for the mission flown i.e. the difference between the upper and lower FL of the ARES requested for the mission defined by national authorities.

3.1.1.2.3.2.1.6 The formula for calculating the ARES location

- **Impact of ARES location**
 - Total segregated training vs. airborne time
 - Average synthetic transit time to/from airbase associated ARES
 - Training time in non-segregated vs. any airspace

Shall be:

$$\text{TSTvsAT} = \text{Time_spent_training_in_ARES} / \text{Total_airborne_time}$$

where:

- time spent training is the time (in minutes) actually spent training by all aircraft in ARES, and
- total airborne time is the total airborne time (in minutes) of all aircrafts participating in the mission.

Total Segregated Training versus Airborne Time TSTvsAT shall provide a measure of the time actually spent in the designated ARES, achieving the mission training objectives, compared with the total time spent airborne.

TSTvsAT shall allow planners to identify whether units are using ARES within an acceptable distance of their base. This indicator should be reviewed in conjunction with AvT, which would provide further detail on the time spent airborne. The time required for training inside ARES may vary according to mission type. Consequently, the performance target should be set as appropriate.

TSTvsAT shall be computed monthly.

$$\text{AvSTT} = \text{Average_Synthetic_Transit_Time}$$

Each military airfield shall have a list of airspace published in aeronautical publications it is using on a regular basis.

Each time an ARES (or a group of ARES) is activated/de-activated, a calculation of synthetic flight path shall be performed for post-analysis purposes:

- for each mission aircraft departing from or returning to an airfield using the ARES airspace on a regular basis
- synthetic flight path
 - departing from the airfield up to the ARES border, only if the airfield uses the ARES airspace on a regular basis

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- returning from the ARES border down to the airfield, only if the airfield uses the ARES airspace on a regular basis
- using optimal flight path in terms of route/altitude/speed in terms of fuel consumption

From this synthetic flight path shall be derived a synthetic transit time associated to each mission aircraft.

These synthetic flight paths shall be averaged for each ARES and for each mission aircraft.

AvSTT shall be calculated monthly.

Only the average shall be published and it shall be published on a national basis (details about the calculation input shall not need to be published by military).

$$nARES = \text{Time_spent_training_in_non_ARES_areas} / \text{Total_time_spent_training}$$

where:

- time spent training in non- ARES areas is the time (in minutes) actually spent training in non-segregated areas, and
- total time spent training is the total time (in minutes) spent training in segregated and non-segregated airspace.

nARES shall provide an indication of how frequently users train in airspace not specifically designated for military training.

nARES shall allow planners to identify whether non ARES is being used for training purposes, which can then be used to identify why and whether this conforms to the training strategy of the State concerned.

nARES shall be calculated monthly.

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0045
Requirement	KPIs related to airspace management or flight paths, serving the national body in charge of monitoring the efficiency of AFUA application, shall make computation by using the following data: <ul style="list-style-type: none"> - requests - allocations - actual use - re-allocations - modifications, cancellation, early closure and/or extended opening
Title	KPI calculation for Airspace Management and Flight Path data
Status	<Validated>
Rationale	EUROCONTROL Specification for the application of the Flexible Use of Airspace (FUA) - Edition 1.1 - 10/01/2009 [EUROCONTROL-SPEC-0112] [22], §8.1 Recommendations, PERF-REQU-05
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

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Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0050
Requirement	<p>The Airspace use KPIs shall include the following:</p> <ul style="list-style-type: none"> • Utilization of Airspace <ul style="list-style-type: none"> o Airspace capacity allocated (allocated vs. requested) o Airspace capacity used (used vs. allocated) • Efficient booking procedures <ul style="list-style-type: none"> o Time used vs. time requested • Access by third party aircraft to allocated ARES. Performance of the ASM process with regard to request/allocation/use of ARES • FIR/UIR lateral airspace volume capacity <ul style="list-style-type: none"> o FIR/UIR surface*time requested vs. available o FIR/UIR surface*time allocated vs. available o FIR/UIR surface*time used vs. available • FIR/UIR vertical airspace volume capacity <ul style="list-style-type: none"> o FIR/UIR volume*time requested vs. surface available o FIR/UIR volume*time allocated vs. surface available o FIR/UIR volume*time used vs. surface available • ARES dimension and shape use <ul style="list-style-type: none"> o Optimum vs. allocated ARES dimensions • Impact of ARES location: <ul style="list-style-type: none"> o Total segregated training vs. airborne time o Average synthetic transit time to/from airbase associated ARES o Training time in non-segregated vs. any airspace
Title	KPI calculation/Airspace use KPIs
Status	<Validated>
Rationale	<p>This requirement has been created to summarize all Airspace use KPIs.</p> <p>“Requested airspace/time ”is the last airspace/time requested by ARES user before ARES activation.</p> <p>“Allocated airspace/time” is the airspace/time allocated at the moment of ARES activation, whatever the phase when this allocation takes place:</p> <ul style="list-style-type: none"> • long term planning phase, • short-medium term planning phase, or • execution phase, before ARES activation <p>“Allocated airspace/time” does not include ad-hoc airspace allocated after ARES use has started and aimed at extending the user’s mission, whatever the reason might be.</p> <p>Traceability between the original ARES and the ad-hoc ARES has to be established for the calculation of the “used airspace/time” in the KPIs.</p> <p>“Used airspace/time” is the airspace/time starting X minutes after ARES activation (X being the legal margin between activation and actual use) and finishing at ARES de-activation (or ad-hoc ARES de-activation in the case of a mission extension).</p> <p>Most of these KPIs come from or are inspired by the following document: EUROCONTROL Civil-Military Performance Measurement Handbook, edition 2 (PRISMIL) [23]</p>
Category	<Performance>

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Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0053
Requirement	<p>The "Access by third party aircraft to allocated ARES" KPI shall consist of 3 sub-KPIs:</p> <ul style="list-style-type: none"> - ARES handed back by its user, - ARES not used at all, - ARES currently used (with limited access to third party aircraft). <p>This KPI, in aircraft Nautical Miles, cumulates during a certain period the total horizontal distance flown in an ARES by any third party aircraft (i.e. any other aircraft than the aircraft for which the ARES was allocated/activated). These KPIs can be calculated for all ARES together or for one or several specific ARES individually.</p> <p>These 'distance times aircraft' KPIs shall be declined at single ARES level as KPIs having number of aircraft as unit, if multiplied by the perimeter (in NM) and divided by the area (in NM²) of the ARES lateral shape.</p>
Title	KPI calculation/Utilization by the civil of Airspace reserved by the military
Status	<Validated>
Rationale	ANSPs and airline operators need to show that the reduced flexibility on the military of having to booked airspace has benefited the Network.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0055
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Requirement	<p>The formula for calculating the KPIs:</p> <ul style="list-style-type: none"> · Utilization of Airspace by military o Airspace capacity allocated (allocated vs. requested) o Airspace capacity used (used vs. allocated) <p>Shall be:</p> <p>Airspace_capacity_allocated_KPI is: $(?(Allocated_Segregated_Volume \times Time_Allocated)) / (?(Requested_Segregated_Volume \times Time_Requested))$</p> <p>Airspace_capacity_allocated_KPI is: $(?(Allocated_Used_Volume \times Time_Used)) / (?(Allocated_Segregated_Volume \times Time_Allocated))$.</p> <ul style="list-style-type: none"> • Requested Segregated Volume: is the segregated volume (NM².feet) requested for military use. • Time Requested: is the time (minutes) requested for military use in segregated volumes. • Allocated Segregated Volume: is the segregated volume (NM².feet) allocated for military use. • Time Allocated: is the time (minutes) allocated for military use in segregated volumes. • Used Segregated Volume: is the actual segregated volume (NM².feet) used for military use training. • Time Used: is the actual time (minutes) spent for military use in segregated volumes. <p>The calculation of these KPIs shall be a rolling calculation. “?” means “sum on all the occurrences of airspace request/allocation/use on the whole rolling calculation period”. They can be calculated for all ARES together or for one or several specific ARES individually.</p>
Title	KPI calculation/Utilization of Airspace
Status	<Deleted>
Rationale	These KPIs come from the following document: EUROCONTROL Civil-Military Performance Measurement Handbook, edition 2 (PRISMIL) ?[23]
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0056
Requirement	<p>The formula for calculating the KPI:</p> <ul style="list-style-type: none"> ? Efficient booking procedures by military o Time used vs. time requested <p>Shall be:</p> <p>Efficient_Airspace_Booking_Procedures_KPI = $Time_used / Time_requested$</p> <ul style="list-style-type: none"> • Time used: is the actual time spent for military use. • Time Requested: is the requested time for military use time. If use is extended beyond (both before and after) that requested time, Time Requested is the sum of the requested time plus the over usage time.

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Title	KPI calculation/Efficient booking Procedures
Status	<Deleted>
Rationale	This KPI comes from the following document: EUROCONTROL Civil-Military Performance Measurement Handbook, edition 2 (PRISMIL) ?[23]
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0057
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Requirement	<p>The formula for calculating the KPI:</p> <ul style="list-style-type: none"> • Performance of the ASM process with regard to request/allocation/use of ARES <p>Shall be:</p> <p>The coefficient is the product of:</p> <ul style="list-style-type: none"> • the degree of fulfilment: relation between booked and allocated use times and expresses up to what degree the booking requests of the military were fulfilled: $\text{time allocated} / \text{time booked}$ (or requested). • the compensation factor: through inefficient booking of the military (t_u different de t_a), a bonus is given to the civil, which reflects a higher degree of fulfilment (the civil made efforts to give airspace to the military for a certain time but they used it only partially) => compensation factor > 1. This compensation factor is equal to 2 - booking efficiency. <ul style="list-style-type: none"> - Booking efficiency is <ul style="list-style-type: none"> - $\text{time used} / \text{time allocated}$ if $\text{time used} < \text{time allocated}$ 2 - $\text{time used} / \text{time allocated}$ if $\text{time used} > \text{time allocated}$ <p>As a result, each time airspace is overused, there shall be a possibility to have $t_u / t_a > 1$:</p> <ul style="list-style-type: none"> - time of airspace use = t_u - time of airspace allocated = t_a - time of airspace overuse = $t_u - t_a$ <p>Example 1 :</p> <ul style="list-style-type: none"> - time booked = 240 minutes (4 hours) - time allocated = 192 minutes - time used = 216 minutes Degree of fulfilment = $192/240 = 80\%$ Booking efficiency = $2 \cdot 216\% / 192\%$ because $216\% > 192\% = 200\% - 112.5\% = 87.5\%$ Compensation factor = $200\% - 87,5\% = 112.5\%$ KPI in percent = $112.5\% \cdot 80\% = 90\%$ <p>The civil were not efficient in fulfilling military needs but it was partially compensated by the fact that in the end the civil released more airspace than previously allocated for military use (small bonus for the military).</p> <p>Example 2 :</p> <ul style="list-style-type: none"> - time booked = 240 minutes (4 hours) - time allocated = 216 minutes - time used = 180 minutes Degree of fulfilment = $216/240 = 90\%$ Booking efficiency = $180\% / 216\%$ because $180\% < 216\% = 83.3\%$ Compensation factor = $200\% - 83.3\% = 116.7\%$ KPI in percent = $90\% \cdot 116.7\% = 105\%$ <p>The civil were not efficient in fulfilling military needs (which were may be overestimated) but in the same time the military used much less than the time really allocated by the civil (small bonus for the civil).</p>
Title	KPI calculation/ Performance of the ASM process with regard to request/allocation/use of ARES
Status	<Deleted>
Rationale	This KPI is a proposal from an ANSP.
Category	<Performance>

Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0058
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Requirement	<p>The formula for calculating the KPI:</p> <ul style="list-style-type: none"> • FIR/UIR lateral airspace volume capacity <ul style="list-style-type: none"> o FIR/UIR surface area*time requested vs. available o FIR/UIR surface area*time allocated vs. available o FIR/UIR surface area*time used vs. available • FIR/UIR vertical airspace volume capacity (in feet) <ul style="list-style-type: none"> o FIR/UIR volume*time requested vs. surface area available o FIR/UIR volume*time allocated vs. surface area available o FIR/UIR volume*time used vs. surface area available <p>Shall be:</p> <p>FIR/UIR lateral airspace volume capacity, pFUh, “h” like “horizontal”):</p> $pFUh_Requested = (FIR\text{-}UIR_surface_area_requested \times time_requested) / (FIR\text{-}UIR_surface_area \times time_period)$ $pFUh_Allocated = (FIR\text{-}UIR_surface_area_allocated \times time_allocated) / (FIR\text{-}UIR_surface_area \times time_period)$ $pFUh_Used = (FIR\text{-}UIR_surface_area_used \times time_used) / (FIR\text{-}UIR_surface_area \times time_period)$ <p>FIR/UIR vertical airspace volume capacity (in feet), pFUv (“v” like “vertical”):</p> $pFUv_Requested = (FIR\text{-}UIR_volume_area_requested \times time_requested) / (FIR\text{-}UIR_surface_area \times time_period)$ $pFUv_Allocated = (FIR\text{-}UIR_volume_area_allocated \times time_allocated) / (FIR\text{-}UIR_surface_area \times time_period)$ $pFUv_Used = (FIR\text{-}UIR_volume_area_used \times time_used) / (FIR\text{-}UIR_surface_area \times time_period)$ <p>Where:</p> <ul style="list-style-type: none"> • FIR/UIR surface area requested/allocated/used (in nm²) is the ARES surface area requested/allocated/used for training within the FIR/UIR, • FIR/UIR volume requested/allocated/used (in nm².feet) is the ARES volume requested/allocated/used for training within the FIR/UIR, • time requested/allocated/used is the time (in minutes) requested/allocated/used for training in ARES within the time period, • FIR/UIR surface area is the FIR/UIR surface area (in nm²) , and • time period is the selected time period (in months, years, etc.) over which the capacity needs to be assessed. <p>Two or more training volumes with overlapping surface areas might be requested for simultaneous use / allocated for simultaneous use / used simultaneously - with no vertical overlapping of course when allocated or used. In this case for pFUh computation (e.g. yearly) their overlapping surface area shall be counted only once during their overlapping use time(s).</p> <p>It is suggested that pFUh/pFUv should be computed yearly.</p>
Title	KPI calculation/ FIR/UIR Capacity
Status	<Deleted>

Rationale	<p>The pFUh KPIs come from the following document: EUROCONTROL Civil-Military Performance Measurement Handbook, edition 2 (PRISMIL) ?[23]</p> <p>pFUh/pFUv allow planners to assess how much of the capacity of the airspace system is being requested/allocated/used.</p> <p>The 'FIR/UIR lateral airspace volume capacity' KPIs will give an indication of 3D (surface x time) percentage of occupancy of airspace request/allocation/use.</p> <p>The 'FIR/UIR vertical airspace volume capacity' KPIs will give an indication of 4D (volume x time) percentage of occupancy of airspace request/allocation/use, independently from what the floor and ceiling altitudes of usable airspace are.</p> <p>As a consequence, $pFUv_Requested/Allocated/Used / (\text{ceiling_altitude} - \text{floor_altitude})$ will give an indication of the volume x time occupancy of ARES in FIR/UIR volume x time period between the floor and the ceiling altitude, provided all ARES are defined between these floor and ceiling altitudes. E.g. on country X airspace 'usable' by military is considered to range between 1000 feet and 100 000 feet in year 2012 (which may be different in year 2020 or in country Y): $pFUv/(100\ 000 - 1000)$ shall give the indication of which 4D (volume x time) percentage of 'usable' airspace (in FIR/UIR volume x time period) has been requested/allocated/used by the military. Floor_altitude could also be defined as an immutable convention to 19 000 feet.</p> <p>Furthermore $pFUv_Requested/Allocated/Used / pFUh_Requested/Allocated/Used$ shall give an indication of the cumulative height of ARES along a vertical line, averaged over the surface covered by ARES reservation/allocation/use during a specified time period. E.g. $pFUv = 300$ feet (which seems to be very small), $pFUh = 2\%$, averaged height of ARES will be $300/0.02 = 15\ 000$ feet.</p> <p>The purpose of a KPI such as this one is not only to have it compared with an hypothetical optimum. It might be a way of comparing the value of the KPI e.g. between year N and year N+1, or to have its evolutions confronted with a KPI of a potentially impacted KPA (e.g. horizontal/vertical deviation fuel burn vs. pFUh used / pFUv used).</p>
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0059
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Requirement	<p>The formula for calculating the KPI:</p> <ul style="list-style-type: none"> • ARES dimension and shape use <ul style="list-style-type: none"> o Optimum vs. allocated ARES dimensions <p>Shall be: $OvsA = \min(A/A0,1) \times \min(FL/FL0,1)$</p> <p>where:</p> <ul style="list-style-type: none"> • A is the ARES surface area (in nm²) used in the mission, • Ao is the optimum ARES surface area (in nm²) for the mission defined by national authorities, • FL is the allocated flight level range, i.e. the difference between the upper and lower FL of the ARES used in the mission, • FL0 is the optimum flight level range for the mission flown i.e. the difference between the upper and lower FL of the ARES requested for the mission defined by national authorities.
Title	KPI calculation/ ARES dimension shape and use
Status	<Deleted>
Rationale	<p>This KPI comes from the following document: EUROCONTROL Civil-Military Performance Measurement Handbook, edition 2 (PRISMIL) [23].</p> <p>OvsA shall provide an indication of how closely the allocated ARES conforms to the optimum airspace dimensions for training.</p> <p>OvsA shall allow planners to consider the effectiveness of allocated ARES. This KPI indicates whether the allocated ARES are meeting the requirements of the users. This indicator shows whether ARES in use are as per published guidelines. It is suggested that OvsA should be computed monthly.</p>
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0060
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Requirement	<p>The formula for calculating the KPIs:</p> <ul style="list-style-type: none"> • Impact of ARES location <ul style="list-style-type: none"> o Total segregated training vs. airborne time o Average synthetic transit time to/from airbase associated ARES o Training time in non-segregated vs. any airspace <p>Shall be:</p> $\text{TSTvsAT} = \frac{\text{Time_spent_training_in_ARES}}{\text{Total_airborne_time}}$ <p>where:</p> <ul style="list-style-type: none"> • time spent training is the time (in minutes) actually spent training by all aircraft in ARES , and • total airborne time is the total airborne time (in minutes) of all aircrafts participating in the mission. <p>Total Segregated Training versus Airborne Time TSTvsAT shall provide a measure of the time actually spent in the designated ARES, achieving the mission training objectives, compared with the total time spent airborne.</p> <p>TSTvsAT shall allow planners to identify whether units are using ARES within an acceptable distance of their base. This indicator should be reviewed in conjunction with AvT, which would provide further detail on the time spent airborne. The time required for training inside ARES may vary according to mission type. Consequently, the performance target should be set as appropriate.</p> <p>TSTvsAT shall be computed monthly.</p> <p>AvSTT = Average_Synthetic_Transit_Time Each military airfield shall have a list of airspace published in aeronautical publications it is using on a regular basis.</p> <p>Each time an ARES (or a group of ARES) is activated/de-activated, a calculation of synthetic flight path shall be performed for post-analysis purposes:</p> <ul style="list-style-type: none"> • for each mission aircraft departing from or returning to an airfield using the ARES airspace on a regular basis • synthetic flight path <ul style="list-style-type: none"> - departing from the airfield up to the ARES border, only if the airfield uses the ARES airspace on a regular basis - returning from the ARES border down to the airfield, only if the airfield uses the ARES airspace on a regular basis - using optimal flight path in terms of route/altitude/speed in terms of fuel consumption <p>From this synthetic flight path shall be derived a synthetic transit time associated to each mission aircraft.</p> <p>These synthetic flight paths shall be averaged for each ARES and for each mission aircraft.</p> <p>AvSTT shall be calculated monthly.</p> <p>Only the average shall be published and it shall be published on a national basis (details about the calculation input shall not need to be published by military).</p> $\text{nARES} = \frac{\text{Time_spent_training_in_non_ARES_areas}}{\text{Total_time_spent_training}}$ <p>where:</p> <ul style="list-style-type: none"> • time spent training in non- ARES areas is the time (in minutes) actually spent training in non-segregated areas, and • total time spent training is the total time (in minutes) spent training in segregated and non-segregated airspace.
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Title	KPI calculation/ Impact of ARES location
Status	<Deleted>
Rationale	<p>These KPIs come from or are inspired by the following document: EUROCONTROL Civil-Military Performance Measurement Handbook, edition 2 (PRISMIL) ?[23]</p> <p>The concept of 'synthetic' flight path (not in the PRISMIL document) was introduced because training activities may actually be also conducted during the transit to/from ARES, leading by nature to non optimal flight/mission profiles.</p>
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0135
Requirement	The national / European body shall collect data about the planned CDR availability at ASM level 1 and 2 and the timestamp of this information.
Title	KPI calculation/ CDR/ Planned availability
Status	<Deleted>
Rationale	<p>EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Rate of CDR Availability (Rica)</p> <p>EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Time Window of Availability (TWA)</p>
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0136
Requirement	The national / European body shall collect data about the actual CDR availability at any moment.
Title	KPI calculation/ CDR/ Actual use
Status	<Deleted>

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Rationale	EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Rate of CDR Availability (Rica)
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0137
Requirement	The national / European body shall collect data about the number of potential users of a CDR planned at ASM level 1 and ASM level 2, together with the timestamp of this information.
Title	KPI calculation/ CDR/ Potential users
Status	<Deleted>
Rationale	EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Rate of Aircraft Interested (RAI)
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0138
Requirement	The national / European body shall collect data about the flight plan associations with any CDR at ASM level 1 and 2 and the timestamp of this information.
Title	KPI calculation/ CDR/ Association with flight plan
Status	<Validated>
Rationale	European Route Network Improvement Plan PART 3 Airspace Management Handbook Guidelines for Airspace Management, ed. 21 November 2014: - Rate of Aircraft Interested (RAI) - Flight Economy Realised (FER) - Flight Economy Lost (FEL) - Flight Economy Offered (FEO) - Rate of Actual Use of CDR (RAU) - Total Potential Flight Economy (PFE) - Actual Flight Economy (AFE)
Category	<Performance>

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Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0139
Requirement	The national / European body shall collect data about the number of actual users of a CDR at any moment.
Title	KPI calculation/ CDR/ number of actual users
Status	<Deleted>
Rationale	<p>EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Rate of Actual Use of CDR (RAU)</p> <p>EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Total Potential Flight Economy (PFE)</p>
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0140
Requirement	The national / European body shall collect data about the association between any actual flight path and CDRs actually used by this flight path
Title	KPI calculation/ CDR/ Association with actual flight path
Status	<Deleted>
Rationale	<p>EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Rate of Actual Use of CDR (RAU)</p> <p>EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Actual Flight Economy (AFE)</p>

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Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0141
Requirement	The national / European body shall collect data about the length and levels of any CDR and its alternate ALTN.
Title	KPI calculation/ CDR/ Length and level of CDR and alternate ALTN
Status	<Deleted>
Rationale	EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Potential Flight Economy (PFE) EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Total Potential Flight Economy (PFE) EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Flight Economy Realised (FER) EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Flight Economy Lost (FEL) EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Flight Economy Offered (FEO) EUROCONTROL Guidelines for Airspace Management - The ASM Handbook - Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, edition 3.0 [EUROCONTROL - GUID - 140] 15/06/2010 ?[16] / Actual Flight Economy (AFE)
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

3.1.1.2.3.2.2 Errors in data transmitting

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0270
Requirement	The system shall allow the occurrence of errors in data transmitting between: - ASM and ATC to be recorded. - ASM and ATFCM to be recorded - ATFCM and ATC to be recorded

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Title	KPI calculation/ Errors in data transmitting between ASM and ATC
Status	<Validated>
Rationale	This KPI is related to Safety KPA.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0271
Requirement	The occurrence of errors in data transmitting between - ASM and ATC - ASM and ATFCM - ATFCM and ATC shall not increase with respect to year <ATC_ATC_ATFCM_yardstick_year>.
Title	KPI calculation/ Errors in data transmitting between ASM and ATC
Status	<Validated>
Rationale	This KPI is related to Safety KPA.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Performance Measurements & Monitoring	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0272
Requirement	The occurrence of errors in data transmitting between ATFCM and ATC shall be recorded and shall not increase with respect to year <ATC_ATC_ATFCM_yardstick_year>.
Title	KPI calculation/ Errors in data transmitting between ATFCM and ATC
Status	<Deleted>
Rationale	This KPI is related to Safety KPA.
Category	<Performance>
Validation Method	<Fast Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

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3.2 Airspace Reservation Operational Service

This Operational Service concerns the **ASM long term planning phase**.

3.2.1 Airspace Booking Application Service

3.2.1.1 Safety Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0001
Requirement	Only legitimate users shall use the ASM Support System, discriminated between consultation and modification users.
Title	ASM Support System users authentication
Status	<Validated>
Rationale	The authentication will be done by secure passwords. This is security but this has an strong impact on safety.
Category	<Safety><Security>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0022	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0025	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0026	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0002
Requirement	Authentication data shall undergo an encryption process.
Title	Encryption of authentication data
Status	<Validated>
Rationale	This is security but this has an strong impact on safety.
Category	<Safety><Security>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0026	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0003
Requirement	Relevant data exchanges between ASM, ATC, ATFCM and Air Defence shall undergo an encryption process.
Title	Encryption of transmitted data
Status	<Validated>

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Rationale	This data will include data of military use. Independently from this, only users authorised to consult this data must be able to consult it (taking into account the possibility of network spying). This is security but this has a strong impact on safety.
Category	<Security>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0026	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0004
Requirement	ASM Support Systems shall contain network intrusion detection system
Title	Network intrusion detection system
Status	<Validated>
Rationale	This is security but this has a strong impact on safety.
Category	<Security>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0026	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0060
Requirement	If one or several computers part of a system dedicated to airspace management and containing airspace booking data, including airspace booking conflict, crash the system shall ensure after computers have been restarted that: <ul style="list-style-type: none"> - no loss of data have occurred inside the system - no loss of data integrity with other systems have occurred - the system is able to automatically trigger sending/retrieving of external messages that did not occur because of the crash
Title	Airspace management-dedicated computer crash recovery and airspace booking data/messages
Status	<Validated>
Rationale	Loss of data/data integrity/messages in the planning phase may hamper flight safety when arriving in the execution phase. Not computer crash itself for airspace management, because the actual airspace bookings are only unexpectedly frozen when the crash occurs.
Category	<Performance><Safety>
Validation Method	<Real Time Simulation>

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Verification Method	
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[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0026	<Full>

3.2.1.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0300
Requirement	Any ARES user (a State Airspace user or a Civil Airspace user) shall be considered for the purpose of the performance assessment.
Title	ARES users
Status	<Deleted>
Rationale	ARES can be requested and used by any Airspace user but historically Military are primary users of ARES.
Category	<Performance>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0302
Requirement	ARES allocation shall enable accommodation of any specific airspace user's needs which impose operational constraints in both space and time.
Title	Airspace user's needs
Status	<Validated>
Rationale	As defined in the SESAR concept, the airspace is treated as a single continuum
Category	<Performance>
Validation Method	<Shadow Mode><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0015	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0304
Requirement	The ASM Support System shall allow to combine any module when booking a VPA
Title	VPA ARES Booking
Status	<Deleted>

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Rationale	This ensures that activated airspace will be closely adapted to the mission / set of missions using the VPA for their training, allowing shorter deviations for GAT flights circum navigating around the VPA (no airspace overuse by military). Deleted because covered by OSED requirements
Category	<Performance>
Validation Method	<Fast Time Simulation><Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0306
Requirement	The ASM Support System shall allow the booking of one VPA module.
Title	One VPA module booking
Status	<Deleted>
Rationale	Depending on the basic design of a VPA, one of its modules can be sufficient for a certain type of mission and can be booked by the requestor
Category	<Performance>
Validation Method	<Fast Time Simulation><Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0308
Requirement	The ASM Support System shall allow the booking of several VPA modules for several missions.
Title	Several VPA modules booking
Status	<Deleted>
Rationale	Because a VPA is composed of a high number of modules, more than one mission can be performed at the same time
Category	<Performance>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0310
Requirement	The ASM Support System shall allow to choose any type of ARES regardless the design principle (VPA or non VPA).
Title	VPA/non-VPA volume type choice
Status	<Deleted>

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Rationale	The ASM Support System will propose a list of types, which correspond to current airspace classification (D, R, TRA, TSA). Deleted because covered by OSED requirements
Category	<HMI><Performance>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0312
Requirement	The type of the VPA (TRA, TSA, D or R) shall allow adaptation according to the mission(s).
Title	VPA type list
Status	<Deleted>
Rationale	For Performance / Safety reasons, airspace users should know far in advance if an airspace is D or R. Deleted because moved as OSED requirements
Category	<HMI><Performance><Safety>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0313
Requirement	D and R types shall appear in the list of available VPA types up to ASM level 2, not after.
Title	Danger and Restricted Areas
Status	<Deleted>
Rationale	For Performance / Safety reasons, airspace users should know far in advance if an airspace is D or R. Deleted because moved as OSED requirements
Category	<HMI><Performance><Safety>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0314
Requirement	The ASM Support System shall allow to choose the upper and lower level for the ARES booking
Title	Upper and lower level for VPA booking

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Status	<Deleted>
Rationale	The ASM Support System will give the possibility for the user to freely choose the upper and lower level for VPA booking (not restraining his/her choice to a limited list of levels) Deleted because covered by OSED requirements
Category	<HMI><Performance>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0316
Requirement	The ASM Support System shall allow to choose the date and the slot (start and end time) for the ARES booking
Title	Date and slot for ARES booking
Status	<Deleted>
Rationale	The day and slot of ARES booking is: - a basic parameter for a reservation - one of the most important criteria for a lesser impact on GAT traffic flows Deleted because moved as OSED requirements
Category	<Performance>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

3.3 Airspace Allocation Operational Service

This Operational Service concerns the **ASM medium/short term planning phase**.

3.3.1 Conflict Management Application Service

3.3.1.1 Safety Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0050
Requirement	If one or several computers part of a system dedicated to airspace management and containing airspace management conflict data do crash, after computers have been restarted the system shall ensure that: <ul style="list-style-type: none"> - no loss of data have occurred inside the system - no loss of data integrity with other systems have occurred - the system is be able to automatically trigger sending/retrieving of external messages that did not occur because of the crash
Title	Airspace management-dedicated computer crash recovery and airspace management conflict data/messages
Status	<Deleted>

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Rationale	Loss of data/data integrity/messages in the planning phase may hamper flight safety when arriving in the execution phase. Not computer crash itself for airspace management, because the actual airspace management conflicts are only unexpectedly frozen when the crash occurs.
Category	<Performance><Safety>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

3.3.1.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0400
Requirement	Airspace Users (Military, Civil) shall share their airspace needs in real time through the ASM Support Systems connected via a common network
Title	Sharing airspace needs
Status	<Validated>
Rationale	Necessary for an efficient consolidation and confrontation of airspace demands.
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0015	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0410
Requirement	The Network Operation Plan (NOP) shall include updates with any agreed data related to the planning
Title	Network Operation Plan update
Status	<Validated>
Rationale	This will enable airspace users to have a clear understanding of all airspace current planning status.
Category	<Performance>
Validation Method	<Shadow Mode><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0420
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Requirement	The Airspace Users shall have access to the Network Operation Plan (NOP) in real time.
Title	Network Operation Plan sharing
Status	<Validated>
Rationale	This will enable airspace users to have a clear understanding of all airspace current planning status.
Category	<Performance>
Validation Method	<Shadow Mode><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0430
Requirement	The de-confliction process shall include the following separate stages - military-military de-confliction, civil-civil de-confliction, civil-military de-confliction.
Title	Military and civil initial deconfliction
Status	<Validated>
Rationale	This deconfliction is performed with the support of the ASM Support System
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0016	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0440
Requirement	After military side and civil side de-confliction has been performed, the Airspace Manager, as a centralised function of the Airspace Management Cells (AMCs), shall start analysing the impact on the network in their respective areas of responsibility, collaborating with the Network Manager for this task.
Title	Analysing ARES impact on the network
Status	<Validated>
Rationale	The AMC/Airspace Manager, at sub regional level and, for civil vs. military de-confliction, at local level, analyses the airspace requests, identify conflicts and coordinate with the requestor to solve conflicts
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A

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<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0015	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0016	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0450
Requirement	The system shall highlight conflicts between military and civil airspace requests. Overlapping military requests shall also be highlighted if negotiations are still going on concerning the booking request, or blocked if area already allocated.
Title	Conflicts highlight
Status	<Validated>
Rationale	Civil-military as well as military-military conflicts might occur.
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

3.3.2 Airspace Negotiation Application Service

3.3.2.1 Safety Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0006
Requirement	The system shall not allow increase from figures in year <conflict_stickyad_year> of Crew/Aircraft induced conflicts concerning airspace infringement due to the introduction of the AFUA concept
Title	Crew/Aircraft induced conflicts
Status	<Deleted>
Rationale	This will be despite the impact of AFUA concept on coordination process DELETED because this is not requirements but Safety Criteria; moreover it is obsolete
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0007
Requirement	The system shall not allow increase from figures in year <conflict_stickyad_year> of ATC induced conflicts concerning airspace infringement due to the introduction of AFUA concept
Title	ATC induced conflicts

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Status	<Deleted>
Rationale	This will be despite the impact of AFUA concept on civil/military coordination process DELETED because this is not requirements but Safety Criteria; moreover it is obsolete
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

3.3.2.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0460
Requirement	The Collaborative Decision Making (CDM) process shall enable airspace users to negotiate requested VPA
Title	Collaborative Decision Making (CDM) process
Status	<Validated>
Rationale	The best possible VPA configuration will be found to accommodate both mission requirements and air traffic flow demand
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0016	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0470
Requirement	The Regional Network Manager and the Airspace Managers shall verify the network performance and propose alternative solutions to the airspace users
Title	Alternative solutions proposal
Status	<Validated>
Rationale	This will be done through What-if and simulation tools
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0015	<Full>

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3.3.3 Airspace Allocation Application Service

The requirement "REQ-07.05.02-SPR-PERF.0500 allocated ARES shall become part of the shared trajectory when and as soon as this trajectory connected to the ARES does exist" is still in status "In Progress" as it shall be validated fully in the trajectory management project P07.06.02. [25], [24]. The rationale is that ARES connected to Trajectory is part of the iOAT (improved OAT Flight Plan) and was validated with its Basic functionality in VP-716. Result assessment leads to a partial V2 maturity level. Further complementary validation is required to complete V2 level; as part of SESAR2020 PJ18.01 planning.

3.3.3.1 Safety Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0008
Requirement	If one or several computers part of a system dedicated to airspace management and containing airspace allocation data do crash, after computers have been restarted, the system shall ensure that: <ul style="list-style-type: none"> - no loss of data have occurred inside the system - no loss of data integrity with other systems have occurred - the system is be able to automatically trigger sending/retrieving of external messages that did not occur because of the crash.
Title	Airspace management-dedicated computer crash recovery and airspace allocation data/messages
Status	<Validated>
Rationale	Loss of data/data integrity/messages in the planning phase may hamper flight safety when arriving in the execution phase. Not computer crash itself for airspace management, because the actual airspace allocation status is only unexpectedly frozen when the crash occurs.
Category	<Performance><Safety>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0026	<Full>

3.3.3.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0480
Requirement	Requested airspace shall become "allocated" as soon as the network reaches a level of stability showing an overall coherence and the Network Operations Plan (NOP) is agreed.
Title	Network Operation Plan (NOP) agreement
Status	<Validated>
Rationale	Allocating the airspace is a way of contributing to network stabilisation but will not prevent further airspace allocation or adhoc airspace activation.
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

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Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Network Operations Plan Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0490
Requirement	The requested airspaces shall not be allocated <VPA_Allocation_Delay> before operations
Title	VPA allocation delay
Status	<Deleted>
Rationale	<VPA_Allocation_Delay> is a system parameter
Category	<Performance>
Validation Method	<Gaming Technique (Agent Based Analysis)><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0500
Requirement	The allocated ARES shall become part of the shared trajectory when and as soon as this trajectory connected to the ARES does exist.
Title	Allocated ARES and reference trajectory
Status	<In Progress>
Rationale	The Shared Trajectories are agreed and become Reference Business/Mission Trajectory.
Category	<Performance>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0510
Requirement	According to the type of a VPA (TSA, TRA), the part of fixed route network concerned shall be closed or useable through coordination agreements
Title	Fixed route network closure
Status	<Deleted>
Rationale	This action will limit controller workload in high density traffic areas and increase predictability for the Aircraft Operators (AOs)
Category	<Performance><Safety>

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Validation Method	<Fast Time Simulation><Real Time Simulation><Gaming Technique (Agent Based Analysis)><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0520
Requirement	The closure of a fixed route network shall trigger automatically warning at least to the trajectory owner for updating the trajectory
Title	Fixed route network closure warning
Status	<Deleted>
Rationale	This action will limit controller workload in high density traffic areas and increase predictability for the Aircraft Operators (AOs). It will also give more initiative to AOs in asking for an alternate route.
Category	<Performance><Safety>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0530
Requirement	The system shall allow allocation and management of any type of ARES in Free Route airspace
Title	ARES in Free Route airspace
Status	<Validated>
Rationale	Allocation of ARES shall be taken into consideration by AOs when planning their trajectories in free route and fixed route airspace. ARES management in FRA can be done by using anchor points around ARES and safety buffers (FBZ FPL buffer zones)
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0540
Requirement	In case of RTSA early release of VPAs the process shall ensure that capacity made available will not be wasted and used to its fullest extent
Title	VPAs new availabilities

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Status	<Validated>
Rationale	Necessary for ensuring an efficient use of airspace
Category	<Performance>
Validation Method	<Live Trial><Shadow Mode><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

3.4 Airspace Activation/De-activation Operational Service (ARESPreActivateService /ARESActivateService/ARESDeactivateService)

These Operational Services concern the **ASM execution phase**.

3.4.1 Safety Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0009
Requirement	The occurrence of the event that a civil or military aircraft fly in an area that Civil or Military ATC is not aware has been activated shall not increase more than the one existing in the current situation and where practicable further reduced
Title	Control agencies not aware of activated area
Status	<Deleted>
Rationale	Necessary for safety reasons. DELETED because this is not requirements but Safety Criteria; moreover it is obsolete
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0010
Requirement	The frequency of granting an activation request that exceeds ATC capacity shall not increase than the one existing in year <ATC_capacity_yardstick_year> and where practicable further reduced
Title	Activation request exceeded
Status	<Deleted>
Rationale	Necessary for safety reasons. DELETED because this is not requirements but Safety Criteria; moreover it is obsolete
Category	<Safety>

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Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-SAFE.0011
Requirement	If one or several computers part of a system dedicated to airspace management and containing airspace activation/de-activation data do crash, after computers have been restarted the system shall ensure that: <ul style="list-style-type: none"> - no loss of data have occurred inside the system - no loss of data integrity with other systems have occurred - the system is able to automatically trigger sending/retrieving of external messages that did not occur because of the crash.
Title	Airspace management-dedicated computer crash recovery and airspace activation/de-activation data/messages
Status	<Validated>
Rationale	Loss of data/data integrity/messages in the execution phase may hamper flight safety. Not computer crash itself for airspace management, because the actual airspace status is only unexpectedly frozen when the crash occurs.
Category	<Performance><Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESActivation	N/A
<APPLIES TO>	<Service>	ARESDeActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0026	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.1010
Requirement	The improvement of data consistency, situational awareness and increased automation due to the interconnection of NM system, ASM systems and ATC systems shall improve safety
Title	Safety improvement
Status	<Validated>
Rationale	The interconnection between NM system, ASM systems and ATC systems, and achieved automation leads to reduction of human induced errors, working on the same information at the same time corresponding to the real situation.
Category	<Performance><Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A

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<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

3.4.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0550
Requirement	The ASM Support System of the appropriate controlling units shall send a message <Pre_Notification_Delay> minutes before the activity starts in an ARES.
Title	Pre-notification delay
Status	<Validated>
Rationale	Necessary for the ARES being clean of non-authorized aircraft. 20 minutes seems to be an appropriate value for <Pre_Notification_Delay>.
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES_TO>	<Service>	ARESActivation	N/A
<APPLIES TO>	<Service>	ARESPreActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0560
Requirement	The ASM Support System shall select automatically the controlling units affected by the pre-notification
Title	Controlling units selection
Status	<Validated>
Rationale	Necessary for knowing who is responsible for ARES flight safety
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES_TO>	<Service>	ARESActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0570
Requirement	If the ARES activation is refused by a controlling unit, the ATC System shall not allow the automatic activation of the ARES
Title	ARES activation refusal

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Status	<Validated>
Rationale	Status of the airspace will be accurate and consistent between the ASM Support System and the ATC System. ARES allocation is done through CDM, not ARES activation. Agreement for ARES allocation may be quite old (a few days) when ARES activation occurs. Even on the best ATM system, something unforeseeable could occur at the very last moment, which could cause air traffic congestion and motivate the controlling unit to refuse activation. The controlling unit may estimate at the very last moment that ARES activation will hamper flight safety.
Category	<Performance><Safety>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES_TO>	<Service>	ARESActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0580
Requirement	When the ARES becomes active, the ASM Support System shall send a message to the ATC System to automatically activate the ARES
Title	ARES automatic activation
Status	<Validated>
Rationale	For the Air Traffic Controller (ATCO) to be aware of ARES activation.
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES_TO>	<Service>	ARESActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0590
Requirement	On the Controller Working Position (CWP) displaying tracks, outlines of the ARES shall differ between: airspace pre-notification and airspace real activation. A separate tag shall indicate if airspace is adhoc defined.
Title	ARES display on Controller Working Position (CWP)
Status	<Validated>
Rationale	The Air Traffic Controller (ATCO) will be able to make the difference between a pre-notification and the real activation to allow him to re route safely all traffics impacted by the activation. Independently from this, knowing about adhoc/non adhoc nature of airspace can improve situation awareness by the controller.

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Category	<Safety>
Validation Method	<Real Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0020	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0600
Requirement	After an ARES has been activated, the ASM Support System shall allow for any specific purpose to extend Airspace activation beyond Airspace reservation time through an Ad-hoc Airspace Request.
Title	Ad-hoc Airspace Request/Extension beyond airspace reservation time
Status	<Validated>
Rationale	This process is necessary to adapt the Area Proximity Warning (APW) to the exact configuration and avoid false alert
Category	<Safety>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0011	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0012	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0013	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0014	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0601
Requirement	The Area Proximity Warning (APW) shall consider exact configuration with regards to Reservation and activation of new Airspace at any moment of planning and execution phases.
Title	Inflight Airspace Request/short notice reservation and APW
Status	<Validated>
Rationale	This process is necessary to adapt the Area Proximity Warning (APW) to the exact configuration and avoid false alert
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A

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<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0011	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0012	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0013	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0014	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0610
Requirement	The process for booking of ad-hoc Airspace shall be the same as the process for a regular booking except that there is no pre-notification part.
Title	Ad-hoc airspace activation
Status	<Deleted>
Rationale	Adhoc airspace activation corresponds to a last minute's allocation and activation of airspace.
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0620
Requirement	The process for ARES de-activation is the same as for activation
Title	ARES De-activation
Status	<Deleted>
Rationale	Deleted as Operational requirement and moved in OSED. The ARES will no longer be displayed on the Controller Working Position (CWP) after a prenotification has already indicated the expected change.
Category	<Performance>
Validation Method	<Real Time Simulation><Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.1020
Requirement	The VPA design principle and real time sharing of airspace status shall improve the use of available capacity
Title	Better use of available capacity
Status	<Validated>
Rationale	VPA design principle allows ARES tailored to the individual mission meeting the real need while offering remaining airspace to civil AU needs. RTSA offers opportunities to take advantage of released airspace.

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Category	<Performance>
Validation Method	<Real Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

3.5 Post Ops Analysis Operational Service

This Operational Service concerns **Post Flight Analysis**.

3.5.1 Planning Efficiency Analysis Application Service

3.5.1.1 Safety Requirements

Not Applicable.

3.5.1.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0630
Requirement	Planning Efficiency analysis shall consist in analysing: <ul style="list-style-type: none"> - The application of the concept - The adherence to optimum airspace dimensions - The utilisation of airspace - The efficient booking system
Title	Planning Efficiency
Status	<Deleted>
Rationale	Deleted as Operational requirement and moved in OSED. The KPIs defined above allow to evaluate planning efficiency as defined in this requirement
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

3.5.2 Flight Efficiency Analysis Application Service

3.5.2.1 Safety Requirements

Not Applicable.

3.5.2.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0640
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Requirement	Flight Efficiency analysis shall consist of comparing the initial flight plan with the executed one. Efficiency of business trajectories is a requirement of the system while efficiency of mission trajectories is a recommendation.
Title	Flight Efficiency
Status	<Deleted>
Rationale	Deleted as Operational requirement and moved in OSED. Military missions, mostly flying from A to A and sometimes having extreme flight profiles are by nature not efficient, although efficiency of their transit phase to the training zone can be improved.
Category	<Performance>
Validation Method	<Real Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

3.5.3 Mission Effectiveness Analysis Application Service

3.5.3.1 Safety Requirements

Not Applicable.

3.5.3.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0650
Requirement	Mission Effectiveness analysis shall consist in analysing: <ul style="list-style-type: none"> - Economic impact of transit - Impact of airspace location on training - Volume and shape of the airspace allocated
Title	Mission Effectiveness
Status	<Deleted>
Rationale	Deleted as Operational requirement and moved in OSED. Efficiency of the transit phase of military missions to their training zone can be improved, in terms of fuel consumption as well as time left for training. Volume and shape of airspace allocated are also important in relation with the training flight profile.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

3.5.4 Flexibility Analysis Application Service

3.5.4.1 Safety Requirements

Not Applicable.

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3.5.4.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0660
Requirement	Civil and military flexibility analysis shall consist in analysing: <ul style="list-style-type: none"> - Training in non-restricted areas (MIL) - Release of airspace (MIL, CIV) - Accommodation of short notice needs (MIL, CIV)
Title	Flexibility
Status	<Deleted>
Rationale	Deleted as Operational requirement and moved in OSED. Flexibility is a key element for both civil and military airspace users to get benefit from AFUA.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

3.5.5 Capacity Analysis Application Service

3.5.5.1 Safety Requirements

Not Applicable.

3.5.5.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0670
Requirement	Capacity analysis shall consist in comparing the initial capacity declared by the Air Navigation Service Provider (ANSP) with the real one
Title	Capacity
Status	<Deleted>
Rationale	Deleted as Operational requirement and moved in OSED. This analysis will allow to make periodic re-assessments of the capacity model
Category	<Performance>
Validation Method	<Real Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

3.5.6 Environment Sustainability Analysis Application Service

3.5.6.1 Safety Requirements

Not Applicable.

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3.5.6.2 Performance Requirements

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0680
Requirement	Environmental Sustainability analysis shall consist in comparing optimum trajectory, i.e. great circle TMS to TMA trajectory, with the executed one
Title	Environment Sustainability
Status	<Deleted>
Rationale	Deleted as Operational requirement and moved in OSED. This requirement is linked to horizontal/vertical deviation fuel burn KPIs.
Category	<Performance>
Validation Method	<Real Time Simulation><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.1000
Requirement	Communication of ASM Support System with any other system shall ensure that data sent has been completely received
Title	Check for completeness of sent data
Status	<Validated>
Rationale	Mitigation for incomplete upload to NM of new airspace data. New airspace data is not (completely) uploaded to NM, whilst AMC believes upload has been completed. Consequently the new or updated airspace data is missing from NM ENV database (thus not available to the other actors), whilst this data will be used by the originator AMC for the production of AUP/UUP. The worst effect would be Hz 01: Conflict between FPL and ARES (Sev 3) (ref. A.1.1) Similarly, mitigation for Mitigation for incomplete upload to NM of new long term planning data. At the latest the problem will be detected within the Allocation step. Not safety but efficiency impact: NM impact assessment of special events and AO production of Business Development Scenarios might be delayed or even biased (ref. A.1.1)
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	AeronauticalInformationFeature	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0690
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Requirement	ASM Support Systems shall receive, process, check airspace data for consistency and disseminate an acknowledgement message upon successful ENV database update
Title	ENV database update consistency check message
Status	<Validated>
Rationale	Mitigation of inconsistent airspace data presented to Users The worst effect would be Hz 03: Need for one or more aircraft to be tactically prevented by ATCO from entering closed airspace due to late provision of airspace data (new ARES) (Sev 4) (ref. A.1.1)
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	AeronauticalInformationFeature	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0700
Requirement	ASM Support Systems shall receive, process, check long term planning data update for consistency and disseminate an acknowledgement message upon successful long term planning data update.
Title	Consistency check message for long term planning update
Status	<Validated>
Rationale	Mitigation for incomplete upload to NM of new long term planning data. New long term planning data is not (completely) uploaded to NM, whilst AMC believes upload has been completed. Consequently some new long term planning data is missing from NM ENV database, is not considered within the NM impact assessment and further not shared with other AMC or published on NOP. At the latest the problem will be detected within the Allocation step. Not safety but efficiency impact: NM impact assessment of special events and AO production of Business Development Scenarios might be delayed or even biased (ref. A.1.1)
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0030	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0710
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Requirement	The Lead AMC ASM Support System shall exchange a confirmation receipt message (e.g. LAM) in response to the ARES request submitted by the Requesting ASM Support System
Title	Confirmation receipt for ARES Request submitted by the Requesting ASM Support System
Status	<Validated>
Rationale	Mitigation of AMC Lead failure to receive ARES request submitted by AMC Requesting (ASM Support Systems or connection error). If not mitigated, additional workload for ARES requestor. At worst, request might not be satisfied due to DCB constraints. No safety but efficiency impact (ref. A.1.1)
Category	<Performance><Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESQuery	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0010	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0720
Requirement	ASM Support Systems shall provide functionality for Automatic preparation and consistency check of NOTAMs
Title	Automated NOTAM request validation
Status	<Validated>
Rationale	Mitigation of the credible corruption of a request for NOTAM publication by ASM Support System, corruption involved by manual input at NOTAM office The worst effect would be Hz 01: Conflict between FPL and ARES (Sev 3) (ref A.1.1)
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	AeronauticalInformationFeature	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0730
Requirement	The ASM Support Systems shall exchange a confirmation receipt message (e.g. LAM) upon reception of the data submitted by the NM system
Title	Confirmation receipt for data submitted by the NM System
Status	<Validated>

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Rationale	Mitigation of failure to receive the last eUUP by the ASM Support System of an AMC No safety impact (ref A.1.1)
Category	<Performance><Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESActivation	N/A
<APPLIES TO>	<Service>	ARESDeActivation	N/A
<APPLIES TO>	<Service>	ARESPreActivation	N/A
<APPLIES TO>	<Service>	ARESRelease	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0010	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0740
Requirement	The ASM Support Systems shall send a confirmation receipt message (e.g. LAM) to the civil and Military ATC / Air Defence Systems upon RTSA information
Title	Confirmation receipt for messages sent by the Military ATC / Air Defence Systems
Status	<Validated>
Rationale	Mitigation of failure to receive a pre-notification (e.g. "Taxi Call") message by the ASM Support Systems. The worst effect would be Hz 05: Mission arriving in ARES whilst not fully cleared of traffic (Sev 4) (ref A.1.1) Mitigation of failure to receive an ARES update message by the ASM Support Systems.. The worst effect would be Hz 01: Conflict between FPL and ARES (Sev 3).
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESActivation	N/A
<APPLIES TO>	<Service>	ARESDeActivation	N/A
<APPLIES TO>	<Service>	ARESPreActivation	N/A
<APPLIES TO>	<Service>	ARESRelease	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0750
Requirement	ATC system and ASM support systems shall enable exchange of real time status of airspace data
Title	ATC system - ASM system RTSA exchanges

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Status	<Validated>
Rationale	Exchange of real time status of airspace data between ATC system and ASM support systems is essential requirement for potential implementation UC4/Taxi call, REQ-07.05.02-OSED-EL01.0019, UC6 (RTSA eUUP data polled), UC7
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESAActivation	N/A
<APPLIES TO>	<Service>	ARESDeActivation	N/A
<APPLIES TO>	<Service>	ARESPreActivation	N/A
<APPLIES TO>	<Service>	ARESRelease	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0760
Requirement	ASM Support Systems and ATCO CWP shall have Common interface for ARES visualisation when receiving real time status of airspace for pre-notification, activation or deactivation of the ARESs
Title	Common interface for ARES visualisation between ASM Support Systems and ATCO CWP
Status	<Validated>
Rationale	Mitigation of failure to receive a Taxi Call message by the ASM Support Systems and of ASM Support System failure to timely trigger/send ARES pre-notification The worst effect would be Hz 05: Mission arriving in ARES whilst not fully cleared of traffic (Sev 4) (ref A.1.1)
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESAActivation	N/A
<APPLIES TO>	<Service>	ARESDeActivation	N/A
<APPLIES TO>	<Service>	ARESPreActivation	N/A
<APPLIES TO>	<Service>	ARESRelease	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0770
Requirement	ARES activation and deactivation in the context of the enhanced automation shall follow a procedure (e.g. acknowledgement) that will prevent an unintended activation and deactivation

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Title	ARES activation and deactivation acknowledgement
Status	<Validated>
Rationale	Mitigation of premature or unintended input of "ARES Deactivation" into ATC System (error in input or misunderstanding in verbal communication). The worst effect would be Hz 08: Multiple aircraft incursion into or excursion from ARES with a late detection through surveillance monitoring (Sev 2) (ref A.1.1) Examples of procedure: 1. The ATC input of deactivation into the system shall trigger a notification to the ARES user, allowing to detect potential unintended action.
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES_TO>	<Service>	ARESActivation	N/A
<APPLIES TO>	<Service>	ARESDeActivation	N/A
<APPLIES TO>	<Service>	ARESPreActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0019	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0780
Requirement	The ASM Support Systems design shall not allow deactivation of ARES unless deactivation notification message from authorised address is received
Title	Prevent spurious ARES deactivation by the system
Status	<Validated>
Rationale	Mitigation of spurious ARES deactivation by ASM Support Systems. The worst effect would be Hz 08: Multiple aircraft incursion into or excursion from ARES with a late detection through surveillance monitoring (Sev 2) (ref A.1.1)
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESDeActivation	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0019	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0790
Requirement	The ASM Support System shall provide decision-support ("what-if") functionality to allow impact assessment
Title	"What-if" functionality allowing impact assessment
Status	<Validated>

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Rationale	Mitigation of incorrect AMC impact assessment. The worst effect would be Hz 04: Late ARES request or modification leading to undetected demand/capacity imbalance (Sev 3).
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0800
Requirement	The NM system shall provide functionality allowing to support the local impact assessment of an in-flight ARES request or modification involving the Local Traffic manager/ATC/AMC
Title	NM System functionality allowing to support the local impact assessment of an in-flight ARES request or modification
Status	<Validated>
Rationale	To prevent a wrong local impact assessment of an in-flight ARES request or modification. The worst effect would be Hz 04: Late ARES request or modification leading to undetected demand/capacity imbalance (Sev 3). As an example, this functionality would provide on the CHMI/NOP an indication of the impacted flights, the potential overlap with other ARES, solution proposals etc.
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0810
Requirement	The ASM Support Systems shall ensure consistency of data when supporting the design, definition, and any potential subsequent adjustment of the ad-hoc airspace.
Title	Ad-hoc airspace
Status	<Validated>
Rationale	Mitigation of misunderstood request for ad-hoc designed airspace or of wrong input or of credible corruption by dedicated ATC System functionality. The worst effect would be Hz 08: Multiple aircraft incursion into or excursion from ARES with a late detection through surveillance monitoring (due to confidence) (Sev 2) (ref A.1.1)
Category	<Safety>

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Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	AeronauticalInformationFeature	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0030	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0820
Requirement	ASM support systems shall include functionality supporting the ATC and Local Traffic Manager local impact assessment of an ad-hoc designed airspace
Title	ASM support systems functionality for the ATC and Local Traffic Manager local impact assessment of an ad-hoc designed airspace
Status	<Validated>
Rationale	Mitigation of wrong ATC & Local Traffic Manager local impact assessment of the request for ad-hoc airspace The worst effect would be Hz 04: Late ARES request or modification leading to undetected demand/capacity imbalance (Sev 3) (ref A.1.1)
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0830
Requirement	ASM Support Systems shall enable management of ad-hoc defined airspace volumes
Title	ASM Support system management of ad-hoc defined airspace
Status	<Validated>
Rationale	essential requirement for potential implementation of ad hoc airspace UC9 (Information about the new defined ad-hoc airspace made available in NM system)
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A

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<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>
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[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0840
Requirement	NM system shall include capability allowing to process and assess the information about the ad-hoc defined airspace
Title	Ad-hoc designed airspace and NM system
Status	<Validated>
Rationale	The RTSA information can also be originated by NM (e.g. case of actions of the Crisis Management Cell). When the RTSA information (ad-hoc airspace design) is available to NM, NM shall be able to interpret and process it.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0850
Requirement	ASM Support Systems shall provide functionality allowing to manage the pending MIL user requests (waiting list)
Title	ASM Support System waiting list management functionality
Status	<Validated>
Rationale	Increased situation awareness and optimal use of the available airspace. Supports AMC in taking the opportunity offered by an ARES cancellation for rapid satisfaction of a MIL user that expressed the need for that airspace
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESQuery	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0860
Requirement	ASM Support Systems shall provide functionality for Automatic detection and warning for conflicting requests among Users in cross-border operations.
Title	Automatic detection and warning for conflicting requests among Users in cross-border operations
Status	<Validated>

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Rationale	The functionality for Automatic detection and warning for conflicting requests among Users in cross-border operations is an essential requirement for potential implementation. (UC1)
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES TO>	<Service>	ARESQuery	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0870
Requirement	ASM Support Systems shall provide functionality to propose automatically potential solutions for the requests' de-confliction
Title	System support for potential solutions for the requests de-confliction
Status	<Validated>
Rationale	The functionality for automated potential solutions for the requests' de-confliction is an essential requirement for potential implementation. (UC1). To enable and support CDM process.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0880
Requirement	ASM Support Systems shall manage proposals and counter-proposals in automated manner or manually
Title	System ability to manage proposals and counter-proposals
Status	<Validated>
Rationale	The functionality to manage proposals and counter-proposals is an essential requirement for potential implementation (UC1, UC2). To enable and support CDM process.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A

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<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0890
Requirement	ASM Support Systems shall support performance assessment in view of airspace allocation based on input of traffic demand prediction and capacity constraints in automated manner or manually
Title	System shall support assessment in view of airspace allocation based on input of traffic demand prediction and capacity constraints
Status	<Validated>
Rationale	essential requirement for potential implementation (UC2 + VP710/TACT)
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PERF.0630	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0900
Requirement	ASM Support Systems shall enable RTSA processes
Title	ASM Support Systems shall enable RTSA processes
Status	<Validated>
Rationale	essential requirement for potential implementation (UC3, UC6, UC10)
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0910
Requirement	ASM Support Systems shall support automated impact assessment on DCB with regards to RTSA
Title	System shall support impact assessment on DCB with regards to RTSA
Status	<Validated>
Rationale	This requirement is in support of NM/FMP Impact assessment on DCB essential requirement for potential implementation UC3, UC4 (REQ-07.05.02-OSED-NOP1.0050), UC6, UC7
Category	<Performance>

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Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0018	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0070	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0920
Requirement	ASM Support Systems shall enable dissemination of RTSA information
Title	Publication in NOP for AO
Status	<Validated>
Rationale	essential requirement for potential implementation UC3, UC4, UC6, UC10
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Network Operations Plan Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<APPLIES_TO>	<Service>	AeronauticalInformationFeature	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0930
Requirement	When ATCO/TRAMON/Supervisor perform coordination, communication and/or cross-checking for an in-flight ARES request or modification input to the system, they shall follow a procedure that will prevent a wrong input or will detect a corruption.
Title	Procedure for preventing a wrong input or detecting a corruption of an in-flight ARES request or modification
Status	<Validated>
Rationale	Mitigation of a request misunderstood or a wrong input or a credible corruption of an in-flight ARES request or modification . The worst effect would be Hz 08: Multiple aircraft incursion into or excursion from ARES with a late detection through surveillance monitoring (due to confidence) (Sev 2) (ref A.1.1)
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A

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<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0017	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0019	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0021	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0022	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0025	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0940
Requirement	When AMC finalize the design of the new airspace and input it to the system for the local impact assessment and for any potential subsequent adjustment following the local impact assessment, they shall follow a procedure for cross-checking the validity of the input information.
Title	Procedure for cross-checking the validity of the input of a request for ad-hoc designed airspace
Status	<Validated>
Rationale	Mitigation of misunderstood request for ad-hoc designed airspace or of wrong input or of credible corruption by dedicated ATC System functionality. The worst effect would be Hz 08: Multiple aircraft incursion into or excursion from ARES with a late detection through surveillance monitoring (due to confidence) (Sev 2) (ref A.1.1)
Category	<Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-AOM1.0002	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0025	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0950
Requirement	The NM and ASM support systems shall allow reservations required for synchronised missions when confirmed by the user.
Title	Acceptance of synchronised missions by NM and ASM systems
Status	<Validated>
Rationale	When several missions are linked together (use the same ARES) ASM and NM systems shall allow the user to override the conflict warning when entering the missions details into the system.
Category	
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0030	<Full>

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[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0960
Requirement	ASM support system shall only allow to override a conflict warning if confirmed by all the relevant users.
Title	Conflict warning overriding
Status	<Validated>
Rationale	In case of several users entering mission data that triggers a conflict warning (e.g. reservation of the same ARES) all the relevant users shall be informed of the conflict. The conflict involving at least two users shall only be resolved by a confirmation from both users.
Category	<HMI><Performance><Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0030	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0970
Requirement	ASM support system shall allow for the synchronisation of missions with ARESES and shall provide a clear indication of the link between the bookings (at what time which ARES is used by which mission) with regard to RTSA
Title	Synchronisation of missions with ARESES
Status	<Validated>
Rationale	Different ARESES and blocks of ARESES shall be linked to a mission to give a clear indication of how these bookings are linked together, even when they have different times and geographical locations. Indication of the link should also serve as a mitigation to the change/ cancellation of missions without regard for the other constituent parts.
Category	<HMI><Performance><Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0010	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0020	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0030	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0980
Requirement	ASM support system shall alert the actors as soon as an RTSA update is received
Title	ASM system RTSA update alert

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Status	<Validated>
Rationale	ASM system user shall be notified as soon as there is a change in RTSA
Category	<HMI><Performance><Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0023	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.0990
Requirement	NM system shall alert the actors as soon as an RTSA update is received
Title	NM system RTSA update alert
Status	<Validated>
Rationale	NM system user shall be notified as soon as there is a change in RTSA
Category	<HMI><Performance><Safety>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0022	<Full>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0023	<Full>

[REQ]

Identifier	REQ-07.05.02-SPR-PERF.1030
Requirement	The VPA design principle and real time sharing of airspace status shall reduce fuel consumption and CO2 emissions
Title	Fuel consumption reduction
Status	<Validated>
Rationale	The implementation of VPA design principle offers more plannable airspace. RTSA provides opportunities to improve flight trajectories. It will contribute to reduce emissions and fuel consumptions.
Category	<Performance>
Validation Method	<Fast Time Simulation><Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<ALLOCATED_TO>	<Functional block>	Cooperative Airspace Management	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Full>

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3.6 Information Exchange Requirements (IER)

[IER]

Identifier	Name	Content Type	Frequency	Safety Criticality	Confidentiality	Maximum Time of Delivery	Interaction Type	Free
IER-07.05.02-OSED-LTPL.0101	Submit long term plan		1	Catastrophic	Restricted	6 months	Collaboration	
IER-07.05.02-OSED-LTPL.0102	Propose Changes to LTP		1	Catastrophic	Restricted	6 months	Collaboration	
IER-07.05.02-OSED-LTPL.0103	Final long term plan		1	Catastrophic	Restricted	6 months	Collaboration	
IER-07.05.02-OSED-LTPL.0104	Accept long term plan		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02-OSED-LTPL.0105	Publish long term plan		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02-OSED-DgAS.0001	Update airspace structure		1	Catastrophic	Restricted	AIRAC cycle (28 days)	Collaboration	
IER-07.05.02-OSED-PuAS.0001	Provide static airspace data		1	Catastrophic	Restricted	AIRAC cycle (28 days)	Collaboration	
IER-07.05.02-OSED-ARES.0001	Submit ARES request		1	Severe	Restricted	Immediate	Collaboration	
IER-07.05.02-OSED-ARES.0002	Propose modifications		1	Severe	Restricted	Immediate	Collaboration	
IER-07.05.02-OSED-ARES.0003	Accept ARES (modifications)		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02-OSED-ARES.0004	Reject ARES (modifications)		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02-OSED-ARES.0005	Modify ARES Request		1	Severe	Restricted	Immediate	Collaboration	
IER-07.05.02-OSED-ARES.0006	Delete ARES Request		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02-OSED-ARES.0007	Approve ARES Request		1	Severe	Restricted	Immediate	Collaboration	
IER-07.05.02-OSED-ARES.0008	ARES not approved		1	Catastrophic	Restricted	Immediate	Collaboration	

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Identifier	Name	Content Type	Frequency	Safety Criticality	Confidentiality	Maximum Time of Delivery	Interaction Type	Free
IER-07.05.02- OSED- nAUP.0001	Propose AUP		1	Severe	Public	NLT 1400 UTC day before operations	Collaboration	
IER-07.05.02- OSED- nAUP.0002	Update AUP		1	Severe	Public	NLT 0800 UTC day of operations	Collaboration	
IER-07.05.02- OSED- nAUP.0003	Set Ready AUP		1	Catastrophic	Public	Immediate	Collaboration	
IER-07.05.02- OSED- nAUP.0004	Delete AUP		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02- OSED- nAUP.0005	Validate AUP = Provide AUP errors list		1	Catastrophic	Restricted	Not specific	Collaboration	
IER-07.05.02- OSED- nAUP.0006	Propose changes to AUP		1	Severe	Restricted	Immediate	Collaboration	
IER-07.05.02- OSED- nAUP.0007	Set Release AUP		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02- OSED- nAUP.0008	request AUP expansion		1	Severe	Public	Immediate	Collaboration	
IER-07.05.02- OSED- nAUP.0009	Provide AUP expansion		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02- OSED- EAUP.0001	Provide eAUP		1	Catastrophic	Public	Immediate	Collaboration	
IER-07.05.02- OSED- AcAS.0001	Notification of pre-activation		1	Severe	Restricted	Immediate	Collaboration	
IER-07.05.02- OSED- AcAS.0002	Real time Activation of an Airspace		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02- OSED- AcAS.0003	Activation Refusal		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02- OSED- AcAS.0004	Real time De-activation of an Airspace		1	Severe	Restricted	Immediate	Collaboration	
IER-07.05.02- OSED- AcAS.0005	Release of an Airspace		1	Catastrophic	Restricted	Immediate	Collaboration	
IER-07.05.02- OSED- PKPI.0001	Publish KPI		1	Major	Restricted	Immediate	Collaboration	

Table 4: IER layout

4 References and Applicable Documents

4.1 Applicable Documents

- [1] Template Toolbox Ed.04.00.00 22/03/2014
<https://extranet.sesarju.eu/Programme%20Library/SESAR%20Template%20Toolbox.dot>
- [2] Requirements and V&V Guidelines 03.00.00
<https://extranet.sesarju.eu/Programme%20Library/Requirements%20and%20VV%20Guidelines.doc>
- [3] Templates and Toolbox User Manual 03.00.00
<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>
- [5] European Operational Concept Validation Methodology (E-OCVM) - 3.0 [February 2010]

4.2 Reference Documents

- [6] SESAR P07.05.04-D45 OSED for Advanced Flexible Use of Airspace in Step 1 Ed.00.04.00
https://extranet.sesarju.eu/WP_07/Project_07.05.04/Project%20Plan/Forms/AllItems.aspx?RootFolder=%2fWP%5f07%2fProject%5f07%2e05%2e04%2fProject%20Plan%2fSTEP%201%2fOSED&FolderCTID=0x01200071EE6E9C31247545B3FDC27B0FE4CD71&View=%7b5EBEBA4D%2d738B%2d4641%2dAE73%2d5E32924FB056%7d
- [7] ED-78A GUIDELINES FOR APPROVAL OF THE PROVISION AND USE OF AIR TRAFFIC SERVICES SUPPORTED BY DATA COMMUNICATIONS.
- [8] SESAR Safety Reference Material
<https://extranet.sesarju.eu/Programme%20Library/Forms/Procedures%20and%20Guidelines.aspx>
- [9] SESAR Security Reference Material
<https://extranet.sesarju.eu/Programme%20Library/Forms/Procedures%20and%20Guidelines.aspx>
- [10] SESAR Environment Reference Material
<https://extranet.sesarju.eu/Programme%20Library/Forms/Procedures%20and%20Guidelines.aspx>
- [11] SESAR Human Performance Reference Material
<https://extranet.sesarju.eu/Programme%20Library/Forms/Procedures%20and%20Guidelines.aspx>
- [12] WPB.01 Integrated Roadmap DS14 version
https://extranet.sesarju.eu/WP_B/Project_B.01/Project%20Plan/Forms/AllItems.aspx?RootFolder=%2fWP%5fB%2fProject%5fB%2e01%2fProject%20Plan%2fB%2e1%2e4%20Integrated%20Roadmap%2fIntegrated%20Roadmap%20Versions%2fDS13&FolderCTID=0x012000BE4653D3772D947BA33C47126A7F166&View=%7bCB21D686%2d3C9B%2d42C9%2d83DD%2d63615C24EF30%7d
- [13] (EC) regulation 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace
- [14] COMMISSION REGULATION (EU) No 691/2010 of 29 July 2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services
- [15] EUROCONTROL Civil-Military Performance Measurement Handbook, edition 2 (PRISMIL)

- [16] European Route Network Improvement Plan (ERNIP) Part 3 Airspace Management Guidelines -The ASM Handbook Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace, Edition Number : 5.1 Edition Date : 23/10/2014
Status: Released Issue
<http://www.eurocontrol.int/sites/default/files/publication/files/ERNIP-ASM-Handbook-Part3.pdf>
- [17] SESAR 07.02-D28 Step 1 Release 4 Detailed Operational Description (DOD), Ed 00.03.00
- [18] EUROCONTROL Civil-Military Performance Measurement Handbook, edition 2 (PRISMIL)
- [19] EUROCONTROL Specifications for the Application of the Flexible Use of Airspace – Edition 1.1 - 10/01/2009 [EUROCONTROL-SPEC-0112]
- [20] 10.01.07-D120-Technical Architecture Description Cycle 2015 Edition 00.01.00
https://extranet.sesarju.eu/WP_10/Project_10.01.07/Project%20Plan/Work%20Area%20-%20Architecture/WP10.01.07-D120%20-Technical%20Architecture%20Description%20-%20Cycle%202015.doc
- [21] 07.02-D42 Step1 Network Subsystems Technical Architecture Edition 00.02.00
https://extranet.sesarju.eu/WP_07/Project_07.02/Project%20Plan/Step1/07.02-D42-Step%201%20TAD.doc
- [22] D52 Step 1 Advanced Flexible Use of Airspace Validation Report (VALR), ed. 00.01.00
- [23] D26 Update Validation report for stand-alone WOC validation for Step 1 (BMT, AFUA, iOATFPL), ed. 00.01.00
- [24] 07.06.02-D50 Validation Report (VALR) for STEP1 Operational Air Traffic (OAT) Flight Plan Management, Ed. 00.01.00 13/11/2015
- [25] P07.06.02-D51 Mission Trajectory OSED (under drafting)

Appendix A. Assessment / Justifications

A.1 Safety and Performance Assessments

A.1.1 Safety assessment

The Safety assessment report is available in the embedded document below:



AFUA Step 1 Safety
Assessment Report_C

A.1.2 Security risk assessment

Security risk assessment has not been done

A.1.3 Environment impact assessment

Environment impact assessment has not been done

A.1.4 OPA

OPA has not been done

-END OF DOCUMENT-

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