EUROPEAN ORGANISATION

FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

- ADVANCED FUA CONCEPT -

Edition	**:**	**1.0**
Edition Date	**:**	**24/07/2015**
Status	**:**	**Proposed issue**
Distribution	**:**	**ATM Stakeholders**

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DOCUMENT CHARACTERISTICS

TITLE			
Advanced FUA CONCEPT			
		Publications Reference:	
		ISBN Number:	
Document Identifier		**Edition Number:**	1.0
		Edition Date:	24 July 2015

Abstract

Keywords

Concept	AFUA	Airspace Configuration	Centralised database
Civil-military	ASM	Performance	

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STATUS, AUDIENCE AND ACCESSIBILITY					
Status		**Intended for**		**Accessible via**	
Working Draft	☐	General Public	☐	Intranet	☐
Draft	☐	ATM Stakeholders	☑	Extranet	☑
Proposed Issue	☑	Restricted Audience	☐	Internet (www.eurocontrol.int)	☐
Released Issue	☐	*Electronic copies of this document can be downloaded from :*			

ADVANCED FUA CONCEPT

DOCUMENT APPROVAL

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ADVANCED FUA CONCEPT

DOCUMENT CHANGE RECORD

The following table records the complete history of the successive editions of the present document.

EDITION	DATE	REASON FOR CHANGE	PAGES AFFECTED
0.1	07/08/2013	First review	all
0.2	22/08/2013	Second review	all
0.3	19/09/2013	Third review	all
0.4	03/12/2013	Fourth review	all
0.5	10/02/2014	Fifth review	all
0.6	17/02/2014	Sixth review	i, iii, v, 1, 3, 4, 5, 7, 10, 13, 19
0.7	25/02/2014	First draft review for board	i, iii, v, 3, 14,15, 16, 17
0.8	28/02/2014	Final draft review for board	i, iii, iv, v, 1, 2, 3, 4, 5, 6, 8, 9, 13, 14, 15, 16, 17, 22, 27
0.9	09/04/2014	Review for consultation	i, iii, iv, 14, 17
0.91	05/01/2015	Review after consultation	i, ii, iii, iv, v, vi, 1, 2, 3, 4, 5, 6, 7, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 27, 28, 29
0.92	20/01/2015	Joint review after consultation	i, ii, iii, iv, v, vi, 1, 2, 3, 4, 5, 6, 7, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 27, 28, 29
0.93	10/03/2015	Additional comments after ASMSG-RNDSG	i, ii, 7, 17
1.0	24/07/2015	Finalisation of the document (editorial numbering)	cover, i, ii, iii, 22

EXECUTIVE SUMMARY

This document presents a Concept for Advanced Flexible Use of Airspace (AFUA Concept). The AFUA aims at further enhancing the ASM/ATFCM/ATS cooperative planning, and it provides the description of operational requirements for the data exchange required to support these processes.

It describes the cooperative, seamless and (when so required) reiterative processes for strategic Level 1, pre-tactical Level 2, and tactical Level 3.
It builds upon the Network Strategy Plan of the Network Manager and the associated ASM Directions of Work planned for implementation until 2019 as well as the SESAR Step 1 and SESAR Step 2 AFUA Operational Service and Environmental Definition (OSED) intended to ultimately contribute to achieving Trajectory Based Operations.

The concept introduces the evolutions required to deliver the AFUA Concept in terms of procedures, airspace organization, coordination processes, system support and performance evaluation. It mainly builds on the enhanced Collaborative decision Making (CDM) and utilization of optimal Airspace Configurations, themselves using new types of airspace structures. **The concept does not intend to affect the sovereign responsibility of the national authorities regarding final decisions on airspace allocation.**

The document is also presenting the improvements expected from the gradual implementation of the AFUA Concept, which may be summarized as the cohesive coordination of the common airspace resources up to network level, through a proactive partnership between all ATM actors. This will ensure that both civil and military needs are addressed, that airspace utilization is optimized and that performance objectives are achieved.

In the description of the elements of AFUA, the airspace configurations are further described as one of the cornerstones of the concept, through the process to be used for their definition and utilization across the ASM levels of the basic FUA concept, and through their composing elements.

Another essential element of AFUA that is described is the enhanced CDM to be implemented for an efficient management of airspace configurations from the strategic and pre-tactical levels down to the tactical level. The description includes the roles of all actors involved in these CDM operations through the ASM levels.

The rolling process replacing the initial FUA snapshot approach for mainly the pre-tactical and tactical airspace planning phases and the live cycle of a given airspace configuration is further described as a component of the AFUA Concept.

Another fundamental aspect is the ASM System support and data management that is necessary for the realization of the improvements mentioned above. The concept is building on the extensive deployment and utilization of interoperable local/sub-regional ASM supporting tools, connected to centralized services allowing all actors connected to exchange relevant ASM data and to conduct CDM negotiations among all relevant stakeholders (including NM), in order to achieve a common picture of the airspace at European level.

Finally, the concept comprises the systematic and comprehensive storage of all data related to the airspace bookings and the airspace management processes. These data will be made available to all authorized parties (including military) interested in querying data to be

aggregated into performance indicators reflecting the efficiency of the AFUA and its contribution to the overall network performance.

In Part 5 of this document, these concept elements are grouped in packages reflecting their level of maturity and the remaining challenges to move from today's reality to the desired end state delivering optimum performance to all users of the airspace.

TABLE OF CONTENT

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ADVANCED FUA CONCEPT

1. INTRODUCTION

This document presents a Concept for Advanced Flexible Use of Airspace (AFUA Concept). It aims at further enhancing the ASM/ATFCM/ATS cooperative planning, and it provides the description of operational requirements for the data exchange required to support these processes.

It describes the cooperative, seamless and (when so required) reiterative processes for ASM levels (strategic, pre-tactical, and tactical levels).

It builds upon the Network Strategy Plan of the Network Manager (as required by Commission Regulation (EU) No 677/2011 of 7 July 2011 as amended) and the associated ASM Directions of Work planned for implementation until 2019 as well as the SESAR Step 1 and SESAR Step 2 AFUA Operational Service and Environmental Definition (OSED). The SESAR elements are part of the Network Operations concept developed by SWP7.2, where all 3 levels of AFUA are addressed to allow dynamic airspace management in all phases of operation designed to achieve Trajectory Based Operations.

1.1 Main elements of the AFUA Concept

1.1.1 The main elements of the overall AFUA concept are based on NMB approved elements[1] of the Network Manager ASM Directions of Work and the SESAR concept:

- Extensive Collaborative decision Making (CDM) which will enhance FUA. The AFUA procedures will include the description of how the performance objectives, the airspace allocation and mission effectiveness are taken into consideration within the CDM.
- An extensive use of Airspace Configurations. These are defined as “the predefined and coordinated organisation of ATS Routes and Free Route Airspace (FRA) of the ARN and/or Terminal Routes (evolving towards Business and Mission Trajectories) and their associated airspace structures (including temporary airspace reservations, variable profile areas, dynamic mobile areas, if appropriate) and ATC sectorisation”. Airspace Configurations are aimed at responding to and balancing performance driven strategic objectives (capacity, flexibility, flight efficiency, mission effectiveness, environmental) at all levels, network, sub-regional and local. In specific, the Airspace Configurations will be supported by:

  ⇨Extensive use of Free Route Airspace in significant parts of the airspace, dynamically defined, where flights are not constrained by any route structure.

  ⇨Provisions for dynamic and pro-active sector management, based on multi-sector planning of sector families, not limited to a local ATS unit. Dynamic sectorisation will support the accommodation of short-term changes, help ensure the network-FRA/sectors consistency, and provide a mechanism to alleviate critical ACC sectors when and where necessary.

  ⇨Introduction of mechanisms allowing the definition and use of

[1] Described in NMB approved NOP since 2012 onwards and in relevant approved NETOPS documents

flexible, *ad hoc*, reserved/segregated airspace structures within a given Airspace Configuration, based on the concept of Variable Profile Areas (VPAs) as described in the SESAR Step 1 documents and possibly on dynamic mobile areas in the longer term.

- Airspace Configurations will result from a CDM process where improvements to the airspace organisation and management are agreed. It will be conducted through an ASM/DCB-ATFCM/ATS process, set up to agree upon a predefined set of Airspace Configurations for a given airspace volume and time, including route structures, restricted/reserved airspace structure and associated sectorisation.
- The CDM process will include Vertical and Horizontal CDM processes as appropriate. The horizontal CDM process will cover all partners in the gate to gate concept (involving airports, ATFCM, Military missions planning, ACC and MIL Units supervisors etc*).* The vertical CDM process will describe the CDM between the Network, FAB and Local level.
- Continuous, seamless and reiterative planning, allocation and use of different airspace configurations, resulting from any airspace change in any time period initiated by both pre-tactical Level 2 and tactical Level 3. This will result in a continuous/ rolling Network AUP/UUP known as rolling process, supporting enhancement of the Network Operations Plan. This will allow airspace users to take benefit from changes to airspace structures.
- More extensive Europe-wide and cross-border shared use of reserved/segregated areas, in a bi-lateral or multi-lateral context, and as a direct consequence of the FAB implementation.
- A more accurate network and local performance monitoring, through a gradual integration, at network level, of the existing network performance management systems.
- Major system support for all collaborative processes of Advanced Flexible Use of Airspace at the 3 Levels. It shall establish a centralised AFUA service connected to a centralised database for network wide ASM, allowing the central collection, integration and provision of ASM data in support of continuous collaborative network processes related to airspace needs, constraints, booking and actual use of the Network.
- Better exchange of data to ensure common situation awareness at any time based on the deployment of local ASM support systems and their interfaces with enhanced NM systems via a centralized service. The exchange is defined by B2B and common agreed standards.
- Based on the SESAR operational improvements, the airspace status will be shared not only among local ATM partners and Network Manager but also among civil and military aircraft. In addition, the implementation of the concept of Dynamic Mobile Areas (DMAs) will require the sharing of the DMA data among all stakeholders, including the aircraft. Ground and airborne systems will need to be upgraded to include trajectory de-confliction with DMAs.
- Providing OAT flight plans referencing airspace needs to civil ATS can create an enhanced awareness of civil ATS on military traffic. Mutual awareness is considered enhancing flight safety, reducing ATCO communication workload in civil and military units, enabling enhanced flexible use of airspace and facilitating tactical civil-military co-ordination.

1.2 Concept Statement

1.2.1 The Advanced FUA Concept:

INTRODUCES

Performance driven operations based on the management of **Airspace Configurations**,

PROVIDES

processes that support the use of more **dynamic and flexible elements** as made available through Advanced FUA,

DESCRIBES

a **seamless, Collaborative Decision Making (CDM) based, ASM/ATFCM/ATS process** with an advanced **real time management** of Airspace Configurations as well as a **continuous sharing** of information among all ATM partners enabled by advanced technology developed within SESAR.

1.3 Evolution Required to Deliver the AFUA Concept

1.3.1 This Advanced FUA concept uses as a baseline the implementation of the ASM work plan. This concept ensures that both the ASM Directions of Work and the SESAR AFUA CONOPS are put together in a cohesive manner to enable improvements across ASM, ATFCM and ATS processes, including a seamless AFUA operation from strategic planning to tactical usage through:

- strengthening of the co-ordination process between all ATM partners and in particular between the Network Manager, the ACCs/FMPs, the military units and the AMCs/FAB ASM-ATFCM Units;
- enhancement of the mechanism for the planning and management of route structures, associated sectorisation and airspace reservations (ARES). This mechanism will also include principles for use of the different structures accommodating the different requirements;
- alignment of ASM Level 2 and ATFCM-DCB (ATFCM evolving into Demand Capacity Balancing) timeframes and moving them closer to the time of operations;
- extension of a seamless real time collaborative process from airspace request up to the tactical phase (Level 3);
- enhancement of the information sharing and notification of all AFUA related data needed for a performance based optimisation of the airspace use;
- pooling, processing and dissemination of accurate ASM/ATFCM/ATS data, expected to be achieved mainly through appropriate supporting services and the AFUA Centralised Service;
- consistency in Flight Plan processing and distribution for both, civil and military operations;
- enhanced performance evaluation associated to the AFUA though a pro-active approach;
- Common agreed system architecture;
- Systems Interoperability supported by common standards and appropriate change management process;

2. IMPROVEMENTS EXPECTED BY THE IMPLEMENTATION OF THE AFUA CONCEPT

2.1 The AFUA concept is a realistic evolution based on enablers developed within preceding and existing ATM related programs, projects and activities, such as the DMEAN Framework Programme, the ASM Improvements Initiative[2], the SESAR Implementation Package 1 and the regulatory enablers implemented through the SES II Package.

2.2 As such, the main improvements expected by the application of the AFUA concept are related to a cohesive coordination of the common airspace resources at network level through a partnership approach between all ATM actors. Sharing responsibility and active participation in the ASM by the users will also lead to a more efficient use of airspace. The development, implementation and deployment at Network level of an AFUA concept will optimize the use of available airspace both locally and at network level, across border, delivering increased flight efficiency, this resulting in more performing flights, **and will not affect the sovereign responsibility of the national authorities regarding final decisions on airspace allocation**. This will ensure that both civil and military needs are addressed and utilisation of the airspace is optimised:

1) Systematic application of cooperative mechanisms among all partners, civil and military, at local, sub regional and network level through interactive ASM/ATFCM/ATS management at all three ASM levels (Strategic, Pre-tactical and Tactical) as required, with the aim of:

   - Optimising resources versus airspace demand;
   - Minimising possible adverse effects on network operations caused by national borders and/or the sub-regional (FAB) constraints and
   - Minimising adverse effects on network operations that local decisions on airspace status may have, through the application of continuous impact assessment of local or sub-regional airspace status change.

2) Seamless and synchronised transition, geographically and time wise, from one operational environment to another (e.g. between FRA and standard ATS routes);

3) Continuous, seamless and reiterative planning, allocation and utilisation of different airspace configurations resulting from any airspace change in any time period initiated by both pre-tactical Level 2 and tactical Level 3 (not limited to the current Level 2 timeframe);

4) Evolution from the current system of regulating the network to precise demand/capacity balancing (DCB) through cooperative airspace planning and usage, including proactive management of all airspace structures activation and shifting air traffic flows as appropriate;

5) Available ASM and ATFCM information is collected and made available to all parties, at various planning stages, through network services;

6) Contribute to the achievement of the performance targets in safety, capacity, environment and flight efficiency/mission effectiveness.

[2] Now replaced by ASM work plan

3. MAIN CHANGES

3.1 Operational Environment

3.1.1 Most of the improvements and complementary requirements for an advanced FUA will be related to the closer interaction between FUA Levels 1, 2 and 3 (Strategic, Pre-Tactical and Tactical). This interaction will result in a seamless (running) process enabled by continuous CDM among the different levels and actors in relation to the nature of the event to be coordinated.

3.1.2 The outputs of this seamless CDM process will result in a coherent Network Operations Plan (NOP), which will continuously be made available to the users through the use of the System Wide Information Management (SWIM) to update the airspace and flight plan information with planned and real-time data. The ATM system will have to be able to cross check FPLs (SBT/SMT & RBT/RMT) for consistency with the expected Airspace Configuration(s) in a particular time-frame (e.g. for the day of operations) and a particular airspace volume (e.g. a FAB, geographical area covering specific traffic flows, hot spot areas, etc.).

3.1.3 After the notification of a particular Airspace Configuration, any proposed change to the agreed airspace structure will be processed at local, sub-regional and at network level. The outcome of the CDM process will result in an agreed updated Airspace Configuration, which in turn will be made available to the airspace users so that they can adapt their FPLs (SBT/SMT or RBTs/RMTs) accordingly. There will be a need to identify the processes and procedures required to perform this continuous, rolling impact-assessment, where changes proposed are assessed with regard to their impact on the overall network performance.

To ensure consistency between the planning cycles of Business and Mission Trajectories and airspace, the notion of Reference allocation of airspace, compliant to the Mission Trajectory concept will be introduced.

3.1.4 For the implementation of the tasks combining ASM, ATFCM and ATS activities at local and sub-regional (FAB) level, a joint civil-military function should be established. This function needs to integrate ASM (current AMC), ATFCM (current FMP) and ATS (real time status of airspace) functions so that ASM/ATFCM/ATS processes can be performed in a combined manner allowing for a cooperative management of Airspace Configurations. This function is expected to manage civil/military airspace allocation, flow and capacity management, including sector configuration management.

3.1.5 With respect to Functional Airspace Blocks, according to specific operational needs, as well as cost benefit analysis, each FAB is expected to decide on their organisational solution to ensure the level of integration required to provide a consolidated picture, in terms of airspace configurations at FAB level. The Network Manager will contribute to the harmonisation of regional solutions aiming at the achievement of defined performance targets.

3.1.6 The notification of Airspace Configurations will be based on automatic flows of information between a centralised database and the different stakeholders through agreed services (B2B or B2C) provided by the Network Manager Function and made available through SWIM. Data quality has to be ensured by establishing quality management processes. B2B service will allow stakeholders to query the system according to their needs while B2C service will provide data to the stakeholders through an automated push mechanism. NOP portal will

continue to be used to retrieve data by those stakeholders not subscribing to any specific service agreement.

3.2 Airspace Structures Applicable

3.2.1 It is expected that airspace structures will consist of:

- Extensive use of conditional structures (CDSs);
- High degree of modularity and dynamicity of existing Airspace Structures (ATS Routes, CDRs, TRAs, TSAs, possibly designed in accordance with the VPA principle, etc.);
- Introduction of processes and procedures for delineation of ad hoc structures and allocation of airspace structures based on requirements;
- Extensive use of Free Route Airspace.

3.2.2 These structures will be the main elements for the planning and utilisation of Airspace Configurations for a given airspace volume and time.

3.2.3 Although it is expected to provide for a significant transition between the existing and the future environment, some hybrid combinations are still considered to be possible, e.g. fixed route and user preferred route environment existing in the neighbouring airspace volumes or even replacing one another in the same airspace volume.

3.2.4 Modular airspace reservations/restrictions with the implementation of Variable Profile Area (VPA) design principles is to facilitate transition towards trajectory based environment. VPA allows for flexible allocation and management of small fixed predefined modules of airspace. Their implementation allows for better response to military requirements and constraints e.g. meteorological constraints, and enhances civil-military coordination including real time airspace status update for defining different airspace scenarios with acceptable network impact.

3.2.5 The design principles of VPA could be extended to collaborative airspace planning for cross border operations (CBO). It encompasses civil and military activities conducted by one or more States within an area established across international borders. The objective is to rationalise the airspace available in order to improve the network efficiency, while fulfilling military needs and requirements through shared use of military areas.

3.3 Other elements from the SESAR concept

3.3.1 From Synchronised Processes towards Integrated Processes

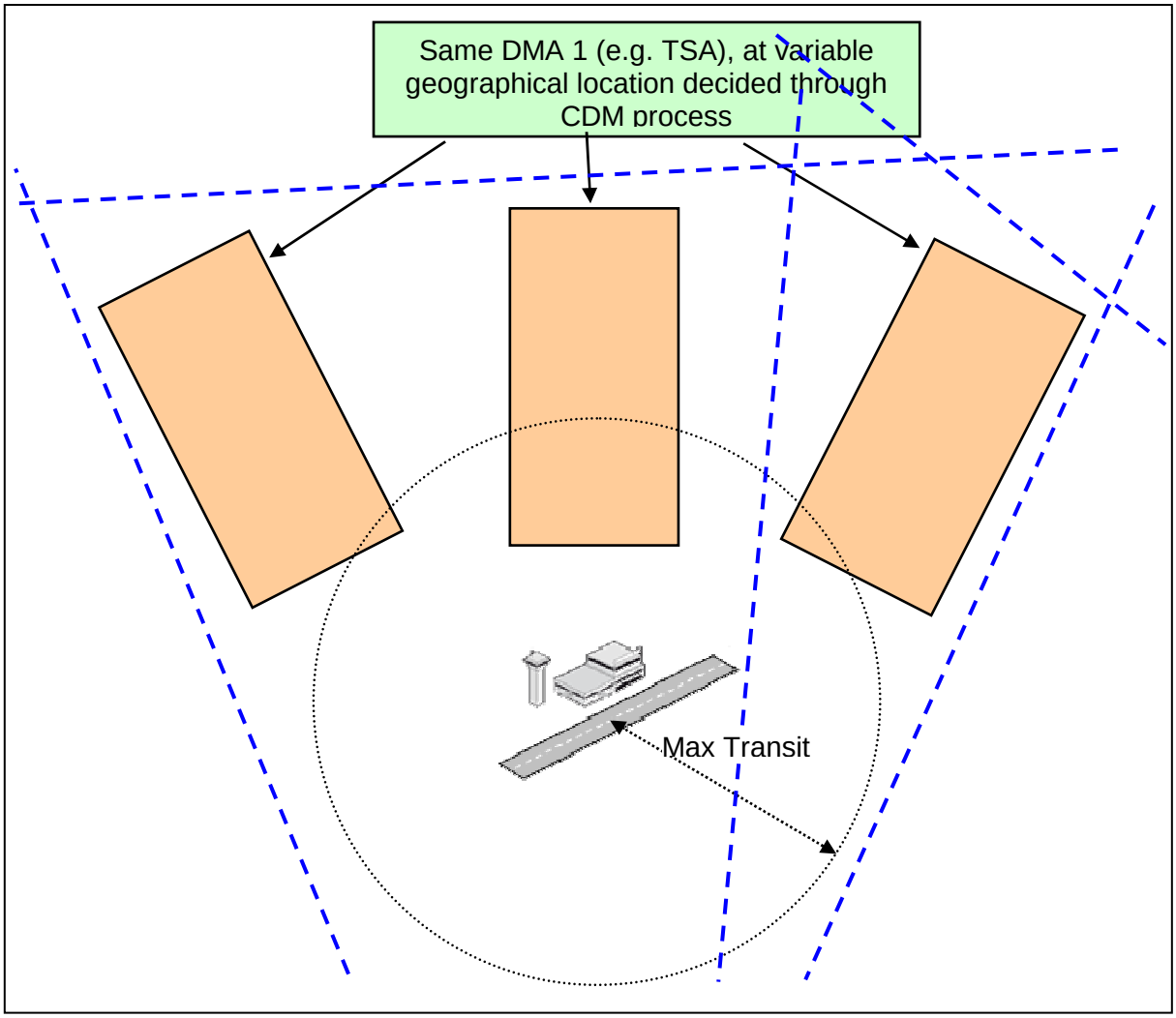
In time based environment (Step 1), the Airspace Management process and ATFCM process are synchronised but remain separate processes. The aim of a trajectory based environment (Step 2) is to fully integrate the two processes. More generally, the objective is to evolve towards a higher integration level of the Mission Trajectory related domains: Airspace Management, ATFCM, Mission Preparation, weather information management (with enriched weather model) and flight planning.
In step 1, the allocation of airspace remains a preliminary step of flight planning (for missions needing an ARES). Reversely, in step 2 it is the sharing of a trajectory including an ARES request which triggers the airspace booking process. The trajectory becomes the basis for negotiation between the military airspace user and the network (at local, FAB and Regional levels).

In a free route environment, the Network Manager system shall identify the trajectories impacted by the allocated airspace volumes (ARES) and shall provide a warning to the trajectory owners. The airspace users are then able to update their trajectories according to the airspace volumes linked with other trajectories. The military will also know the trajectory of civil users that fly along user preferred routes.
These evolutions will require the definition of new processes for negotiation and the upgrades of systems used for WOC operations. Integrated support systems and the participation to SWIM will be the corner stone for this enhanced civil-military cooperation.

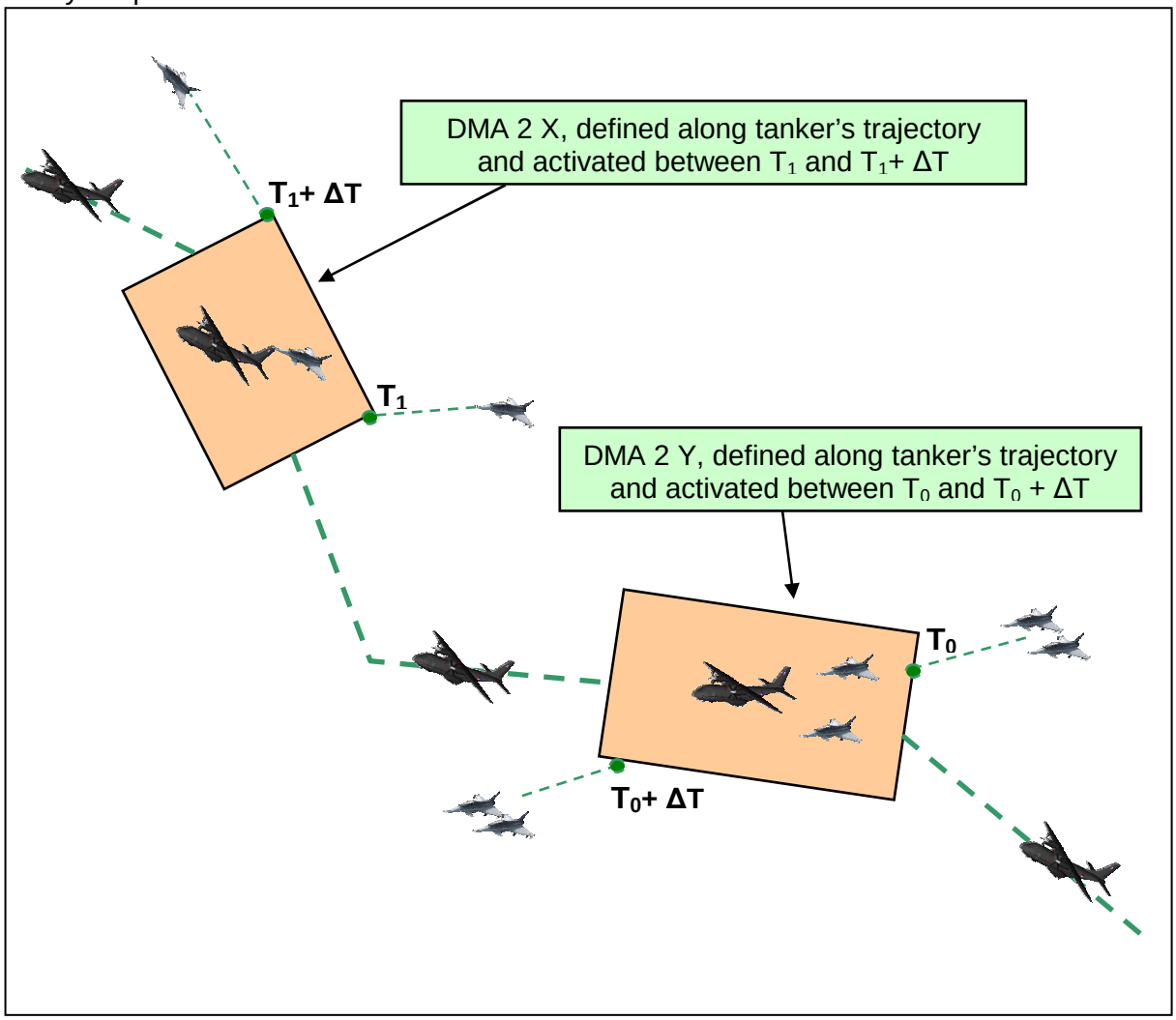
3.3.2 New Airspace Design Options

In step 2, Dynamic Mobile Areas (DMAs) are introduced as a supplementary option for ARES. DMAs are temporary mobile airspace exclusion areas, whose aim is to minimise the impact on the network while satisfying the needs of military airspace users. Three types of DMAs are identified: DMAs of types 1, 2 and 3, as described below.

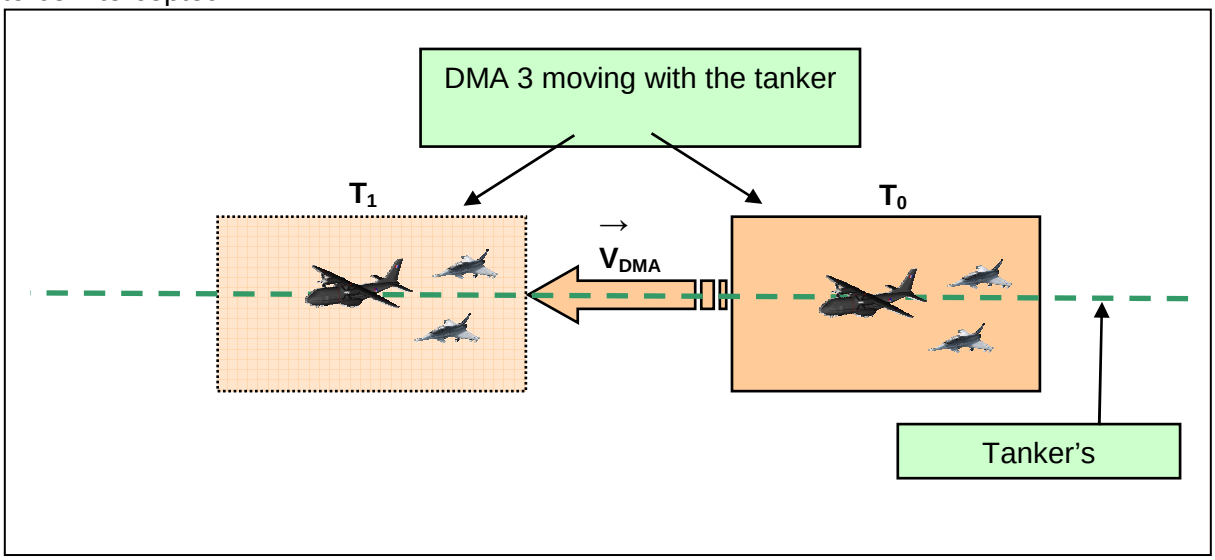
· **DMA of type 1**: it is an area defined with lateral and vertical dimensions and time frame allocation needs at variable geographic location negotiated through CDM process. The use of DMAs of type 1 allows on the basis of proposals from the local FMP and/or the Network Manager the AMCs to decide on the location of the requested ARES in order to minimise the impact on the expected traffic, while keeping the transit time between the ARES and the aerodrome of destination below the maximum threshold defined by the military airspace user.



· **DMA of type 2**: it is an area with defined lateral and vertical dimensions and time frame allocations needs at variable geographic location along a defined trajectory. A change in the trajectory therefore implies a change in the DMA. A military mission often includes the accomplishment of several tasks at different locations and different flight levels (e.g. air-to-air refuelling, combat exercise, etc.). It is not always possible to allocate a single ARES that encompasses all these tasks as it would represent a too important portion of the airspace and therefore would have a too big impact on the network. DMAs of type 2 will consist in this case in several smaller ARES defined along the trajectory, which allows to limit the impact on the network and to guarantee to the military airspace user the allocation of these ARES.



· **DMA of type 3**: it is an area with defined lateral and vertical dimensions around moving activities requiring extra lateral and vertical separation from other trajectories. A DMA of type 3 is therefore a "bubble" moving with the aircraft to be separated from the rest of the traffic. This type of DMA not only minimizes airspace segregation but is also beneficial to the military airspace user, by increasing flexibility. It allows for instance a same tanker to move to different locations to refuel several aircraft formations, thus removing the need for several tankers, each of them constrained in a fixed ARES. It can also increase safety by defining a volume of protection around a suspicious aircraft to be intercepted.



These three types of DMA can be used both in a free route environment and in a fixed route environment.

4. DESCRIPTION OF THE ELEMENTS OF THE CONCEPT

4.1 Airspace Configuration Definition and Operational Deployment

4.1.1 Introduction

4.1.1.1 Airspace Configurations enable flexible solutions as a function of changes that have occurred or are anticipated to occur.

4.1.1.2 Until such time when Airspace Configurations will become completely dynamic, the majority of them are expected to be pre-defined strategically. Each configuration comprises of pre-defined fixed and flexible routing options (or optimised trajectories) and optimum ATC sectorisation, meeting civil and military air traffic demand, including environmental constraints if so determined. The definition of the configurations will consider the complexity and will ensure a transparent civil-military coordination. They will be capable of being dynamically adaptable to traffic demand so that they can respond flexibly to different performance objectives which vary in time and place. In order to optimise performance, it is anticipated that a certain configuration will include a number of variations at local/sub-regional level. These variations should be of such nature that they contribute to the network performance and are based on previously commonly (level 1, FAB, NM) agreed parameters, and can therefore be agreed and applied through local decisions.

4.1.2 Process for Defining Airspace Configurations

4.1.2.1 The processes and procedures for the definition and selection of an Airspace Configuration, aim at defining optimal Airspace Configuration at local and/or sub-regional (FAB) level and at European network level in a given airspace volume and within a particular timeframe ensuring the optimal performance of the European network.

4.1.2.2 These processes and procedures will also enable, at network level, seamless and synchronised transition between different Airspace Configurations such as different local or FAB configurations and those configurations of the neighbouring local airspaces or FABs, including the application of night routes, weekend routes, free routes, etc.

4.1.2.3 The Airspace Configuration definition process will be based on a comprehensive and precise coordination in vertical plane (local <> sub-regional <> network) as well as in the horizontal plane (between adjacent airspace volumes) resulting in an agreed Airspace Configuration.

4.1.2.4 The following input parameters will facilitate the Airspace Configuration definition process:

1) Strategic Level 1 Parameters:

- Respective elements of the SES II regulatory package (e.g. Performance Regulation, Airspace Regulation, FUA Regulation, ATFM Regulation);
- European airspace policy agreed through EUROCONTROL Stakeholders working arrangements;
- Cross-border airspace and operation
- National/sub-regional airspace policy;
- National/sub-regional airspace design, organisation and management, e.g. ATS Routes, CDR propagation/consistency, Early Access to Weekend Routes, night routes, direct routes, Free Route Airspace, TSA,TRA, CBA…;
- Local/sub-regional/network capacity/complexity constraints;
- Local/sub-regional/network performance plans, including targets;
- Local/sub-regional/network historical/anticipated civil traffic demand;
- Local/sub-regional/network historical/anticipated military traffic demand, i.e. reserved/segregated airspace demand;
- Environmental constraints, e.g. CO_2 pollution quotas (if/when applicable); and national/sovereignty constraints
- Any other relevant parameter.

2) Pre-tactical Level 2 Parameters:

- Planned activation of different airspace structures organisation (e.g. Free Route Airspace);
- Expected civil and military traffic demand;
- Anticipated hot-spots;
- Anticipated over-demanded flows (e.g. in the FRA environment);
- Reserved and restricted airspace demand;
- Ad-hoc airspace delineation criteria;
- Anticipated Airport constraints;

- Expected environmental constraints;
- Anticipated capacity and complexity constraints;
- Weather constraints, e.g. wind, adverse weather, airport weather, turbulence;
- Anticipated number of active ATC sectors, including sector capacity, layout and configuration;
- Human resources, i.e. ATC staff availability;
- Local and/or FAB airspace performance targets;
- Civil or Military request for ad-hoc airspace allocation;
- Real time airspace changes (derived from Level 3); and
- Any other relevant parameter.

3) Tactical Level 3 Parameters:

- Tactical changes (military mission constraints);
- Non-planned - sudden real-time constraints e.g. security measures; and
- Sudden adverse weather constraints, e.g. CB activity, snow, ice.

4.1.3 Airspace Configuration Elements

4.1.3.1 To develop a typical Airspace Configuration the following constituent elements are to be considered (to be gradually implemented depending on maturity and validation):

- Volume of airspace subject to the foreseen operational deployment:
  - Sector families within/across FIRs;
  - Whole FIR;
  - Sector families within/across FABs;
  - Whole FAB;
  - Two or more neighbouring FABs; and
  - European network.
- Airspace structures to be considered within an Airspace Configuration:
  - ATC sectors;
  - Control Areas - CTAs, containing ATS Routes, TMA, LTA, UTA;
  - Control Zones (CTR);
  - D/R/P areas;
  - TRA/TSAs, MTA, possibly designed in accordance with the VPA principle;
  - ATS routes(including CDRs); and
  - Free/Night/Direct Route areas.
- Other, not physically defined volumes:
  - Hot-Spots; and
  - Significant Traffic Flows (e.g. SE or SW axes).

4.1.3.2 Each Airspace Configuration at either local or FAB or network level consists of an interactive combination ("modus operandi") of a number of the constituent elements and results in its publication in the Network Operations Plan.

4.2 Collaborative Decision Making with airspace configurations

4.2.1 General

4.2.1.1 The strategic management of Airspace Configurations requires a consolidated and flexible approach in order to provide a seamless transition to the Tactical Level 3 phase of the network operations. All actors and functions, including i.e. airspace design, airspace management, DCB, ATFCM and ATS, need to be involved in this process.

4.2.1.2 Such a consolidated and synchronised Network Management process should mitigate in a balanced manner against any potential network impediments caused by implementation of configurations that may be convenient at local level but detrimental for network performance.

4.2.1.3 To provide for this consolidated approach, the Airspace Configuration definition and operational deployment processes will be based on a CDM sequence of events, and the 3 phases will be executed by relevant actors organised in appropriate CDM groups. If the result of a phase level decision is unsatisfactory, a higher level phase may be restarted. Within a given phase, simulations will be performed to assess the input parameters and optimise the proposed configuration.

4.2.1.4 Each actor could be involved in different CDM group, in accordance with the decisions required for each phase and the different target time (date(s) or hour(s) of operations.

4.2.1.5 For each phase, a set of tasks must be defined to be implemented under the supervision of the associated CDM group. This includes the definition of roles and responsibilities of all actors in CDM.

4.2.1.6 The link between airspace planning and tactical management of the network can only be assured once all actors and functions involved in the process are aware of their roles and responsibilities. With this in place, potential gaps will be minimised between planning and actual operations by taking into account changes that have occurred. This will be done through the notion of Airspace Configuration.

4.2.1.7 This process will also provide for a seamless and synchronised transition between different Airspace Configurations planned for a local or a FAB airspace, in order to ensure the best European network performance. Such processes will allow local and/or sub-regional volumes of airspace to efficiently move between different configurations to optimise the use of their airspace without adversely impacting network performance.

4.2.2 Actors

4.2.2.1 The following main actors are identified with their associated roles for the different cycles:

CDM Level 1 – Strategic Phase - **High Level Airspace Policy Body (HLAPB or its equivalent; at national and sub-regional level), with participation of the civil and military airspace users as appropriate, supported by the Network Manager** - this CDM Group establishes criteria and prioritisation rules. Validation methodology and tools (e.g. simulation tool, real time simulations, live

trials etc) will be extensively used. When the level of maturity of an anticipated Airspace Configuration is reached by a Level 1 cycle, it is terminated and the focus is passed over to Level 2. The Network manager supports this process with network views on the design of configurations.

CDM Level 2 - Pre-tactical Phase – a joint civil-military function, combining ASM, ATFCM and ATS activities at local and/or sub-regional (FAB) level, **civil and military airspace users and the Network Manager** – this CDM Group takes over from Level 1 to plan in more detail the Airspace Configuration for specific airspace volume(s) and time, based on the demand for the use of airspace as submitted by **civil and military airspace users**. The airspace allocation process will be improved with the relevant ATFCM information at its very early stage. Consequently, from the conceptual point of view, CDM will be shifted closer to the starting point of the airspace allocation process. The requestor will be provided with the necessary information during the definition of his airspace request to fulfil his mission. The ATFCM information is needed to offer the opportunity to choose airspace with the lowest impact on air traffic flows.

This includes assessments using simulations and/or optimisation tools to prove the feasibility of a planned Airspace Configuration in support of performance. When maturity is reached and there is agreement on a selected Airspace Configuration by the Level 2 Cycle, the focus is passed over to Level 3. In case of difficulties to reach an agreement, or if so required, it may be reverted back to Level 1 to obtain necessary strategic decision(s) (e.g. missing criteria). The Level 2 planning phase focuses on short time periods. As soon as an Airspace Configuration has been agreed upon it is published in the NOP.

CDM Level 3 - Tactical Phase – is combining ASM, ATFCM and ATS activities at local level Civil and Military Units – decisions at this phase are bound by the decisions made at Level 2, but it is recognised that there will continue to be a requirement for a certain dynamism and flexibility at Level 3 to respond to the current operations and events of unpredictable nature in time critical conditions. These changes of the configuration will be reported back to the level 2 which will consider the effects on the network.

4.3 The Rolling Process

4.3.1 The current ASM/ATFCM/ATS processes are based on the AUP. Additionally, UUP snapshots can be issued by AMC. This process will become a ‘Rolling Process’.

4.3.2 This Rolling Process will be based on Airspace Configurations that by their nature are a significant enhancement of the AUP/UUP principle. In addition to the optimum solution for the civil/military airspace sharing, Airspace Configurations contain any element/parameter that may affect the optimum performance at the local, sub-regional and the network level. The most prominent of those elements is the dynamic and proactive ATC sectorisation management.

4.3.3 The key change is that Airspace Configurations are based on known and anticipated changes, and are adapted or fine-tuned continuously, whenever a change occurs.

4.3.4 The Level 1 is normally not part of the Rolling Process. However, exceptionally, during critical events, the role of Level 1 may be required to make necessary strategic decisions.

4.3.5 Pre-tactical activities within the ASM/DCB-ATFCM/ATS process will take place at regular intervals up to a defined time before the time of operations. Based on the Airspace Configuration definition criteria set up at Level 1, the Level 2 delivers a Draft Airspace Configuration that is subject to CDM process performed by the Level 2 partners. After its completion, the Draft Airspace Configuration becomes an Agreed Airspace Configuration and is a part of the Network Operation Plan (NOP). Immediately after the Agreed Airspace Configuration has become a part of NOP, it may become subject to updating and/or fine-tuning depending on the significance of an airspace change that will have occurred. Updating or fine-tuning will be done through a rolling process, as soon as an airspace change happens or when triggered by events.

4.3.6 At Level 2 the updating of an Agreed Airspace Configuration may occur at any time, resulting in an Updated Airspace Configuration agreed in the CDM process performed with involved Level 2 partners. Such Updated Airspace Configuration becomes a part of NOP.

4.3.7 At Level 3 the fine-tuning of an Agreed or Updated Airspace Configuration may occur, resulting in a Fine-tuned Airspace Configuration. The CDM required will be referred to Level 2, targeting only a limited number of Level 2 and Level 3 partners that are directly affected and are able to change their RBT/MBT in real time, e.g. flight level capping, re-routing (for civil operators) or re-positioning in horizontal or vertical plane (for military operators). Information on a Fine-tuned Airspace Configuration will be referred to the Level 2 partners enabling them to adapt the Agreed Airspace Configuration, or develop a new one.

4.3.8 However, in time critical situations the Level 3 partners should act as a decision making body regarding the measures to be taken with information to be immediately shared with Level 2 actors.

4.3.9 Level 2 will take into account new Airspace Configuration re adapted at Level 3. It will be integrated in the CDM process for the next time period.

4.4 ASM System Support and data management

4.4.1 From the Network point of view, the optimisation of the systems to support AFUA has been analysed and the result is that the Advanced Flexible Use of Airspace concept and its collaborative process involving all civil and military actors shall be strengthened by a centralized AFUA major system support, which enables the continuous collection and availability of ASM data.

4.4.2 The ASM data that is shared and used by partners in ASM/ATFCM/ATS need to be consistent so that the initiator of a change is using the same information as those at the end of the chain, which hence ensures qualitative data to all ATM partners. The security of data and its exchange needs also to be considered.

4.4.3 Adding more flight intent data to an airspace demand and providing ATFCM information as environmental data to be considered when planning and negotiating would be an accessible first major step towards integration of ASM, ATFM and FPL processes.
The early flight intents attached to an ARES should include at least the following information:

- Departure/arrival airbase
- Mission Type
- Number of aircraft in the mission
- Priority of the mission

The sharing of early flight intents supports the CDM process. After optimisation via the CDM process, the early flight intents become flight intents, which themselves result in the filing of an Improved OAT flight plan.

4.4.4 ASM systems used nationally will have to support a mutually agreed data exchange model and standardised data sets to be exchanged with the AFUA central support service.

4.4.5 Strategic Phase – Level 1

4.4.5.1 The system shall support the necessary flow of information for the strategic planning activities, allowing coordination between the users of airspace, the adjacent countries, the ASM actors and NM. Strategic planning activities, including military exercises, have normally an impact on the network design, utilisation and overall performance (KPAs on environment/flight efficiency and capacity covering mainly the KPIs defined in the Commission Implementing Regulation (EU) No 390/2013). Therefore, sharing strategic planning information and information on local and network constraints with NM and its operational stakeholders will enable a collaborative choice of the best location and time horizon for each activity.

4.4.5.2 The necessary information to enable a collaborative process and detailed network impact assessment on mission effectiveness and network performance shall be provided by the ASM system support. Extending the sharing of such information to all actors concerned on the long term will also improve the understanding and visibility on the planning of operations and airspace, and subsequently improve the performance of the planning activities of actors like Aircraft Operators (AO), Military Operators, Air Navigation Service Providers (ANSP), Airspace Management Cells (AMC) or Flow Management Positions (FMP).

4.4.5.3 The strategic airspace planning data will also comprise new/temporary airspace reservations.

4.4.6 Pre-tactical Phase – Level 2

4.4.6.1 The Airspace Use Plan (AUP) and the subsequent rolling updates thereof (Updated Airspace Use Plan, UUP) reflect the local (national, FAB. Etc.) decisions on the temporary allocation of the airspace reflecting the civil-military coordination achieved at AFUA level 2 within a state jurisdiction or a FAB when such arrangements are in place.

4.4.6.2 For the continuous coordination and production of the best possible European AUP/UUP and updates (EAUP/EUUP) by the Network Manager, the centralized Advanced FUA System Support shall make available the relevant airspace data in support to the agreed airspace configuration and availability data allowing for querying and modification of the information on airspace availability within the central database and the ASM Support Systems. Full interoperability between all systems will need to be ensured.

4.4.6.3 The systems shall support different actors to execute their tasks as follows:

- NM for the identification of hot spots including in free route environment; impact assessment on flight efficiency, mission effectiveness, airport congestion; automated generation of airspace relocation and rerouting proposals with inputs from the MILO function, production and release of the consolidated EAUP and continuous updates (EUUP) and for the production of network impact assessments; NM will use these data to ensure, if necessary, the appropriate negotiation with ASM partners on the airspace availability; NM will also share all relevant information on flows and traffic density with the local AMCs (and military airspace users if applicable) to show the impact of local decisions on capacity and

encourage the participation of the users, but with no change in the full freedom of the AMC for the final decision.

- AMCs for sending their AUP and UUPs, and for visibility on sub-regional/network constraints, the provision of data and answers to NM proposals, and as a support to local impact assessment, the available data supporting optimal decision making on airspace allocation; Based on a shared view of civil and military needs, AMCs will coordinate the utilization of airspace structures to improve the mission effectiveness and to limit the impact of reserved airspace on the network.
- Other relevant actors executing local/sub-regional impact assessments.

4.4.7 Tactical Phase – Level 3

4.4.7.1 The ASM system support shall ensure the availability of ad hoc airspace and real time airspace status data during the tactical phase, enabling the collection, integration and distribution of relevant real time information to all interested parties. It will require that all ATC units or controlling military units provide and share the real time information on the actual status of the airspace for the database and the information provided by the service to be up to date.

4.4.7.2 The system shall support the following Level 3 processes

- Support tactical changes of the airspace planned
- Support to provision of high quality information on airspace activation/deactivation to the flow management (FMP, FAB, NM) and real time information to interested ATM systems.

4.4.7.3 To enable dynamic airspace management processes, the definition and allocation of ad-hoc routes and areas provided by the concerned air traffic control centre and/or controlling military unit will be used to update the network systems with real-time information.

4.4.8 Post Operational Evaluation and Performance Monitoring

4.4.8.1 The performance evaluation associated to the AFUA will focus on the performance of ASM and on the impact of ASM on the overall performance of the network operations.

4.4.8.2 The ASM support tool shall support the archiving of all received ASM data to be made available for performance assessment by regulatory bodies (State authorities, Performance Review Body [PRB]), the Network Manager or other authorised ASM network actors, and as feedback to be used to improve performance.

4.4.8.3 The service shall allow generating all necessary and authorized local and network aggregated data. Local authorities, the Network Manager, the PRB or other authorised parties, will use this data to calculate and monitor performance indicators and to produce reports in conformity with the requirements of the applicable performance regulation. The aggregated data and performance indicators shall include airspace usage, CDR utilisation, military mission effectiveness and civil use of airspace subject to reservation.

4.4.8.4 The archived data will be defined in order to support the calculation of the relevant performance indicators associated to the Key Performance Areas related to airspace management. The data provided will have to be able to evolve as required in the future (in their definition and in their format) in order to adapt to the changes which may impact the PIs and KPIs currently identified in the performance regulation.

5. CLASSIFICATION OF THE CONCEPT ELEMENTS FOR IMPLEMENTATION

The AFUA concept represents the desired end state delivering optimum performance regardless of maturity, cost and organisational matters.

In order to enable concrete and measureable achievements, the concept elements can be grouped in three packages, on top of a baseline showing what is already implemented. Package 1 is made of widely accepted improvements and packages 2 and 3 what is less mature and requires broad acceptance or further research and development.

5.1 Baseline

Baseline is listing the elements which are already implemented to a significant extent and are known as having, or likely to have, an impact on the network performance

Airspace configurations are described in a concept document which has been reviewed by NETOPS in 2012-2013. NETOPS has subsequently decided to hand over the document to SESAR for further validation. However, if complex and comprehensive airspace configurations are not yet deployed, a subset of basic and simple combinations of ATS routes, Free route, flexible airspace structures including with variable profile are already implemented today in some parts of the European airspace. Early Access to Week-end routes (EAW) may be given as an example where a number of elements are negotiated, agreed, combined and planned for situations which are well identified and where combinations like EAW come as the most efficient solution for airspace organization.

Free Route Airspace is one of the elements to be used in airspace configurations, which has already started to be significantly implemented. Important work has been conducted by NM in 2013 to ensure that the necessary evolutions were formalized in order to ensure the compatibility of free route airspace and airspace reservation (the ASM Handbook has been updated to include the elements related to Free route airspace, flight planning buffer zones and performance indicators associated to Free route airspace). According to the current planning, a major part of the European airspace will be covered by free route operation by 2019.

Variable Profile Areas (VPA) are not yet widely used by European States for the design of military training areas, but they are already implemented were the airspace situation was the most critical, like in some parts of the German airspace and in the core area. Additionally, the VPA belong to the SESAR Step 1, so it is expected that the extension of their utilization is going to grow in the coming years.

Collaborative decision Making (CDM) is one the major elements of the AFUA Concept. The CDM process has been improved compared to the starting point situation initially described in the FUA Concept. The deployment of tools like CIAM, the involvement of personnel like the airlines operations liaison officers, and more recently advanced ASM support tools (LARA, STANLY_ACOS) and the military liaison officers (MILO), have significantly extended the meaning of CDM. Nevertheless, a lot is still to be done and is expected to be achieved with the evolutions envisaged by the AFUA Concept.

The rolling process has not yet become completely fluid as it is expected with AFUA, but from the original start, it has been significantly improved over the recent years with the new procedures related to AUP-UUP, which have been introduced in the ASM

Handbook for the purpose of moving the final stage of planning closer to the time of operations.

Cross Border Operations have been deployed and used already for some time, but on a limited basis. Such operations need to be extended, better harmonised in their functioning and publication, whenever possible with a lead AMC.

With regards to system support, the significant progress achieved in the recent years was initially with the deployment of CIAM, and then with the validation and deployment of new ASM tools (e.g. LARA, STANLY ACOS). The inter-connection of the existing deployed ASM tools is already very promising, and the acceleration expected with the centralised service AFUAS complemented by existing local ASM supporting tools will bring the required evolution for a really performing flexible airspace management.

Performance monitoring has been implemented to a significant extent by the network manager, as described in section 7 of the ASM Handbook, which has recently been modified to include the necessary measurements associated to flexible use of airspace in free route environment. This is complemented by the availability of the PRISMIL tool, with a particular focus on military mission effectiveness, for the States having decided to implement it. It is expected that the PRISMIL performance evaluation will evolve and be extended under the AFUA Concept development.

5.2 Package 1

Package 1 is listing the elements which are not yet implemented, or only partially implemented, but for the implementation of which a wide consensus exists and no additional difficulties are expected

Package 1 brings the following improvements:

At Strategic level

- Civil-military airspace designed in modules adapted to different mission profiles: cross border “Variable Profile Areas” or ad hoc airspace volumes adjusted to real needs.
- Implementation of FPL “buffer zones” around a reserved airspace are harmonized to facilitate the route network design, the development of tools and procedures and to support Free route implementation, based on agreed ASM Handbook procedures.
- Expand areas where free route is implemented cross border and appropriately de-conflicted from military activity.

At pre-tactical and tactical levels

- Full deployment of airspace management tools (LARA, STANLY ACOS or equivalent) at local, FAB and NM level all connected through B2B interfaces to share consistent and permanently updated data allowing a common, unique, extensive view of military activity at pan-European level; Continuous update of the airspace use plans (until few hours before execution) and availability of the

real time status of the airspace (i.e. activated or deactivated) in all AMCs, civil and military units/systems and NM systems. The updated information may be shared and used by both the planning function (AMC and NM) and the ATC function, and ensures a continuous common situational awareness.

- Sharing of information on flows and traffic density with the military airspace users (civil airspace users to be confirmed)) to show the impact of local decisions on capacity and encourage the participation of the users

- Based on this shared view of the civil and military needs, coordinated booking of the airspace at FAB or NM level (when required), with a specific focus on cross border structures should be accomplished. This new collaborative decision making process (CDM) is based on relocation and time change proposals generated by either the AMC/FAB function or by NM through the MILO function to limit the impact of the reserved airspace and to improve the mission effectiveness. In particular, the military would be more proactive if they could measure the output of their effort for their own benefit but also for the overall benefit of the network.

- The performance of the airspace booking function and of the civil use of the released airspace is monitored at network and State levels. The success of AFUA depends on mutual trust and confidence that the airspace is optimised for all users. For the time being, few indicators exist to measure the impact of AFUA on military training. Indicators should be available not just in the post operational phase but also to better plan the operations.

5.3 Package 2

Package 2 is listing the elements which are envisaged in the Concept, but for which further discussions and agreement from partners is still required

Airspace configurations: as indicated in the baseline, some basic and limited features of airspace configurations are currently used or implemented. For the deployment of more complex, comprehensive and mature airspace configurations, there is a need for further validation in the context of SESAR. The description document of the airspace configurations has been handed over to SESAR in 2013, and it is now the subject of further work in Work Package 7. Some initial progress steps are expected in 2014, but the stage required to reach the maturity for deployment is likely to take a couple of years more.

ASM support to ATFCM: notion of dynamic airspace configurations
Airspace configurations are pre-defined routing options and sectors grouping to respond mainly to capacity or flight efficiency problems and meet airspace needs. Airspace configurations are already used when the flows and constraints can be predicted well in advance (e.g. week end routes or seasonal flows of traffic). A more dynamic process involving the military, the civil users and the controllers would require new functionalities and procedures and well defined collaborative decision making

processes at pre-tactical level. The feasibility and benefit of dynamic airspace configurations designed at tactical level should be demonstrated.

Dynamic Mobile Areas (DMA) are part of the SESAR Step 2. These areas are not only made under the principle of a modular design both horizontally and vertically, but also designed to be mobile to adapt to local constraints (DMA 1)

Collaborative decision Making will really go through a huge evolution in the context of this Package 2, as it corresponds to the timeline and maturity of the full development of an architecture allowing permanent and real time exchange of data. The implementation of the centralized service should normally accelerate the process of improving the CDM up to the optimal level. Nevertheless, dynamicity and pro-activity in the AFUA practice will need to be ensured by all available means to achieve the best possible network performance.

The rolling process will become a seamless process as soon as all required supporting systems and procedures are implemented and will be frozen only at the moment considered optimal for the balance between planning/predictability and impact assessments.

It is believed that the introduction of proper and comprehensive support services, together with more mature FABs and extended KPIs are likely to extend the utilization of cross border areas under CBO procedures. Important works are already ongoing in several FABs, including FABEC.

The required system support in accordance with the AFUA Concept should be made available with the introduction of the AFUAS centralized service, supported itself by a wide network of deployed LARA systems or equivalent.

For performance monitoring as well, the introduction of the AFUAS centralized service should ensure the availability of more data than it is the case today, and subsequently allow a better aggregation of relevant data into PIs and KPIs, the latter being an option depending on the content of the requirements under RP3 and the readiness of the States.

5.4 Package 3

Package 3 is listing the elements which are envisaged in the Concept, but still require development, validation and/or support

The concept of Dynamic Mobile Areas (DMA) has been invented to provide flexible airspace structures more adapted to military needs. SESAR will start initial validations in 2015 and the feasibility of DMA 2 and 3 will have to be studied. In view of their complexity, DMAs 2 and 3 belong to package 3.

The uplink and visualisation of airspace management data on military aircraft displays has been envisaged to improve the situation awareness for pilots and to increase safety. Still, the associated costs and cyber risks need to be assessed and the possibility to provide an equivalent service through military ground control should be considered

The impact of civil/military airspace structures in a real Free route environment offering the ability to the airspace users to plan and re-plan within multiple FIR areas of interest will be further assessed. This work is currently performed by SESAR in low to medium complexity environments and will have to be continued in high/very high complexity environments to assess the impact on network performance and mission effectiveness.

ADVANCED FUA CONCEPT

Requests for airspace will be integrated to military flight plans and military flight objects in the future. This new functionality will facilitate the integration of airspace, flow, capacity and ATC management. More work is needed to assess the impact of these developments and how it could be used to streamline all coordination processes.

ANNEX A - SESAR related operational improvements and enablers

Related SESAR Operational Improvements[3]

AOM 0201	Moving Airspace Management Into Day of Operation
AOM 0202	Automated Support for real civil-military coordination in airspace management
AOM 0204	Europe-wide shared use of military training areas 2013-2018
AOM 0205	Modular Temporary Airspace Structures and Reserved Areas
AOM 0206 A	Flexible Military Airspace Structures
AOM 0206 B	Sharing real-time airspace information with the aircraft
AOM 0208 A	Dynamic Mobile Areas (DMA)
AOM 0301	Harmonised EUROCONTROL ECAC Area Rules for OAT-IFR and GAT Interface
AOM 0304 B	Mission Trajectories – Integrated Management of Mission Trajectories in Step 2
AOM 0402	Further Improvements for Route Network and Airspace including Cross-Border Sectorisation and Further Routing options
AOM 0403 A	Pre-defined ATS Routes activation only When and Where Required within FRA (Free ROUTE Airspace) in Step 1
AOM 0403 B	Pre-defined ATS Routes activation only When and Where Required within FRA (Free ROUTE Airspace) in Step 2
AOM 0403 C	Pre-defined ATS Routes activation only When and Where Required within FRA (Free ROUTE Airspace) in Step 3
AOM 0501	Use of Free Routing for Flight in cruise and vertically evolving, inside FAB above certain level, within low to medium traffic complexity areas

[3] Updated information on Operational Improvements Steps (OIs) and Enablers (En), can be found on the European ATM Portal – https://www.eatmportal.eu

AOM 0502	Use of Free Routing (H24) for Flight in cruise and vertically evolving, through FABs above certain level, extending to high traffic complexity areas
AUO 0203 B	Shared Business Trajectory (SBT) in Step 2
AUO 0204 B	Agreed Reference Business / Mission Trajectory (RBT/RMT) in Step 2

Related Operational Improvements Enablers

AOM 0201	- PRO-184 - PRO-185
AOM 0202	-AAMS-06a -AAMS-08 -AAMS-09 -AAMS-10a -AAMS-15 -AIMS-21 -AIMS-22 -AIMS-23 -AIRSP-01 -GG SWIM-49 -NIMS-02 -NIMS-24 -PRO-184
AOM 0204	-AAMS-10b -AAMS-12 -AAMS-18 -AIMS-21 -AIMS-22 -AIRSP-02 -HUM-AOM-0204 -NIMS-24 -PRO-230
AOM 0205	-AAMS-08 -AIMS-20 -NIMS-14a -NIMS-14b -PRO-009 -PRO-082 -PRO-185
AOM 0206 A	-AAMS-05 -AAMS-06 b -AAMS-06 c -AAMS-08 -AAMS-09 -AAMS-09 a -AAMS-11 -AAMS-12

	-HUM-AOM-0206
AOM 0206 B	-A/C-03 -A/C-40 -AGSWIM-42
AOM 0208 A	-A/C-61 -A/C-62 -AAMS-16 a -AIMS 15 -CTE-C2b -CTE-C11b -ER APP ATC 77 -NIMS-14a -NIMS-14b -NIMS-14c -MIMS-19 -PRO-146 -PRO-147
AOM 0301	-PRO-181
AOM 0304 B	-A/C-01 -A/C-02 -A/C-03 -A/C-04 -A/C-09 -A/C-10 -A/C-31c -A/C-34 -A/C-37a -A/C-45 -A/C-61 -AAMS-16 a -AAMS-16 b -AAMS-17 -AAMS-18 -CTE-C3 -CTE-N1a -CTE-N2 -CTE-N3a -CTE-N3b -CTE-N3c -ER APP ATC 152 -ER APP ATC 154 -HUM-AOM-0304 -MIL-0301 -MIL-0407 -MIL-0501 -MIL-0601 -PRO-147 -PRO-ACC-03 -PRO-ACC-09 -PRO-ACC-45

AOM 0501	-A/C-04 -A/C-37a -AAMS-06 b -AAMS-16 a -AIMS-22 -ER APP ATC 76 -ER APP ATC 100a -HUM-AOM-0501 -NIMS-21 -PRO-085
AOM 0502	-A/C-04 -A/C-04 a -A/C-37a -AAMS-06 c -AAMS-16 a -AIMS-22 -AOC-ATM-10 -ER-APP-ATC 78 -HUM-AOM-0502 -HUM-AOM-0502-01 -NIMS-21 -PRO-148 -PRO-149 -PRO-150 -PRO-151 -PRO-152 -PRO-AC-04c
AUO 0203 B	HUM-AUO-0203-B
AUO 0204 B	HUM-AUO-0204-B

ANNEX B – DEFINITIONS AND ACRONYMS

Note: Annex B pending further changes in this document.

The terms used in this document have the following meanings.

The ICAO definitions are identified with **(ICAO)** at the end of the text, those applied in the EC Regulations for the creation of the Single European Sky are identified with **(SES)** and those currently used in the EUROCONTROL FUA Reference Material are identified with **(FUA)**.

'Ad hoc Structures'	refers to airspace structures, whether routes or areas, required to meet operational needs at shorter notice than ASM Level 1 process. The establishment of such ad hoc structure at ASM Level 2 or ASM Level 3 should follow the general design and safety management criteria.
'Airspace Configuration'	Is a pre-defined and coordinated organisation of routes and their associated airspace structures, temporary airspace reservations and ATC sectorisation.
'Airspace Management Cell' (AMC)	A joint civil/military cell responsible for the day-to-day management and temporary allocation of national or sub-regional airspace under the jurisdiction of one or more ECAC state(s). **(FUA)**
'Airspace reservation' (ARES)	A defined volume of airspace normally under the jurisdiction of one aviation authority and temporarily reserved, by common agreement, for exclusive use by another aviation authority (ICAO). *In the context of the FUA Concept, airspace reservation includes TRA and TSA.*
'Airspace Use Plan' (AUP)	Airspace Management message of NOTAM status notifying the daily decision of an Airspace Management Cell on the temporary allocation of the airspace within its jurisdiction for a specific time period, by means of a standard message format. **(FUA)**
'Area Control Centre' (ACC)	A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction. **(ICAO)**
'ATS route network'	A network of specified routes for channelling the flow of general air traffic as necessary for the provision of air traffic services.
'B2B'	means 'Business-to-Business'
'B2C'	means 'Business-to-Consumer'
'CDM'	means 'Collaborative Decision-Making'

'Conditional Route' (CDR)	an ATS route or a portion thereof which can be planned and used under certain specified conditions.
'Conditional Structure' (CDS)	Any route or part of route, path, or airspace volume (e.g. MVPA, user-preferred routing area), open to GAT under specific conditions or restrictions published on an AIM support.
'Controlling Military Unit' (CMU)	means 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
'Demand-Capacity Balancing' (DCB)	The future SESAR form of ATFCM
'DMA'	means 'Dynamic Mobile Area'
'DMEAN'	means 'Dynamic Management of the European Airspace Network'
'FAB'	means 'Functional Airspace Block'
'Filed Flight Plan' (FPL)	The flight plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes. **(ICAO)**
'Flow Management Position' (FMP)	A working position established within an ACC to ensure the necessary interface with the NM on matters concerning the provision of the Air Traffic Flow & Capacity Service and the interface with national AMCs on matters concerning the Airspace Management Service. **(FUA)**
'FPL Buffer zone' (FBZ)	FBZ is the associated airspace which may be applied to a reserved/restricted airspace. The FBZ defines the lateral and vertical limits for the purpose of submitting a valid IFR FPL when such areas are active or planned to be active.
'Free Route Operations Airspace' (FRA)	A specified airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) way points, without reference to the ATS route network, subject to airspace availability. Within this airspace, flights remain subject to air traffic control.
'General Air Traffic' (GAT)	All movements of civil aircraft, as well as all movements of State aircraft (including military, custom and police aircraft) when these movements are carried out in conformity with the ICAO. **(SES)**
'Joint Civil/Military Function'	An entity established at national or at sub-regional (FAB) level, integrating the ASM (current AMC) ATFCM (current FMP) and ATS (current local ATC sector management) functions to combine the ASM/DCB-ATFCM/ATS processes for the cooperative management of Airspace Configurations under the jurisdiction of one or more ECAC State(s).
'LARA'	Local And sub-Regional ASM support system
'LTA'	means Lower Traffic Area

'MTA'	means Military training Area
'NM'	means 'Network Manager', the body established under Article 6 of Regulation (EC) No 551/2004 to perform the duties provided for in that Article and this Regulation and further described in Commission Regulation (EU) No 677/2011 of 7 July 2011, as amended;
'NOP'	means 'Network Operations Plan'
'Notice to Airmen' (NOTAM)	A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations. **(ICAO)**
'Operational Air Traffic' (OAT)	Encompasses all flights which do not comply with the provisions stated for GAT and for which rules and procedures have been specified by appropriate national authorities. **(FUA)** *OAT can include civil flights such as test-flights, which require some deviation from ICAO rules to satisfy their operational requirements*
'RBT' or 'RMT'	means 'Reference Business Trajectory' or 'Reference Mission Trajectory'. The Reference Business or Mission Trajectory (RB/MT/RMT) is created from the last version of the SB/MT/SMT. It is the trajectory that the Airspace User agrees to fly and that the ANSP and Airport agree to facilitate. It is associated to the filed flight plan and includes both air and ground segments. It consists of 2D routes (based on published way points and/or pseudo waypoints computed by air or ground tools to build the lateral transitions and vertical profiles); altitude and time constraints where and when required; altitude, time and speed estimates at waypoints, etc. When an RB/MT/RMT is agreed a NOP update is triggered.
'Routing'	The chosen itinerary to be followed by an aircraft during its operation. **(SES)**
'SBT' or 'SMT'	means 'Shared Business Trajectory' or 'Shared Mission Trajectory'. The Shared Business or Mission Trajectory (SB/MT/SMT) is the trajectory published by the Airspace User that is available for collaborative ATM planning purposes. The refinement of the SB/MT/SMT is an iterative process. The final form of the SB/MT/SMT becomes the Reference Business or Mission Trajectory (RB/MT/RMT) and is part of the filed flight plan.
'STANLY ACOS'	STANLY Airspace Coordination System
'SWIM'	means **'**System Wide Information Management'
'Temporary Reserved Area' (TRA)	A defined volume of airspace normally under the jurisdiction of one aviation authority and

	temporarily reserved, by common agreement, for the specific use by another aviation authority and through which other traffic may be allowed to transit, under ATC clearance. **(FUA)**
'Temporary Segregated Area' (TSA)	A defined volume of airspace normally under the jurisdiction of one aviation authority and temporarily segregated, by common agreement, for the exclusive use by another aviation authority and through which other traffic will not be allowed to transit. **(FUA)**
'Updated Airspace Use Plan' (UUP)	An Airspace Management message of NOTAM status issued by an AMC to update and supersede AUP/previous UUP information. **(FUA)**
'UTA'	means Upper Traffic Area
'Variable Profile Area' (VPA)	An 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, dependent on individual mission profiles
'WOC'	means 'Wing Operations Centre'