SESAR Solution #118 - Final SPR-INTEROP/OSED V3 - Part I

Basic Extended ATC Planning Function

Topic:	ATM Operations
Edition Date:	15 May 2018
Edition:	01.00.01

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Document History

Edition	Date	Status	Author	Justification
01.00.00	28/02/2018	Draft	[redacted]	
01.00.01	15/05/2018	Final		

BASIC EXTENDED ATC PLANNING FUNCTION

Abstract

This document is the final version of the SPR-INTEROP/OSED for **Solution #118 - Basic EAP (Extended ATC Planning) function** at V3 level.

The basic EAP (*b*EAP) function concept describes an **automated tool supporting the basic communication** between the Local DCB position and the Controllers' Work Positions to be deployed in En-route operating environments of **Medium** and **High complexity**.

The basic EAP function is expected to facilitate the implementation of ATFCM measures to better match capacity to predicted demand and to reduce the complexity of traffic presentation in order to suit available capacity.

Table of Contents

The SPR/INTEROP-OSED Template includes the following parts:

- ***SPR/INTEROP-OSED Template – Part I (this volume)***
- SPR/INTEROP-OSED Template – Part II Safety Assessment Report (SAR)
- SPR/INTEROP – OSED Template – Part III Security Assessment Report (SeAR)
- SPR/INTEROP – OSED Template – Part IV Human Performance Assessment Report (HPAR)
- SPR/INTEROP – OSED Template – Part V Performance Assessment Report (PAR)

List of Tables

List of Figures

1 Executive Summary

This document provides the requirements specification, covering functional, non-functional and interface requirements related to **Solution #118** that describes the **Basic EAP (Extended ATC Planning) function.**

The Basic EAP (Extended ATC Planning) concept consists in the definition of an automated tool supporting the basic communication between the Local DCB position and the Controllers' Work Positions to be deployed in En-route operating environments of Medium and High complexity.

The basic EAP function is expected to facilitate the implementation of ATFCM measures to better match capacity to predicted demand and to reduce the complexity of traffic presentation in order to suit the available capacity.

The basic EAP concept introduces also a **new role**, the EAP role (Extended ATC Planning), which is intended to **fill the gap between ATFCM and ATC**. The **EAP role is not necessarily an additional staff**: it is a role covering a set of services/functions that can be assumed by different personnel of the ATSU (already existing actors, like TC or new actors like MSP or LTM);

The main responsibilities of the EAP role will be:

- The monitoring of the implementation of STAMs elaborated collaboratively with the LTM;
- The monitoring of the implementation of decomplexification measures elaborated under his sole responsibility ;
- Bridging the gap between ATC and ATFCM through an easier and more complete and accurate mutual situation awareness.

The main benefits expected from the basic EAP function are principally:

- To help providing a **better service to airspace users** through reduced delays, better punctuality, less ATFCM regulations, whilst maintaining or even increasing safety.
- To **increase the controllers' productivity** contributing thus to increase of the overall en-route capacity of the ACC.

In addition, the basic EAP concept can be considered as a **potential enabler** for the deployment of functionalities such as **Extended AMAN** or **Free Routing** operations.

2 Introduction

2.1 Purpose of the document

This document provides the requirements specification, covering functional, non-functional and interface requirements related to **Solution #118** that describes the ***basic* EAP (*b*EAP).**

This SPR-INTEROP/OSED represents one of the key parts of the **Solution #118 datapack**, ready for industrialisation and deployment of the basic EAP function (bEAP).

This SPR-INTEROP/OSED is composed of different parts:

- **Part I** (this document) provides the Safety and Performance Requirements (SPR) and Interoperability Requirements (INTEROP), related to the Solution #118- basic EAP, that have been validated during SESAR 1 validation exercise VP-687. These requirements are presented in the context of the Operational Service and Environment Definition (OSED) which describes the environment, assumptions that are applicable to the SPR and INTEROP requirements.

  These requirements cover safety, performance, operational aspects as well as the interoperability aspects of the *basic* EAP function (*b*EAP).

  The document is completed by an appendix including the **Benefit and Cost Mechanisms**, showing how the Solution #118 elements contribute (positively or negatively) to the delivery of performance benefits and the costs.

- **Parts II to V,** delivered as separate documents when applicable, provide the series of assessments performed at SESAR Solution level that justify the SPR and INTEROP requirements:

  - **Part II**: The Safety Assessment Report describes the results of the safety assessment work for the Solution #118;

  - **Part III**: "**Not Applicable**". The development of a Security Assessment Report has not deemed necessary for the Solution #118;

    Indeed, with respect to the services offered by Solution #118:

    1. The data manipulated by the *basic* EAP function (bEAP) are not critical and their **unlikely loss of integrity would not impact the ATC service anyway**:

       - The **total loss of information** would have no impact on safety: the unavailability of the system is known to the impacted centres and would lead to the application of the procedures existing currently;

       - The **detectable corruption** of the information would have no impact on safety, the erroneous information being ignored by the controllers and the crews before application. This situation would lead the operators to

declare the system as unavailable and return to the procedures existing currently;

- The **undetectable corruption** of information would have a very limited impact on safety which would result in a possible increase of coordination with downstream centres that would have a different view of the operational situation;

2. All **security controls** related to the data manipulated by the *basic* EAP function are **already in place**;

- **Part IV**: The Human Performance Assessment Report describes the results of the Human Performance assessment work for the Solution #118;
- **Part V**: the Performance Assessment Report (PAR) that consolidates the performance results obtained in different validation activities at Solution #118 level.

2.2 Scope

This document provides the SPR-INTEROP/OSED for **Solution #118 - Basic EAP (Extended ATC Planning)** function at **V3 level.**

This OSED describes the operational improvements and the associated operating methods required to enable operating a *basic* EAP function based on the Extended ATC Planning concept developed in SESAR 1 P04.07.08 Project and validated through the validation exercise VP-687 achieving a V2 maturity level.

After the validation activities conducted within SESAR 1, DSNA has demonstrated that this Extended ATC Planning concept could be operationally used through the deployment, in the Reims ACC, of the "**4ME**" system, which operational status has been approved by the French NSA in December 2016.

The present document is building on the Extended ATC Planning concept as described in the SESAR 2020 Transition OSED ([38]) published in October 2016 by project P04.07.08.

It is worth noting that the full EAP concept is currently studied within SESAR 2020 PJ09.02 Project.

2.3 Intended readership

The intended audience for this SPR-INTEROP/OSED is:

- The key stakeholders targeted by the Solution, i.e.
  - Airspace Users who will be directly impacted by the deployment of the *basic* EAP function in En-Route airspace;
  - Air Traffic Controllers who will benefit from a smoothed workload and less complex traffic situations thanks to the STAM or decomplexification measures enabled by the *basic* EAP function, especially in hotspot areas;

- SESAR 2020 PJ09.02 members:

  The current document is built upon the SESAR 1 P04.07.08 Transition OSED (extended ATC Planning) issued in September 2016 [38]. This new issue has simply been adapted to meet the requirements of a SESAR Solution datapack for V3 phase.

  This SPR-INTEROP/OSED is not intended to be updated by PJ09.02.

- SESAR 2020 Projects developing solutions that can benefit from the deployment of the *basic* EAP function.

2.4 Background

In 2006, DSNA started to work on the concept of a complementary role to the existing Flow Manager to fill the gap between the ATFCM and the ATC. This concept was deemed to be much promising in terms of safety and capacity and moreover, the R&D work to be done was estimated compliant with the SESAR timeframe.

In 2013, the Integrated Network and extended ATC Planning concept (INAP) emerged from projects P04.02 and P07.02. This concept is introducing a new role, the Extended ATC Planning (EAP) role, which is intended to fill the gap between ATFCM and ATC.

The safety and performance requirements developed in this SPR build upon the above-mentioned background information and on the work conducted within SESAR 1 in the project P04.07.08.

2.5 Structure of the document

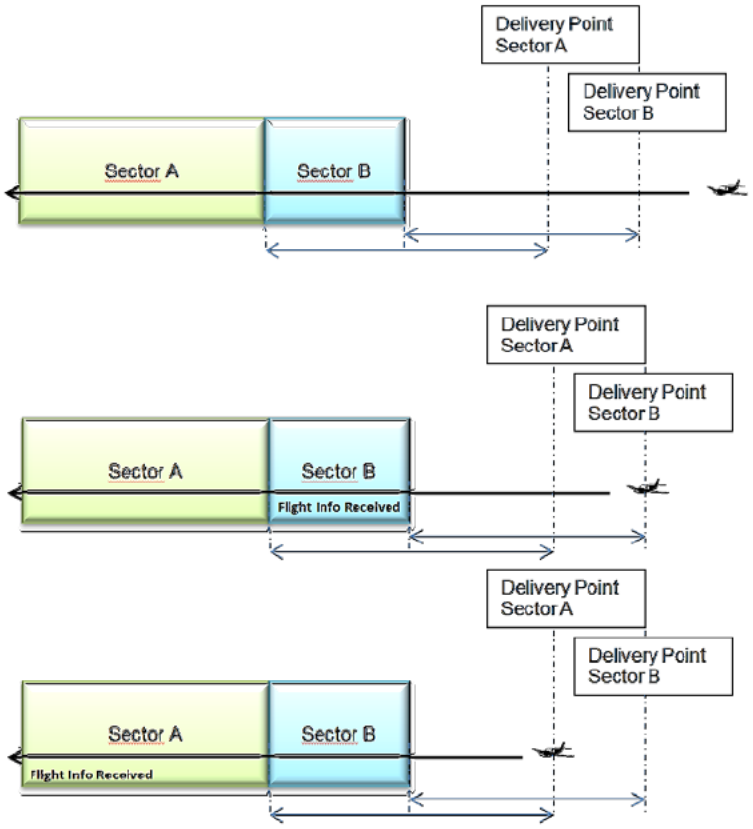
Part I of this SPR-INTEROP/OSED (this document) is composed of five chapters:

- Chapter **1** is an Executive Summary of the document scope and content.
- Chapter **2** is presenting the document purpose, scope and intended readership.
- Chapter **3** is providing the Operational Service and Environment Definition (OSED) for the *basic* EAP.
- Chapter **4** contains the safety, performance and interoperability requirements relevant for the Solution #118;
- Chapter **5** provides the list of references and applicable documents.
- **Appendix A** includes an initial description of the Cost and Benefit Mechanisms for the Solution.

2.6 Glossary of terms

Term	Definition	Source of the definition
Airborne Flight	is flight with an ATOT in the present or in the past e.g. take off time is in the present or in the past	

Term	Definition	Source of the definition
CDM Process (Negotiation)	Collaborative Decision Making Process. In the frame of this document it is used as a generic term to designate any coordination, negotiation, collaboration and/or information sharing activities between ATC and ATFCM and flight crew actors to ease air traffic management	
Climb	The period from take-off to the initial cruise level.	High Level Model Process [44] (chapter 5.2.1.)
Communication Management	The management of the air/ground communication. . (Reference STA chap 2.1.1)	
Complex Hotspot	A Complex Hotspot is a Hotspot where the workload is mainly due to a complex air situation at the present or in the future. The workload can therefore be lowered by mean of a decomplexification measure instead of a traditional airborne STAM or a mix of both measures.	
Complexity Management	Traffic management to maintain the level of workload that would guarantee safety (reference STA **[46] D04 State of the art of** ATM actors responsibilities and roles chap 2.1.1)	
Decomplexification	This process has been defined within EAP concept by the Project 04.07.08. It designs the EAP activity to decrease the complexity of a given sector / area through appropriate measures, called **decomplexification measures** or solution in this document. It can be through a flight level change request. The main difference between a STAM and a decomplexification measure is that with the latter, the flight will continue crossing the same sectors list (no off-loaded / on-loaded sector involved in this process).	
Delivery Time	When a flight is going to enter a new sector, this sector will receive the flight information ***x*** minutes before the flight enters the sector thanks to an FDPS. This delivery time might be specific to each sector, i.e. depending on its configuration or ACC specificities. In the context of ***b*EAP**, it is used to compute the answer time out for an implementing sector when receiving a STAM or a	

Term	Definition	Source of the definition
	decomplexification measure from EAP. 	
Descent	The period from the top of descent until touchdown.	High Level Model Process [44] (chapter 5.2.1.)
Dynamic Mobile Area	A constraint set on a trajectory with the purpose of avoiding an area with military or other similar activity. The owner of the trajectory decides how to satisfy the constraint with the most appropriate change. The high precision of 4D navigation allows properly equipped aircraft to avoid the temporary trajectory exclusion volumes with minimum business trajectory disruption.	SESAR Definition Phase - The Concept of Operations at a glance
En-Route	The period from reaching the initial cruise level to the top of descent.	High Level Model Process [44] (chapter

Term	Definition	Source of the definition
		5.2.1.)
Hotspot	A hotspot is a traffic volume which requires a high workload for the sector team during a period of time. A hotspot has to be solved to lower the sector team workload. • A public Hotspot is shared at NM level • A Local Hotspot is kept at ATSU level.	
Implementing Sector	It is the sector in charge of the TFV where the STAM or the decomplexification measure has to be implemented, e.g. where the MOD and Clearance have to be done. The Implementing TFV should be upstream from the impacted or the off-loaded and on-loaded sectors	
INAP	Integrated Network management and extended ATC Planning is a function assisted by automation that plans and organises air traffic within an area of operation (Sector Family) such that situations of excessive complexity and air traffic controller workload can be avoided. It also balances workload between the sector families if required. (The INAP context is further described in DOD 04.02)	
Intruder	It is a flight with detected vertical or lateral discrepancies from IFPS flight plan. • "**Type 1 intruder**" is a flight which is not in the TFV of its filed plan, in the present or in the future, meaning it does not fly what it filed. • "**Type 2 intruder**" is a flight which filed plan is likely to be inconsistent with its actual flight profile as it is supposed to descent before the TOD. • "**Type 3 intruder**" is an intruder (type 1 or 2) due to an action of the ATFCM or ATC stakeholders (EAP, LTM, ATCO,..). This could be for instance a flight which has received a STAM. This definition is proposed by 04.07.08 project in the frame of the EAP concept described in this OSED.	
Late Decomplexification Measure	A Late decomplexification measure is a concept defined within EAP concept. It is a non-implemented request for which the sector where there is a Complex Hotspot has already received the flight information. The late decomplexification is computed by the system and depends on the flight entry time in the	

Term	Definition	Source of the definition
	sector where there is a Complex Hotspot. Any non-implemented decomplexification measure can therefore become a Late decomplexification measure when the system detects the flight information has just been sent to the sector where there is a Complex Hotspot.	
Late STAM	A Late STAM is a concept defined within EAP concept. It is a non-implemented STAM for which the off-loaded sector has already received the flight information. The late STAM is computed by the system and depends on the flight entry time of the off-loaded sector. Any non-implemented STAM can therefore become a Late STAM when the system detects the flight entry time of the off-loaded sector becomes too short to prevent the off-loaded sector from receiving the flight information.	
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).	High Level Model Process [44] (chapter 5.2.1.)
Manually Forced Flight	Forcing a flight is an NM operator action to improve a slot-issued flight in the ETFMS by proposing a new CTOT close to its ETOT (or last received TTOT for A-CDM departures) without creating an overload (in Entry Counts or Occupancy Counts) in every crossed TFV. This action will result in the allocation of a new CTOT for that flight.	
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). The medium-short term planning starts from 6 months up to a few hours before departure	High Level Model Process [44] (chapter 5.2.1.)
Occupancy Counts	For a given traffic volume, for a selected counting period, *Occupancy Counts* are defined as the number of flights that are "inside" this traffic volume during this counting period. A flight is "inside" an airspace volume within a selected counting period. In other words, the aim is to count flights in a Traffic Volume every ***step*** minute with a look ahead time of ***duration*** minutes:	

Term	Definition	Source of the definition
	• The ***step*** value is defined as the difference between the start times of two consecutive Occupancy Counting Periods. • The ***duration*** value defines the between start and end time of each Occupancy Counting Period. For example, a 1min step value and a 11min duration value counts correspond to a picture taken every 1min with an exposure of 11min.	
Occupancy Curves	the graphs showing several occupancy curves on a given Traffic Volume (TFV) and time frame	
Off-Loaded Sector	It is the sector in charge of the TFV which the flight impacted by a STAM should have crossed but will not due to the STAM (and will instead cross the On-Loaded CWP).	
On-Ground Flight	a flight with an ATOT or E/CTOT in the future, e.g. take off time is in the future	
On-Loaded Sector	It is the sector in charge of the Traffic Volume which the flight impacted by a STAM would cross while it was not planned, instead of crossing the off-Loaded sector.	
Post Flight Processes	The period after the conclusion of the flight (on block), e.g. Performance Analysis.	High Level Model Process [44] (chapter 5.2.1.)
Strategic / Potential Conflict	Two flights are in strategic conflict if flights are in levelled-off phases. In other words there is no strategic conflict to compute on a flight phase which is not stable. A strategic conflict is a loss of separation (parameters are to be defined) at some points in the future. If this loss of separation is detected in two or more Traffic Volumes, then the strategic conflict is associated to the first one only	
Supervisor	The Supervisor is responsible for all activities in the Control Room. A network services activated flight is a TACT-ACTIVATED flight. It should be an airborne flight based on its ETOT or CTOT, but actually it might still be an on-ground flight. The latter case is somewhat tricky for the operators and the downstream systems, when they face a very late take-off	

Term	Definition	Source of the definition
Surface-In	The period from touchdown through taxi until in-blocks.	High Level Model Process [44] (chapter 5.2.1.)
Surface-Out	The period from off-blocks, through taxi and take-off until the wheels are off the ground.	High Level Model Process [44] (chapter 5.2.1.)
Traffic Monitoring	Follow the progress of the traffic to verify the behaviour of each flight having the mental representation of all traffic in its sector. (Reference STA **[46] D04 State of the art of** ATM actors responsibilities and roles chap 2.1.1)	
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 Network Operations Plan.	High Level Model Process [44] (chapter 5.2.1.)
Urgent STAM or decomplexification measure	An urgent STAM or decomplexification measure is a concept defined within EAP concept. It is a request for which the EAP needs a quick answer. An urgent STAM or decomplexification measure can also be a late STAM or decomplexification measure but the two concepts are strictly independent. The urgent request is tagged by the EAP and depends on The operational needs; independently from any time criteria (e.g. exit time of implementing sector or delay for PC to answer the request).	

Table 1: Glossary of terms

2.7 List of acronyms

Acronym	Definition
ACC	Area Control Centre
A-CDM	Airport Collaborative Decision Making
ACT	Flight Activated by ATC systems and processed by ETFMS
ADD	Architecture Definition Document

Acronym	Definition
ADEP	Airport Departure
ADES	Airport Destination
AMAN	Arrival Manager
ARCID	Aircraft ID
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATFCM	Air Traffic Flow and Capacity Management
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATOT	Actual Take Off Time
ATSU	Air Traffic Service Unit
***b*EAP**	*basic* Extended ATC Planning
CHMI	CFMU Human Machine Interface
CNS	Communication Navigation and Surveillance
CONOPS	Concept of Operations
CR	Change Request
CTA	Controlled Time of Arrival
CTFM	Current Tactical Flight Model
CTO	Controlled Time Over
CTOT	Calculated Take Off Time
CWP	Controller Working Position
DCB	Demand and Capacity Balancing
dDCB	Dynamic Demand and Capacity Balancing
DMA	Dynamic Mobile Area
DOD	Detailed Operational Description
DRA	Direct Routing Airspace
EAP	Extended ATC Planning role or Extended ATC Planning
EAP Area	Extended ATC Planning Area
EATMA	European ATM Architecture
ETFMS	Enhanced Tactical Flow Management System operated by NMOC
ETOT	Expected Take Off Time

Acronym	Definition
FDPS	Flight Data Processing System
FMP	Flow Management Position or Deputy Supervisor in charge of FMP
FRA	Fixed Routing Airspace
FTFM	Filed Tactical Flight Model
GAT	General Air Traffic
HMI	Human Machine Interface
HPAR	Human Performance Assessment Report
INAP	Integrated Network management and extended ATC Planning
INTEROP	Interoperability Requirements
IRS	Interface Requirements Specification
KPA	Key Performance Area
LTM	Local Traffic Manager
MOD	Modification of the Flight Plan [French] Modification. It is a French acronym which refers to the modifications a controller can perform on a flight plan
MSP	Multi Sector Planner
NM	Network Management or Network Manager
NMOC	Network Management Operation Centre
OCD	Operational Concept Description
OI	Operational Improvement
OPAR	Operational Performance Assessment Report
OSED	Operational Service and Environment Definition
PAR	Performance Assessment Report
PC	Planning Controller
QoS	Quality of Service
SAC	Safety Criteria
SAR	Safety Assessment Report
SESAR	Single European Sky ATM Research Programme
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SPR	Safety and Performance Requirements
STAM	Short Term ATFCM Measures

Acronym	Definition
Supervisor	He / She is the en-route control room responsible on duty. He / She works in collaboration with LTM and has notably the task to manage sectors configuration (band-boxing and so on)
SWIM	System Wide Information Model
TACT-ACTIVATED	Flight Activated internally by the ETFMS when the flight should have been activated by ATC.
TAD	Technical Architecture Description
TC	Tactical Controller called as well Executive Controller
TFV	Traffic volume
TS	Technical Specification
TTA	Target Time of Arrival
TTO	Target Time Over
TTOT	Target Take Off Time
UAC	Upper Airspace Control
UC	Use Case

Table 2: List of acronyms

3 Operational Service and Environment Definition

This section describes **Solution #118 - Basic EAP (Extended ATC Planning) function**, further detailing the operational concept aspects under the scope of the solution.

In the following sub-sections, the document describes the operational environment that is applicable to Solution #118 as the context for assessing and establishing the requirements at Solution level, which are captured in the Safety, Performance and Interoperability Requirements section of this document (See §4).

3.1 Solution #118: a summary

3.1.1 Concept Overview

Operational Concept Elements in the scope of the Solution

The SESAR **Solution #118 - Basic EAP (Extended ATC Planning) function** is defined in the applicable version of EATMA (Dataset 18) as follows:

Solution #118 — Basic EAP (Extended ATC Planning) function

The basic Extended ATC Planner aims at bridging the gap between Air Traffic Flow and Capacity Management (ATFCM) and Air Traffic Control (ATC) providing real-time and fine-tuning measures to solve ATFCM hotspots and to perform early measures to alleviate complexity closest to ATC activities.

The solution consists of an automated tool and associated procedures supporting the basic communication between the Local DCB position and the Controllers' Work Positions allowing the EAP and the ATC team in identifying, assessing and resolving local complexity situations. The basic EAP relies on a real time integrated process for managing the complexity of the traffic with capability to reduce traffic peaks through early implementation of fine-tuned solutions to solve workload imbalances at the local level, compatible with the short term timeframe of execution phase of the flights.

Operational improvement and expected benefits

The basic EAP (Extended ATC Planning) function introduces an **initial automated interface** together with the related procedures that will facilitate the communication between local DCB position and the Controllers' Work Positions through the provision of optimised solutions to solve workload imbalances compatible with the short term timeframe of execution phase of the flights.

The basic EAP concept introduces also a **new role**, the EAP role (Extended ATC Planning), which is intended to **fill the gap between ATFCM and ATC** as illustrated on Figure 1 below:

- The **EAP is not an additional staff**: it is a **role** covering a set of services/functions that can be assumed by different personnel of the ATSU (already existing actors, like TC or new actors like MSP or LTM);
- It is **highly recommended** that the EAP is holding or has held an **ATCO rating** in the concerned ATSU's airspace

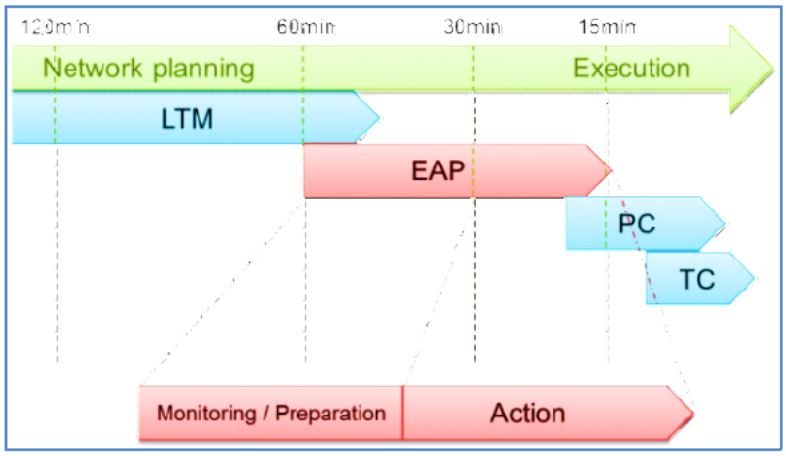


Figure 1: The EAP role fills the gap between ATFCM and ATC

The main benefits expected from the basic EAP function are principally:

- To help providing a **better service to airspace users** through reduced delays, better punctuality, less ATFCM regulations, whilst maintaining or even increasing safety.
- To **increase the controllers' productivity** contributing thus to increase of the overall en-route capacity of the ACC.

In addition, the basic EAP concept can be considered as a **potential enabler** for the deployment of functionalities such as **Extended AMAN** or **Free Routing** operations.

Key Feature and Capabilities under the scope of the Solution

The basic EAP function is part of the INAP (*Integrated Network management and extended ATC Planning*) management.

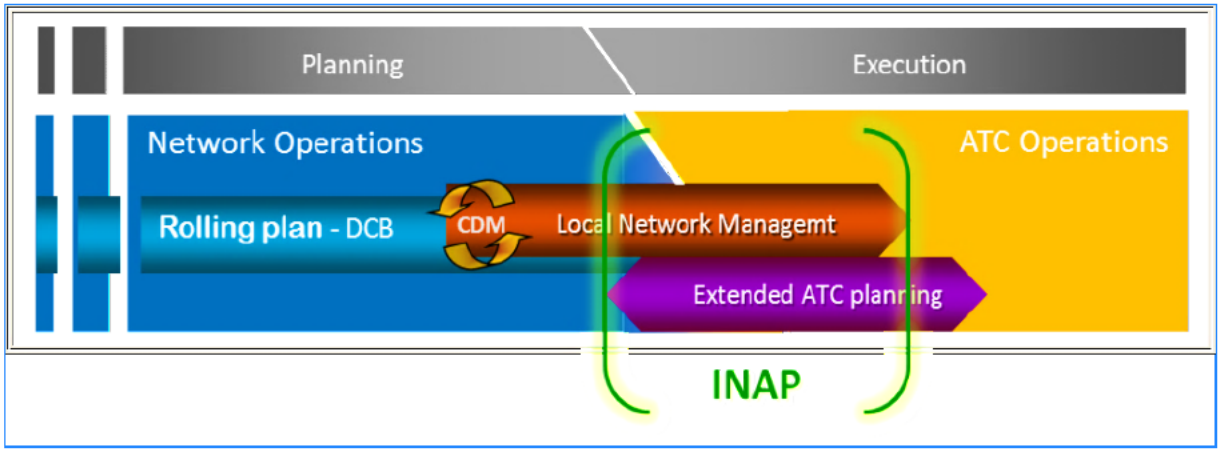


Figure 2: INAP horizon

As illustrated on Figure 2 above, the **tasks of the EAP role** are included in a timeframe **ranging from the short-term planning** (i.e. up to 2 hours before exit time of the sector where a hotspot has been identified) **up to the execution phase.**

The main responsibilities of the EAP role can be summarized as follows:

- In close coordination with the LTM (unless both roles are merged), the EAP role is in charge to **monitor the hotspots evolution and elaborate the appropriate ATFCM measures** (STAM) to lower the sector team workload.

  The *occupancy counts* which are illustrating instant load in a given sector, allow alleviating residual / reactional overloads on a small period of time.

- The EAP role has **to coordinate the STAM with the Planning Controller** (PC) from around 15' up to 30' before the flights enter the hotspot;

- The EAP role is in then charge **to monitor the STAM implementation** until the concerned flight has conformed to the measure (but not later than the entry of the flight in the on-loaded sector);

- Independently of ATFCM measures, the EAP role can **initiate short term actions on traffic**, in order to smooth the traffic to the next CWPs so as to facilitate the resolution of strategic conflicts and reduce the expected complexity;

  These actions have to be performed by the EAP role prior the traffic enters the concerned beneficiary sectors. These actions also have to be undertaken based on the most updated traffic situation and should fit with any other complementary ATFCM measures already in place.

On the ATC team's side, the main responsibilities can be summarized as follows:

- With the introduction of the EAP role, the **Planning Controller becomes the interface between the EAP and the Tactical Controller** on the CWP:
  - The Planning Controller is in charge to **receive the requests** (proposed measures) from the EAP, and potentially **negotiate them with the EAP role** (via a CDM process supported by the EAP tool) according to the real time traffic conditions;
  - The Planning Controller is also in charge to **negotiate with downstream sectors** the changes of flights' delivery parameters, as foreseen by the EAP role in the proposed measures;
  - The Planning Controller has to **prepare as much as possible the actions of the Tactical Controller** related to the measures initiated/prepared by the EAP role;
  - The Planning Controller has to **ensure that the Tactical Controller perform the actions** related to the measures initiated/prepared by the EAP role;
- With the introduction of the EAP role, the **Tactical Controller** of the Implementing Sector is directly impacted by the EAP role's proposed measures.

- The Tactical Controller is in charge to **ask the pilots when necessary** (for example a level climb), whether the **clearance** proposed by the EAP role is **feasible**;
- The Tactical Controller has to **perform the actions requested by the Planning Controller** consequent to the measures proposed by the EAP role;
  For example, he might have to manage extra aircraft rerouted by the EAP role and accepted by the Planning Controller.

The EAP role addresses the same traffic as the LTM but at a different time horizons: up to one hour in advance for the EAP role whilst it is up to 5 hours in advance for the LTM (FMP) as illustrated below on Figure 3.

It is worth noting that the basic cooperation between the two roles has been addressed through the validation exercise VP-687 but should be further dig out in SESAR2020.

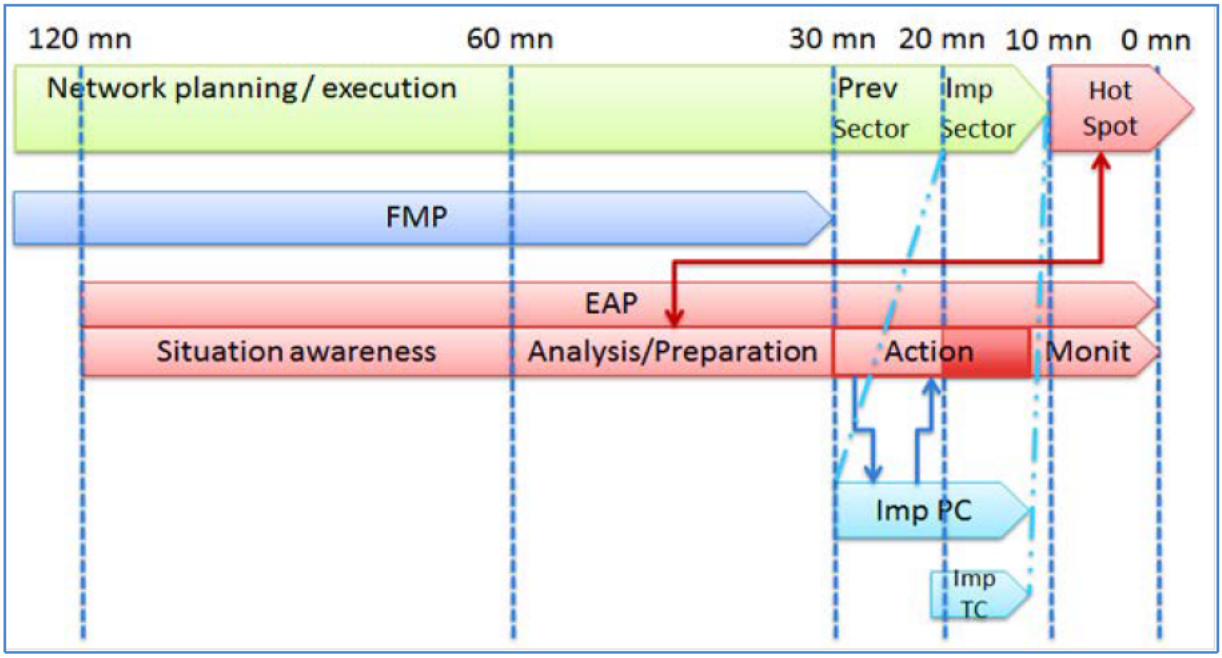


Figure 3: EAP role time horizon of work

To be more accurate regarding the EAP time horizon of work, the basic EAP concept developed in this SPR/INTEROP OSED relies on the following assumptions:

- He monitors hotspots up to one hour in advance;
- He is allowed to create *ad-hoc* hotspots in close coordination with the LTM up to one hour in in advance;
- He analyses the situation and prepares STAM up to one hour before flights enter the hotspot;
- He coordinates the STAM with the Planning Controller from around 15' up to 30' before the flights enter the hotspot;
- He monitors the STAM until the flights conformed to the measure (but no later than the entry of the flight in the on-loaded sector)

- Regarding the tools it is assumed that the EAP role will need to have a longer time horizon than one hour, not because of his own task but to be aware of what is the demand just after.

OI Steps and Operational Enablers under the scope of the Solution

Table 3 below summarizes the relevant **OI Steps** under the scope of the **Solution #118** as defined in the applicable version of EATMA.

SESAR Solution ID	SESAR Solution Title	OI Steps ID ref. (coming from EATMA)	OI Steps Title (coming from EATMA)	OI Step Coverage
Solution #118	Basic EAP (Extended ATC Planning) function	**CM-0106**	Initial support to INAP: basic EAP (Extended ATC Planning) function	**Fully covered**

Table 3: SESAR Solution #118 Scope and related OI steps

The OI Step **CM-0106** includes the set-up of a basic EAP (Extended ATC Planning) function providing an initial automated interface and related procedures improving the communication between local DCB position and the Controllers' Work Positions through the provision of optimised solutions to solve workload imbalances with resolution assessment at the local level, compatible with the short term timeframe of execution phase of the flights.

Table 4 summarizes the relevant **Operational and/or Human Enablers** under the scope of the SESAR Solution according to the applicable version of EATMA.

SESAR Solution ID	SESAR Solution Title	Enablers ID ref. (coming from EATMA)	Enablers Title (coming from EATMA)	Enablers Coverage
Solution #118	Basic EAP (Extended ATC Planning) function	**ER-ATC-164**	ATC tools to re-organize traffic flows to reduce complexity **in the execution phase**	**Full**
		PRO-220a	ATC Procedures related to Detection and Resolution of Complexity, Density and Traffic Flow Problems	**Partial** – Limited to the **execution phase**
		PRO-220b	FCM procedures to describe how detection and resolution of complexity, density or traffic flow issues are managed.	**Partial** – Limited to the **execution phase**

Table 4: Related Operational and/or Human Enablers

Note on the OIs and Enablers linked to the Solution #118

The EAP concept has been initially developed by DSNA within SESAR 1 P04.07.08 (OIS CM-0104-A) and validated through the exercise VP-687 in Reims ACC in June 2015 as part of **Solution #19** in **R5**.

However, the R5 review has stated that the OIS **CM-0104-A** has only been **partly addressed** in Solution #19 in R5, and that consequently there was *"a need to submit a CR in Dataset 18 in order to review the scope of CM-0104-A, PRO-220a and PRO-220b (i.e. only address Traffic complexity resolution in the planning phase). The backlog of CM-0104-A, PRO-220a and PRO-220b should also be addressed by a CR in DS17."* The OIS **CM-0104-B** addresses the full EAP concept which is currently developed by **PJ9.02** in which DSNA is involved. In this context, DSNA has discussed with SJU the possible solutions to follow the recommendations of R5 review regarding the OIS CM-0104-A.

The following updates of the EATMA have therefore been decided:

- The creation of a specific solution (#118) to cover the part not covered by solution #19;
- The creation of a specific OIS, **CM-0106**, to cover the part of OIS CM-0104-A not properly addressed in solution #19 and
- The creation of a specific enabler **ER-ATC-164** attached to **CM-0106.**

The results of these changes for solution #118 are illustrated on Figure 4 below.

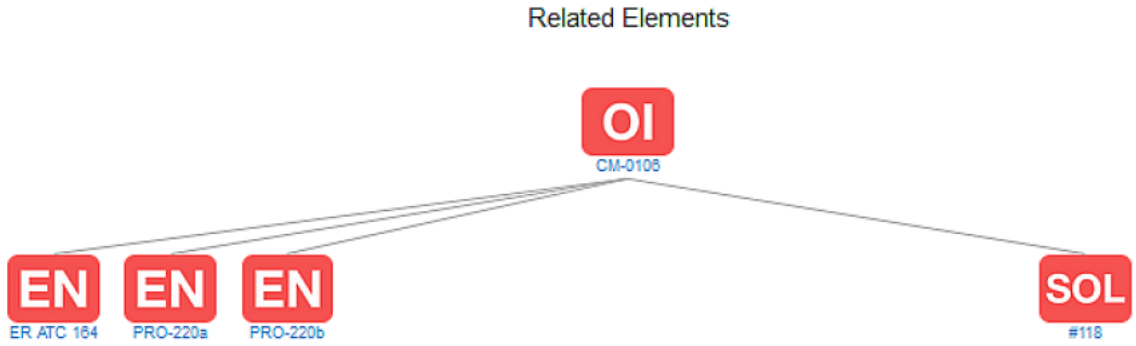


Figure 4: Solution #118 – Related OI and Enablers

Table 5 below summarizes the **High Level Operational Requirements** applicable to the SESAR Solution in the CONOPS maintained by PJ19.

High Level CONOPS Requirement ID	High Level CONOPS Requirement	Reference to relevant CONOPS Sections
S09-02-HLOR-01	Integrated local DCB processes shall provide to all actors in the INAP environment access to all flow, trajectory and capacity options by: • Automated tool supporting the local DCB and Extended ATC Planning actors in traffic complexity/ATC workload assessment at the planning	**Section 4.11.2 High Level Requirements PJ 09**

High Level CONOPS Requirement ID	High Level CONOPS Requirement	Reference to relevant CONOPS Sections
	and execution phases in order to increase capacity by providing timely and accurate prediction on upcoming congestions and providing appropriate input to tools handling hotspot/complexity resolution. • Seamless integration of airspace management functions and dynamic airspace configurations; • Support of the identification, assessment (including the use of 'what if' modelling) resolution of local complexity in a dynamic airspace management environment; • Collaborative flight planning and constraints management; • Improvement of situational awareness.	

Table 5: Link to CONOPS

Note on the High Level CONOPS Requirement linked to the Solution #118

This High Level CONOPS Requirement goes beyond the scope of the Solution #118 since this HLOR corresponds to the full EAP solution which is currently developed by PJ9.02.

However, the Solution #118 can be linked to S09-02-HLOR-01 since it covers partly the need for automated tool supporting the local DCB and Extended ATC Planning actors in traffic complexity/ATC workload assessment at the execution phase.

Scope of the Solution and link with other SESAR Solutions

According to the applicable version of EATMA, the Solution #118 is not linked to other SESAR Solutions.

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

Operational Environment addressed by the Solution#118

The Solution #118 - Basic EAP (Extended ATC Planning) function has been defined with reference to En-route operational environments of Medium and High complexity only. Consequently the OI Step **CM-0106**, specific of this solution, should be declared applicable for en-route operational environments of Medium and High complexity only.

3.2 Detailed Operational Environment

3.2.1 Operational Characteristics

The Solution #118 - Basic EAP (Extended ATC Planning) function is defined with reference to **En-route operating environments of Medium and High complexity.**

In the PRR 2013 [57] , these operating environments are defined according to complexity and traffic volume by a **traffic complexity score** which is as follows:

- En-Route High Complexity: traffic complexity score higher than 6
- En-Route Medium Complexity: traffic complexity score higher than 2 but lower than 6.

This complexity indicator is therefore representative of the level (and characteristics) of the traffic demand in the airspace (and the need for Enhanced DCB including Complexity Management at regional/sub-regional/local level and/or Enhanced Conflict Management and Automation at local level).

The map below illustrates how the traffic complexity scores, computed by the PRU for 2016, are allocated to the different European airspaces.

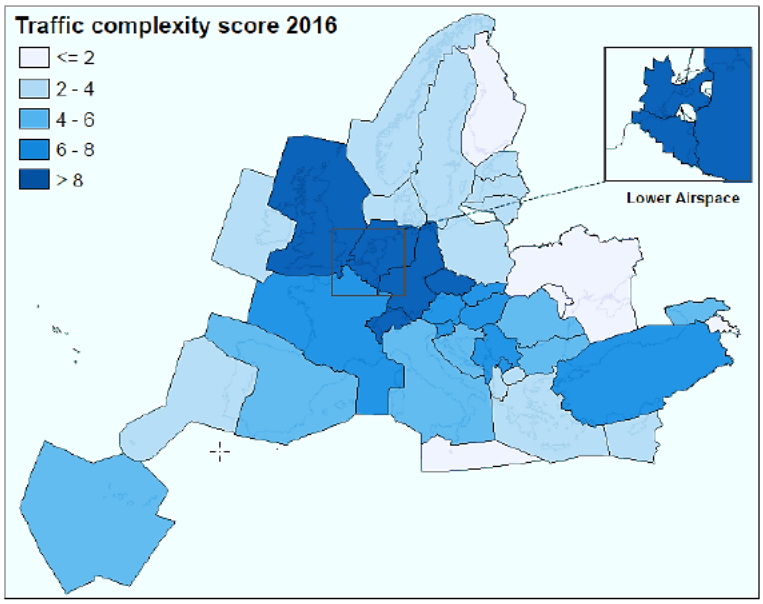


Figure 5: En-Route complexity scores – Source PRR 2016 Report [59]

From the above map it can be observed that most of the upper airspace and the lower airspace of the core area are potentially concerned by the basic EAP function.

In these airspaces, all **flights operating under GAT IFR rules** area eligible to the measures managed by the basic EAP function.

According to the EUROCONTROL STATFOR Medium-term traffic forecast [56], the most-likely of the 3 scenarios forecast of the annual number of IFR flights is for 11.6 million IFR flight movements in Europe in 2023, which represents **17.2% more than in 2015.**

ECAC		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	AAGR 2023/2015	AAGR RP2 2019/2014
IFR Flight Movements (Thousands)	H	.	.	.	.	10,632	10,967	11,369	11,818	12,176	12,545	12,920	3.4%	3.1%
	B	9,603	9,770	9,923	10,197	10,492	10,689	10,880	11,109	11,266	11,451	11,629	1.9%	2.2%
	L	.	.	.	.	10,355	10,421	10,401	10,523	10,516	10,539	10,561	0.5%	1.3%
Annual Growth (compared to previous year unless otherwise mentioned)	H	.	.	.	.	4.3%	3.1%	3.7%	3.9%	3.0%	3.0%	3.0%	3.4%	3.1%
	B	-1.1%	1.7%	1.6%	2.8%	2.9%	1.9%	1.8%	2.1%	1.4%	1.6%	1.6%	1.9%	2.2%
	L	.	.	.	.	1.5%	0.6%	-0.2%	1.2%	-0.1%	0.2%	0.2%	0.5%	1.3%

Table 6: IFR movements Medium Term Forecast (ECAC[1] Region) - Source STATFOR February 2017 [56]

In this forecast all IFR flights, including military and general aviation flights operating under GAT IFR rules, are included.

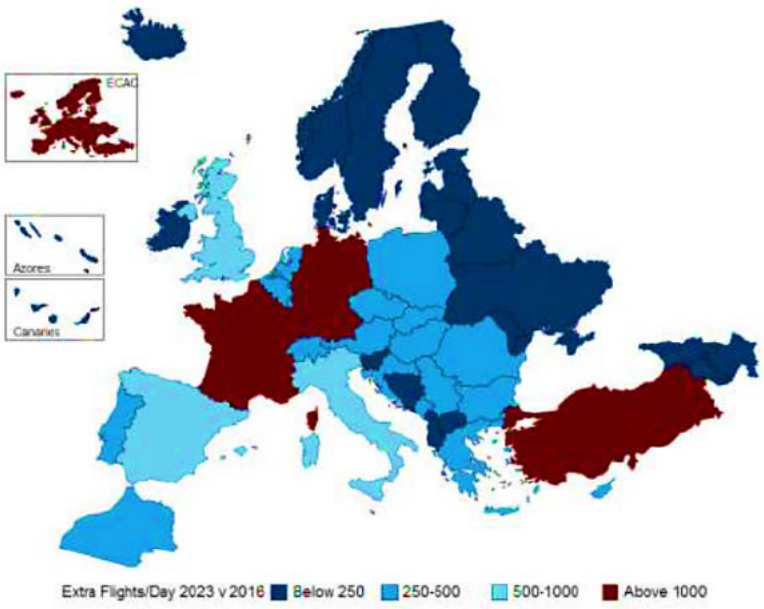


Figure 6: Number of additional movements, 2023 vs. 2016 (Base scenario). – Source STATFOR Feb. 2017 [56]

As illustrated on Figure 6 above it is still the busiest States (France, Germany, Spain, UK and Italy) which will see the greatest number of extra flights per day in 2023 (compared to 2016) which is consistent with the distribution of En-Route Medium and High Complexity airspaces shown on Figure 5.

[1] The European Civil Aviation Conference (ECAC) is an intergovernmental organization which was established by ICAO and the Council of Europe. ECAC now totals 44 members, including all 28 EU, 31 of the 32 EASA member states, and all 41 EUROCONTROL member states.

3.2.2 Roles and Responsibilities

3.2.2.1 Airspace Users Roles and Responsibilities

At Airspace User level, the Flight Deck node is the only directly impacted by the Solution #118, but its related Actors/Roles is not expected to change.

Node	Description	Related Actors/Roles
Flight Deck	Performs all the on-board AU operations including flight execution/monitoring according to agreed trajectory, compliance with ATC clearances/instructions, etc.	**Flight Crew**

Table 7: Airspace User Operations Node

Flight Crew

No change is envisaged in flight crew's operating methods for flight execution and trajectory revision.

The Flight Crew (including single pilot cockpit) remains ultimately responsible for the safe and orderly operation of the flight in compliance with the ICAO Rules of the Air, other relevant ICAO and NSA/EASA provisions, and within airline standard operating procedures. It ensures that the aircraft operates in accordance with ATC clearances and with the agreed Reference Business Trajectory.

Refer to the applicable version of EATMA for further details.

3.2.2.2 Network Management Roles and Responsibilities

At Network Management level, the Air Traffic Flow and Capacity Management node is directly impacted by the Solution #118

Node	Description	Related Actors/Roles
Air Traffic Flow and Capacity Management	The ATFCM node is responsible for the demand and capacity balancing activities.	Network Manager (Regional level) Flow Manager (sub-regional level) **Local Traffic Manager (LTM)** **Extended ATC Planning (EAP) role**

Table 8: Air Traffic Flow and Capacity Management Node

Local Traffic Manager (LTM)

The LTM is responsible for identifying the adequate dDCB (dynamic Demand and Capacity Balancing) measures to be implemented in case of traffic imbalance. Close cooperation with EAPs and

Supervisor allows the LTM to initiate measures compliant with the traffic situation in progress, with actions engaged or actions which will be engaged (sector split/collapsed for example).

The LTM is a major actor of dDCB processes both for the medium to short term planning phase and the execution phase. In case of imbalance, he is responsible for identifying the adequate measures to be taken, in coordination with the appropriate partners (that could include NM (Network Manager), Regional FM (Flow Manager) other LTM and AU).

In execution phase and appropriately in short term planning, the LTM will work closely with Supervisors and EAP. The LTM is also likely to be a Supervisor, or report to one, and as such will retain local safety accountability. Any ATFCM initiatives will have to be approved by him.

Extended ATC Planning (EAP)

The **Extended ATC Planning** (EAP) is a **new role** that will benefit from a global vision on traffic through several sectors; it will then be able to operate decomplexification tasks. He will be assisted in these tasks by semi-automated tools for conflicts detection, STAM coordination and management, and so on.

Some innovative tasks devoted to EAP should pop up with the application of Dynamic Airspace Configurations, for instance:

- In the context of Free Route Airspace activation,
- With dynamic sectorisation, when relocating some flows, and consequently some conflicts from one sector to another,
- With the implementation of concept such as Dynamic Mobile Area.

It will also integrate practices already applied like Short Term ATFCM measures while improving and supporting them with communication and assistance to decision making tools in order to pursue the action of the Local Traffic Manager (the existing FMP) on a more qualitative and precise way.

The EAP is indeed not systematically an additional staff; it is a role which covers a set of services/ functions and which can be assumed by different already existing actors (like MSP or LTM). Performing this function requires actors to have local expertise and the way it will be implemented (procedures, detailed activities, actors involved ...) will vary dependent upon local drivers.

3.2.2.3 En-route ATS Roles and Responsibilities

Below is a summary of the relevant ATS Operations Node (as described in the applicable version of EATMA).

Node	Description	Related Actors/Roles
En-Route/ Approach ATS	Performs all the en-route and approach ATS operations.	• ATC Sector Planning Controller • ATC Sector Executive Controller, • etc.

Table 9: En-Route/Approach ATS Node and Responsibilities

ATC Sector Planning Controller (PC)

The **ATC Sector Planning Controller** is responsible for providing his own sector team (PC+TC) and the next sector teams with conflict free traffic, for that, he can initiate coordination with the relevant adjacent PCs.

The Planning Controller (Appendix C of [46]) is part of the sector team responsible for a designated area (e.g. control sector). His principal task is to check the planned trajectory of aircraft intending to enter his control sector for potential separation risk, and to co-ordinate entry/exit conditions leading to conflict-free trajectories. He is assisted in these tasks by automated tools for conflict detection and resolution, trajectory monitoring, and so on.

With the introduction of the new EAP role, the Planning Controller will be the interface between the EAP and his Tactical Controller.

The Planning Controller will:

- Receive requests from the EAP, then a CDM process (negotiation) can take place according to the real time traffic situation
- Negotiate with downstream sector the change of flight delivery parameters foreseen by the EAP.
- Prepare as much as possible TC's actions initiated / proposed by the EAP
- Ask his TC to operate the actions initiated / prepared by the EAP

Note: The Planning Controller may wait for a decrease of the TC workload, before asking him to perform the actions

Tactical/Executive Control (TC)

The **Tactical (Executive) Controller** is responsible for maintaining separation minima between aircraft and/ or between aircraft and prohibited areas, and for expediting flows of traffic.

Additionally, he monitors the trajectory (4D and 3D) of aircraft with regards to the clearance they have received. He is assisted in these tasks by automated tools for conflict detection and resolution, trajectory monitoring and area proximity warning (APW)... The responsibilities of the Executive Controller are focused on the traffic situation, as displayed at the Controller Working Position (CWP), and are very much related to conflict resolution and traffic optimization.

With the new EAP role, the Tactical Controller of the Implementing Sector will be impacted by the EAP actions. The Tactical Controller will:

- Ask the pilots whether the clearance foreseen by the EAP is feasible when necessary (for example a level climb)
- Operate actions requested by the Planner. For example, he might have to manage extra aircraft rerouted by the EAP and accepted by the planner.

3.2.3 Technical Characteristics

The only technical support systems impacted by the Solution #118 - Basic EAP (Extended ATC Planning) function are those deployed at the ACCs.

3.2.3.1 En-Route ACC Capabilities

En-Route ACCs need specific ATC tools and capabilities in targeted Operating Environment in order to enable the basic EAP (Extended ATC Planning) function.

En-Route ATC – EAP role support tool

The *b*EAP function will require appropriate support tool for the EAP role:

- To monitor the hotspots evolution;
- To elaborate appropriate ATFCM measures (STAM) or to initiate short term actions on the traffic to be coordinated with the Planning Controller;
- To monitor the implementation until the concerned flight has conformed to the measure.; and
- To communicate with the ATC Sector Planning and Tactical controllers' support tool.

En-Route ATC – ATC Sector Planning and Tactical controllers' support tool

On the ATCO team's side, the bEAP function will require appropriate support tool:

- To communicate with the EAP role support tool;
- To display the proposed measures from the EAP to the Planning Controller;
- To support a negotiation dialogue with the EAP; and
- To inform back the EAP on the implementation of the proposed measures.

3.2.4 Applicable standards and regulations

N/A.

3.3 Detailed Operating Method

The operating methods described in this section are limited to the scope of the **Solution #118**, which is focused on the improvement of the communication between the Local DCB position and the Controllers' Work Positions contributing thus to bridge the gap between tactical Air Traffic Flow and Capacity Management (ATFCM) and Air Traffic Control (ATC).

3.3.1 Previous Operating Method

This paragraph describes a specific operational environment and the associated working method (based on the French current situation) that will be considered as the **reference situation** to define the previous operating method in this OSED, allowing thus the comparison with the EAP working method (i.e. the new SESAR operating method) described in *§3.3.2*. This does not call into question the fact that the **EAP concept is foreseen to be implemented in various operational environments with potentially different working methods.**

In the reference situation, on en-route control positions, a controllers' team is composed of one Tactical Controller and one Planning Controller and the tools available at each working position (CWP) are as follows:

- Radar visualization screen;
- Flight plan data displayed on paper strips and electronic support as radar labels or flight lists (sorted by exit point or exit flight level);
- Assistance tools:
  - Arrival management function (AMAN)
  - Short-Term Conflict Alert function (STCA)
- Radio communication with aircraft
- Telephone.

In the reference situation, all the actors involved in the ATC activities in the control room have a local ACC radar rating.

3.3.1.1 Operational Control Room Composition

All qualification areas are composed by:

- One duty supervisor
- One deputy supervisor in charge of the flow management position (FMP)
- "N" pairs of Tactical and Planning Controllers

Actors	License	Valid Unit Endorsement	Specific Qualification required
Duty Supervisor	Multi rating (ADI/ADV, APP/APS, ACP/ACS)	Mandatory	Yes (3 year validity)
Deputy Supervisor in charge of FMP	Multi rating (ADI/ADV, APP/APS, ACP/ACS)	Mandatory	Yes
Tactical Control	Multi rating (ADI/ADV, APP/APS, ACP/ACS)	Mandatory	Nil

Actors	License	Valid Unit Endorsement	Specific Qualification required
Planning Controller	Multi rating (ADI/ADV, APP/APS, ACP/ACS)	Mandatory	Nil

Table 10: Operational Control Room Composition Table

3.3.1.2 Generic processing of flights on a CWP

- When flight data come up on a position, and when they are consulted for the first time by controllers, the flight is **integrated**. Integration can include also the visual check of the aircraft position on the radar screen.
- At that stage, the Planning Controller looks for possible conflicts and informs the Tactical Controller of those possible conflicts. The Planning Controller can also delay this action, in order to have a more precise idea of future positions of aircraft and then warn the Tactical Controller in case of conflicts.
- The Tactical Controller integrates the flights and consults his radar screen to check aircraft position, especially for those involved in conflicts detected by the Planning Controller.
- The Planning Controller and the Tactical Controller draw up together the conflict resolution: they choose the safest and most effective trajectories changes in order to keep separation minima.
- When conflict resolution requires trajectory changes within adjacent sectors the Planning Controller asks those sectors for their approval, i.e.: he coordinates the trajectories changes.
- Once all necessary approvals are collected, the Planning Controller or the Tactical Controller solves the conflict: he gives aircraft clearances corresponding to the resolution elaborated above. He also checks on his radar screen that separation is maintained until aircraft can join again their initial track.

3.3.1.3 Flow Management Position (FMP)

Medium Term Planning

These activities are performed in a period from 18 months and 6 days before the day of operations. They consist in identifying predictable problems (from flows, days, sectors, airfields … point of view), and to prepare adequate ATFCM measures to manage those problem.

Short Term Planning

From six to one day ahead of time, The FMP prepares the initial ATFCM plan for the D day, especially, the FMP determines sectors configurations (which sectors to open and when), and applicable capacities on that day.

These tasks are : updating the D+1 daily plan for the ATSU regarding military activity including negotiations, update information in CHMI , Check if regulations are needed for the next morning, initiate some local measures that could be taken the next morning,….)

Execution Phase

On the D day, the FMP on duty monitors the measures elaborated at the pre-tactical level. He works closely with the ATSU Supervisor and the Network Management Operation Center (NMOC), part of

the Directorate for Network Management (DNM) and under the authority of the Supervisor or by delegation.

Adapting demand and capacity

The FMP on duty continuously **monitors and analyses the traffic situation**, looking for the best adequacy between the available capacity and the forecast demand:

- He improves capacity through sector re-configuration, ASM negotiations…
- He manages demand via all possible ATFCM measures described in ATFCM manuals
- He adapts and updates ATFCM measures to real-time traffic figures.

The FMP on duty also in charge to **follow and improve ATFCM measures elaborated during pre-tactical** phase in order to cope with real time traffic situation:

- By monitoring traffic counts;
- By proposing tactical measures in order to improve traffic smoothness.

The FMP monitors the controller's workload through data provided by the CHMI (occupancy counts and flow counts). The actions to alleviate complexity (sectors splitting, delays on departures…) are then initiated by the Supervisor under FMP advisory.
The table below summarizes the role and tasks of the FMP per ATM phase.

ATM Phases	Role of the FMP	Tasks of the FMP
Medium Term Planning	Preparation of the ATFCM measures of the day	• Identify predictable problems • Prepares adequate ATFCM measures to manage the problems
Short Term Planning	Preparation of the ATFCM measures of the day	• Determines Applicable Capacity • Determines Sectors Configuration
Execution Phase	Monitoring ATFCM Measures	• Coordinates actions with the FMD • Coordinates actions with the Supervisor
	Improves initial ATFCM Measures	• Monitors Traffic Counts compared to capacity monitoring values • Monitors occupancy counts compared to instant load (local data) • Proposes Level Capping, and all kind of adapted measures to the actual traffic • Excludes when possible traffics from regulations
	Adapt the demand to the capacity	• Acts as ATFCM's advisor to the supervisor in choosing the most adapted sector configuration • Initiates new ATFCM Measures

Table 11: FMP role per ATM phase

3.3.1.4 Extended ATC Planning (EAP) role

The Extended ATC Planning (EAP) does not exist today.

3.3.1.5 Planning Controller (PC)

Flight integration

The integration corresponds to the first consultation of flight data; it can be combined with a check of the aircraft position on the radar.

During the integration, the controller memorizes flight data especially route and levels, and radar position when it is available, making a first analysis of potential interactions with surrounding flights and restricted areas.

Conflict detection

Each controller makes his own conflict detection on the whole traffic situation and check his analysis against his team mate, so there is no gap in the conflict detection and they both have the whole traffic situation in mind.

The Planning Controller extends his detection beyond the boundaries of the sector:

- He detects conflicts involving every new aircraft (recently integrated);
- He takes into consideration the whole traffic in his area of interest, in order to refresh his situational awareness , looking for potential conflicts/interactions;
- He looks for unexpected/undetected conflicts due to last minute changes for example (level, route)
- He informs the Tactical Controller of all detected conflicts.

Conflict resolution

The Planning Controller is responsible for:

- Assisting the Tactical Controller in the separation task.
- Alleviating the Tactical Controller conflict resolution/monitoring workload by negotiating entry and/or exit conditions (FL allocation and/or DCT and/or Heading and/or Speed constraint) that can contribute to solve the conflict while easing the execution of the exit planned conditions.

Traffic monitoring

The Planning Controller monitors the frequency and the flight data displayed on the radar screen in order to update his situation awareness and detect potential mistakes/ problems.

Communication management

The Planning Controller is responsible for monitoring the frequency to stay aware of the air traffic situation and to the extent possible in order to detect wrongly acknowledged clearances.

Coordination

The Planning Controller is responsible for all negotiations of flight data changes with adjacent sectors.

Complexity management

On a given sector, the Planning Controller monitors the Tactical Controller's workload mainly through the number on incoming aircraft and the number of simultaneous conflicts to manage.

He can initiate actions to alleviate complexity such as sectors splitting, delays on departures.

3.3.1.6 Tactical Controller (TC)

Flight integration

The integration corresponds to the first consultation on flight data; it can be combined with a check of the aircraft position on the radar. At the integration, the Tactical Controller memorizes the flight data especially route and levels, and radar position when it is available

During the flight integration, he Tactical Controller pays more attention to aircraft with conflict tags from the Planning Controller.

Conflict detection

On a CWP, each controller makes his own conflict detection on the whole traffic, so there is no gap in the conflict detection and they both have the whole traffic situation in mind.

The Tactical Controller focuses the conflict detection on aircraft **within the sector boundaries**.

- Taking into account the initial detection made by the Planning Controller;
- Looking for conflict involving aircraft he has just integrated (analyse especially based on radar information);
- Looks for new conflicts with consulting regularly aircraft radar positions within the sector;
- Detecting any additional conflict which could be the consequence of any modification of any flight trajectory.

Conflict resolution

The Tactical Controller is responsible for solving all conflicts within his sector.

Traffic monitoring

The Tactical Controller ensures:

- That the flight crew follows the issued clearances, and
- That the issued clearances allow for separation provision and optimization of the traffic flows.

Communication management

The Tactical Controller gives clearances to pilots through R/T communication, in order to operate conflict resolution or to monitor aircraft behaviour.

Coordination

Usually the Tactical Controller is not involved in coordination.

Complexity management

The Tactical Controller informs his Planning Controller of any overload, so that the Planning Controller can take quickly adequate measures in order to manage this overload.

3.3.1.7 Previous operating method summary

The table below describes roles assumed by the FMP regarding complexity management and workload smoothing to the benefit of CWPs. The roles for the Planning Controller are also detailed because it is assumed that on a CWP, he is the main partner of the FMP.

ATM Phases	Role for the FMP	Role for the Planning Controller
Execution Phase	Maintains the overall consistency of all the actions needed on traffic and demand in the ATSU).This role is detailed below (4 points) • Monitors and adjusts the ATFCM Measures (in order to meet the prepared target) • Adapts the capacity and the demand (improve capacity vs. reduce the demand) • Improves ATFCM Measures , i.e. STAM measures, regulations, …	• Evaluates the feasibility of the FMP request (according the traffic situation on the sector) • Coordinates actions requested by the FMP with his Tactical Controller
	Analyses and initiates actions in order to alleviate controller's workload on CWPs in the ATSU.	idem
	Negotiates and coordinates actions with concerned actors	idem
	Delivers information and support to actors concerned by the measures	

Table 12: Previous operating method summary

3.3.2 New SESAR Operating Method

In this section related to new operating methods, the focus is the ATC aspects and local DCB aspects (in the frame of INAP) expected to change in the scope of the Solution#118 to enable the *basic* EAP function in high complexity cross-border environment.

One objective of the EAP will be to continue the action of the LTM and to contribute as well to bridge the gap between tactical Air Traffic Flow and Capacity Management (ATFCM) and Air Traffic Control (ATC).

The EAP works at the execution phase level in cooperation with the LTM function and under the authority of the Supervisor acting on all flights, co-monitoring hotspots evolution and elaborating measures to be applied through a CDM process with the LTM.

In particular, the EAP will be a major enabler in the CDM process between Traffic Management and Traffic control by implementing STAM on specific flights and coordinating the tactical actions.

Moreover, the EAP will be tasked to monitor real-time complexity, to propose solutions to better respond to sectors or crew solicitations (severe icing or turbulences conditions)

Moreover the EAP could also perform STAM at his own level enhanced by communication and assistance to decision tools.

3.3.2.1 New LTM Operating Method with the bEAP function

The LTM is involved in dDCB processes both for medium, short term planning and execution phases. He ensures consistency between the whole ATFCM measures.

The LTM uses traffic load monitoring tools, to compare demand with declared capacity in the Network Operations Plan and to assess sectors workloads and/or complexity compared with predefined thresholds.

The Local Traffic Manager's responsibilities refer to the **dynamic Demand and Capacity Balancing (dDCB).**

The Local Traffic Manager is responsible for:

Monitoring the demand and the capacity

- The LTM monitors forecast demand against declared capacity.
- The LTM assesses the impact of different sector configurations on the traffic flows.
- The LTM assesses sectors workloads.

Providing information about predicted imbalance

- The LTM provides advance notice of demand that peaks above capacity.
- The LTM provides advance notice of unusual sector workloads.
- The LTM provides advance notice of peaks in traffic complexity.
- The LTM Provides TACT messaging if required.

Coordinating actions with others actors to manage imbalances

- The LTM notifies the ATSU Supervisor of any reduction in declared capacity.

- The LTM advises the ATSU Supervisor on sector opening/closing and staffing to meet the demand
- The LTM devises and coordinates appropriate action to resolve any imbalances in co-ordination with the ATSU Supervisor.
- The LTM optimises ATC/ATFM system performance including the instigation and coordination of remedial action with any ATS provider, aircraft operator or aerodrome to ensure maximum system performance

Monitoring in real time the local consequences of measures applied in adjacent airspace

- The LTM monitors the impact of departure, en-route and arrival management systems on traffic in the area of interest.
- The LTM monitors the impact of traffic and complexity management in neighbouring areas on his area of interest.

Managing unusual situations

- The LTM manages demand when impacted by weather or following an incident or unusual occurrence.
- The LTM provides information on, and solutions for unexpected increases in demand.

The Local Traffic Manager (LTM) is functionally located between the Flow Manager (FAB level) and multi-sector planning actors. He is responsible for a group of sectors (potentially a complete ATSU) and for any airfield located within its area of responsibility.

The LTM is a major actor of DCB processes both for the medium to short term planning phase and the execution phase. In case of imbalance, he is responsible for identifying the adequate measures to be taken, in coordination with the appropriate partners (that could include NM (Network Manager), FM, (Flow Manager) other LTM and AU).

The LTM provides a bridge in understanding between operational perceptions of complexity, workload & demand and how that translates into ATFCM requirements as deliverable occupancy & workload values.

In execution phase and appropriately in short term planning, the LTM works closely with Supervisors and Extended ATC Planning.

The LTM is also likely to be either a Supervisor, or report to one, and as such will retain local safety accountability. Any ATFCM initiatives will have to be approved by him.

3.3.2.2 EAP Operating Method with the bEAP function

The EAP role alleviates the LTM workload by working with him on flights.

The EAP acts in his given EAP Area (Multi-sector area of responsibility), under close coordination with the LTM, as the LTM has a global view on the ATSU's area.

In order to be fully efficient, the EAP should be able to appreciate difficulties that a traffic situation could generate from a controller point of view (the EAP works for them) that is why the EAP function should be done by staff holding (or having held) an ATCO rating in the concerned ATSU's airspace and will need an appropriate air situation display dedicated to The tasks.

This EAP position can either be collapsed with LTM, or regarding the expected traffic, be insured by a specific EAP specialist (when needed). The EAP is indeed not systematically an additional staff in the ATSU, it is a role, which covers a set of services/ functions and which can be assumed by different people (already existing actors, like TC or new actors like MSP or LTM) in the ATSU.

Moreover, it is important to note that any dDCB measure decided will have to remain fully coherent with the Network, this highlighting the need for coordination with the LTM, and the neighbouring ATSUs in order to allow for global Network optimization.

The EAP works at the execution phase level in cooperation with the LTM function and under the authority of the Supervisor, acting on flights (until approximately 30 min before the effective problem to solve), co-monitoring hotspots evolution and elaborating measures to be applied through a CDM process with the LTM.

The EAP is in charge of identifying all possible improvements to the traffic situation at ATSU level, in order to comply with the real time operational situation.

Once an optimized scenario has been decided by LTM, the EAP selects the individual flights on which to perform the predefined ATFCM or ATC actions and propose those to the relevant sector team Planning Controller (PC).

The EAP is responsible for the mitigation of the real time complexity by inter alia managing number of potential strategic conflicts through a dedicated tool.

Is responsible for selecting accurate actions through a list of pre-defined scenarios in coordination with the LTM, which will provide better use of actual capacity, by balancing capacity/workload to the benefit of his multi sector area of responsibility (EAP Area):

- Cherry picking in case of bunch phenomenon to redistribute the traffic to less loaded sectors or to solve complexity inside the Hotspot
- Early descent, late descent, or delayed climb to avoid a specific sector (in his EAP Area)
- FL balancing to adjust traffic load between layers of airspace
- Use of flexible division of Flight level, which can be associated with the dynamic FL allocation scheme
- Rerouting, in order to balance the workload between sectors in nominal situations or taking in consideration specific weather conditions or unexpected military activity (or non-activity). This implies a coordination with LTM, as it has a network effect beyond the EAP Area.

The EAP participates to the implementation of miles in trail procedures. This also implies coordination with the LTM, as it has a network effect beyond the EAP Area.

The EAP Participates to immediate reaction and optimization in his given EAP Area when the status of a route or an area changes (military areas, CDR ...)

Within The time horizon of work and his multi-sectors overview in his area of interest, the EAP takes into account the TTA/TTO instructions or potential CTO/CTA issued by TRACT)

The EAP has the ability to interact with the control areas via a communication tool. This tool allows transferring to the sectors the clearances requested.

The EAP Can act at the request of any sector in his given EAP Area :

- When a specific sector or area encounters adverse weather situation (CBs building up, turbulence appearing) the EAP help may be asked to act to facilitate the transition towards a situation where accurate ATFCM measures will come into effect. When en-route holding patterns are activated, the EAP may be asked to assist to coordinate speed reduction with upstream sectors and further to coordinate stack exit levels especially in case of multiple layers.
- The EAP will be able to answer specific and real time requests from users, expressed either by the crew through RT or through any other communication tool by the AO Operations.

Some innovative tasks devoted to EAP should pop up with the application of Dynamic Airspace Configurations, for instance:

- **In the context of activation of Free Route Airspace :**
  The EAP will need a tool which gives a probability of strategic conflicts based on the uncertainty (of the trajectory prediction at least).

  Moreover, as it is more complex to solve conflicts for a sector team in a Free Route environment, the EAP could in some cases, choose to make a strategic deconfliction with a slight change on the trajectory in a smoother way thanks to a trajectory editor at the ATSU level.

  Like the Planning Controller and Tactical Control, EAP tasks could be impacted by:

  - Short crossings at boundaries of Free Route sectors. So, EAP should pay a particular attention to these areas, up to circa 30' when they become complex.

  - When a conflict is identified (with or without a conflict detection tool) at the boundary of two sectors, one problem is to determine which sector team is responsible for the resolution. The EAP thanks to his view of the traffic at the ATSU level, will be able to decide which sector team could be used to best solve the conflict.
  - A dedicated tool may be used to communicate the conflicts to the best sector team.
  - Intricate conflicts which do share the same crossing point: As the EAP is not subject to the same time pressure as the sector team, it is easier to think about a resolution. The EAP will be able to communicate the conflicts in advance, allowing sector team to anticipate it before flights are inside the sectors. So, as soon as the first flight in conflict in a medium term enters the sector, sector team will be able to give clearances which take into account the potential conflicts, for example by stopping a climb, or anticipating a descent even if the second or the third flight in conflict is not yet inside the sector.

- **With the implementation of concept such as Dynamic Mobile Area**

3.3.2.3 New Planning Controller Operating Method with the bEAP function

The Planning Controller is involved in STAMs performing by insuring coordination with the EAP. The Planning Controller real time situation awareness and the EAP qualification allow them to find where and when to safely apply corrections on aircraft trajectories. The Planning Controller will propose actions on aircraft to the Tactical Controller and explain him the expected benefits.

3.3.2.4 New Tactical/Executive Control Operating Method with the bEAP function

The Tactical Controller role might be impacted during the STAM coordination process initiated by the EAP when it is required to contact flight crew to ensure e.g. that the aircraft characteristics are compatible with the proposed STAMs.

The Tactical Controller is also impacted by implementation of the STAMs:

- Most of the time he will implement the STAM by giving a clearance.
- Sometimes (rarely) he will not be able to implement the proposed STAM because of a potential loss of separation appearing at the last minute.

3.3.2.5 Summary of the new operating method

The new roles for the LTM and the EAP are presented in the table below. Other roles for the EAP linked with interactions of the EAP and other actors will be studied after having defined how the LTM and EAP should work together.

ATM Phase	Role for the LTM	Role for the EAP	Role for the Planning Controller
Execution Phase	1) The LTM is responsible for maintaining the overall consistency of all the actions needed on traffic and demand in the ATSU: • The LTM monitors and adjusts the ATFCM Measures (in order to meet the prepared target) • The LTM adapts the capacity and the demand 2) The LTM is responsible to take the appropriate actions in cooperation with the EAP when excess of demand over monitoring values is detected • The LTM Improves ATFCM Measures : define STAM measures to be applied by the EAP	1) The EAP is responsible for monitoring and adjusting the ATFCM Measures (in order to meet the prepared target) 2) The EAP is responsible for adapting the capacity and the demand (in his EAP Area) 3) The EAP is responsible for taking the appropriate action in cooperation with the LTM when excess of demand over monitoring values is detected • The EAP Improves initial ATFCM Measures (in his EAP Area): negotiates with concerned actors the implementation of STAM measures defined	The PC is responsible for: Evaluating the feasibility of the EAP request (according the traffic situation on the sector) Coordinating actions requested by the EAP with his TC

ATM Phase	Role for the LTM	Role for the EAP	Role for the Planning Controller
		by the LTM	
	The LTM is responsible to analyse and initiate actions in order to alleviate controller's workload on CWPs in his ATSU	The EAP is responsible to initiate actions in order to alleviate controller's workload on CWPs (in his EAP Area), for example in Free Route Airspace	
	The LTM is responsible for the global coordination upstream and downstream, so as to maintain the coherence between the EAP's Actions (if many in the ATSU), the AUs' needs and the NMOC vision on the Network coherence		
	The LTM is responsible to negotiate and coordinate actions with concerned actors	The EAP negotiates and coordinates actions with concerned actors under LTM agreement	idem
	The LTM delivers information and support to actors concerned by the measures	The EAP delivers information and support to actors (in his EAP Area)	

Table 13: Summary Table of New Operating Method

3.3.2.6 Use Cases

The Use Cases (UC) described hereafter, limited to the basic EAP role with STAMs solution and decomplexification measures have been identified through brainstorming sessions involving flow managers and consolidated after the SESAR 1 validation exercise VP-687 in Reims ACC [48].

It is worth noting that the **full EAP scope** will be addressed by PJ09.02.

The table below provides traceability between scenarios and UC issued from relevant DODs with the Scenarios and UC described in this OSED.

DOD Scenario identification	DOD UC identification	EAP OSED UC identification
Step 1 – DOD 04.02 - OS-4-02	CM-UC-03-01 Manage Co-ordination Requests	UC1.1
	CM-UC-03-02 Manage a Co-ordination Receipt	UC1.1
	CM-UC-04-01 Update the iRBTs/iRMTs	UC1.4 & UC2.4
	CM-UC-05-01 Monitor De-complexing Solution Implementation	UC1.4 & UC2.4
	CM-UC-05-02 Adjust Implemented De-complexing Solution	UC1.2 & UC2.2
	CM-UC-05-03 Modify an Existing De-complexing Solution	UC1.3 & UC2.3
	CM-UC-05-04 Create a New De-complexing Solution	UC1.2 & UC2.2
	CM-UC-06-04 Edit an iRBT/iRMT Solution	UC1.4 & UC2.4
Step 1 – DOD 04.02 - Operational Scenario Execution Phase	UC-NE-04 Monitor Deviation between Agreed and Actual Flight Profile	UC1.4 & UC2.4
	UC-NE-07 Detection of Demand Capacity Imbalances (Hot Spots)	UC1.1
	UC-NE-08 Analysis and Preparation of the STAM Solution for Cherry Picking Measures	Operational Scenario 1 (UC 1.1 to UC 1.4)
	UC-NE-10 Coordination of the STAM Solution	UC1.2 & UC1.3
	UC-NE-11 Implement STAM Solution	UC1.4
	UC-NE-17 Facilitate and Optimise local complexity resolution	All : operational scenario 1 & 2
Step 2 – DOD 04.02 - OS-4-01	TM-UC-07-01 : TTO for STAM	
Step 2 – DOD 04.02 - OS-4-01	TM-UC-08-02 : Revision initiated by the INAP	Operation Scenario 2
Step 2 – DOD 04.02 - OS-4-02	UC-CM-01-03 Extended ATC Planning Level	All : Operational Scenario 1 & 2
Step 2 – DOD 04.02 - OS-4-03	UC-SM-05 EAP and/or Sector team detect potential conflicts	UC2.1

DOD Scenario identification	DOD UC identification	EAP OSED UC identification
	UC-SM-06 EAP, PC and/or EC build a resolution scenario	UC2.2 & UC 2.3
	UC-SM-09 (non-nominal) Sector team launches En-Route – execution phase – CDM process	Not covered
Step 2 – DOD 07.02 - DCB in the Medium and Short-Term Planning	UC-DB-04 : Monitor workload and detect hotspots	UC2.1
	UC-DB-09 : Prepare STAM/DCB measures	UC1.2, UC1.3 & UC2.2, UC2.3
Step 2 – DOD 07.02 - dDCB in the Short-Term planning and Execution Phase	Uc-dB-01 : Monitor the forecast workload	UC1.1 & UC1.4 & UC2.1 & UC2.4

Table 14: Traceability Table: Scenario/UC DOD <-> EAP OSED UC

3.3.2.6.1 Operational Scenario 1: STAM or decomplexification measure required by the LTM (local network level)

Notes:

- In the UCs contained in this section, the term **LTM request** will be used to define a request addressed by the LTM to the EAP to solve a hotspot through a number of STAMs to apply or a number of decomplexification measures to apply. Decomplexification measure and STAM measure will be dissociate only whenever needed and in which case clearly mentioned.
- The term **request** (not preceded by the word LTM) will be used in the UCs below to designate a STAM or a decomplexification measure. These two types of measures will only be dissociated whenever needed and in which case clearly identified.

The Operational Scenario 1: "STAM or decomplexification measure required by the LTM (local network level)" is fully described by the four (4) UCs presented below ***in the following chronological order***:

- **UC 1.1**: Analysis of the LTM request
- **UC 1.2:** Preparation of the LTM request
- **UC 1.3**: Coordination of the LTM request
- **UC 1.4**: Implementation of the LTM request

The reference scenarios to which these Use Cases are applicable are listed in Table 10: Traceability Table: Scenario/UC DOD <-> EAP OSED UC.

3.3.2.6.1.1 UC 1.1: Analysis of the LTM request

Scope

Applicable within all type of environments (Fixed, Direct Routing Airspace (DRA), Fixed Routing Airspace (FRA))

Level

User Goal

Summary

This Use Case is triggered when the LTM at the local level has requested a STAM solution or a decomplexification measure (request) to be applied on a specified number of flights with the purpose of contributing to the clearing of an identified hotspot.

A hotspot correlated with a large number of strategic conflicts might give to the EAP an indicator on the choice of flights on which he must act.

This could allow a reduction of complexity, occupancy and workload by suppressing potential conflict.

The primary actor works to assess the STAM or decomplexification measure by selecting individual flights and associated ATC measures that support LTM goals and objectives while:

- Maintaining network coherence and stability.
- Minimizing adverse impact on flight efficiency.
- Minimizing adverse impact on ATC sector workload.

Actors

Primary Actor

The EAP, under LTM supervision/coordination, is responsible for selecting the individual flights and the associated ATC measures that comply with LTM request.

The EAP wants to ensure that solutions to fulfil with LTM request are addressed and prepared in a manner that is appropriate, proportionate, fair and equitable both to the users and the ATC sectors involved.

When it is possible for him/her to act early enough the EAP can alleviate the PC's workload by eliminating potential strategic conflicts.

Supporting Actor(s)

N/A.

Off-Stage Actor(s)

N/A.

Preconditions

The LTM has confirmed a hotspot and, thanks to the analysis of a solution (STAM or decomplexification) at his level, has decided that the solution on a specified number of flights should be analysed by the EAP and has sent him a LTM request, containing the type and the number of DCB measures to be applied (i.e. the number of flights).

Post conditions

Success End State

At least one solution with adequate number of candidate aircraft and corresponding ATC actions has been identified to comply with the LTM request.

Failure End State

The assessment activity fails to identify at least one solution with the adequate candidates or the appropriate ATC actions to satisfy the LTM request.

Notes

N/A.

Trigger(s)

The Uses Case starts when the LTM has decided that a STAM or decomplexification measure should be applied on a number of flights to solve an identified hotspot and has sent The request to the EAP.

Flows

Main Flow

The EAP under LTM supervision/coordination is expected to analyse the LTM request on a given flight between around 15' to 1 hour before this flight exits the implementing sector. He consults the Occupancy count, the Intruders count, the complexity (a strategic conflict count tool at least), the hotspot flights list. He analyses the flight profiles in order to select the mitigation measure with minimal impact for airspace user and minimal added workload for ATC sectors.

In order to acquire the mental representation of the predicted air situation, the EAP shall be able to visualize selected flights from the hotspot flight list on a flight horizontal profile visualization display.

Some attributes should help allowing identification of best candidates:

- Specific mark on flights with TTA or CTO constraint;
- Specific mark on Intruders;
- Specific mark on manually forced flights;
- Specific mark on flights with previous penalizations for ATFCM purpose;

- Specific mark on flights concerned by on-going other confirmed hotspots;
- Specific mark on flights concerned by a proposed/coordinated/implemented STAM or decomplexification measure;
- Specific mark on flights involved in a strategic conflict;
- Specific mark on flights with a high complexity value.

The EAP shall be able to select individual flights in the flight list or in the Predicted Air Situation Display and, thanks to a "*what if*" function, change manually their profile in order to simulate and analyse the impact on Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification.

The Use Case ends when the analysis of the LTM request has been completed.

The **UC 1.2: Preparation of the LTM request** is then to be applied.

Alternative Flows

Cancel

The EAP monitors the hotspot and identifies that the LTM request on flights are no more valid. The request is cancelled.

Failure Flows

The potential solutions identified by EAP (STAMs or decomplexification measures) are not satisfying the LTM request.

The LTM is advised by the EAP of the situation and assess it, then assume coordination with Adjacent LTM, so as to minimize network effect.

3.3.2.6.1.2 UC 1.2: Preparation of the LTM request

Scope

Applicable within all type of environment (Fixed, DRA, FRA)

The reference scenarios to which this Use Case is applicable are listed in *Table 14: Traceability Table: Scenario/UC DOD <-> EAP OSED UC*

Level

User Goal

Summary

This Use Case describes the preparation of the LTM request by the EAP after its successful analysis.

Actors

Primary Actor

The EAP, under LTM supervision/coordination, is responsible for selecting the individual flights and the associated ATC measures that comply with LTM request.

The EAP wants to ensure that solutions to fulfil with LTM request are addressed and prepared in a manner that is appropriate, proportionate, fair and equitable both to the users and the ATC sectors involved.

When it is possible for him/her to act early enough the EAP can alleviate the PC's workload by eliminating potential strategic conflicts.

Supporting Actor(s)

N/A.

Off-Stage Actor(s)

N/A.

Preconditions

The **UC1.1 Analysis of the LTM request** has ended successfully, e.g. with at least one solution with a number of candidate flights and ATC actions compliant with the LTM request

Post conditions

Success End State

The best solution identified in **UC1.1 Analysis of the LTM request** has been prepared and still complies with the LTM request.

Failure End State

The preparation activity fails to provide at least one solution with the adequate candidates or the appropriate ATC actions to satisfy the LTM request.

Notes

N/A.

Trigger(s)

The Uses Case starts when the LTM request analysis by the EAP has led to at least one identified solution with compliant number of candidate flights and ATC actions.

Flows

Main Flow

The EAP selects the most likely solution to cope with LTM request while minimizing the adverse impact on flight efficiency and on workload for ATC sectors.

The EAP will coordinate with LTM any action that could have an effect beyond his EAP Area, as LTM is in charge with overall consistency and coordination with FAB level / Network management.

The EAP prepares the measures on the candidate flights. The HMI shall propose him/her a menu with possible measures to comply LTM request:

- Speed or time control;
- Flight Level change;
- Rerouting.

The Use Case ends when the preparation of the LTM request has been achieved on EAP side.

The **UC 1.3: Coordination of the LTM request** is then to be applied.

Alternative Flows

Cancel

The EAP monitors the hotspot and identifies that the LTM request on flights are no more valid. The LTM request is cancelled.

Late STAM

The EAP under LTM supervision/coordination was not able to prepare The STAM on a flight in the expected time horizon. He then prepares the STAM between 3' to around 10' before the flight exits the implementing sector.

Once the off-loaded sector has received the information of the flight, the STAM is considered late. In this flow, the off-loaded sector has to deal with the flight even if it will not cross it because of the future implementation of the STAM.

Urgent STAM

The EAP needs a quick answer from PC to ensure of his solution and selects the option Urgent before sending the STAM. The request remains a STAM for the PC, but will be displayed with additional stimuli on PC side.

Urgent decomplexification measure

The EAP needs a quick answer from PC to ensure of his solution and selects the option Urgent before sending the request. The request remains a decomplexification measure for the PC, but will be displayed with additional stimuli on PC side.

Failure Flows

The solutions identified by EAP within **UC1.1 Analysis of the LTM request** are no longer satisfying the LTM request or are no longer possible.

The LTM is advised by the EAP of the situation and assess it, then assume coordination with Adjacent LTM, so as to minimize network effect.

3.3.2.6.1.3 UC 1.3: Coordination of the LTM request

Scope

Applicable within all type of environment (Fixed, DRA, FRA)

The reference scenarios to which this Use Case is applicable are listed in *Table 14: Traceability Table: Scenario/UC DOD <-> EAP OSED UC*

Level

User Goal

Summary

This Use Case is triggered when EAP starts to coordinate the request with the corresponding actors involved.

The coordination between LTM and EAP at analysis and preparation stages is therefore not concerned here. (Both are described **in UC 1.1: Analysis of the LTM request** and **UC 1.2: Preparation of the LTM request**)

The primary actor works to coordinate and negotiate the measures chosen to fulfil the LTM request by selecting individual flights and associated ATC measures that support LTM goals and objectives while:

- Maintaining network coherence and stability.
- Minimizing adverse impact on flight efficiency.
- Minimizing adverse impact on ATC sector workload.

The STAM or decomplexification measure possible coordination statuses are the following:

- PROPOSED (by LTM/EAP)
- REJECTED (by PC)
- ACCEPTED (by PC)
- IMPLEMENTED (by PC)
- CANCELLED (by LTM/EAP)
- TERMINATED (by system)

Actors

Primary Actor

The EAP coordinates the LTM request with the corresponding actors involved.

Supporting Actor(s)

The actors that can be considered as supporting are:

- Flight Crew
- Planning Controller

- Adjacent LTM
- Adjacent EAP
- LTM

Off-Stage Actor(s)

N/A.

Preconditions

The Use Cases attached to **UC 1.2: Preparation of the LTM request** achieves success status. Indeed, an adequate number of candidate aircrafts and corresponding ATC actions identified to comply with LTM request are a pre-requisite for this Use Case.

Post conditions

Success End State

The LTM request has been successfully coordinated and negotiated with all relevant actors.

Failure End State

The activity fails to coordinate and negotiate an appropriate solution to comply with the LTM request.

Notes

N/A.

Trigger(s)

The Use Case starts when the EAP determine(s) that the most appropriate time to start coordination with relevant actors has been reached.

Flows

Main Flow

The EAP initiates coordination with the involved actors.

The EAP prepares the coordination with the selected ATC sectors, adjacent EAP that are going to be impacted by the proposed measures.

The LTM is in charge of coordination with Adjacent LTM if required, so as to minimize network effect. Each actor is affected with a status corresponding to his level of involvement in the process:

- Off loaded or impacted actor (actor protected by the STAM or actor impacted by the decomplexification measure);
- Implementing actor (actor which shall implement the STAM or decomplexification measure);
- On loaded actor (actor which will receive a flight after STAM implementation);
- Upstream actors for information (in order to strengthen FPL adherence).

For each selected flight, the EAP sends an implementation request to the implementing actor with a time-out indicating the time frame for the coordination process. The EAP may wait for the best moment to send the request, using flight profile.

In case the request is sent by EAP but flight is not known on position, the request display on CWP Com Tool is delayed until position is aware of the flights (based on ATFCM information or local FDPS when available). The request remains sent but not yet displayed until then. This is transparent for ATCO.

When displayed on CWP COM tool, the request status turns to PROPOSED.

Several additional coordination actions may be launched if needed. They may lead to an update of the exit level, route or CTO in the local FDPS before answering the request:

- ATCO/Pilot Crew;
- ATCO / Downstream sector;
- ATCO/EAP to exchange relevant information.

After coordination, the EAP is finally given a positive answer, the request status turns to ACCEPTED, meaning the ATCO will implement the request

The EAP notifies the other selected actors with the coordinated measures.

The Use Case ends when the coordination with the actors implementing the request yields a positive result. The **UC 1.4: Implementation of the LTM request** is then to be applied.

Alternative Flows

Cancel

The EAP monitors the hotspot and identifies that LTM request are no more valid. The request is cancelled. The request status turns to CANCELLED. The request disappears from CWP and EAP HMI.

The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly[2].

[2] At the moment of this edition, there is a too much long delay with B2B to be compliant with this statement

Reminder to Act sent by EAP

The EAP does not receive an answer from the implementing actor early enough for the operational needs. He sends a reminder to act to Implementing sector, which has the effect to display the request with additional stimuli. Then the process follows the main flow.

Late STAM

During the coordination process, the off-loaded sector has received the information of the flight; the STAM becomes then a late STAM. In this flow, the off-loaded sector has to deal with the flight even if it will not cross it because of the future implementation of the STAM. Then the process follows the main flow.

Urgent STAM

During the coordination process, the EAP needs a quick answer from ATCO to ensure of the solution and decides to update the STAM with the option Urgent. The request is still a STAM for ATCO, but is now displayed with additional stimuli. Then the process follows the main flow.

Urgent decomplexification measure

The EAP needs a quick answer from PC to ensure of the solution and selects the option ***Urgent*** before sending the request. The request remains a decomplexification measure for the PC, but will be displayed with additional stimuli on PC side.

Failure Flows

The EAP receives a negative answer on a PROPOSED or ACCEPTED request. The request status turns to REJECTED and is automatically removed from ATCO screen

The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly.

The LTM is advised by the EAP of the situation and assess it, then assume coordination with Adjacent LTM, so as to minimize network effect.

3.3.2.6.1.4 UC 1.4: Implementation of the LTM request

Scope

Applicable within all type of environment (Fixed, DRA, FRA)

The reference scenarios to which this Use Case is applicable are listed in *Table 14: Traceability Table: Scenario/UC DOD <-> EAP OSED UC*

Level

User Goal

Summary

This Use Case is triggered after the EAP has duly coordinated the request to be performed on flights with the relevant actors. This Use Case describes the process by which the implementation of the request is monitored by the EAP.

Actors

Primary Actor

The EAP monitors the implementation of the request in coordination with the involved actors.

Supporting Actor(s)

The actors that can be considered as supporting are:

- Flight Crew
- Executive Controller
- Planning Controller
- LTM
- Adjacent EAP
- Adjacent LTM

Off-Stage Actor(s)

N/A.

Preconditions

Use Case 1.3: Coordination of the LTM request achieves success state. The successful coordination of the request, with status ACCEPTED, is indeed a pre-requisite for this Use Case.

Post conditions

Success End State

Implemented measures satisfy with the LTM request.

Failure End State

The amount of implemented measures does not satisfy with the LTM request.

Notes

The success criteria in the context of this Use Case is limited to the effective implementation of a sufficient amount of measures to comply with the LTM request only, it should not be confused with the success (or failure) of the effect of these DCB measures in rectifying (or not) the detected imbalance or the detected high complexity.

Trigger(s)

The Use Case starts when the Primary Actor is in possession of coordinated measures (status ACCEPTED for all measure) on airborne flights[3] that satisfy with the LTM request.

Flows

Main Flow

After the request coordination is over, the EAP monitors the effective implementation of the measures in the implementing sector of the area of responsibility.

Depending on the request type (STAM level capping, rerouting or speed adjustment), the Planning Controller or the Tactical Controller acts on the flight plan to comply with the request. The request status turns to **IMPLEMENTED** as soon as the flight information is updated.

The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly[4].

Note: In the case of a request coordinated with an adjacent EAP/FMP, it is the duty of this supporting actor to monitor the implementation of the request within his own area of responsibility.

Alternative Flows

Rejection of the request

[3] The flights could be not airborne during the coordination process, but must be during the implementing process

[4] At the moment of this edition, there is a too much long delay with B2B to be compliant with this statement

In the end, the EAP gets the information from the implementing actor that the request will not be implemented (e.g. refusal from the flight crew):

1. If the monitoring EAP is at the origin of the request, flow resumes at **UC 1.2: Preparation of the LTM request**;
2. If the monitoring EAP monitors the request on behalf of an adjacent requesting EAP, he has to notify the latter.

The request status turns to REJECTED.

The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly[1].

Late STAM

Before the implementation process is over, the off-loaded sector has received the information of the flight; the STAM becomes then a late STAM. In this flow, the off-loaded sector has to deal with the flight even if it will not cross it because of the STAM future implementation.

Failure Flows

The EAP gets the information from the implementing actor that the request will not be implemented (e.g. refusal from the flight crew or for traffic reason) and the EAP decides that he has no opportunity to restart the coordination process UC1.2. He should cancel the request.

The request status turns to CANCELLED.

The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly[5].

The LTM is advised by the EAP of the situation and assesses it, then assumes coordination with Adjacent FMP, so as to minimize network effect

[5] At the moment of this edition, there is a too much long delay with B2B to be compliant with this statement

3.3.2.6.2 Operational Scenario 2: Decomplexification measure at EAP level (no LTM supervision) in Fixed Routing Airspace (FRA)

Notes:

- In the UCs contained in this section, the term **LTM request** will be used to define a request addressed by the LTM to the EAP to decomplexify a given traffic Volume (TFV) through measures such as a Level Change request.
- The decomplexification measure process without LTM supervision is described **only in Fixed Routing Airspace (FRA) environment** as this process is not deemed applicable or relevant in other traffic environments.

The Operational Scenario 2: "Decomplexification measure at EAP level (no LTM supervision) in Fixed Routing Airspace (FRA)" is fully described by the four (4) UCs presented below ***in the following chronological order***:

- **UC 2.1:** Analysis of the decomplexification measure;
- **UC 2.2:** Preparation of the decomplexification measure;
- **UC 2.3:** Coordination of the decomplexification measure;
- **UC 2.4:** Implementation of the decomplexification measure.

3.3.2.6.2.1 UC 2.1: Analysis of the decomplexification measure

Scope

Applicable within all type of environment (Fixed, DRA, FRA)

The reference scenarios to which this Use Case is applicable are listed in *Table 14: Traceability Table: Scenario/UC DOD <-> EAP OSED UC*

Level

User Goal

Summary

This Use Case is triggered when the EAP at the local level has identified that a decomplexification measure should be applied with the purpose to decrease a high complexity of a given sector or TFV

The primary actor works to assess and prepare the decomplexification measure by selecting individual flights and associated ATC measures whilst:

- Maintaining network coherence and stability;
- Minimizing adverse impact on flight efficiency;
- Minimizing adverse impact on ATC sector workload.

Actors

Primary Actor

The EAP is responsible for selecting the individual flights and the associated ATC measures that comply with his needs.

The EAP wants to ensure that solutions are addressed and prepared in a manner that is appropriate, proportionate, fair and equitable both to the users and the ATC sectors involved.

When it is possible to act early enough, the EAP can alleviate the PC's workload by eliminating potential strategic conflicts.

Supporting Actor(s)

N/A.

Off-Stage Actor(s)

N/A.

Preconditions

A high complexity on a given traffic volume (TFV) or sector is confirmed and, thanks to the analysis of the decomplexification measure at EAP level, he has decided that decomplexification should be applied on a specified number of flights in a given sector or TFV.

Post conditions

Success End State

At least one solution with adequate number of candidate aircraft and corresponding ATC actions has been identified to decrease the complexity by this mean.

Failure End State

The assessment activity fails to identify at least one solution with the adequate candidates or the appropriate ATC actions to decrease the complexity by this mean.

Notes

N/A.

Trigger(s)

The Uses Case starts when the EAP has decided that decomplexification measures should be applied on flights.

Flows

Main Flow

The EAP consults the Occupancy count, the Intruders count, the complexity between around 15' to 1 hour before this flight exits the implementing sector.

He analyses flight profiles in order to select the mitigation measure with minimal impact for airspace user and minimal added workload for ATC sectors.

In order to acquire the mental representation of the predicted air situation, the EAP shall be able to visualize selected flights on a flight horizontal profile visualization display.

Some attributes should help allowing identification of best and worst candidates:

- Specific mark on flights with TTA or CTO constraint.
- Specific mark on Intruders
- Specific mark on manually forced flights
- Specific mark on flights with previous penalizations for ATFCM purpose.
- Specific mark on flights concerned by on-going other confirmed hotspots.
- Specific mark on flights concerned by a proposed/coordinated/implemented request (STAM / decomplexification);
- Specific mark on flights involved in a strategic conflict
- Specific mark on flights with a high complexity value.

The EAP shall be able to select individual flights in the flight list or in the Predicted Air Situation Display and, thanks to a "*what if*" function, change manually their profile in order to simulate and analyse the impact on Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification.

Due to the FRA specificities, he will also have the task when needed to determine the most appropriate implementing sector in case of conflicts at the boundaries of sectors. A dedicated tool to display flights trajectory might be useful.

The Use Case ends when the analysis of decomplexification has been completed with at least one or several solutions.

The **UC 2.2: Preparation of the decomplexification measure** is then to be applied

Alternative Flows

Cancel

The EAP monitors the complexity and identifies that decomplexification measures on flights are no more valid. The request is cancelled.

Failure Flows

The number of potential decomplexification measures identified by EAP is not satisfying the purpose. In this case, **in close coordination with the LTM**, he can identify a new Hotspot whenever appropriate. Therefore **UC 1.1: Analysis of the LTM request** might be applied.

3.3.2.6.2.2 UC 2.2: Preparation of the decomplexification measure

Scope

Applicable within all type of environment (Fixed, DRA, FRA)

The reference scenarios to which this Use Case is applicable are listed in *Table 14: Traceability Table: Scenario/UC DOD <-> EAP OSED UC*

Level

User Goal

Summary

This Use Case describes the preparation of the decomplexification measure by the EAP after its successful analysis.

Actors

Primary Actor

The EAP is responsible for selecting the individual flights and the associated ATC measures that comply with he needs.

The EAP wants to ensure that solutions are addressed and prepared in a manner that is appropriate, proportionate, fair and equitable both to the users and the ATC sectors involved.

When it is possible for him/her to act early enough the EAP can alleviate the PC's workload by eliminating potential strategic conflicts.

Supporting Actor(s)

N/A.

Off-Stage Actor(s)

N/A.

Preconditions

The **UC2.1 Analysis of the decomplexification measure** has ended successfully, e.g. with at least one solution with a number of candidate flights and ATC actions compliant with the decomplexification of a given TFV.

Post conditions

Success End State

The best solution identified in **UC 2.1: Analysis of the decomplexification measure** has been

prepared successfully and is still valid.

Failure End State

Appropriate ATC actions are taken to satisfy decomplexification needs.

Notes

N/A.

Trigger(s)

The Uses Case starts when the EAP analysis has led to at least one identified solution with compliant number of candidate flights and ATC actions.

Flows

Main Flow

The EAP selects the most likely solutions to cope with the need while minimizing the adverse impact on flight efficiency and on workload for ATC sectors.

The EAP prepares the measures on the candidate flights. The HMI shall propose him/her a menu with possible decomplexification measures:

- Speed or time control
- Flight Level change
- Rerouting

The Use Case ends when the preparation of the decomplexification measure has been achieved on EAP side.

The **UC 2.3: Coordination of the decomplexification measure** is then to be applied

Alternative Flows

Cancel

The EAP monitors the hotspot and identifies that the decomplexification measure on flights is no more valid. The request is cancelled.

Urgent decomplexification measure

The EAP needs a quick answer from PC to ensure of his solution and selects the option Urgent before sending the request. The request remains a decomplexification measure for the PC, but will be displayed with additional stimuli on PC side.

Failure Flows

The solutions identified within **UC 2.1: Analysis of the decomplexification measure** by EAP are not satisfying anymore with the decomplexification needs or are no more possible.

In this case, **in close coordination with the LTM**, he can identify a new hotspot whenever appropriate. Therefore **UC 1.1: Analysis of the LTM request** might be applied.

3.3.2.6.2.3 UC 2.3: Coordination of the decomplexification measure

Scope

Applicable within all type of environment (Fixed, DRA, FRA)

The reference scenarios to which this Use Case is applicable are listed in *Table 14: Traceability Table: Scenario/UC DOD <-> EAP OSED UC*

Level

User Goal

Summary

This Use Case is triggered when EAP starts to coordinate the request with the corresponding actors involved.

The primary actor works to coordinate and negotiate the measures chosen by selecting individual flights and associated ATC measures while:

- Maintaining network coherence and stability.
- Minimizing adverse impact on flight efficiency.
- Minimizing adverse impact on ATC sector workload.

The decomplexification measure possible coordination statuses are the following:

- PROPOSED (by EAP)
- REJECTED (by PC)
- ACCEPTED (by PC)
- IMPLEMENTED (by PC)
- CANCELLED (by EAP)
- TERMINATED (by system)

Actors

Primary Actor

The EAP coordinates the decomplexification measure with the corresponding actors involved.

Supporting Actor(s)

The actors that can be considered as supporting are:

- Flight Crew
- Planning Controller

Off-Stage Actor(s)

N/A.

Preconditions

The Use Cases attached to **UC 2.2: Preparation of the decomplexification measure** achieves success status. Indeed, an adequate number of candidate aircrafts and corresponding ATC actions identified to comply with decomplexification needs are a pre-requisite for this Use Case.

Post conditions

Success End State

The decomplexification measure has been successfully coordinated and negotiated with all relevant actors.

Failure End State

The activity fails to coordinate and negotiate an appropriate solution to comply with the decomplexification needs.

Notes

N/A.

Trigger(s)

The Use Case starts when the EAP determine(s) that the most appropriate time to start coordination with relevant actors has been reached.

Flows

Main Flow

The EAP initiates coordination with the involved actors.

The EAP prepares the coordination with the selected ATC sectors, adjacent EAP that are going to be impacted by the proposed measures.

Each actor is affected with a status corresponding to his level of involvement in the process:

- Impacted actor (actor impacted by the decomplexification measure)
- Implementing actor (actor which shall implement the decomplexification measure)
- Upstream actors for information (in order to strengthen FPL adherence)

For each selected flight, the EAP sends an implementation request to the implementing actor with a time-out indicating the time frame for the coordination process. The EAP may wait for the best moment to send the request, using flight profile.

In case the request is sent by EAP but flight is not known on position, the request display on CWP Com Tool is delayed until position is aware of the flights (based on ATFCM information or local FDPS when available). The request remains sent but not yet displayed

until then. This is transparent for ATCO.

When displayed on CWP COM tool, the request status turns to **PROPOSED**.

Additional coordination may be launched if needed which may lead to an update of the exit level, route or CTO in the local FDPS before answering the request:

- ATCO/Pilot Crew
- ATCO / Downstream sector
- ATCO/EAP to exchange relevant information

After coordination, the EAP is finally given a positive answer, the request status turns to ACCEPTED, meaning the ATCO will implement the request

The Use Case ends when the coordination with the actors implementing the request yields a positive result. The **UC 2.4: Implementation of the decomplexification measure** is then to be applied.

Alternative Flows

Cancel

The EAP monitors the hotspot and identifies that the decomplexification measure is no more valid. The request is cancelled. The request status turns to **CANCELLED**. The request disappears from CWP and EAP HMI.

The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly[6].

Reminder to Act sent by EAP

The EAP does not receive an answer from the implementing actor early enough for his operational needs. He sends a reminder to act to Implementing sector, which has the effect to display the request with additional stimuli. Then the process follows the main flow.

Urgent decomplexification measure

The EAP needs a quick answer from PC to ensure of his solution and selects the option ***Urgent*** before sending the request. The request remains a decomplexification measure for the PC, but will be displayed with additional stimuli on PC side.

[6] At the moment of this edition, there is a too much long delay with B2B to be compliant with this statement

Failure Flows

The EAP receives a negative answer on a **PROPOSED** or **ACCEPTED** request. The request status turns to **REJECTED** and is automatically removed from ATCO screen

The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly.

In this case, **in close coordination with the LTM**, he can identify a new Hotspot whenever appropriate. Therefore **UC 1.1: Analysis of the LTM request** might be applied.

3.3.2.6.2.4 UC 2.4: Implementation of a decomplexification measure

Scope

Applicable within all type of environment (Fixed, DRA, FRA)

The reference scenarios to which this Use Case is applicable are listed in *Table 14: Traceability Table: Scenario/UC DOD <-> EAP OSED UC*

Level

User Goal

Summary

This Use Case is triggered after the EAP has duly coordinated the request to be performed on flights with the relevant actors. This Use Case describes the process by which the implementation of the request is monitored by the EAP.

Actors

Primary Actor

The EAP monitors the implementation of the request in coordination with the involved actors.

Supporting Actor(s)

The actors that can be considered as supporting are:

- Flight Crew
- Executive Controller
- Planning Controller

Off-Stage Actor(s)

N/A.

Preconditions

UC 2.3: Coordination of the decomplexification measure achieves success state. The successful coordination of the request, with status **ACCEPTED**, is indeed a pre-requisite for this Use Case.

Post conditions

Success End State

Implemented measures satisfy with the decomplexification needs.

Failure End State

The amount of implemented measures does not satisfy with the decomplexification needs.

Notes

N/A.

Trigger(s)

The Use Case starts when the Primary Actor is in possession of coordinated measures (status **ACCEPTED** for all measure) on airborne flights[7] that satisfy with the decomplexification needs.

Flows

Main Flow

After the request coordination is over, the EAP monitors the effective implementation of the measures in the implementing sector of The area of responsibility.

Depending on the request, the Planning Controller or the Tactical Controller acts on the flight plan to comply with the request.

The request status turns to **IMPLEMENTED** as soon as the flight information is updated.

The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly[8].

Alternative Flows

Rejection of the request

In the end, the EAP gets the information from the implementing actor that the request will not be implemented (e.g. refusal from the flight crew). Flow resumes at **UC 2.2: Preparation of the decomplexification measure**. The request status turns to **REJECTED**. The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly[1].

[7] The flights could be not airborne during the coordination process, but must be during the implementing process

[8] At the moment of this edition, there is a too much long delay with B2B to be compliant with this statement

Failure Flows

The EAP gets the information from the implementing actor that the request will not be implemented (e.g. refusal from the flight crew or for traffic reason) and the EAP decides that he has no opportunity to restart the coordination process **UC 2.2: Preparation of the decomplexification measure**. He should cancel the request.

The request status turns to **CANCELLED**.

The Occupancy Counts, Entry Counts, Complexity indicator and Strategic conflict identification are updated accordingly[9].

[9] At the moment of this edition, there is a too much long delay with B2B to be compliant with this statement

3.3.3 Differences between new and previous Operating Methods

The main actions of EAP will impact the operating method as follows:

1. **Implementation of STAMs in close coordination with the LTM:**

   The LTM and the EAP roles will charge of the STAMs implementation. The decisions will be elaborated collaboratively between the LTM and the EAP, but the final decision will have to be approved by the LTM as the LTM is in charge to maintain the overall consistency of measures taken in the ATSU's area.
   It is expected that the main measures will be first analysed at LTM level, and then fine-tuned at EAP level in order to minimize the final impact on traffic, especially in hotspot area.
   With this new task sharing, the implementation of a STAM measure will be divided in two steps:

   - First **the initial analysis at ATSU level and the preparation of the STAM** by LTM which remains responsible for the global consistency of the traffic patterns in in the ATSU's area;
   - Then **the final adjustments and adaptations** performed by the EAP.

2. **Decomplexification of the situation without changing the list of traversed sectors:**

   It is expected that this action could be performed on the **EAP sole responsibility**, the coordination with LTM being not deemed necessary.
   In his area of responsibility, the **EAP can initiate specific actions** (decomplexification actions, speed restrictions, TTA allocation...) without the LTM supervision. He might however decide to share the information with the LTM to ensure global consistency of all the measures taken.

3. **Bridging the gap between ATC and ATFCM**

   The EAP will enable an easier and more complete and accurate mutual situation awareness Thanks to his functional position between ATCOs and LTM, the EAP will be able to provide accurate data from the network to the CWPs and vice-versa, improving thus the mutual situation awareness and the global efficiency of the service.

The following table is a summary of changes implied by a new EAP role.

ATM Phase	Role for the LTM	Role for the EAP	Tasks for the EAP
Execution Phase		**Monitoring and adjustments of the ATFCM Measures (in order to meet the prepared target) in his EAP Area**	• Observation of traffic load, occupancy, and complexity. • Comparison of demand and monitoring values of critical sectors • Monitoring of effect of implemented measure(s) and initiation of corrective action if necessary and possible

ATM Phase	Role for the LTM	Role for the EAP	Tasks for the EAP
		Adapt the capacity and the demand The EAP – under LTM supervision - is responsible for taking the appropriate action in coordination with the LTM when excess of demand over monitoring values is detected	It means • Coordinates sectors splitting with the Supervisor and LTM • Initiates new ATFCM Measures (in his EAP Area) chosen with the LTM
		Improves initial ATFCM Measures with STAM measures	STAM measures are applied by LTM/EAP in addition to regulations and follow the purpose to mitigate their impact The EAP is involved in decision in close coordination with the LTM for the following actions : Capacity Management (sectors splitting/collapsed) Tactical Rerouting Level Capping Miles in Trail ATFCM Exemptions
		Alleviate workload of ATCO in his EAP Area	• Observation of strategic conflicts and complexity • Decides which sector team could be used to best solve a conflict • Recommends a resolution when it seems appropriate or let the sector team decides
	Global coordination upstream and downstream, so as to maintain the coherence		

ATM Phase	Role for the LTM	Role for the EAP	Tasks for the EAP
	between the EAP's Actions (if many in the ATSU), the AUs' needs and the NMOC vision on the Network coherence		
		Negotiates and coordinates actions with concerned actors • Coordinates actions with the Supervisor • Coordinates actions with the LTM • Coordinates actions with CWP	• The EAP types details of the action on the coordination tool and sends the message to the concerned sectors.
		Delivers information and support to actors concerned by the measures within his EAP Area	

Table 15: Differences between Previous and New Operating Methods

4 Safety, Performance and Interoperability Requirements (SPR-INTEROP)

This section contains the safety, performance and interoperability requirements **for V3 phase** relevant for the **SESAR Solution #118 - *basic* EAP** that has been validated during SESAR 1 validation exercise VP-687.

These requirements have been defined according SESAR Requirements and V&V guidelines [26].

These requirements are related to the Use Cases (UCs) of the two Operational Scenarios described in this document, namely:

- **Operational Scenario 1:** STAM or decomplexification measure required by the LTM (local network level);
- **Operational Scenario 2**: Decomplexification measure at EAP level (no LTM supervision) in Fixed Routing Airspace (FRA)

4.1 General

4.1.1 Notation

Requirements' identifiers naming rule follows the following pattern:

REQ-SOL.118-SPRINTEROP-UUij.wxyz where

'**UU**' can be set to:

- '**FM**' for operational requirements related to Air Traffic Flow and Capacity Management in the frame of the basic EAP function;
- '**PC**' for operational requirements related to Planning Separation Assurance;
- '**TC**' for operational requirements related to Tactical Separation Assurance;

'**ij**' can be set to set to:

- '**00**' for operational requirements at airspace level;
- '**01**' for operational requirements at actor/role level;
- '**02**' for operational requirements at system level; and

'**wxyz**' is a sequence number ranging from 0010 to 9990 with a step of 10.

4.2 Operational Requirements

This section considers successively the requirements related to the **two actors/roles** of the EAP concept **regarding STAMs process and decomplexification measures**, namely the EAP role and the Planning Controller (PC).

Note:

In the operational requirements hereafter:

1. **"EAP"** refers to the **EAP role**;
2. **"CWP Com Tool"** refers to the tool used by the ATCO in order to handle DCB EAP Measure;
3. **"DCB EAP measures"** is a generic term to design the DCB measures that can be applied by the EAP. However, it does not mean that these DCB Measures can be applied only by the EAP.

   In this SPR/INTEROP/OSED, a **"DCB EAP measure"** is either a **"STAM"** or a **"decomplexification measure"**. Please note that this definition is applicable only in the context of this document and may refer to other types of measures in another context.
   The term **DCB EAP measures** is used in requirements which are strictly identically valid for the two types of above-mentioned measures (STAM or decomplexification measure).

4.2.1 EAP Role requirements

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0010**
Title	**ATC Workload monitoring**
Requirement	The EAP shall be able to assess ATCO workload on all TFV in the EAP area of responsibility within a timeframe of one hour.
Status	<validated>
Rationale	The EAP monitors several indicators to assess the workload in a time horizon of one hour to assist the LTM on short term. But, this operational requirement, does not say that the tools should only display a time horizon of one hour. The timeframe of the tools may be longer to help assessing the ATCO workload on a one hour timeframe. The EAP needs to assess ATCO workload on all potential TFV as at the time of the EAP (approximately 1 hour in advance), the TFV that will be in operation are not definitively known.
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0020**
Title	**Flights data monitoring**
Requirement	The EAP shall be able to consult ATFCM relevant flight details within his area of responsibility
Status	<validated>
Rationale	To reduce complexity, it is usually necessary to refine the analysis by looking deeply inside the traffic data details. The so called relevant flight details have been defined through workshops in preparation of the experimentations and shall be refined with their results
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0030**
Title	**Flights profiles**
Requirement	The EAP shall monitor filed, regulated or current ATFCM flight profiles on all TFV in the EAP area of responsibility, within a timeframe of one hour
Status	<validated>
Rationale	The flight profiles are used in use cases described in the ch 5.
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0040**
Title	**Occupancy Count Monitoring**
Requirement	The EAP shall monitor the predicted Occupancy on all TFV in the EAP area of responsibility within a timeframe of one hour
Status	<validated>
Rationale	The Occupancy is an indicator for assessing the ATCO workload at a glance.
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0050**
Title	**Intruders Count Monitoring**
Requirement	The EAP shall identify and monitor the predicted Intruders on all potential TFV in the EAP area of responsibility within a timeframe of one hour.
Status	<validated>
Rationale	The Intruders tag and counts are an indicator to understand an unpredicted high Occupancy at a glance due to intruders in a TFV. In order to solve the peak in this case, one or more DCB EAP Measure(s) could be the solution.
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0060**
Title	**Hotspot – Definition**
Requirement	The EAP shall be able to identify and create local Hotspots
Status	<validated>
Rationale	Due to intruders, manually forced flights, and bad predictions regarding taking-off flights, it may happen that the Hotspot appear very lately in a TFV. In this case, the EAP shall be able to identify the Hotspot, and create it locally, in his area of responsibility. The EAP shall keep the LTM/FTM informed in this case.
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0070**
Title	**STAM solution**
Requirement	The EAP shall be able to provide solutions to a given hotspot through STAMs
Status	<validated>
Rationale	This is one of the core of the EAP concept
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0080**
Title	**DCB EAP Measures creation and preparation**
Requirement	The EAP shall be able to create and prepare DCB EAP Measures on a given flight inside the EAP area of responsibility
Status	<validated>
Rationale	To allow the EAP to prepare a Hotspot resolution with STAMs and / or decomplexification measures.
Category	<Functional>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0090**
Title	**DCB EAP Measure monitoring**
Requirement	The EAP shall be able to monitor DCB EAP measures under the EAP area of responsibility
Status	<validated>
Rationale	To allow the EAP to follow the implementation of The solutions to solve a hotspot or a conflicting situation. The monitoring implies all steps of the solution implementation, from ATCO's answer to proposal, to the effective clearance provided
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0100**
Title	**DCB EAP Measure proposal**
Requirement	The EAP shall be able to propose a DCB EAP Measure to Implementing sector
Status	<validated>
Rationale	When a solution is prepared, the EAP shall be able to propose it to the relevant PC for analysis and implementation if feasible
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0110**
Title	**STAMs - Mutual Situation Awareness**
Requirement	The EAP shall be able to inform Off-Loaded sector and all On-Loaded sector(s) inside the ATSU, of every STAMs in ACCEPTED or IMPLEMENTED status
Status	<validated>
Rationale	To provide situation awareness to all involved actors. The Off-Loaded shall be informed of a STAM which means that the sector may not have to handle the concerned flight anymore while the On-Loaded sector(s) shall be informed of an unexpected flight the sector(s) may have to handle within their area of interest

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM01.0120**
Title	**EAP traffic environments**
Requirement	The EAP shall be able to work in the following airspace type: Free Routing, Direct Routing and Fixed Route.
Status	<validated>
Rationale	The methods and tools shall allow EAP perform The tasks independently of the traffic type environments.
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

4.2.2 Planning Controller (PC) requirements

[REQ]

Identifier	REQ-SOL.118-SPRINTEROP-PC01.0010
Title	**ATCO new role in DCB EAP Measures process**
Requirement	The PC shall be able to handle the DCB EAP measures sent by EAP within the TFV under his responsibility
Status	<validated>
Rationale	The ATCO is in charge of implementing if feasible the Solution defined by the EAP to solve hotspots and informs back the EAP on the Solution implementation
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

4.2.3 HMI Requirements

This section describes the expected displays and features for EAP terminal and CWP com tools to perform the STAM and decomplexification measures processes as described in this OSED.

In this section, the ***EAP terminal*** refers to the terminal used by the EAP role in order to perform his tasks. The EAP terminal is expected to be provided with ad-hoc tools.

4.2.3.1 EAP HMI Requirements

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0010**
Title	**Flights Visualization – Highlight on moused over flights**
Requirement	The EAP terminal shall allow the highlight of the callsign of the flights moused over by the EAP, whatever the position of the flight(s) is.
Status	<validated>
Rationale	The need is to help EAP analyse the workload with highlight of the flights he has moused over. The highlight should be visible on any tools (ASD , Flight Lists,..)
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

4.2.3.1.1 Flight Plan

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0020**
Title	**Flight Plan**
Requirement	The EAP terminal should provide access to the flight plan of every flights (filed, regulated and current) in the EAP area of responsibility
Status	<validated>
Rationale	When available, all flight plan data, including Filed Profile, Regulated Profile, and Current Profile should be provided to help EAP's analysis. This need has emerged during V2 experimentations in June 15
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

4.2.3.1.2 Occupancy & Complexity

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0030**
Title	**Occupancy Count Monitoring**
Requirement	The EAP terminal shall provide to the EAP the Occupancy Curves with the following information : four categories of flights three thresholds : the peak value, the sustain value, the maximum acceptable duration of sustained heavy traffic.
Status	<validated>
Rationale	The categories of flights and the three thresholds are useful for curves understanding and analysing. They have been based on existing FMP tools and refined through workshops for the exercise preparations. They may be further refined based on the research results
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0040**
Title	**Occupancy Curves – 4 main Categories**
Requirement	The EAP terminal shall display by default the Occupancy curves of a given traffic volume and for a given time range (t0 -10min-> t0+2h) with the four main categories below : • Airborne Flights • Flights on ground and activated by network services (see §1.7 Acronyms & Terminology for TACT-ACTIVATED flights) • Flights airborne and activated by network services (see §1.7 Acronyms & Terminology for TACT-ACTIVATED flights) • Flights on ground
Status	<validated>
Rationale	The categories have been defined during workshops with end users. They are considered necessary for the EAP tasks as described in the present document The categories correspond respectively to the CHMI categories below: - ACT flights with ATOT in past or present (CTFM profile) - TACT-ACTIVATED flights with ATOT in future (CTFM profile) - TACT-ACTIVATED flights with ATOT in past or present (CTFM profile) - IFPL flights (RTFM profile with CTOT or FTFM profile with ETOT)
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0050**
Title	**Occupancy Curves – Intruders notification**
Requirement	The EAP terminal shall display Intruders counts (types 1,2 & 3) on demand
Status	<validated>
Rationale	The Intruders curves shall display Intruders type 1, 2 and should display intruder type 3, and Manually Forced Flights.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0060**
Title	**Flights – Intruders notification**
Requirement	The EAP terminal shall allow the EAP to identify the Intruders flights
Status	<validated>

Rationale	The flights counted as Intruders (types 1, 2 or 3) should be visible for the EAP on the ASD and on the Flight List.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

4.2.3.1.3 Flights Lists

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0070**
Title	**Flights data monitoring**
Requirement	The EAP terminal shall allow the EAP to display the Flight Lists contained in a selected TFV (within his area of responsibility) and time range or in a selected identified hotspot (previously created by the EAP or by the FMP)
Status	<validated>
Rationale	In order to define solutions for decomplexification or dynamic demand balancing To be more specific for analysis and cherry picking of candidate for DCB EAP measures for instance The selected time range shall be by default the next two hours
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0080**
Title	**Flight List – Time Frame**
Requirement	The EAP terminal shall allow the modification of the time range of a flight list.
Status	<validated>
Rationale	The need is to help EAP refine his analysis and for ergonomic purpose. The start and end times can be independently extended or restricted This action will lead to query an automatic update of the flights list taking into account the new time range
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0090**
Title	**Flight List – Update**
Requirement	The EAP terminal shall allow the refresh of the flights list on user's demand
Status	<validated>
Rationale	Updating the Flights List is needed to refresh on demand the displayed data.

	NB1 : An automatic update is counter-productive because of the HMI issues regarding an uncontrolled rows order update. NB2 : The update command should send a flight data request to the flight data provider (ETFMS or FDPS), and update interface consequently (hours, routes,...). NB3 : In the scope of the VP-687, the update requests are sent periodically to the ETFMS. So the refresh will be based on the latest update request, not on the current data. So the age of the refreshed and displayed data might be up to the request update period duration.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0100**
Title	**Flight List – Hotspot Creation**
Requirement	The EAP terminal shall allow the creation of a local hotspot from a given flights list.
Status	<validated>
Rationale	The need is to create a local Hotspot. The created Hotspot shall recall the time range of the flight list used for its creation
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0010**
Title	**Flight List – Required Data**
Requirement	The EAP terminal shall display at least the following information for any flight within a flights list: ENTRY time in the considered Traffic Volume Aircraft Information : ID, Type, Departure, Arrival, and RFL Actual Take Off Time, Estimated or Calculated Take-Off Time) Network Information : Delay , Regulation Aircraft Flags and Indicators : Intruders, Manually Forced, DCB EAP Measure Complexity Indicator(s)
Status	<validated>
Rationale	The list of information has been prepared during workshops with users (Reims). These fields are considered to be necessary for the EAP tasks as described in the present document and analysis to identify flights candidate for DCB EAP Measure. The information corresponds respectively to the CHMI fields below : - ENTRY time in the considered Traffic Volume ARCID ATYP ADEP ADES - RFL E/C TOT: with E(stimated) or C(alculated) mention ATOT: yes (information TTOT not available) Delay Regul+ Flag flight Intruders Flag Manually Forced Flight if available

	Flag DCB EAP Measure in progress (Yes/No) Flight Complexity if available
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0110**
Title	**Flights List – Colour**
Requirement	The EAP shall be able to know the occupancy category of a flight at a glance within a given flights list.
Status	<validated>
Rationale	The need is to remind the occupancy category of the flights according to the ETFMS status (if colours are used in occupancy curves, then the same colour should be used for the flight within the flights list)
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0120**
Title	**Flights List – Flight Selection**
Requirement	The EAP terminal shall allow the selection of one or several flights in a Flights List.
Status	<validated>
Rationale	The need is first to highlight on others HMI the flights for analysis and then to select the flights candidate for a DCB EAP measure
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

4.2.3.1.4 Predicted Air Situation

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0130**
Title	**Predicted Air Situation**
Requirement	The EAP terminal shall allow the visualization of the predicted air situation at a reference time from the present up to two hours in the future in the airspace within the EAP area of responsibility.
Status	<validated>
Rationale	The need is to refine the analysis with the sectors allocation, military airspaces, and other elements of interest with a prediction up to 2 hours in the future
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0140**
Title	**Flights Visualization – Analysis of Trajectories**
Requirement	The EAP terminal shall allow the analysis of flights predicted trajectories up to two hours in the future on the predicted air situation
Status	<validated>
Rationale	The need is to help EAP analyse the workload in current and future time with for example extrapolation, trends, time slider
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0150**
Title	**Flights Visualization – Filter per level**
Requirement	The EAP terminal shall allow the filtering of the flights per flight level on the predicted air situation display
Status	<validated>
Rationale	The need is to help EAP analyse the workload with filters to allow a clear view of a given traffic
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0160**
Title	**Flights Visualization – Filter per TFV**
Requirement	The EAP terminal shall allow the filtering of the flights per crossed TFV on the predicted air situation display on a period of time
Status	<validated>
Rationale	The need is to help EAP analyse the workload with filters to allow a clear view of a given traffic
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0170**
Title	**Flights Visualization – Geographical and airspace elements**
Requirement	The EAP terminal shall allow the visualization of any geographical and airspace elements (military zone, frontiers, sectors,...) relevant to get complete overview of the flights in their global environment
Status	<validated>
Rationale	The need is to provide relevant elements to EAP for complete situation analysis. The so called relevant elements have been defined through workshops in preparation of experimentations and may be refined after experimentations results
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0180**
Title	**Flights Visualization – Trajectory phases display on demand**
Requirement	The EAP terminal shall allow the visualization on EAP's demand on the predicted air situation display of the different phases (climb, descent, stable) of the current selected flights
Status	<validated>
Rationale	The need is to provide ergonomic access to the EAP by allowing him/her to show additional elements of the trajectory when needed
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0190**
Title	**Predicted Air Situation Time Shift**
Requirement	The EAP terminal shall allow the shift of the reference time of the predicted air situation from the present up to two hours in the future
Status	<validated>
Rationale	Shifting the reference time in the future is a multipurpose enabler. For example : It could be used to refine the Occupancy and Complexity analysis. It could be used to choose the appropriate moment to prepare or propose a DCB EAP Measure to an implementing ATC actor, the EAP shall identify the associated point of the flight trajectory, and possibly, shift the time in the future to put the flight at this point to find the resulting ETO.
Category	<Operational>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0200**
Title	**Flights Visualization – Highlight of Strategic conflicts**
Requirement	The EAP terminal should highlight the strategic conflicts on the predicted air situation
Status	<validated>
Rationale	The need is to display pairs of flights which are in strategic conflict. Any additional information (shorter separation for example, time of shorter separation), are of course welcome.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0210**
Title	**Flights Visualization – DCB EAP Measure display**
Requirement	The EAP terminal shall provide the visualization of a DCB EAP measure (from ACCEPTED to IMPLEMENTED status) in the concerned flight label on the predicted air situation display
Status	<validated>
Rationale	The need is to monitor geographically the current (or active) DCB EAP measure
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

4.2.3.1.5 EAP measure Interface

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0010**
Title	**EAP Measure Management Interface - General**
Requirement	The EAP terminal shall allow the management of the complete lifecycle of the DCB EAP measures: creation, preparation, proposal, monitoring of answer (accepted, implemented, rejected), ATFCM situation awareness pushed to ATCO (informing Complex, On-Loaded, Off-Loaded actors), cancellation, termination, and update.
Status	<validated>
Rationale	The need is to perform the tasks related to the EAP measure process as defined in this OSED.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0010**
Title	**DCB EAP Measure creation by EAP**
Requirement	The EAP terminal shall allow the EAP to create a DCB EAP Measure by designing flight(s) within a TFV or hotspot flights list.
Status	<validated>
Rationale	A DCB EAP measure created on a given flight will create a new row in the STAMs list
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0220**
Title	**DCB EAP Measure monitoring**
Requirement	The EAP terminal shall display the complete list of prepared, created, sent but not yet displayed, proposed, accepted, implemented or rejected DCB EAP measures with an involved TFV in the EAP area of responsibility.
Status	<validated>
Rationale	In order to monitor the implementation of solutions for hotspots. The STAMs from the LTM should be listed too
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0230**
Title	**DCB EAP Measure monitoring display**
Requirement	The list of proposed, accepted and rejected DCB EAP measures shall be always visible on EAP terminal.
Status	<validated>
Rationale	The list needs to be always visible for monitoring purpose. Ideally the list shall even be always displayed on the same location of the screen for easier monitoring
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0240**
Title	**DCB EAP measure General Requirements**
Requirement	The EAP terminal shall allow the visualization of the following attributes of a "DCB EAP measure": - Aircraft ID - Hotspot - Traffic Volume (if no hotspot, otherwise it is the TFV of the hotspot) - Entry Time in Hotspot or Traffic Volume - Off-Loaded / Complex sectors - Implementing sector - Entry time of Implementing sector - Time-out of coordination with Implementing actor - On-Loaded sector (only for STAM) - Status (Created, Prepared, Proposed, Accepted, Rejected, Implemented, Terminated) - "Late STAM measure" indicator - Urgency indicator - Type: Level, Route, CTO - -Value
Status	<validated>
Rationale	These information are considered as mandatory for the EAP tasks as described in the present document
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0250**
Title	**DCB EAP measure solution General Requirements – Flight Update**
Requirement	The following time-based attributes of a "DCB EAP measure" shall be automatically updated, if appropriate, in accordance with the flight information : - Entry Time in Hotspot or Traffic Volume - Entry time of Implementing sector - Time Limit of coordination with Implementing actor
Status	<validated>
Rationale	The need is to provide an up-to-date information to the EAP
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0260**

Title	**DCB EAP Measure General Requirements – fields editable for created, prepared or rejected status**
Requirement	The EAP terminal shall allow the edition of the following attributes of an EAP measure in CREATED, PREPARED or REJECTED status - Off-Loaded / Complex sector - Implementing sector - On-Loaded sectors (only for STAM) - Urgency criteria - Type: Level, Route, CTO - Value
Status	<validated>
Rationale	The need is to allow the preparation of a DCB EAP Measure. Several DCB EAP measures can be prepared in parallel, allowing the EAP to test and refine potential solutions before sending DCB EAP Measure to Implementing actor. The other fields not mentioned in this requirement shall not be editable
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0270**
Title	**DCB EAP Measure General Requirements – fields editable for proposed and sent but not yet displayed status**
Requirement	The EAP terminal shall allow the edition of the following attributes of a DCB EAP Measure in SENT BUT NOT YET DISPLAYED or PROPOSED status - On-Loaded sector (for STAM only) - Urgency criteria
Status	<validated>
Rationale	The need is to allow the update of the DCB EAP Measure after it has been sent to the implementing actor, following the DCB EAP Measure lifecycle and without any modification on Implementing CWP Com Tool Display. It is especially used for situation awareness towards On-Loaded actors. The other fields not mentioned in this requirement shall not be editable
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0280**
Title	**STAM General Requirements – Editable fields for STAM in ACCEPTED or IMPLEMENTED status**
Requirement	The EAP terminal shall allow the edition of the following attributes of a STAM in ACCEPTED or IMPLEMENTED status - On-Loaded sector
Status	<validated>
Rationale	The need is to allow the update of a STAM after its implementation without any modification on Implementing CWP Com Tool Display. It is especially used for situation awareness to On-Loaded actors. The other fields not mentioned in this requirement shall not be editable
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0290**
Title	**DCB EAP measure Management Interface – Answer Timeout Display**
Requirement	The EAP terminal shall display the "answer timeout" of a DCB EAP measure in CREATED, PREPARED, PROPOSED or SENT BUT NOT YET DISPLAYED status, as soon as the "answer timeout" is computed.
Status	<validated>
Rationale	The need is to monitor the communication timeout with the Implementing PC. That is why for a DCB EAP measure in any other status not mentioned in the requirement, this answer timeout is not relevant anymore and not needed to be displayed on EAP terminal
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0300**
Title	**EAP Measure Management Interface – Proposal to Implementing sector**
Requirement	The EAP terminal shall allow sending a DCB EAP measure in PREPARED status to the Implementing sector
Status	<validated>
Rationale	
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0310**
Title	**DCB EAP Measure Management Interface – Answer from Implementing sector**
Requirement	Following the sending of a DCB EAP measure in PROPOSED status, the EAP terminal shall be able to receive the answer from the Implementing sector : ACCEPTED, IMPLEMENTED or REJECTED
Status	<validated>
Rationale	Implementation could be made without any first answer (Implemented actor jumps directly to IMPLEMENTED answer) or after a first answer (ACCEPTED). The Implementing actor can set an ACCEPTED answer and change his mind later by modifying his ACCEPTED answer to a REJECTED. In this case, the EAP terminal will first receive an Accepted answer (and set the status accordingly) then a second answer (rejected) and update the status accordingly.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0320**
Title	**STAM Management Interface – Information to On-Loaded actors**
Requirement	The EAP terminal shall allow the sending of a STAM with ACCEPTED or IMPLEMENTED status to the defined On-loaded actors
Status	<validated>
Rationale	Mutual Situational awareness
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0330**
Title	**DCB EAP Measure Management Interface – Cancel**
Requirement	The EAP terminal shall allow cancelling a DCB EAP Measure in CREATED, PREPARED, SENT BUT NOT YET DISPLAYED, PROPOSED or REJECTED status
Status	<validated>
Rationale	A DCB EAP Measure can be cancelled without impact under created, prepared and sent but not yet displayed status. It shall be possible to cancel a DCB EAP Measure in proposed or rejected status (tool shall allow it) but the working method shall plan a phone coordination with ATCO in these two cases
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0340**
Title	**DCB EAP Measure Management Interface – HMI deletion**
Requirement	The EAP terminal shall not display a CANCELLED DCB EAP measure
Status	<validated>
Rationale	To avoid polluting interface with obsolete DCB EAP measure
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0350**
Title	**DCB EAP Measure Management Interface – HMI terminated**
Requirement	The EAP terminal should allow the EAP to display the list of TERMINATED DCB EAP measure of the day.
Status	<validated>
Rationale	To keep track of DCB EAP measures performed during the day. Operational History need
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0360**
Title	**DCB EAP Measure Management Interface – Clean-up of requests in IMPLEMENTED status**
Requirement	The EAP terminal should allow the EAP to remove a DCB EAP measure in IMPLEMENTED status from the HMI before it is TERMINATED.
Status	<validated>
Rationale	The need is to clear the HMI from useless information. This feature should not to be confused with the cancel action (and its associated CANCELLED status) which means that actually the DCB EAP Measure could not solve an ATFCM issue.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0370**
Title	**DCB EAP Measure List – Reminder to Act**
Requirement	The EAP terminal should allow the EAP to send a reminder to act to the implementing sector of any DCB EAP measure (urgent, late and generic alike) in PROPOSED Status
Status	<validated>
Rationale	The need is to allow EAP to alert ATCO that he expects an answer of a given DCB EAP Measure as soon as possible even if the answer timeout is not over. This action should lead to the display of the request with additional stimulus on CWP Com Tool side and on EAP terminal (to trace the concerned requests for the EAP).
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-FM02.0380**
Title	**STAM List – late indicator**
Requirement	The EAP terminal shall allow the EAP to identify Late STAM from Generic STAM
Status	<validated>
Rationale	A Generic STAM becomes a Late STAM when the off-loaded sector involved has received the flight information
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
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<Sub-Operating Environment>	

4.2.3.2 CWP Communication Tool HMI Requirements

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0010**
Title	**CWP Communication Tool HMI – General**

Requirement	The CWP Com Tool shall allow the ATCO (on Implementing, Off-Loaded, Complex and On-Loaded sectors) to handle any DCB EAP measures sent by the EAP:
	- DCB EAP Measure reception,
	- Relevant DCB EAP Measure and flight information display,
	- DCB EAP Measure answer (as implementing sector),
	- DCB EAP Measure deletion,
	- Situational awareness including:
	  - List of DCB EAP measures (as off-loaded, complex or on-loaded sectors),
	  - List of hotspots and regulations in the ATSU

Status	<validated>
Rationale	The CWP Com Tool shall be sufficient to perform all tasks related to the DCB EAP Measure process on ATCO side
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0020**
Title	**CWP Communication Tool HMI – Hot Spot information**
Requirement	The CWP com tools, shall display the list of Hotspots declared in the ACC with sectors, start time and end time
Status	<validated>

Rationale	The objective is to protect the mentioned sectors from a pilot request to climb or descend in the hotspot while it was not planned in the IFPL.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0030**
Title	**CWP Communication Tool HMI – DCB EAP Measure display area**
Requirement	The CWP com tools shall display in dedicated areas the DCB EAP measures received: - As Implementing (DCB EAP measures in Proposed or Accepted status) - As on-loaded sector (STAM in Accepted or Implemented status) - As off-loaded/complex sectors (DCB EAP measures in Accepted or Implemented status)
Status	<validated>
Rationale	The DCB EAP measures shall be displayed in accordance with the expected ATCO role for each, so as to improve ATCO efficiency and ergonomic
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0040**
Title	**CWP Communication Tool HMI – DCB EAP Measure display order**
Requirement	The CWP Com Tool should order the DCB EAP measures received as implementing sector first by urgency criteria and then by increasing timeout answer
Status	<validated>
Rationale	The urgent DCB EAP measures need to be on top of the list to be more visible for and inform on the urgency criteria. The urgent DCB EAP measures, if more than one, should be ordered by answer timeout, starting with the shortest one. Then the non-urgent DCB EAP measures shall be displayed by answer timeout, starting with the shortest one.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0050**
Title	**CWP Communication Tool HMI – DCB EAP Measure Status not to Display**
Requirement	The CWP Com Tool shall not display any received DCB EAP measures in CANCELLED, REJECTED or TERMINATED status.
Status	<validated>

Rationale	To provide a clean agenda to the ATCO so that he identifies quicker the remaining DCB EAP measures to manage– Ergonomic purpose
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0060**
Title	**CWP Communication Tool HMI – Implementing Sector (1)**
Requirement	The CWP com tools shall display at least the following information of a DCB EAP Measure received as Implementing sector: - ARCID, - Entry Time in the implementing sector, - Implementing sector, - Urgency criteria - Type - Value, - Answer timeout - Status
Status	<validated>
Rationale	This information has been discussed during workshops with end-users to allow implementing ATCO to manage the DCB EAP measures The information mentioned here are deemed sufficient for the Implementing ATCO to understand the request and be able to deal it Please note that it is essential to avoid the confusion between the urgency criteria and the answer timeout of the DCB EAP Measure. The two attributes are independent. The concept of an urgent DCB EAP Measure is independent from any time criteria.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0070**
Title	**CWP Communication Tool HMI – Answer to Proposed DCB EAP Measure by Implementing Sector**
Requirement	The CWP Com Tool shall allow the ATCO to answer to DCB EAP Measure received as Implementing sector and in PROPOSED status as follows : - ACCEPTED, or, - IMPLEMENTED, or - REJECTED
Status	<validated>
Rationale	The implementing sector shall be able to provide an answer to proposed DCB EAP Measure received.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0080**
Title	**CWP Communication Tool HMI – Answer to Accepted DCB EAP Measure by Implementing Sector**
Requirement	The CWP Com Tool shall allow the ATCO to answer to DCB EAP Measure received as Implementing sector and in ACCEPTED status as follows : - IMPLEMENTED, or - REJECTED
Status	<validated>
Rationale	This is to be compliant with requests' workflow defined within the EAP concept
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0090**
Title	**CWP Communication Tool HMI – No Answer Allowed by other sectors than the Implementing Sector**
Requirement	The CWP Com Tool shall not allow the ATCO to answer to DCB EAP Measure received as Off-loaded, Impacted or On-loaded sectors.
Status	<validated>
Rationale	The DCB EAP Measure received as off-loaded, on-loaded or impacted sectors are for situation awareness and do not require any action from those sectors
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0100**
Title	**CWP Communication Tool HMI – Answer Change**
Requirement	After entering an answer to a DCB EAP Measure, the CWP should be able to modify silently his answer during a short time before the CWP Com Tool send the answer to the EAP terminal
Status	<validated>
Rationale	The need is to avoid mishandling answers. Ergonomic purpose. Silently means that the answer is not sent to the EAP terminal before the authorized change delay
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

[REQ]

Identifier	**REQ-SOL.118-SPRINTEROP-PC02.0110**
Title	**CWP Communication Tool HMI – Cleaning HMI**
Requirement	The CWP Com Tool should allow the ATCO to clean the DCB EAP measure in ACCEPTED or IMPLEMENTED status from his HMI, on all areas:
Status	<validated>
Rationale	This to avoid having an HMI full of obsolete information when the ATCO considers it as non-relevant anymore. For DCB EAP measures received as Implementing sector, the manual deletion of an ACCEPTED EAP Measure by the ATCO may be the way to send to the EAP terminal that the EAP Measure has moved to IMPLEMENTED status (visible on EAP only). It is indeed considered, based on experiments and workshops, that if ATCO deletes manually an ACCEPTED EAP Measure, then it means implicitly that it has been implemented. However, if so, the working method has to be dig up further The cleaning should be also possible for DCB EAP measures received as Off-loaded, On-Loaded or complex sectors as well However in this case, an ACCEPTED EAP Measure deleted by the ATCO should never move its status to IMPLEMENTED on EAP terminal.
Category	<HMI>

[REQ Trace]

Linked Element Type	Identifier
<SESAR Solution>	Solution #118
<Service>	
<Information Exchange>	
<Function>	
<Activity>	
<Functional Block><role>	
<Sub-Operating Environment>	

4.3 Performance and Safety Requirements

This section contains the safety requirements as identified by the Safety assessment conducted on the basic EAP concept and reported in the document SESAR Solution#118 – SPR/INTEROP/OSED V3 - Basic Extended ATC Planning – SAR - 00.01.00, 31 January 2018, [60].

The Safety Assessment conducted on the basic EAP concept is based on a twofold approach:

- A success approach which is concerned with **the safety of the operations in the absence of failure** within the end-to-end system
- A conventional failure approach which addresses the **safety of the operations in the event of failures** within the end-to-end system.

Together, the two approaches lead to identify Safety Objectives and Safety Requirements which set the minimum positive and maximum negative, safety contributions of the system.

4.3.1 Safety Objectives

4.3.1.1 Success Approach

4.3.1.1.1 Normal operations

The derivation of Safety Objectives (Functionality & Performance – success approach) for **Normal Operations** produced the list of Safety Objectives below.

Safety Objective ID	Safety Objective Description
SO_EAP_001	EAP shall receive and analyse request of DCB EAP measure from the LTM
SO_EAP_002	EAP shall identify situations requesting a decomplexification measure
SO_EAP_003	EAP shall prepare appropriate DCB EAP measures
SO_EAP_004	EAP shall coordinate the implementation of DCB EAP measures with ATCO
SO_EAP_005	EAP shall monitor the implementation of DCB EAP measures

Table 16: List of Safety Objectives (success approach) for Normal Operations

4.3.1.1.2 Abnormal Operations

The derivation of Safety Objectives (Functionality & Performance – success approach) for **Abnormal Operations** produced the list of Safety Objectives below.

ID	Description
SO_EAP_006	ATCO shall consider the proposition of DCB EAP measures of lower priority in comparison to management of the tactical situation.

Table 17: List of Safety Objectives (success approach) for Abnormal Operations

4.3.1.2 Failure approach

The derivation of Safety Objectives for the failure approach produced the list of Safety Objectives below.

Safety Objective ID	Safety Objective Description
SO_EAP_101	The frequency of occurrence of a lack of detection of need for a DCB EAP measure shall not be greater than 2.0x10-3 per sector ops hour
SO_EAP_102	The frequency of occurrence of a DCB EAP measure not implemented shall not be greater than 2.0x10-3 per sector ops hour
SO_EAP_103	The frequency of occurrence of a DCB EAP measure inefficient shall not be greater than 2.0x10-3 per sector ops hour
SO_EAP_104	The frequency of occurrence of a DCB EAP measure with contrary effect on the target sector shall not be greater than 2.4x10-5 per sector ops hour
SO_EAP_105	The frequency of occurrence of a DCB EAP measure generating imbalance in other sectors shall not be greater than 2.0x10-3 per sector ops hour
SO_EAP_106	The frequency of occurrence of a DCB EAP measure generating excessive workload in implementing sector shall not be greater than 2.0x10-3 per sector ops hour

Table 18: Safety Objectives (integrity/reliability)

4.3.2 Safety requirements

4.3.2.1 Derivation of Safety Requirements (Functionality and Performance) – Normal operation

ID	Safety Requirement (functionality & performance)	Safety Objective
SR_EAP_001	LTM shall provide request of EAP DCB measure to the EAP	SO_EAP_001
SR_EAP_002	The EAP shall analyse and monitor the predicted occupancy count on all TFV in the EAP area of responsibility within a timeframe of one hour	SO_EAP_001 & SO_EAP_002
SR_EAP_003	The EAP shall analyse and monitor the traffic count on all TFV in the EAP area of responsibility within a timeframe of one hour.	SO_EAP_001 & SO_EAP_002
SR_EAP_004	The EAP shall analyse and monitor filed, regulated or current ATFCM flight profiles on all TFV in the EAP area of responsibility, within a timeframe of one hour	SO_EAP_001 & SO_EAP_002

ID	Safety Requirement (functionality & performance)	Safety Objective
SR_EAP_005	The EAP shall be able to consult ATFCM relevant flight details within its area of responsibility	SO_EAP_001 & SO_EAP_002
SR_EAP_006	The EAP shall be able to identify and monitor the predicted intruders (types 1, 2 & 3) on all potential TFV in the EAP area of responsibility within a timeframe of one hour.	SO_EAP_001 & SO_EAP_002
SR_EAP_007	The EAP shall be provided with an appropriate air situation display dedicated to his tasks	SO_EAP_001 & SO_EAP_002
SR_EAP_008	EAP shall answer LTM if a request of EAP DCB measure is considered as no more valid	SO_EAP_001
SR_EAP_009	The EAP shall assess ATCO workload on all TFV in the EAP area of responsibility within a timeframe of one hour.	SO_EAP_002
SR_EAP_010	The EAP shall be able to create of a local hotspot from a given flights list through the EAP terminal	SO_EAP_002
SR_EAP_011	The EAP shall hold (or having held) an ATCO rating	SO_EAP_002
SR_EAP_012	The EAP shall be able to create and prepare DCB EAP measures through EAP terminal in order to solve a given hotspot inside the EAP area of responsibility	SO_EAP_003
SR_EAP_013	The EAP shall be able to create a STAM through EAP terminal in order to solve a given hotspot inside the EAP area of responsibility	SO_EAP_003
SR_EAP_014	The EAP shall be able to create a decomplexification measure through EAP terminal in order to solve a given hotspot inside the EAP area of responsibility	SO_EAP_003
SR_EAP_015	EAP shall be able to highlight urgent or late DCB EAP measures through EAP terminal	SO_EAP_003
SR_EAP_016	The EAP shall inform the FMP in case of inability to identify a solution that satisfy the LTM request	SO_EAP_003
SR_EAP_017	The EAP shall be able to propose a DCB EAP Measure to Implementing sector through EAP terminal	SO_EAP_004
SR_EAP_018	ATCO of implementing sector shall receive propositions of DCB EAP measures from the EAP through the CWP Communication tool	SO_EAP_004

ID	Safety Requirement (functionality & performance)	Safety Objective
SR_EAP_019	Proposition of DCB EAP measures relating to flight not yet known by the ATC system of the implementing sector shall not be displayed on the CWP Communication tool	SO_EAP_004
SR_EAP_020	ATCO shall be informed through specific stimuli on the CWP Communication tool in case of urgent or late DCB EAP measure.	SO_EAP_004
SR_EAP_021	ATCO of implementing sector shall analyse the proposition of DCB EAP measure from the EAP	SO_EAP_004
SR_EAP_022	ATCO of implementing sector shall coordinate the proposed DCB EAP measure with adjacent sector if necessary	SO_EAP_004
SR_EAP_023	ATCO shall consider the proposition of DCB EAP measures of lower priority in comparison to management of the tactical situation.	SO_EAP_004
SR_EAP_024	ATCO of implementing sector shall answer to the EAP regarding the proposed DCB EAP measure through CWP Communication tool	SO_EAP_004
SR_EAP_025	The EAP shall be informed of the answer from the implementing sector (accepted, rejected or implemented) regarding a DCB EAP measure, through the EAP Terminal	SO_EAP_004 & SO_EAP_005
SR_EAP_026	The EAP shall be able to send a reminder regarding a DCB measure via the EAP terminal	SO_EAP_004
SR_EAP_027	The EAP shall be able to edit a DCB EAP measure through EAP terminal when needed	SO_EAP_004
SR_EAP_028	The EAP shall be able to inform Off-Loaded sector and all On-Loaded sector(s) inside the ATSU, of every STAMs accepted or implemented through EAP terminal	SO_EAP_004
SR_EAP_029	ATCO of Off-Loaded sector and all On-Loaded shall be informed of accepted or implemented STAM impacting their sector, through the CWP Communication tool	SO_EAP_004
SR_EAP_030	ATCO of implementing sector shall inform the EAP though CWP communication tool when a proposition of DCB EAP measure has been correctly implemented	SO_EAP_004
SR_EAP_031	The EAP shall be able to monitor DCB EAP measures under the EAP area of responsibility	SO_EAP_005

ID	Safety Requirement (functionality & performance)	Safety Objective
SR_EAP_032	The EAP should be able to access to operational history of past DCB EAP measures of the day, through EAP Terminal	SO_EAP_005

Table 19: Safety Requirements (functionality and performance) derived from Safety Objectives

4.3.2.2 Safety Requirements derived from cause analysis

Table 20 and Table 21 respectively collect the additional Functional/Performance Safety Requirements and Integrity Safety Requirements derived within the failure approach for bEAP.

ID	Safety Requirement	Derived from
SR_EAP_033	Training of EAP shall ensure their qualification is adequate to identify the predicted traffic situation that requires decomplexification measure.	HZ_EAP_01
SR_EAP_035	EAP shall be informed of a loss of connection between EAP Terminal and ETFMS	HZ_EAP_02"
SR_EAP_036	Training of EAP shall ensure their qualification is adequate to propose feasible DCB EAP measure to the ATCO (e.g. feasibility due to aircraft performance...)	HZ_EAP_01
SR_EAP_037	In case of absence of answer from the ATCO regarding a DCB EAP measure after a significant period, EAP shall be informed of the rejection of the measure through the EAP terminal.	HZ_EAP_02
SR_EAP_039	Training of EAP shall ensure their qualification is adequate to prevent the design of DCB measure that are inefficient or that have contrary effects (generate imbalance in the target sector or in others sectors)	HZ_EAP_02
SR_EAP_040	The EAP shall be able to request the refresh of the traffic prediction data on the EAP Terminal	"HZ_EAP_03
SR_EAP_041	Training of EAP shall ensure their qualification is adequate to prevent the design of DCB measure which are too difficult/workload demanding to implement	HZ_EAP_04
SR_EAP_042	LTM shall provide the request of DCB EAP measure to the EAP sufficiently in advance to allow him to analyse, prepare and implement the measure.	HZ_EAP_05"
SR_EAP_043	EAP shall provide the DCB EAP measure to the ATCO sufficiently in advance to allow them to analyse and	"HZ_EAP_03

ID	Safety Requirement	Derived from
	implement the measure.	

Table 20: Safety Requirements (Functional and Performance) to mitigate internal failure

ID	Safety Requirement	Derived from
SR_EAP_034	The continuity failure of the EAP Terminal shall not occur more frequently than 1e-3 per sector ops hour	"HZ_EAP_01
SR_EAP_038	The continuity failure of the CWP Communication tool shall not occur more frequently than 1e-3 per sector ops hour	HZ_EAP_02

Table 21: Safety Requirements (Integrity) to mitigate internal failure

4.4 Information Exchange Requirements (IER):

This section is based on AIRM model [47] and contains the major exchange elements. There is no new information exchange defined in this OSED, hence section 4.5 is left empty.

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status (AIRM Model)	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-04.07.08-EAP-OSED-0000.0001	OccupancyCount	Network (B2B)	EAP LTM	Nb of Flights per TFV	Analysis and preparation of EAP DCB measures (STAM, change level)	Occupancy Count is needed to be provided and refreshed very regularly for EAP and LTM tasks	In Progress	Nb of flights per TFV is needed for analysis of potential hotspots and adequate measures. The accuracy of the data is very important	REQ-07.02-DOD-0001.0022<Partial>	N/A.
IER-04.07.08-EAP-OSED-0000.0002	ComplexityCount	N/A.	LTM EAP	Complexity per TFV	Analysis and preparation of EAP DCB measures (STAM, change level)	Complexity Count is needed to be provided and refreshed very regularly for EAP and LTM	In Progress	Complexity is an aid for analysis of DCB measures preparation and the potential trigger of a decomplexification measure by the EAP The accuracy of the data is very	REQ-07.02-DOD-0001.0022<Partial>	N/A.

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status (AIRM Model)	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
						tasks		important		
IER-04.07.08-EAP-OSED-0000.0003	EntryCount	Network	LTM EAP	Nb of flights requesting to enter a given TFV	Analysis and preparation of EAP DCB measures (STAM, change level)	Entry Count is needed to be provided and refreshed very regularly for EAP and LTm tasks	In Progress	This information is needed for analysis of DCB measures preparation and potential hotspots The accuracy of the data is very important	REQ-07.02-DOD-0001.0022<Partial >	N/A.
IER-04.07.08-EAP-OSED-0000.0004	ATFMHotspot	Network LTM	EAP	Hotspot location and duration	Analysis and preparation of EAP DCB measures (STAM, change level)	Hotspot information is needed to be provided as soon as a Hotspot is identified by the network of the LTM	In Progress	The Hotspot is the trigger of EAP tasks	REQ-07.02-DOD-0001.0022<Partial >	N/A.
IER-04.07.08-EAP-OSED-0000.0005	ShortTermATFCMMeasures	EAP	PC	Flight Candidate with Measure	Coordination and Implementa	This information shall be	In Progress	The STAM communication to the PC is	REQ-07.02-DOD-0001.0023<Partial	N/A.

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status (AIRM Model)	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
		LTM		information (type, value, ...)	tion of STAM	exchanged each time a STAM is needed to be coordinated or implemented		needed for its coordination / implementation	>	
IER-04.07.08-EAP-OSED-0000.0006	ATFMMeasure	EAP LTM	PC	Flight Candidate with Measure information (type, value, ...)	Coordination and Implementation of decomplexification measure	This information shall be exchanged each time a decomplexification measure is needed to be coordinated or implemented	In Progress	The decomplexification measure communication to the PC is needed for its coordination / implementation	REQ-07.02-DOD-0001.0023<Partial >	N/A.

4.5 Interoperability Requirements

N/A

5 References and Applicable Documents

5.1 Applicable Documents

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

Content Integration

[1] B.04.01 D138 EATMA Guidance Material

[2] EATMA Community pages

[3] SESAR ATM Lexicon

Content Development

[4] B4.2 D106 Transition Concept of Operations SESAR 2020

System and Service Development

[5] 08.01.01 D52: SWIM Foundation v2

[6] 08.01.01 D49: SWIM Compliance Criteria

[7] 08.01.03 D47: AIRM v4.1.0

[8] 08.03.10 D45: ISRM Foundation v00.08.00

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

[10]B.04.03 D128 ADD SESAR1

[11]B.04.05 Common Service Foundation Method

Performance Management

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

[13]B.04.01 D42 SESAR2020 Transition Validation

[14]16.06.06-D26_04, Guidelines for Producing Benefit and Impact Mechanisms, Edition 03.00.01

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

[16]16.06.06-D68 Part 1 –SESAR Cost Benefit Analysis – Integrated Model

[17]16.06.06-D51-SESAR_1 Business Case Consolidated_Deliverable-00.01.00 and CBA

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

[19]ATM Cost Breakdown Structure_ed02_2014

[20]Standard Inputs for EUROCONTROL Cost Benefit Analyses

[21]16.06.06_D26-08 ATM CBA Quality Checklist

[22]16.06.06_D26_04_Guidelines_for_Producing_Benefit_and_Impact_Mechanisms

Validation

[23]03.00 D16 WP3 Engineering methodology

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

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

System Engineering

[26]SESAR Requirements and V&V guidelines

Safety

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

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

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

[30]SESAR, Resilience Engineering Guidance, May 2016

Human Performance

[31]16.06.05 D 27 HP Reference Material D27

[32]16.04.02 D04 e-HP Repository - Release note

Environment Assessment

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

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

Security

[35]16.06.02 D103 SESAR Security Ref Material Level

[36]16.06.02 D137 Minimum Set of Security Controls (MSSCs).

[37]16.06.02 D131 Security Database Application (CTRL_S)

5.2 Reference Documents

The following documents have been used to develop this SPR:

Misc. input/guidance/further information/other:

[38]04.07.08 SESAR 2020 Transition OSED (Extended ATC Planning), Edition 00.01.02, 07/10/2016

[39]EP3 Analyse bibliographique des travaux EUROCONTROL ET FAA sur les concepts de MSP, D20

[40]EP3 Clarification des concepts MSP, analyse des divergences et impacts sur les outils et procédures de contrôle, D21

[41]EP3 Identification des dépendances entre le MSP, d'autres fonctions ATM et les équipements avion, (D22)

[42]Tools for Trajectory-Based Air Traffic Control and Multi Sector Planning - Thomas Prevot - Paul Lee - Lynne Martin - Joey Mercer - San Jose State University - NASA Ames Research Center Moffett Field, CA 94035, USA tprevot@mail.arc.nasa.gov & Everett Palmer, Nancy Smith NASA Ames Research Center Moffett Field, CA 94035, USA http://humansystems.arc.nasa.gov/publications/Prevot-06-HCI-Aero-Trajectory-MSP-Tools.pdf

[43]The Area Flow Multi-Sector Planner: A Fast-Time Study of MSP Coordination Activities - Carolyn Sorensen & Ian Crook ISA Software carolyn@isa-software.com ian@isa-software.com-Diana Liang & Richard Jehlen U.S. Federal Aviation Administration diana.liang@faa.gov, richard.jehlen@faa.gov , http://www.atmseminar.org/seminarContent/seminar8/papers/p_149_NSTFO.pdf

[44]B.04.02 - High Level Process Models 00 02 00 draft edition, 20101202, D08 Step 1 Operational View

[45]B.04.02, SESAR Concept Of Operations Document Step 1, D66 Edition 2013 v02 00 00

[46]D04 State of the art of ATM actors responsibilities and roles

[47]8.1.3. AIRM Model, D45, v4.0.0

[48]04.07.08 Step 1 V2 Validation report (extended ATC Planning) VP-687, D78 Edition 00.01.00, 14/12/2015

[49]B.01 Integrated Roadmap – DS13 Release Note, D81, Edition 00.01.01, 12/12/2014

[50]04.02Detailed Operational Description (DOD) Step 1, D98 Edition 00.07.00, 31/03/2015

[51]07.02 Detailed Operational Description (DOD) Step 1, Release 4 D27 Edition 00.02.00,

[52]04.02 Detailed Operational Description (DOD) Step 2, D08 Edition 00.02.00, 27/06/2014

[53]07.02 Detailed Operational Description (DOD) Step 2, D07 Edition 00.03.00, 06/02/2015

[54]04.07.01 – STEP 2 Preliminary OSED, D26, Edition 00.02.00, 18/03/2016

[55]ATFCM Operations Manual – Network Manager, Edition 1.0, 10/03/2015 (available on www.eurocontrol.int)

[56]EUROCONTROL Seven-Year Forecast – February 2017, Flight Movements and Service Units 2017-2023, STATFOR Team, Edition 17/01/02-100

[57]PRR 2013 - Performance Review Report, An Assessment of Air traffic Management in Europe during the Calendar Year 2013, May 2014

[58]PRR 2014 - Performance Review Report, An Assessment of Air traffic Management in Europe during the Calendar Year 2014, May 2015

[59]PRR 2016 - Performance Review Report, An Assessment of Air traffic Management in Europe during the Calendar Year 2016, Draft final report, April 2017

[60]SESAR Solution#118 – SPR/INTEROP/OSED V3 - Basic Extended ATC Planning – SAR - 00.01.00, 31 January 2018

FMP Operating Method

[61]Arrêté du 24 avril 2008 fixant les attributions, l'effectif, la procédure de nomination, et la formation des adjoints au chef de salle chargés de l'ATFCM dans les centres en route de la navigation aérienne (publié au publié au Bulletin officiel du ministère de l'écologie, de l'énergie, du développement durable et de l'aménagement du territoire.)

[62]http://www.bulletin-officiel.developpement-durable.gouv.fr/fiches/BO20089/A0090022.htm

[63]CTL11-0205-Note-FMP-France

[64]CTL11-0205-MANEX FMP LFBB version 12-2009

[65]CTL11-0205-Méthode tactique FMP LFEE Occupancy

[66]Standard Operational Procedures du "ATFCM Operating Procedures for Flow Management Position ":

[67]https://www.eurocontrol.int/sites/default/files/content/documents/nm/network-operations/HANDBOOK/atfcm-operations-manual-current.pdf

New SESAR Operating Method

[68]MSPDSNA.doc (in French)

Operational Concept Description

[69]**EP3 - Episode 3 Final Report and Recommendations**, chap 5.2.2.1 Roles and Responsibilities, D2.5-01

[70]**SESAR Definition Phase- The Concept of Operations at a glance** (for def. of Dynamic Mobile Area)

[71]Writing Effective Use Cases, Alistair Cockburn, Addison-Wesley Professional First Edition January 2000

Appendix A Cost and Benefit Mechanisms

A.1 Stakeholders Identification and Expectations

Stakeholder	The type of stakeholder and/or applicable sub-OE	Type of Impact
ANSP	European High Complexity ACCs	**Invest** in the tool (purchase , implementation, training cost and non-monetized costs such as increase of the FMP workload) **Enjoy** the non-monetized benefits such as a complexity decrease or an ATCO workload decrease
Scheduled Airlines (Mainline and Regional)	All airlines that are using high complexity Airspace	**Enjoy** monetized benefit such as cost reduction through airborne and ground delays decrease

Table 22: SESAR Solution #118 CBA Stakeholders and impacts

A.2 Benefits mechanisms

The following BIMs have been investigated for Solution #118. They have been already been presented in the VALP and VALR of exercise V687 performed during SESAR Phase1.

A.2.1 BIM Part 1

(1a) The enhanced intruder monitoring suite (on ASD, on Intruders Curves per TFV, in the flight details lists) shall allow a better monitoring of intruders

(2a) Cherry picking on intruders flights shall be facilitated, thus the number of STAM concerning intruders will increase.

(3a) Thanks to a higher number of STAMs on Intruders, unforeseen Hotspots due to Intruders will be more easily managed through this feature which links to Safety

(1b) Rough complexity is assessed through the use of a conflict count tool. If a TFV has many conflicts, it is likely that the TFV is rather complex.

(2b) Cherry picking on flights in conflicts shall be facilitated, thus the number of STAM concerning conflicting flights will increase

(3b) By reducing the number of flights in conflicts in a TFV through STAMs, the resulting traffic Complexity will decrease which links to Safety

(1c) Aim of the EAP role in En-Route is to alleviate overloaded ATCOs by transferring flights to a less loaded ATCOs.

(2c) The rate of ATCOs who sustain the workload will then increase.

(3c) The resulting ATC workload will then be smoothed which links to both Safety and Human Performance.

(1d) The enhanced local DCB integrates the EAP role to support his tasks

(2d) Thanks to adequate methods, responsibilities and processes, the number of STAMs sent by the EAP will increase

(3d) and **(3e)** Then the LTM workload will decrease while the EAP workload will increase. It is however yet not clear if the sum of their respective workload will be equivalent, LTM decrease compensating the EAP increase. This links to Human Performances.

(2m) The accuracy of B2B will be improved

(3k) This will allow the EAP to deal with better predictions and this will improve the relevance of the STAM. This links to Safety.

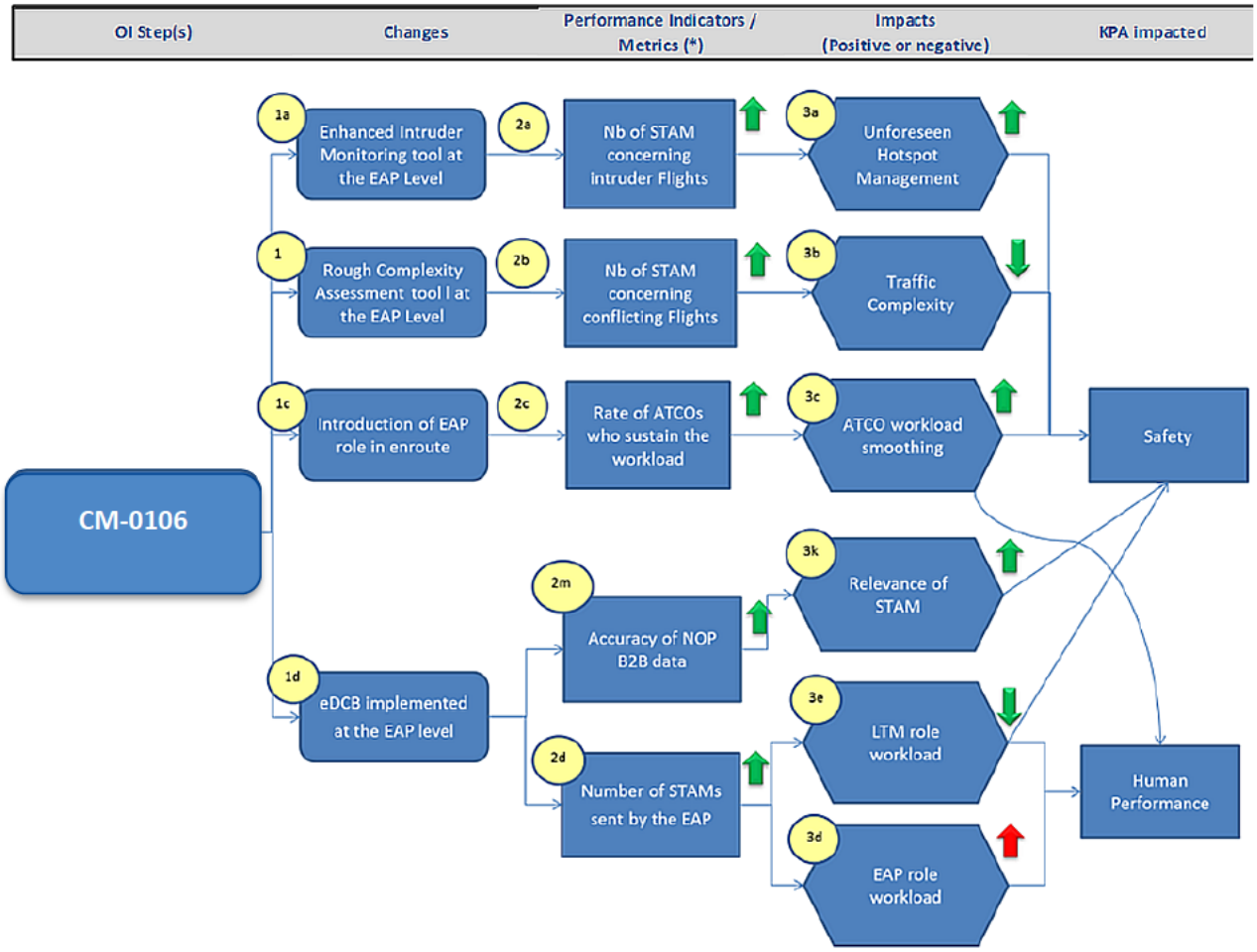

Figure 7: BIM Part 1

A.2.2 BIM Part 2

(1e) The new predicted ASD will allow the EAP to be able to predict all flights' positions in the future based on ETFMS flight plans (FTFM, RTFM or CTFM).

(2e) The EAP will have a better understanding of what will happen in the future, despite the potential uncertainty of the predicted situation.

(3f) This will lead to a better EAP situation awareness reducing then the required time for analysis and so the workload of the EAP which links to Human Performance.

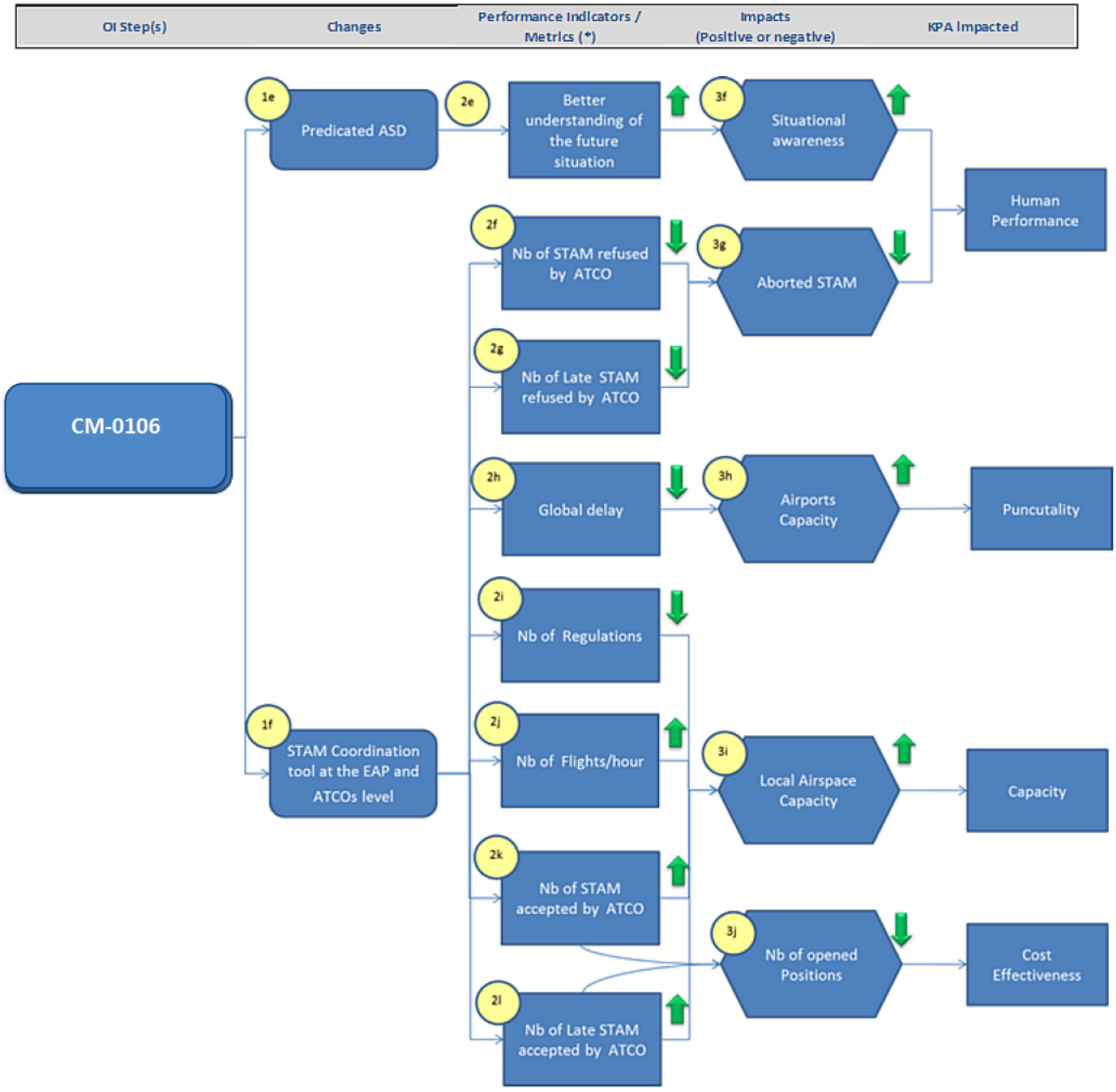

Figure 8: BIM Part 2

(1f) The STAM coordination tool will replace pieces of paper physically brought by the LTM to the CWP. It is a key tool to ease the management of the whole STAM process.

(2f) and **(2g)** The number of standard or late STAM which cannot be implemented by the ATCO will decrease thanks to the coordination tool which will facilitate the STAM negotiation process.

(3g) As a result, the number of aborted STAM due to a lack of coordination will decrease, then the associated workload to prepare, propose, analyse and reject the STAM will decrease too. This links to Human Performance.

(2h) The Overall delay at ACC level will decrease, thanks to an increase number of implemented STAMs through the use of the coordination tool.

(3h) This will improve the Airports Capacity because the flights will depart on time more often. This links to Punctuality.

(2i), (2j), (2k) and (2l) Thanks to a better STAMs coordination with the tool, the number of implemented standard or late STAM will increase, then the number of local regulations will consequently decrease and the number of flights/hour will increase **(3i)** This will improve the local En Route Airspace Capacity which links to Capacity.

(3j) As the number of implemented standard or late STAM will increase, there will be less need to split band boxed sectors. This links to Cost Effectiveness.

A.3 Costs mechanisms

The goal of the CBA is to monetise the costs and benefits in order to determine if the solution is profitable for a specific investor and for the overall network. In order to answers to both of those needs, it has been decided to use generic aggregated European data to monetize the costs.

The costs of the EAP role and tool will be **entirely supported by the ANSPs** that will choose to invest in Solution#118 to optimise their operations. The **costs borne by the ANSPs** will be subjected to a number of assumptions concerning:

- **Implementation Costs**;
- **One-off costs** (such as Initial Training, Project Management, Administrative costs, Installation and commissioning, Validation and certification costs);
- **Capital Costs** (such as Equipment & Systems, Integration costs)
- **Transition Costs**;
- **Operational costs** (such as Raw Material, Personnel and training, Maintenance and repairs)

The Solution #118 - Basic EAP (Extended ATC Planning) function is defined with reference to En-route operating environments of Medium and High complexity. In the best case scenario it is envisaged that the 20th most constraining European ACC in terms of En-Route Delays should invests in the SESAR Solution#118 for optimised benefits at the EATMN scale.

Appendix B Requirements Traceability Towards SESAR 1 OSED

This section provides the traceability between the requirements presented in **chapter 4** of this document and the requirements presented in the SESAR 2020 Transition OSED ([38]) published in October 2016 by project P04.07.08.

From this Transition OSED, only the requirements for which the *Expected coverage* field was set to **"VP-687 and seq"** have been kept.

To comply with SESAR 2020 rules, all these requirements have received a new identifier based on the pattern indicated in section **4.1.1** of this document, other fields have been kept as is.

Table 23 below provides the correspondence between the former identifiers and the requirements 'identifiers used in this SPR/INTEROP/OSED.

P04.07.08 SESAR 2020 Transition OSED Requirement ID	Solution #118 OSED Requirement ID
EAP Role Requirements	
REQ-04.07.08-OSED-0001.0001	REQ-SOL.118-SPRINTEROP-FM01.0010
REQ-04.07.08-OSED-0001.0002	REQ-SOL.118-SPRINTEROP-FM01.0020
REQ-04.07.08-OSED-0001.0010	REQ-SOL.118-SPRINTEROP-FM01.0030
REQ-04.07.08-OSED-0001.0004	REQ-SOL.118-SPRINTEROP-FM01.0040
REQ-04.07.08-OSED-0001.0006	REQ-SOL.118-SPRINTEROP-FM01.0050
REQ-04.07.08-OSED-0001.0011	REQ-SOL.118-SPRINTEROP-FM01.0060
REQ-04.07.08-OSED-0001.0012	REQ-SOL.118-SPRINTEROP-FM01.0070
REQ-04.07.08-OSED-0001.0013	REQ-SOL.118-SPRINTEROP-FM01.0080
REQ-04.07.08-OSED-0001.0014	REQ-SOL.118-SPRINTEROP-FM01.0090
REQ-04.07.08-OSED-0001.0015	REQ-SOL.118-SPRINTEROP-FM01.0100
REQ-04.07.08-OSED-0001.0016	REQ-SOL.118-SPRINTEROP-FM01.0110
REQ-04.07.08-OSED-0001.0023	REQ-SOL.118-SPRINTEROP-FM01.0120
Planning Controller Requirements	
REQ-04.07.08-OSED-0001.0024	REQ-SOL.118-SPRINTEROP-PC01.0010
EAP HMI Requirements	
REQ-04.07.08-OSED-0001.0209	REQ-SOL.118-SPRINTEROP-FM02.0010

P04.07.08 SESAR 2020 Transition OSED Requirement ID	Solution #118 OSED Requirement ID
REQ-04.07.08-OSED-0001.0143	REQ-SOL.118-SPRINTEROP-FM02.0020
REQ-04.07.08-OSED-0001.0005	REQ-SOL.118-SPRINTEROP-FM02.0030
REQ-04.07.08-OSED-0001.0145	REQ-SOL.118-SPRINTEROP-FM02.0040
REQ-04.07.08-OSED-0001.0150	REQ-SOL.118-SPRINTEROP-FM02.0050
REQ-04.07.08-OSED-0001.0151	REQ-SOL.118-SPRINTEROP-FM02.0060
REQ-04.07.08-OSED-0001.0165	REQ-SOL.118-SPRINTEROP-FM02.0070
REQ-04.07.08-OSED-0001.0195	REQ-SOL.118-SPRINTEROP-FM02.0080
REQ-04.07.08-OSED-0001.0175	REQ-SOL.118-SPRINTEROP-FM02.0090
REQ-04.07.08-OSED-0001.0180	REQ-SOL.118-SPRINTEROP-FM02.0100
REQ-04.07.08-OSED-0001.0185	REQ-SOL.118-SPRINTEROP-FM02.0010
REQ-04.07.08-OSED-0001.0190	REQ-SOL.118-SPRINTEROP-FM02.0110
REQ-04.07.08-OSED-0001.0200	REQ-SOL.118-SPRINTEROP-FM02.0120
REQ-04.07.08-OSED-0001.0205	REQ-SOL.118-SPRINTEROP-FM02.0130
REQ-04.07.08-OSED-0001.0206	REQ-SOL.118-SPRINTEROP-FM02.0140
REQ-04.07.08-OSED-0001.0207	REQ-SOL.118-SPRINTEROP-FM02.0150
REQ-04.07.08-OSED-0001.0208	REQ-SOL.118-SPRINTEROP-FM02.0160
REQ-04.07.08-OSED-0001.0210	REQ-SOL.118-SPRINTEROP-FM02.0170
REQ-04.07.08-OSED-0001.0211	REQ-SOL.118-SPRINTEROP-FM02.0180
REQ-04.07.08-OSED-0001.0215	REQ-SOL.118-SPRINTEROP-FM02.0190
REQ-04.07.08-OSED-0001.0220	REQ-SOL.118-SPRINTEROP-FM02.0200
REQ-04.07.08-OSED-0001.0225	REQ-SOL.118-SPRINTEROP-FM02.0210
REQ-04.07.08-OSED-0001.0240	REQ-SOL.118-SPRINTEROP-FM02.0010
REQ-04.07.08-OSED-0001.0241	REQ-SOL.118-SPRINTEROP-FM02.0010

P04.07.08 SESAR 2020 Transition OSED Requirement ID	Solution #118 OSED Requirement ID
REQ-04.07.08-OSED-0001.0245	REQ-SOL.118-SPRINTEROP-FM02.0220
REQ-04.07.08-OSED-0001.0250	REQ-SOL.118-SPRINTEROP-FM02.0230
REQ-04.07.08-OSED-0001.0265	REQ-SOL.118-SPRINTEROP-FM02.0240
REQ-04.07.08-OSED-0001.0280	REQ-SOL.118-SPRINTEROP-FM02.0250
REQ-04.07.08-OSED-0001.0290	REQ-SOL.118-SPRINTEROP-FM02.0260
REQ-04.07.08-OSED-0001.0295	REQ-SOL.118-SPRINTEROP-FM02.0270
REQ-04.07.08-OSED-0001.0300	REQ-SOL.118-SPRINTEROP-FM02.0280
REQ-04.07.08-OSED-0001.0325	REQ-SOL.118-SPRINTEROP-FM02.0290
REQ-04.07.08-OSED-0001.0315	REQ-SOL.118-SPRINTEROP-FM02.0300
REQ-04.07.08-OSED-0001.0330	REQ-SOL.118-SPRINTEROP-FM02.0310
REQ-04.07.08-OSED-0001.0345	REQ-SOL.118-SPRINTEROP-FM02.0320
REQ-04.07.08-OSED-0001.0355	REQ-SOL.118-SPRINTEROP-FM02.0330
REQ-04.07.08-OSED-0001.0365	REQ-SOL.118-SPRINTEROP-FM02.0340
REQ-04.07.08-OSED-0001.0370	REQ-SOL.118-SPRINTEROP-FM02.0350
REQ-04.07.08-OSED-0001.0372	REQ-SOL.118-SPRINTEROP-FM02.0360
REQ-04.07.08-OSED-0001.0373	REQ-SOL.118-SPRINTEROP-FM02.0370
REQ-04.07.08-OSED-0001.0275	REQ-SOL.118-SPRINTEROP-FM02.0380
CWP Communication Tool HMI Requirements	
REQ-04.07.08-OSED-0001.0375	REQ-SOL.118-SPRINTEROP-PC02.0010
REQ-04.07.08-OSED-0001.0380	REQ-SOL.118-SPRINTEROP-PC02.0020
REQ-04.07.08-OSED-0001.0390	REQ-SOL.118-SPRINTEROP-PC02.0030
REQ-04.07.08-OSED-0001.0395	REQ-SOL.118-SPRINTEROP-PC02.0040
REQ-04.07.08-OSED-0001.0425	REQ-SOL.118-SPRINTEROP-PC02.0050

P04.07.08 SESAR 2020 Transition OSED Requirement ID	Solution #118 OSED Requirement ID
REQ-04.07.08-OSED-0001.0400	REQ-SOL.118-SPRINTEROP-PC02.0060
REQ-04.07.08-OSED-0001.0405	REQ-SOL.118-SPRINTEROP-PC02.0070
REQ-04.07.08-OSED-0001.0414	REQ-SOL.118-SPRINTEROP-PC02.0080
REQ-04.07.08-OSED-0001.0412	REQ-SOL.118-SPRINTEROP-PC02.0090
REQ-04.07.08-OSED-0001.0410	REQ-SOL.118-SPRINTEROP-PC02.0100
REQ-04.07.08-OSED-0001.0420	REQ-SOL.118-SPRINTEROP-PC02.0110

Table 23: Link to SESAR1 P04.07.08 requirements