Enhanced DCB OSED for Step1

Document information	
Project Title	Enhanced DCB
Project Number	13.02.03
Project Manager	EUROCONTROL
Deliverable Name	Enhanced DCB OSED for Step1
Deliverable ID	D303
Edition	00.05.01
Template Version	03.00.00
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Abstract

This document describes the Dynamic DCB operational concept defined as Solution#17 Advanced Short ATFCM Measures (STAM) and Solution#18 – CTOT and TTA for Step 1 of SESAR, based on "time based operations".
This document describes four concept elements:

- STAM Measures : Fine Tuning techniques to adjust imbalances
- Target Time Management
- Airport Arrivals Management using TTA Allocation
- Collaborative NOP (MassDiv).

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Rational for rejection
None.

Document History

Edition	Date	Status	Author	Justification
00.00.90 (D35)	22/02/2013	Draft	[redacted]	Editorial changes
00.01.00 (D35)	15/03/2013	Final		Final version initial OSED
00.02.00 (D301)	04/03/2014	Final		Interim Version
00.03.00 (D302)	16/02/2015	Final		Including Review comments from others SESAR projects
00.04.00 (D303)	20/08/2015	Draft		MDI MP (Message Private) V-STAM Predefined Scenarios
00.04.01 (D303)	12/04/2016	Draft		Changes due to Quality review
00.04.02 (D303)	18/04/2016	Draft		Hotspot Monitoring Simulated OC (basic what-if) Including SJU Review comments
00.04.03 (D303)	10/06/2016	Draft		Integration of review comments
00.05.00 (D303)	29/06/2016	Final		Amended after Peer Review and agreement for SJU submission
00.05.01 (D303)	30/08/2016	Final		Amended after SJU review assessment

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Executive summary

This dynamic DCB Enhanced DCB OSED for Step1 is the response to the SESAR dDCB Concept for Step 1 based on “time-based operations”. It will cover several operational improvements:

- OI DCB-0208 : Solution #17 : Advanced Short Term ATFCM Measures (STAM) -
- OI DCB-0308 : Solution #18 : CTOT to TTA
- OI DCB-0310 : Contributing to the Solution #21 : Improved efficiency in the management of airport and ATFCM planning
- OI DCB-0103-A : Contributing to the Solution #20 : Massive Aircraft Diversion

OI DCB-0208: Solution #17:

Current network performance and flight operations are impacted by measures imposed on individual flights, such as departure slots, re-routes and arrival holdings, in order to prevent situations when traffic demand exceeds available ATC and Airport capacity. Significant effort is put in by the service providers to reduce implementing these measures and minimizing their impact. However, further improvements are limited by current operating methods that constrain an effective and predictable alignment of flight entry rates/intervals with available ATC and Airport resources.

The DCB process aims at:

1. Minimising DCB constraints on individual flights,
2. Increasing cost-effectiveness, i.e. better use of ATC and Airport resources.

It addresses these shortcomings through a cooperative approach between Network, ATC, Airspace Users and Airports, and the introduction of time based processes that facilitate a smoother and more predictable sequencing of flights into ATC sectors and Airports.

DCB aims at proposing a collaborative process to determine and implement optimal solutions for network operations though continuous information sharing of individual and local preferences. This process is split into two potentially distinct phases, as follows:

- **Cooperative Planning**: With cooperation it should be possible to target individual flights with a STAM Measure (Short-Term ATFCM Measure) and, to take into account local preferred solutions, rather than apply a regulation to a group of flights as a whole.
- **Cooperative execution**: In the execution phase of flights, through cooperation it is possible to improve the delivery of flights into constrained/regulated areas, both in en-route and arrival phases of flight.

In order to enable the cooperation process a set of changes and enablers are required:

- Occupancy and Network Impact Assessments. The data that are currently used to identify bottlenecks in the network, need to be more accurate and standardized. Only if all actors in the cooperation (or coordination) phase have a shared network view of the same data, effective cooperation is possible. It is also important to have the appropriate tools for analysing availability -such as network impact tools- and interfacing with any existing local tool.
- Enhanced Network Coordination. Processes, and supporting procedures, which enhance co-operation between all the relevant actors (NM, FOC, AU, ATC, LTM, etc), involved in the planning and execution phases, need to be agreed. Sharing continuous information and providing timely updates are at the basis of enhance coordination.

OI DCB-0308: Solution #18: CTOT to TTA

To enable cooperation in the execution phase after departure, target time-measures (STAM, CASA regulation) need to be introduced in order to reduce the shortcomings of the CTOTs (which are restricted to the departure phase only) and to support a better resolution of the hotspot. With target times all actors share the same time-managing constraint. Fundamental to cooperation is that firstly, actors of the execution phase (flight crews, ATCOs) implement the measures anticipated in the planning phase as much as possible and secondly, when the planned measures need to be adapted, they are modified and agreed in a CDM process to ensure most efficient and less impacting solutions to be selected. The plan however needs to be of sufficient accuracy, e.g. updates in the execution phase need to be taken into account. Target Time adherence monitoring and recovery mechanism has been addressed as well.

OI DCB-0310: Contributing to the Solution #21: Improved efficiency in the management of airport and ATFCM planning

It aims at proposing a better integration of DCB measures in the airport management process to accommodate both the DCB plan and the airport optimisation criteria (e.g. reactionary delay).

OI DCB-0103-A: Contributing to the Solution #20: Massive Aircraft Diversion

It aims at optimising the management of a massive diversion for a major European airport or set of airports in case of unusual and unexpected situation, by sharing information among the actors (ATSU, Airports, Airspace users, NM), supporting decision to identify the best alternate aerodromes (diversions), and preparing the recovery phase after the unusual situation clears up.

The concept of operations for MassDiv has been elaborated and validated during 2014, in the framework of SESAR, with the support of more than 40 experts, including ANSPs, Aerodromes, Airspace Users and the Network Manager. At the end of the validation a general consensus was agreed among the participants that the level of maturity reached in the definition of the concept, the roles and responsibilities and the operational requirements allowed to start the preparation of the operational deployment and to perform the next validation via a Pilot Phase (i.e. operational procedures relying on operational systems). In May 2015, the MassDiv concept has been presented to the AOT (Airport Operations Team) which provided its formal support for the inclusion of the MassDiv tool in the NM NOP development plan. An additional support has been received from the ODSG (ATFCM Operations & Development Sub-Group) in June 2015.

According to the Validation Report the maturity level assessment is indicated in the table hereafter:

Code	Name	Project contribution	Maturity at project start	Maturity at project end
DCB-0308 – Solution #17	Advanced Short Term ATFCM	P13.02.03 developed, validated (through exercises VP-314, VP-522, VP-700 and VP-632) and provided recommendations on the following concept features of this OI Step: • Hotspot detection, • Analysis and preparation of STAM,	V2	 End V3 End V3

		• STAM coordination, • STAM implementation, • NMOC supervision.		Mid V3 End V3 Mid V3
DCB-0208 – Solution #18	DCB in a Trajectory Management Context	P13.02.03 developed, validated (through exercises VP-632, VP-634, VP-723 and VP-749) and provided recommendations on the following concept features of this OI Step: • TTA dissemination • TTA Adherence • Local TTA assignments • Roles & Responsibilities (NM, FMP & Airport side)	V2	End V3 Mid V3 Mid V3 End V3
DCB-0310 – Solution #21	Improved Efficiency in the management of Airport and ATFCM Planning	P13.02.03 through its validation activities, including VP-632, VP-634 and VP-749 contributed to the V3 maturity level of this Solution. The last exercise VP-749 covers the Target Time Management and AOP-NOP Integration in a collaborative effort with P07.06.01 covering AOP/NOP Integration, and P06.03.01 (covering the AOP and airport DCB related aspects) of the following aspects • AOP-NOP harmonized interface and data synchronisation • Airport / AU / NM Interface for Airport Impact Assessment and TTA window improvement into ATFCM	V2	V3
DCB-0103-A – Solution #20	MassDiv - Collaborative NOP for Step 1	MassDiv: The level of maturity reached in the definition of the concept, the roles and responsibilities and the operational requirements allowed to start the preparation of the operational deployment and to perform the next validation via a Pilot Phase.	V2	V4

NOTA: The P07.02 DOD has identified MassDiv in the OI DCB-0103-A. The P13.02.03 has been aligned accordingly. However, NATS has expressed a caveat concerning the validity and the adequacy to address Massdiv in the OI DCB-0103-A. NATS suggests that the OI DCB-0103-A relates to the availability of the NOP in a crisis situation, and does not relate to implementation of MASSDIV procedures.

1 Introduction

1.1 Purpose of the document

This Operational Service and Environment Definition (OSED) describes the operational concept defined in the Detailed Operational Description (DOD P07.02 Network Federating Project) [[5]] in the scope of its Operational Focus Area (OFA05.03.04 Enhanced ATFCM processes).

It defines the operational services, their environment, use cases and requirements.

The OSED is used as the basis for assessing and establishing operational, safety, performance and interoperability requirements for the related systems further detailed in the Safety and Performance Requirements (SPR) document [6]. The OSED identifies the operational services supported by several entities within the ATM community and includes the operational expectations of the related systems.

This OSED is a top-down refinement of the Network Operations DOD produced by the federating P07.02 Network Federating Project [5]. It also contains additional information which should be consolidated back into the higher level SESAR concepts using a “bottom up” approach.

The figure (Figure 1: OSED document with regards to other SESAR deliverables) below presents the location of the OSED within the hierarchy of SESAR concept documents, together with the SESAR Work Package or Project responsible for their maintenance.

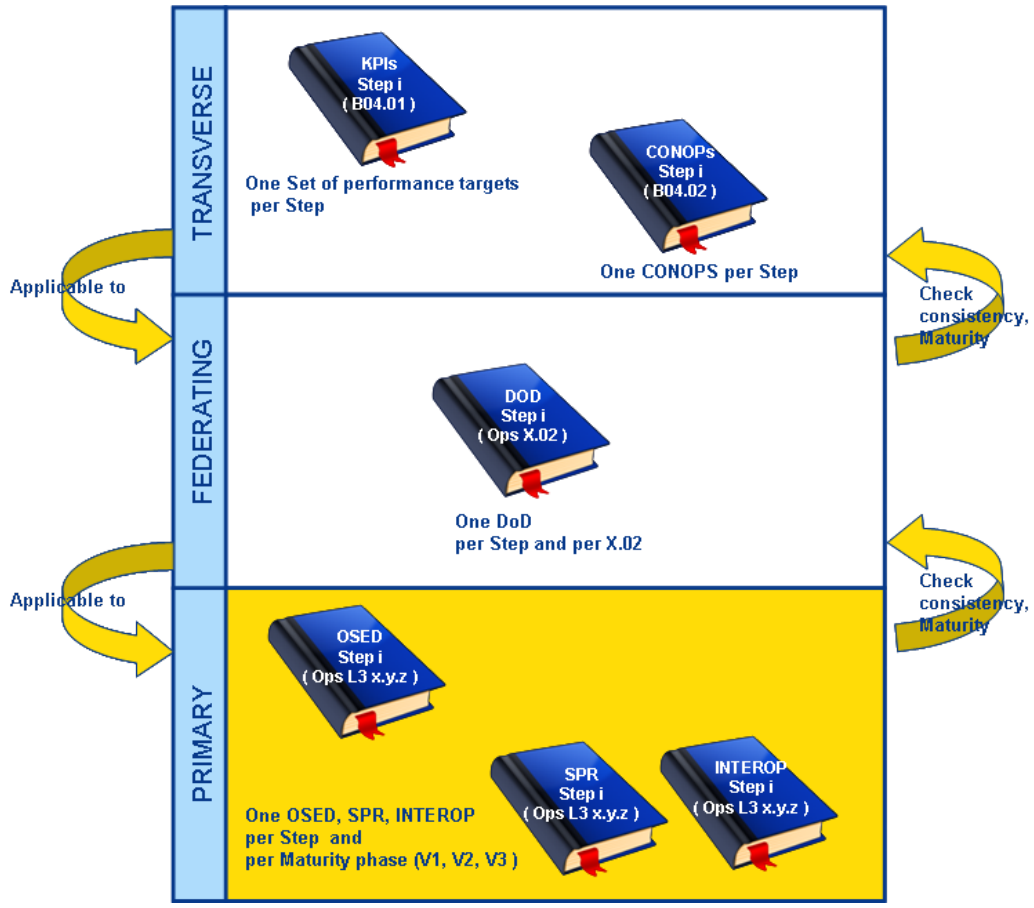

Figure 1: OSED document with regards to other SESAR deliverables

In Figure 1: OSED document with regards to other SESAR deliverables, the Steps are driven by the OI Steps addressed by the project.

In addition, this OSED takes outcomes and recommendations of following exercises performed during SESAR 1 programme and consolidated in final Step 1 dDCB Validation Report [8]:

For STAM concept

EXE-07.06.05-VP-314	Validation of network coordination processes in support to Short Term ATFCM Measures implementation – Live Trial
EXE-07.03.02-VP-522	Dynamic DCB (STAM) – Live Trial
EXE-13.02.03-VP-700	Advanced Short Term ATFCM including Network Supervision and interface with Local Tools – Live Trial

For CTOT to TTA concept

EXE-07.06.05-VP-634	Fairstream – Live Trial
EXE-07.03.02-VP-632	Dynamically updating the NOP using TTA procedure – Live Trial
EXE-13.02.03-VP-723	TTO/TTA Management (V2) - FTS
EXE-13.02.03-VP-749	TTO/TTA Management (V3) – Live Trial

Note: iSTREAM results could not been taken into account, results were not available at the time the OSED had to be delivered.

1.2 Scope

This OSED details the operational concept for the Operational Focus Area OFA05.03.04 Enhanced ATFCM Processes in Step1 (Including validation release 1, 3 and 4).

- OI DCB-0308: Solution #17: Advanced Short Term ATFCM Measures: Fine Tuning techniques to adjust imbalances between demand and capacity.
- OI DCB-0208: Solution #18: DCB in a trajectory management context: Improve Flight adherence for regulated flight at arrival
- OI DCB-0310: Contributing to Solution #21: Improved Efficiency in the management of Airport and ATFCM Planning
- OI DCB-0103-A : Contributing to the Solution #20: Collaborative NOP for Step 1: Crisis Management

This OSED details, as well, the operational concept of SESAR 1 following Solutions for Step 1:

- Solution #17 : Advanced Short ATFCM Measures (STAM)
- Solution #18: CTOT and TTA

1.3 Intended readership

This document is aimed at the following stakeholders:

- The SJU;
- B4.2 project;
- SWP 07.02: P07.02 is the coordinating federating project for the OFA 05.03.04 – enhanced ATFCM processes;
- The project P13.02.03 "Dynamic DCB" project team;

- The project P13.02.03 “Dynamic DCB” stakeholders including ANSP and Airspace Users;
- Those members of P07.02 “Coordination and Consolidation of Operational Concept Definition and validation” who are in charge of the respective coordination and consolidation, via the P07.02 project management.
- The project P13.02.03 “Network Operations & Monitoring Sub-Systems Definition” who is interested in technical requirements for developing the necessary tools on which to realise the full benefit demonstrated from an initial prototype system.
- The OFA 05.03.04 contributing projects : P04.02, P04.03, P04.07.01, P04.07.07, P07.02, P08.01.05, P08.01.06, P08.01.09, P08.03.03, P08.03.04, P08.03.05, P10.08.01, P13.01.01, P13.02.03
- The project WP08 for supporting the definition of information exchange requirements

This document is important for the stakeholders in order to understand and agree about the DCB Step1 Operational Improvement and operational and technical consequences.

1.4 Structure of the document

This document is divided into 6 chapters:

- Chapter 1 gives a general description of the document structure and scope;
- Chapter 2 gives a description of the operational concept;
- Chapter 3 gives a description of the operational environment;
- Chapter 4 gives a description of the detailed operating method;
- Chapter 5 gives a description of the operational scenarios and processes/use-cases;
- Chapter 6 gives a description of operational requirements;
- Chapter 7 indicates the references.

1.5 Background

In order to achieve the planned implementation timescales for Step 1, the concept definition will build on current activities and technologies. As such the concept definition will start from the work already done in various initiatives in the area of Dynamic DCB: DMEAN programme, CAMES project, EUROCONTROL studies on instant load and occupancy counts, Dynamic DCB early project and local current practices in some ANSPs (For example: French, UK and German ATSUs). In that frame the P13.02.03 pioneer project has been identified to deliver tangible results by the end of 2011. Taking into account the maturity of these early solutions, a requirements consolidation activity will take place at the very beginning of the project. Coordination with the technical project P13.02.03 is essential to speed up the process, and to balance the trade-off between stakeholders’ expectations and technological capabilities (to enable local tool implementation). The Step 1 activity covers the V3 phase of the E-OCVM validation lifecycle. The OSED consolidates all this initial work in one harmonised concept with the aim to provide a pragmatic implementation step for the 2011-2015 timeframe.

1.6 Glossary of terms

Term	Definition	Source
A-CDM	Airport Collaborative Decision Making (CDM) is a concept which aims at improving Air Traffic Flow and Capacity Management (ATFCM) at airports by reducing delays, improving the predictability of events and optimising the utilisation of resources. Implementation of Airport CDM allows each Airport CDM Partner to optimise their decisions in collaboration with other Airport CDM Partners, knowing their preferences and constraints and the actual and predicted situation. The decision making by the Airport CDM Partners is facilitated by the sharing of accurate and timely information and by adapted procedures, mechanisms and tools. The Airport CDM concept is divided in the following Elements: • Airport CDM Information Sharing • CDM Turn-round Process – Milestones Approach • Variable Taxi Time Calculation • Collaborative Management of Flight Updates • Collaborative Pre-departure Sequence • CDM in Adverse Conditions • Advanced CDM	Airport CDM Operational Concept Document Ver. 3.0
ADS-C EPP report	ADS-C EPP (Extended Projected Profile) report is the ADS-C report containing the sequence of 1 to 128 waypoints or pseudo waypoints with associated constraints and/or estimates (altitude, time, speed, etc.), gross mass and min/max speed schedule, etc. as defined in WG78/SC214 standards	SESAR, document WP 5 Project D01 05.05.01 - Step 1 TMA Trajectory Management Framework
ADS-C ETA min/max report	ADS-C ETA min/max report is the ADS-C report containing the earliest and latest values of ETA computed by the aircraft system on the point specified by ATC (e.g. IAF).	B4.2
Aircraft intent	Information on planned future aircraft behaviour, which can be obtained from the aircraft systems (avionics). It is associated with the commanded trajectory and will enhance airborne functions. The aircraft intent data correspond either to aircraft trajectory data that directly relate to the future aircraft trajectory as programmed inside the avionics, or the aircraft control parameters as managed by the automatic flight control system. These aircraft control parameters could either be entered by Flight Crew or automatically derived by the flight management system.	ICAO Doc 9854
Airport Operations Plan (AOP)	A single, common and collaboratively agreed rolling plan available to all airport stakeholders whose purpose is to provide common situational awareness and to form the basis upon which stakeholder decisions relating to process optimisation can be made. As well as timely and accurate information, the AOP also contains a robust performance monitoring capability which allows the airport processes to be efficiently managed in	6.2 DOD Ver. 00.03.00

Term	Definition	Source
	real-time. Through its 'rolling' nature, the AOP will ensure that mitigation actions taken by each stakeholder will be based on accurate information with the result of their actions being reflected directly back into the AOP	
Airspace Reservation / Restriction	Airspace Reservation means a defined volume of airspace temporarily reserved for exclusive or specific use by categories of users (TSA, TRA, CBA) and Airspace Restriction designates Danger, Restricted and Prohibited Areas.	EC Regulation n°2150/2005
Arrival Manager	Arrival Manager is a planning system to improve arrival flows at one or more airports by calculating the optimised approach / landing sequence and Target Landing Times (TLDT) and, where needed, times for specific fixes for each flight, taking multiple constraints and preferences into account.	SESAR Airports Definition Team
ATC Clearance	Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.	ICAO Doc 4444
ATC Instruction	Directives issued by air traffic control for the purpose of requiring a Flight Crew to take a specific action.	ICAO Doc 4444
Capacity Measure	Measure to allow more traffic in a zone. It includes Military areas reservation change to allow civil traffic, ATSU sector configuration change.	New
Complexity Management	Complexity Management is a service that manages, balances, individual Controller (or sector Controller team) workload at local level - ATSU environment to achieve the goal of maximising the throughput of the ATM system by not wasting, or leaving unused, any latent capacity and reduces safety risks related to workload variations.	New
Controlled Time of Arrival	An ATM imposed time constraint on a defined merging point associated to an arrival runway.	SESAR Def. Phase
Departure Manager	Departure Manager is a planning system to improve departure flows at one or more airports by calculating the Target Take Off Time (TTOT) and Target Start-up Approval Time (TSAT) for each flight, taking multiple constraints and preferences into account.	EUROCONTROL (2008) Airport CDM Implementation Manual
DCB Measure	It includes all Capacity measure and Demand measure to be taken during in several days to 4 hours prior to the congested area event.	New
Demand Measure	This is action on flight trajectory (time, horizontal/vertical adjustment) to alleviate a congested area	New
Dynamic DCB	A process to identify and manage imbalances between demand and capacity. It focuses on a period of 4 hours to 15 minutes prior to the entry of a flight in a congestion area. It includes capacity measures on sector configuration and demand measures on flights.	New
Estimated Time	An information on Estimated Time, subject to variation, neither a Controlled Time (time constraint) nor a Target Time (planned time)	New
ETA min/max	ETA min/max is the earliest/latest ETA at a waypoint, provided	New

Term	Definition	Source
	the aircraft flies the 4D trajectory at its max/min allowable speed, wind/temp error is also taken into account, in order to guarantee that any CTA defined within associated ETA min/max interval will be satisfied with high probability.	
Estimated In-Block Time	Estimated In-Block Time, the estimated time that an aircraft will arrive in block. (Equivalent to Airline/Handler ETA – Estimated Time of Arrival).	A-CDM Manual
Flight intent	The future aircraft trajectory expressed as a 4-D profile until destination (taking account of aircraft performance, weather, terrain, and ATM service constraints), calculated and "owned" by the aircraft flight management system, and agreed by the pilot.	ICAO Doc 9854
Flight Object	The system instance view of a flight. It is the flight object that is shared between the IOP stakeholders.	EUROCAE (2009), Flight Object Interoperability Specification, ED-133
Local Traffic Management role	The Local Traffic Management role lies in between the Flow Management and (multi)-sector planning roles, taking a wider view over a group of multi sector areas and/or sectors (potentially a complete ACC) and any Airfield Towers that fall within the Local Traffic Management's area of responsibility. The associated actor provides the coordinating link between the ATSU, sub-regional and regional flow and airspace management. In case of an imbalance, the responsibility is to identify the adequate measures to be taken, in coordination with the appropriate partners (that could include Network management, Flow Management, other Local Traffic Management and the Airspace Users). The Local Traffic Management actor is 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.	SESAR WP 4.2
Messages	SAM message: Slot Allocation Message CHG message: Flight Plan Change ACK message: acknowledgement SRM message : Slot Revision Message DLA message: Flight is delayed CNL messaged : Measure is cancelled	WP7.2 Detailed Operational Description
Network Operations Plan	The Network Operations Plan is a set of information and actions derived and reached collaboratively both relevant to, and serving as a reference for, the management of the Pan-European network in different timeframes for all ATM stakeholders, which includes, but is not limited to, targets, objectives, how to achieve them, anticipated impact.	SESAR NOP Project Team
Network situation	A set of information, continuously updated by the Network Operations Plan (NOP).	New
Open Loop Instruction	An open-loop instruction is an ATC instruction that does not include a specified or implied point where the restriction on the	SESAR Trajectory

Term	Definition	Source
	trajectory ends and does not include a specified or implied return path to a downstream computed, known or expected trajectory.	Management Document
Operational Flight Plan	The operational flight plan provided to Flight Crew before departure is more detailed than the ATC flight plan and consists of the detailed list of the waypoints of the route, with their associated altitude, speed, time and fuel estimates. 1	New
Operational Focus Area	A limited set of dependent operational and technical improvements related to an Operational sub-package, comprising specific interrelated OIs designed to meet specific performance expectations of the ATM Performance Partnership.	SESAR SJU, "Operational Focus Area Programme Guidance - Executive Summary" Edition 02.00.00
Operational Package	1. A deployment focused grouping of performance driven operational changes and associated technical and procedural enablers 2. A (very) high level grouping of (related) Operational Improvement Steps for the purpose of (very) high level communication	SESAR SJU, "Operational Focus Area Programme Guidance - Executive Summary" Edition 02.00.00
Operational Scenarios	Within the context of an operational concept scenarios are a description of how a future system could work. Each scenario describes the behaviour of users and the future system, interaction between the two, and the wider context of use. From a detailed scenario the ATM Stakeholders should be able to identify user requirements and potential business cases.	New
Operational Sub-Packages	A sub-grouping of connected operational and technical improvements related to the Operational Package with closely related operational focus, designed to meet performance expectations of the ATM Performance Partnership.	SESAR Joint Undertaking (2010), Release 1 Plan v1.0
Predefined Route	A predefined route is based on published waypoints (ICAO). These waypoints are inputs inserted in the FMS (among other elements) for trajectory computation.	New.2
Reference Business Trajectory	The business trajectory which the airspace user agrees to fly and the ATSU and Airports agree to facilitate (subject to separation provision).	SESAR Consortium (2007) CONOPS Acronyms and Definitions, Task 2.2.2 - Milestone 3
Reference	The Reference Business or Mission Trajectory (RBT/RMT) is	SESAR Def.

[1] Note that The ATM Lexicon includes an ICAO definition of Operational Flight Plan strictly for helicopter operations.

Term	Definition	Source
Business or Mission Trajectory	created from the last version of the SBT/SMT. It is the trajectory that the Airspace User agrees to fly and that the ANSP and Airport agree to facilitate. It is associated to the filed flight plan and includes both air and ground segments. It consists of 2D routes (based on published way points and/or pseudo waypoints computed by air or ground tools to build the lateral transitions and vertical profiles); altitude and time constraints where and when required; altitude, time and speed estimates at waypoints, etc. When an RBT/RMT is agreed a NOP update is triggered.	Phase
Regulation	A measure applied on flights still on ground. It is an update of CTOT or TO of a flight.	
Required Time of Arrival	In this document refers only to the aircraft FMS RTA function, enabling the on-board management of CTA instruction.	New
Revision of the Reference Business or Mission Trajectory	The revision of the Reference Business or Mission Trajectory (RBT/RMT) is triggered at Controller or Flight Crew initiative when there is the need to change the route and/or altitude constraints and/or time constraints, mainly due to hazards (traffic, weather), fine sequencing (CTA or CTO allocation) or inability for the aircraft system to meet a constraint (CTA missed).	SESAR Def. Phase
Update of the Reference Business or Mission Trajectory	The update of the Reference Business or Mission Trajectory (RBT/RMT) is automatically triggered when the trajectory predictions continuously computed by the aircraft system, differ from the previously shared trajectory predictions more than the delta defined by ATC in Trajectory Management Requirements (TMR). The update of the RBT/RMT can also be triggered on request or periodically.	SESAR Def. Phase
Shared Business or Mission Trajectory	The Shared Business or Mission Trajectory (SBT/SMT) is the trajectory published by the Airspace User that is available for collaborative ATM planning purposes. The refinement of the SBT/SMT is an iterative process. The final form of the SBT/SMT becomes the Reference Business or Mission Trajectory (RBT/RMT) and is part of the filed flight plan.	SESAR Consortium (2007) CONOPS Acronyms and Definitions, Task 2.2.2 - Milestone 3
STAM – Short Term ATFCM	It includes cherry-picking, a measure impacting a selected flight or flow measures, a measure impacting a group of flights. It may be target-time, Minimum Departure Interval (MDI),rerouting, level-capping, SID change, Miles in Trail (MIT).	New
Tailored Arrival	Tailored arrival procedures are defined from Top of Descent to Initial Approach Fix (IAF) or to runway taking in account the other traffic and constraints, to optimize the descent. The concept is based on the downlink to the ATSU of actual aircraft information (like weight, speed, weather etc.) and the uplink of cleared route (STAR) calculated by the ATSU.	OI AOM-0704 New
Target Time of Arrival	An ATM computed arrival time. It is not a constraint but a progressively refined planning time that is used to coordinate between arrival and departure management applications.	SESAR Consortium (2007) CONOPS

Term	Definition	Source
		Acronyms and Definitions, Task 2.2.2 - Milestone 3
Target Time Over	An ATM computed over-flight time. It is a progressively refined planning time that is used as an indication for flight planning and execution to coordinate at network level and enhance the effectiveness of the ATFCM measures.	WP7.2 Detailed Operational Description
Target Deviation Indicator	In the execution phase, it represents the difference between the planned DCB Target Time (TTO/TTA) and the Estimated Time (ETO/ETA)	WP7.2 Detailed Operational Description
Trajectory	The description of movement of an aircraft both in the air and on the ground including position, time, and at least via calculation, speed and acceleration.	ICAO (2003) AN-CONF/11-WP/4 The Global ATM Operational Concept
Trajectory (4D)	The 4D trajectory is a set of consecutive segments linking published waypoints and/or pseudo waypoints computed by air or ground tools (airline pseudo FMS, aircraft FMS, ground Trajectory Predictor) to build the lateral transitions and the vertical profiles. Each point is defined by a longitude, latitude, a level and a time with associated constraints where and when required.	New
Trajectory management (4D)	Trajectory management is the process by which the Business or Mission Trajectory of the aircraft is planned, agreed, updated and revised. It is achieved through Collaborative Decision Making (CDM) processes between Airspace users (Airspace Users) and ATM Service Providers (ANSP, Airports, Network Manager) or directly between Flight Crew and Controller during the execution phase when time does not permit CDM.	New
Trajectory Management Requirement	Trajectory Management Requirement (TMR) specifies the requirement on the aircraft to share the updated trajectory in the event that the flight detects a 'delta' from previously shared predictions or on a cyclical basis. The TMR specify the lateral, vertical or time parameters that will trigger the update process. The TMR specify the other event driven and periodic trajectory sharing requirements. The TMR will specify the data content required and the allowable tolerances of selected time/speed and altitude.	New
User Preferred 4D Trajectory	The User Preferred 4D Trajectory (UP4DT), or from a Military perspective the Requested Mission Trajectory (ReqMT), is the user preferred 4D trajectory integrating the known ATM constraints, Airspace User agree to fly and ATSUs & Airports will strive to facilitate; it corresponds to the operational flight plan currently provided by Airspace User to Flight Crew that has been shared with ATM actors to take into account static and known dynamic constraints in ATM system (airspace reservations, capacity short falls, weather, etc.); it represents	New

Term	Definition	Source
	the initial step toward the Shared Business / Mission Trajectory (SBT) and the Reference Business / Mission Trajectory (RBT).	
User Preferred Route	A user preferred route may include published as well as non-published points defined in latitude/longitude or point bearing/distance. Such waypoints are inserted in the FMS for trajectory computation	New
User Preferred Trajectory	The user preferred trajectory is the set of consecutive segments linking waypoints and additional pseudo waypoints computed by the FMS to build the vertical profiles and lateral transitions	New

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384 ## 1.7 Acronyms and Terminology

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Term	Definition
A/C	Aircraft
AAH	Active Advisory Horizon
ACC	Area Control Centre
A-CDM	Airport-Collaborative Decision Making
ADR	Airspace Data Repository
AFUA	Advanced Flexible Use of Airspace
AIMA	Airport Impact Model Assessment
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information, Regulation and Control
AIRM	ATM Information Reference Model
AIS	Aeronautical Information Service
AMAN	Arrival Manager
AMC	Airspace Management Cell
ANSP	Air Navigation Service Provider
AOBT	Actual Off Block Time
ATN	Aeronautical Telecommunication Network
FOC	Flight Operation Center
AOP	Airport Operations Plan
AOR	Area of Responsibility
AOWIR	Aircraft Operator 'What-If' Reroute tool
API	Arrival Planning Information
APP	Approach
APT	Airport

ARCID	Flight identification
ARN	ATS Trunk Route Network
ASM	Airspace Management
ATC	Air Traffic Control
ATFCM	Air Traffic Flow and Capacity Management
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATOT	Actual Take-Off Time
ATS	Air Traffic Services
ATSU	Air Traffic Service Unit
ATT	Achievable Target Time
AU	Airspace User
AUP	Airspace Use Plan
B2B	Business-to-Business
CASA	Computer Aid Slot Allocation
CDM	Collaborative Decision Making
CDR	Conditional Route
CHMI	Collaborative Human Machine Interface
CONOPS	Concept of Operations
CTA	Controlled Time of Arrival
CTFM	Calculated Trajectory Flow Management
CTO	Controlled Time Over
CTOT	Calculated Take-Off Time
DCB	Demand and Capacity Balancing
dDCB	Dynamic Demand and Capacity Balancing
DCT	Direct Route

DDR	Demand Data Repository
DMEAN	Dynamic Management of European Airspace Network
DNM	Directorate Network Management
DOD	Detailed Operational Description
DPI	Departure Planning Information
EAD	European AIS Database
EAP	Extended ATC Planner
ECAC	European Civil Aviation Conference
EET	Estimated Elapse Time
EFPL	European Flight Plan
EOBT	Estimated Off Block Time
EPP	Estimated Projected Profile
ETA	Estimated Time of Arrival
NMF	Enhanced Medium/short-term planning phase Flow Management System
ETO	Estimated Time Over
ETOT	Estimated Take Off Time
EUROCONTROL	European Organization for the Safety of Air Navigation
FAB	Functional Airspace Block
FRA	Free Route Airspace
FIR	Flight Information Region
LTM	Flow Management Position
FMS	Flight Management System
FPFS	First Planned First Served
FOC	Flight Operation Centre
FPL	Flight Plan
FUA	Flexible Use of Airspace

HMI	Human Machine Interface
ICAO	International Civil Aviation Organisation
ID	Identifier
IER	Information Exchange Requirements
INAP	Integrated Network management & ATC Planning
iRBT	Initial Reference Business Trajectory
iSBT	Initial Schedule Business Trajectory
KPA	Key Performance Area
KPI	Key Performance Indicator
LCM	Local Capacity Manager
LTM	Local Traffic Manager
MCDM	Collaborative Decision Making Framework for NMF
MDI	Minimum Departure Interval
MET	Meteorology
MIL	Military
MIT	Miles-In-Trail
N/A	Not Applicable or Not Available or Not Assigned
NATS	National Air Traffic Services (UK)
NM	Network Manager
NMC	Network Management Cell
NMOC	Network Management Operational Cell
NMF	Network Management Function
MPR	Most Penalizing Regulation
NOP	Network Operations Plan
OAT	Operational Air Traffic
OC	Occupancy Count

OFA	Operational Focus Area
OFPL	Operational Flight Plan
OI	Operational Improvement
OPS	Operations
OSED	Operational Service and Environment Description
OTMV	Occupancy Traffic Monitoring Values
POB	Number of Persons on Board
P&S	Processes and Services
RAD	Route Availability Document
REQ	Requirement
R/T	Radio/Telephone
RTFM	Regulated Trajectory Flow Management
SAM	Slot Allocation Message
SBT	Shared Business Trajectory
SES	Single European Sky
SESAR	Single European Sky ATM Research
SIBT	Scheduled In-Block Time
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SLC	Slot Requirement Cancellation Message
SMS	Short Message Service
SRM	Slot Revision Message
SOBT	Scheduled Off Block Time
STAM	Short-Term ATFCM Measures
STAR	Standard Instrument Terminal Arrival Route
SWIM	System Wide Information Management
SWP	Sub-Workpackage

TDI	Target Deviation Indicator
TMA	Terminal Manoeuvring Area
TLDT	Target Landing Time
TOBT	Target Off Block Time
TONB	Take Off Not before
TSA	Temporary Segregated Area
TSAT	Target Start-Up Approval Time
TT	Target-Time
TTA	Target Time of Arrival
TTC	
TTG	Time To Gain
TTO	Target Time Over
TTL	Time To Loose
TTL	Time lo Landing
TTOT	Target Take Off Time
TTREV	Target Time Revision
TTW	Target Time Window
UC	Use Case
UDPP	User Driven Prioritisation Process
UIR	Upper Flight Information Region
UNTL	Until
UUP	Updated Airspace Use Plan
WEF	With Effect From
WOC	Wing Operations Centre
WP	Work Package

Table 1 : List of Acronyms

2 Summary of Operational Concept from DOD

Fundamental to Step1 is the improvements in network operations planning that will reduce the existing gap between flight planning and execution phase. By being truer towards the real flight's execution representation, an improved network operations planning associated to a better coordination between actors will increase the network resources usage. This will manifest in best fitted and higher quality ATFCM measures.

The gap between planning and execution is reduced by following key improvements:

- Actors cooperate to better share their plans, and network operation is linking and presenting the overview possibly with enrichment of input data as e.g. historical demand data. Local actors are, as a result, better equipped to view their local plans in a network wide context and to optimise with the support of network coordination.
- Sharing the original target measures and reasons, keep relevant operational actors alerted to the specific network optimisation measures. The current translation or recalculating of required operations to another point in the network will also exist. As a result, measures are applied and adhered to more efficient. It also entails a move towards time-based ops.
- Updates are increasingly shared and coordinated with relevant actors in a network environment following a CDM approach. The initial developments to link ATC to the network are established with the introduction of INAP through dDCB and extended ATC Planning (EAP). The associated roles LTM and EAP are building the coordination to fill the gap and organise the overlap between ATFCM and ATC.

The SESAR Network Concept Step1 foresees the following key elements:

- Historical traffic data and military airspace needs are enriched with demand data from airports and continuously updated by users;
- Dynamic early allocation of capacity values, and being more dynamic because of taking into account demand complexity;
- Network coordination (including airports) of local capacity limitations;
- Network flights optimisation measures to flights targeted to the actual geographical position of the bottleneck that needs regulation,(i.e. a shift towards time-based operation where target times for flights are shared across the network);
- Sharing medium/short-term planning phase measures that improve delivery of traffic downstream (network level medium sharing, controllers level; initial sharing);
- Updating profiles taking benefit of real-time operational opportunities with known and agreed downstream network impact.

2.1 Mapping tables

This section contains the link with the relevant DOD, scenarios and use cases, environment, processes and services relevant for this particular OSED. The following tables shall be coherent with the related Network Operations for Step 1 Detailed Operational Description (DOD) [5].

Table 2 lists all the Operational Improvement steps, within the associated Operational Focus Area.

Each OIs should in general be allocated to a single OSED, but the possibility of having multiple OSEDs for the same OIs may occur. In this case, the OSED is identified as either the 'Master' (M) or 'Contributing' (C) for the OIs.

Relevant OI Steps ref. (coming from the Integrated Roadmap)	Operational Focus Area name / identifier	Story Board Step	Master or Contributing (M or C)	Contribution to the OIs short description
DCB-0208 DCB in a Trajectory Management Context	05.03.04 Enhanced ATFCM Processes	Step1	M	• From CTOT to target times (TTO/TTA) • Target Times (TTA/TTO) sharing between NM, Airport, AU and ATSUs • Adherence monitoring of Target Times (TTO/TTA) • Initial Integration of AMAN
DCB-0308 Advanced Short Term ATFCM	05.03.04 Enhanced ATFCM Processes	Step1	M	• Imbalance alerting based on Occupancy Count/Complexity in the Network View • Hotspot notification in the Network View • CDM coordinated promulgation and implementation of STAM measures • DCB Step1 Generic Network Position (GNWP) • Network Supervision (Step1) Local DCB tools connected via B2B services to NM
DCB-0310 Improved Efficiency in the management of Airport and ATFCM Planning	05.03.04 Enhanced ATFCM Processes	Step1	C	• AOP-NOP harmonized interface and data synchronisation • Airport / AU / NM Interface for Airport Impact Assessment and TTA window improvement into ATFCM
DCB-0103-A Collaborative NOP for Step 1	05.03.04 Enhanced ATFCM Processes	Step1	C	• Massive Aircraft Diversion (MassDiv) in case of unusual and unexpected situation

Table 2 : List of relevant OIs within the OFA

Table 3 : List of relevant DOD Scenarios and Use Cases, identifies the link with the applicable scenarios and use cases of the DOD.

Scenario identification	Use Case Identification	Reference to DOD section where it is described
Medium/Short Term Planning	UC-NP-13 Assess Complexity and Sector Workload	4.2.2
	UC-NP-17 Monitor Declared Capacity Values	
	UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase	
	UC-NP-21 Prepare STAM/dDCB Measures	
	UC-NP-22 Analyse and Prepare DCB/dDCB Measures	
	UC-NP-23 Prepare and coordinate DCB measures using TTA	
	UC-NP-24 Validate DCB solution and Determine Impact on Network	
	UC-NP-26 Validate DCB solution and Determine Impact on Network	
	UC-NP-37 Notify TTA in addition to CTOT	
	UC-NP-38 Notify TTO in addition to CTOT	
	UC-NE-01 Monitor the Application of DCB/dDCB measures	
	UC-NE-06 Revision of TTA/TTO	
	UC-NE-16 Communicate TTA/TTO information	
Execution Phase	UC-NE-01 Monitor the Application of STAM/dDCB measures	4.2.3
	UC-NE-04 Detection of Demand Capacity Imbalances (Hot Spots)	
	UC-NE-06 Coordination of the STAM Solution	
	UC-NE-07 Implement STAM Solution	
	C-NP-13 Assess Complexity and Sector Workload	
	UC-NP-17 Monitor Declared Capacity Values	
	UC-NE-08 Analysis and Preparation of the STAM Solution for Cherry Picking Measures	
	UC-NE-09 Analysis and Preparation of the STAM Solution for Flow Measures	
	UC-NE-10 Coordination of the STAM Solution	

	UC-NE-11 Implement STAM Solution	
	UC-NE-12 Escalation to Network Manager	
	UC-NE-16 Communicate TTA/TTO information	
	UC-NE-17 : Facilitate and Optimise local complexity resolution	

Table 3 : List of relevant DOD Scenarios and Use Cases

Table 4 : List of relevant DOD Environments, identifies the list of relevant operational environment applicable in the DOD.

Operational Environment	Class of environment	Reference to DOD section where it is described
Capacity Data Information Availability over Time Horizon	Updated Sectorisation plan based on live resource availability and demand Capacities Revised based on live complexity / workload forecast assessments.	3.1.7

Table 4 : List of relevant DOD Environments

Table 5 : List of the relevant DOD Processes and Services, identifies the link with the applicable Operational Processes and Services defined in the DOD.

DOD Process / Service Title	Process/ Service identification	Process/ Service short description	Reference to DOD section where it is described
Balance Demand with Resources & Capabilities		Demand capacity balancing information (imbalances) and solutions detected/elaborated during planning	5.2.1.4

Analyse the Network demand and resources and capabilities; Analyse the local demand and resources and capabilities; Anticipate Hot Spots; Prepare DCB/dDCB solutions at LTM level; Coordinate DCB/dDCB solutions with partners; Prepare and coordinate DCB solutions at Network level; Collaboratively Validate DCB/dDCB solutions; Analyse latest information; Analyse the updated Network demand and resources and capabilities; Analyse the updated demand and resources and capabilities; Apply ATFCM scenarios; Request ATFCM measures; Apply regulations; Coordinate and apply DCB/dDCB solutions; Monitor measures	D6 D7 D8 D10 D11 D12 D20 D40 D41 D42 D51 D53 D54 D55 D61	dDCB/DCB solutions are analysed and implemented. The CDM process allows the validation of the DCB/dDCB solutions by all the partners. It is supported by the assessment of the impact of the solutions on the different levels of the network (regional/sub-regional/local).	
Dynamically Balance Network Capacity with Demand Detect Demand & Capacity imbalances; Analyse imbalance; Select appropriate dDCB measure; Coordinate dDCB measure with partners; Implement dDCB measure; Coordinate ATFCM Measures at sub-regional/regional level; Request sub-regional or regional action; Monitor the Network Effect; Monitor the application of DCB/DDCB measures	E10 E20 E30 E40 E50 E60 E61 E70 E90	Demand capacity balancing information (imbalances) and solutions detected/elaborated during execution phase	5.2.2.1

Table 5 : List of the relevant DOD Processes and Services

Table 6 : List of the relevant DOD Requirements, summarizes the Requirements including Performance (KPA related) requirements relevant of the OSED

DOD Requirement Identification	DOD requirement title	Reference to DOD section where it is described
REQ-07.02-DOD-0001.0006	Improve predictability of sector capacities	**6.1**

REQ-07.02-DOD-0001.0007	Using flow and capacity management techniques close to real time operations	**6.1**
REQ-07.02-DOD-0001.0008	Manage trajectory time parameters	**6.1**
REQ-07.02-DOD-0001.0010	Dynamically manage the Network Operations Plan	**6.1**
REQ-07.02-DOD-0001.0011	Assessing Network Performance through all phases	**6.1**
REQ-07.02-DOD-0001.0013	Fuel Efficiency: Reduction in fuel burn for Step 1	**6.2.5**
REQ-07.02-DOD-0001.0014	Cost Effectiveness: Reduction in cost per flight for Step 1	**6.2.3**
REQ-07.02-DOD-0001.0015	Capacity : Increase in airspace capacity for Step 1	**6.2.4**
REQ-07.02-DOD-0001.0016	Predictability: Improvement in predictability for Step 1	**6.2.2**
REQ-07.02-DOD-0001.0017	Security - collaborative support	**6.2.2**
REQ-07.02-DOD-0001.0018	Security – resilience and self-protection	**6.2.2**
REQ-07.02-DOD-0001.0019	Security – transition to implementation	**6.2.2**
REQ-07.02-DOD-0001.0020	Capacity: Increase in TMA capacity for Step 1	**6.2.4**
REQ-07.02-DOD-0001.0021	Human Performance – Role of the Human	**6.2.12**
REQ-07.02-DOD-0001.0022	Human Performance – Technical Systems	**6.2.12**
REQ-07.02-DOD-0001.0023	Human Performance – Team and Communication	**6.2.12**
REQ-07.02-DOD-0001.0024	Human Performance – Transition Factors	**6.2.12**
REQ-07.02-DOD-0001.0028	Improve predictability of sector capacities	**6.1**
REQ-07.02-DOD-EAPP.1000	Capacity: Increase in En-Route capacity due to enhanced demand management in Step 1	**6.2.4**
REQ-07.02-DOD-EAPP.1010	Capacity: Increase in TMA capacity due to enhanced demand management in Step 1	**6.2.4**
REQ-07.02-DOD-EAPP.1020	Cost-Effectiveness improvement of productivity due to enhanced demand managmenet in Step 1Safety: improvement of safety due to enhanced demand management in Step 1	**6.2.3**
REQ-07.02-DOD-EAPP.1030	Safety: improvement of Safety due ti enhanced demand management in Step 1	**6.2.1**
REQ-07.02-DOD-EAPP.1040	Fuel Efficiency improvement of efficiency due to enhanced demand management in Step 1	**6.2.5**

Table 6 : List of the relevant DOD Requirements

2.2 Operational Concept Description

Current network performance and flight operations are impacted by measures imposed on individual flights, such as departure slots (CASA regulation), re-routes and arrival holdings, in order to prevent situations when traffic demand exceeds available ATC and Airport capacity. Significant effort is put in by the service providers to reduce implementing measures and minimizing their impact. However, further improvements are limited by current operating methods that constrain an effective and predictable alignment of flight entry rates/intervals with available ATC and Airport resources.

The DCB project aims at

- manage the safety-critical situation in the Network
- minimise DCB constraints on individual flights,
- increase cost-effectiveness, i.e. better use of ATC and Airport resources,

It addresses these shortcomings through a cooperative approach between Network, ATC, Airspace Users and Airports, and the introduction of time based processes that facilitate a smoother and more predictable sequencing of flights into ATC sectors and Airports.

The concept of Dynamic DCB has been proposed aiming at bridging the gap between ATFCM, ATC and flight operations from planning to execution by proposing a more tactical and dynamic ATFCM layer to optimise real-time operations and offer a seamless transition with ATC. It needs to be organised in such a way that common situation awareness (network information sharing) and Collaborative Decision Making (CDM) processes are achieved between all ATM actors. This will enable the various organisations to continuously adjust their own actions on an enlightened and up-to-date knowledge of Demand Capacity Balancing events.

The dynamic DCB for Step 1 shall address following Operational Improvements steps:

- DCB-0308: Advanced Short Term ATFCM: Fine Tuning techniques to minimise constraints on individual flights
- DCB-0208: DCB in a trajectory management context: Target-Time Management
- DCB-0310: Improved Efficiency in the management of Airport and ATFCM Planning
- DCB-0103-A : Collaborative NOP for Step 1

2.2.1 Solution #17: Advanced Short Term ATFCM Measures (STAM) - DCB-0308

Dynamic DCB is envisaged as a process taking place on the day of operation and aiming at maintaining the balance between demand and capacity during the course of daily traffic operations. It will consist of pro-actively monitoring the traffic situation to identify and manage real-time imbalance situations. This will aim at applying all refinements needed to the long-term planning phase/medium/short-term planning phase set of DCB measures in order to restore the network stability, addressing both the flights in execution phase and on ground, minimizing the impact of any changes or disruptions (e.g. compression of traffic demand due to airport situation) and taking benefit of any opportunity ((e.g. early release or cancelation of an ARES -Airspace reservation-), involving all the partners (Airspace Users, Regional/Sub-regional/Local, ATC, …).
The Dynamic DCB shall nominally be restricted to addressing residual problems of limited magnitude (e.g. due to traffic bunching effect), imbalances of greater magnitude shall either, if expectable, have been addressed during the planning phases or, if unplanned, be addressed following a network-wide pre-coordinated plan, and recovery after capacity reduction. dDCB shall also improve the performance by optimising operations eg by reducing regulation delay.

Dynamic DCB is seen as a continuous process that:

- Monitors the situation, the demand / capacity balance through analysis of ATC workload/ Anticipates and detects possible bottlenecks;
- Adjusts airspace resources dynamically to accommodate the demand whenever possible;
- Proposes solutions to solve persistent problems with minimum impact on the airspace user's business/mission trajectory.
- Maximise safe, flight efficient traffic throughput according to the available capacity

The goal of dynamic DCB Step 1 is to prepare ATFCM for the first step of the SESAR concept "time based operations". The plan is to develop short-term ATFCM measures, so-called STAM, consisting of an approach to smooth sector workloads by reducing traffic peaks through short-term application of minor ground delays, appropriate flight level capping and exiguous rerouting to a limited number of flights. These measures are capable of reducing the traffic complexity for ATC with minimum curtailing for the airspace users. STAM is based on high-quality data for prediction and accurate traffic analysis and will be an important contribution to dynamic DCB. Therefore local STAM have been developed by some ANSP/ATSU (such as: DFS, NATS, DSNA, ENAIRE, MUAC) to supplement the use of ground regulations. Based on more fine-grained monitoring techniques, STAM aim to respond more accurately to unexpected or minor traffic excesses.

It is proposed to benefit from these local STAM practices and to include them into the defined Dynamic DCB Step 1 processes, being subject to agreed procedures between involved actors. In particular, the proposed evolution in Step 1 is:

- The definition of **a uniform process** in accordance with the ATFCM implementing rules, connecting ATFCM planning activities with medium/short-term planning phase ATFCM interventions up to the ATC working horizon.

- The definition of **clear procedures based** on this process and enabled by transparent information sharing throughout the network, to ensure Collaborative Decision-Making (CDM) involving all partners.

- The definition of **a new allocation of roles and responsibilities** between regional, sub-regional and local actors involved in network operations from planning to execution phases.

- The definition of **data sharing and common situation awareness**

- The definition of **supporting tools**:

  An innovative working environment will be proposed for the Network functions actors in order to sustain their activities taking into account their new rules, roles and responsibilities. It aims at ensuring that the capacity and demand is managed in a more coherent manner by the different local sub-regional and regional DCB services.
  The Network Working Position (NWP) is proposed with the same philosophy the Controller Working Position (CWP) has been proposed 20 years ago. It aims at integrating the human actors together with the System populated by all the on-going activities in order to support advanced features as Hotspot and STAM Management, Collaborative Decision Making,

  - *Problem Detection*
    Key of the concept is the ability of the LTM to evaluate the complexity of the traffic situation creating an issue to be analysed and appropriately solved with STAM and

the reliability of this information. Nowadays the quality of evaluation is to a high level based on LTM expertise and experience. In the future it will be increasingly supported by analysis tools allowing advanced and consistent data interpretation. Currently most LTMs are bound to monitor entry counts (hourly counts) in order to take decisions regarding demand and capacity. The introduction of the occupancy counts in the daily work of LTM greatly modifies the controllers' way of working. "Occupancy counts" are a much more precise prediction of the instantaneous density of aircraft in a sector. The declared capacity can no longer be the only reference used to take medium/short-term planning and execution phase decisions. The declared capacity will still and always be used during the long-term planning phase to evaluate imbalances with entry counts and adjust capacity accordingly (configuration plan) as well as during the medium/short-term planning phase to complete the overall picture of demand and capacity. The occupancy count (instant density of aircraft) will though become the primary reference to manage the traffic according to safety indicators. This reference will be complemented by complexity measures in order to assess the corresponding ATC workload

- *Network View*
  The implementation of STAM requires the utmost integrity and transparency in operational data exchange. This includes the provision of current available information as well as the collection and distribution of information that is currently not available nor supported by existing systems. In the future all actors will obtain most actual, accurate and updated information. Intentions of STAM will be published and accessible to all users in real time. Information sharing through instant messaging will enable Collaborative Decision Making (CDM). Actors will be able to take consistent and coordinated decisions based on the most actual information. A network consolidation of the traffic situation, based on the advisory information sent by LTMs will enable AUs to express preferences for their operational intention and propose alternative options while Network Managers may divert to coordination of network solutions when needed to avoid multiple overloads;

- *Complexity Assessment and elaboration of the DCB solution*
  The selection of DCB solutions shall produce the minimum impact on Airspace users by either
  1) Dynamic capacity adjustments based on short-notice configuration changes or negotiations with military authorities (AMC) or
  2) Cherry-picking actions based on the identification of the flights creating the complexity, thanks to enhanced flight list attributes providing LTMs with the accurate flight status and aircraft attitude, as well as what if capabilities to assess the different options.

  Possible actions would include:
  - The allocation of small ground delay to specific flights
  - Flight level reassignments or route changes negotiated with Airspace Users
  - Interventions on airborne flights in close coordination with adjacent LTMs when needed;

- *Measure Coordination*
  DCB Measures will be coordinated with the relevant actors and fed into the network systems by systematic flight data updates.

- *Measure Implementation*
  DCB Measures will be implemented by the relevant actors/systems.

- *DCB Monitoring*
  The execution of the DCB plan will be monitored in order to detect deviation.

- *DCB Supervision*
  The Supervision shall support the NMOC monitoring of the STAM activity in the Network and the elaboration of the NMOC mental picture in term of network situation awareness and understanding.

2.2.2 Solution #18: CTOT and TTA - DCB-0208

Objectives of the Target Time Management

The aim of the current DCB time-based measures (CASA regulation, STAM cherry-picking time-based) is to resolve significant imbalances detected between planned traffic demand and the available network capacity by time constraining the excessive traffic demand such that the resultant traffic quantity no longer exceeds the available capacity and is presented in a smoothed flow that allows downstream ATC processes to maximise safe, flight efficient traffic throughput according to the available capacity.

This current operating method is based on the assumption that a departure ground delay (CTOT) will be evenly propagated along the planned route, so that it will produce in time the smoothing effect in the congested area. The reality is that many factors might interfere (e.g direct routing) with the expected propagated smoothing effect of a ground delay measure, in particular when applied to manage a congested area distant from the departure.

The Target Time management solution is based on the assumption that the DCB interferences in the network will be alleviated if the concerned actors (ATSUs, AUs, Pilots) are aware about the Target Time constraints. It is presumed that improved visibility leads to improve 3D+time adherence to flight plans during the execution phase and to have a better resolution of the hotspot.

For the flights subject to CASA or STAM Time constraints, the Network Manager (NM), indeed only notifying the CTOT, communicates time of entry in the congested area(s) (TTA/TTO) to the FOC or ARO (ATS Reporting Office), the relevant Flow Managers, Local Traffic Manager and Airport Operations Centres2, in current messages which are used such as slot allocation notification (SAM/SRM) and for informing the ATM Community of deviation between planning and execution through ATFCM progress messaging (FUM /EFD) or B2B Web Services, possibly using NM remote interfaces and Flight Object (FO).

In the pre-departure phase, the NM communicates the time of entry in the congested area(s) (TTA/TTO) and associated tolerances to the FOC, the relevant Flow Managers, Local Traffic Manager and Airport Operations Centres (APOCs).

During the flight execution, the detected deviations between the agreed targets and their tolerances and the actual profile phase are detected by the NM systems and disseminated to the relevant NMF actors to allow them to assess and monitor the effects of the deviations. (ATC roles involvement will be subject to operational description, operational requirements and validation within WP4 and 5 primary projects).

[2] Monitoring and facilitation of TTA/TTO by NM, ATC and FOCs/Flight Deck needs to be addressed by the relevant work packages (e.g. WP4, WP11, etc)

Significant deviations between the planned and actual demands may lead to a revision of the target and related tolerances, in which case the advices for a target time update or cancellation is disseminated by the NM system to all stakeholders.

The Network Concept operational description focusses on the contribution of the Network Management functions to the Target Time management. The availability of a profile data shared between the air and ground components is a prerequisite required to guarantee enough accuracy and predictability of the estimated time over the target fix (ETO) in the ground NM functions' systems. It assumes as well that Flight Crew and ATC operations contribute to the efficient Target Time management while ensuring the safe conduct of the operations. Solutions must be identified in such a way as to not increase the ATCO workload.

Proposed Improvements for the Target Time Management

Target Time management is a transversal concept impacting WP4, WP5, WP7, WP11. The general overview and process is described at the B4.2 conops level, then detailed at the X.2 level.

At the P13.02.03 level, the Target Time Management concept describes the NMF process.

The NMF process proposes new improvements focus on:

- Target Time assignment (TTO/TTA) for flights involved in an hotspot
- Reconciliation of multiple DCB time-based constraints
- Management and Dissemination of Target-Time information in the pre-departure and execution phases
- Target Time deviation monitoring
- Target Time revision
- Linking the DCB and the Arrival Management procedures

New NM components will be developed to enable the NMF, ATC, AU and pilots to manage the Target Time. B2B made available with FB694 can support indeed ATC, AU and pilots but the way this is achieved is beyond the scope of this OSED. The NM components provide:

- Target-Time Collector, Processing and Publisher
  This component aims at
  - ✓ collecting the Target-Time planning from CASA and STAM processes
  - ✓ Processing the Most Penalizing Constraint
  - ✓ Publish the Target-Time (CTOT, TTO, TTA) at the slot issue time

- Target Deviation Indicator Processing and Publisher
  This component aims at
  - ✓ Processing the ETO/ETA value to determine the Target Deviation Indicator (TDI)
  - ✓ Publish the TDI

- Target Time Revision Processing and Publisher
  This component aims at
  - ✓ Processing the decision-making criteria to trigger a TT revision (update/cancel)
  - ✓ Publish the Proposal for a Target Time revision

In the context of the Step1v3 Phase I context, the NM components allow to:

- Assign and publish STAM TT for flight in the pre-departure and execution phase
- Assign and publish CASA TT for flight in the pre-departure phase only
- Publish TDI for CASA and STAM TT

- Publish TT Revision Proposal for STAM TT only
- Revise TT (update/cancel) for STAM TT only
- Implement TT (creation/update/cancel) in the execution phase using the M-CDM STAM process, procedure and support tool

Target-Time Assignment by the local DCB actor

The Local DCB actor decides about which flight to assign a Target Time in order to support the hotspot resolution. The Target Time assignment process could be based on a collaborative approach in order to take into account the constraints of the different actors (eg airports, AU) to reach an optimised and agreed solution.

Reconciliation of Multiple DCB time-based constraints

The DCB Local Actors (En-Route, Airport) will be able to apply Target Time (TTO/TTA) for the en-route and arrival congestion. At any point during the planning timeframe there will be a NM reconciliation process between all time constraints applicable to an individual trajectory. In Step1 a simple mechanism shall ensure the reconciliation of multiple STAM time-based constraints and FPFS[3] CASA time-based constraints. The CASA regulation time-based constraints will overrule the time-based STAM Measures. *To be noted that The MPR mechanism will be more sophisticated and automated for the Step2 while it will be very basic for the Step1. The rules are described in the Chapter "Operating Method".*

If the flight is involved in several hotspots, the process selects one Target Time by using the MPR (Most Penalizing Regulation).

All the time-based constraints will be collected in the NM component
- CASA constraints for flight in the pre-departure phase
- STAM TT constraints for flight in the pre-departure phase (in the form of force_CTOT)
- STAM TT constraints for flight in the execution phase

The STAM TT constraint can be issued for flight in the pre-departure and execution phases.

The TT information will contain:
- Reference Measure (CASA/STAM)
- TT value
- TT previous_value
- TT_Fix
- TT_status {creation, update, cancellation}

Management and Dissemination of Target-Time information in the planning phase

In the planning phase, only the Target Time calculated on the most penalising DCB constraint is notified to the AU and will enable the FOC to establish a trajectory to adheres to it (The Target Times on others hotspot are derived from FOC EET information included in FPL/EFPL). AU is involved in negotiating the best way to accommodate the constraint (the flight might reroute to avoid the hotspot, in which case there may be no Target-Time). When AU updates the flight plan to comply with the Target-Time, it marks the end of negotiation. Such revised flight plan to comply with Target-Time must be tagged for prioritization in airport DCB processes and A-CDM milestone handling.

[3] FPFS : First Plan First Served

Target Times (CTOT, TTO, TTA) serves as a means of flow control and are provided by NM.
NMF is responsible for

- Calculating and distribute the Target-Time (CTOT, TTO, TTA) and adherence monitoring information to DCB, ATC, Airport, AU.
- Calculating the Most Penalising Constraint when a flight is involved in several hotspots.

The Target Time are referring to constrained points, in line with A-CDM milestone. It is a progressively refined planning time that is used as an indication for flight planning and execution to coordinate at network level and enhance the effectiveness of the ATFCM measures.

- CTOT – Calculated Take-Off Time
- TTO – Target Time Over (fix)
- TTA – Target Time of Arrival
- TOBT – Target Off-Block Time
- TSAT – Target Start-Up Approval Time
- TTOT – Target Take-Off Time
- TIAT – Target time over Initial Approach Fix
- TLDT – Target Landing Time
- TIBT – Target In-Block Time

In the Step1, the CTOT remains and is back calculated from the Target Time and hence the standard A-CDM process still applied.

The Target-Time information is distributed to the DCB, ATC, Airport, FOC and Flight Crew using different supports (B2B Services, ACARS messaging, VHF radio, ….). The process to distribute the information varies depending on whether the flight is in the pre-departure or execution phases.

Management and Dissemination of Target-Time information in the execution phase

In the execution phase, a STAM Time-based Measures can be assigned to resolve hotspots, coordinated using the M-CDM STAM coordination process, and implemented based on the well-defined STAM process.

Target Time Deviation Monitoring

The monitoring of Target-Time adherence is concerning the execution phase and will be performed by NMF. The ETO/ETA at target is continuously compared with the Target-Time to produce a TDI (Target Deviation Indicator). The Target-Time deviation (i.e. the difference -subtraction- between the ETO/ETA and the TT time values) is calculated by NMF.

The Target Deviation Indicator will be enriched with the time window of adherence associated to the Target Time. This time window of adherence is named DCB Target Window (TW) and is a static parameter for Step1. The static Target Window shall depend on the status of the flight (e.g. +- 10 min after TOBT, +- 5 min after TSAT, +- 3 min after ATOT…). The precise value of the Target Window must be refined with validation exercises.

The TDI information managed by NMF is available on request for ATC, Airport, Local DCB, AUs.

The TDI information will contain:

- Reference Measure (CASA/STAM)

- Flight Id
- TDI Value
- Static Target Window Compliance {ok, nok}

Using the most up-to-date flight data[4] the LTM continuously monitor the situation to assess the ATC workload/complexity and the evolution of the hotspots. In addition,an automatic detection of Hotspot Resolution Deviation shall alert the LTM:

- When the LTM cancels a hotspot he notifies the network of its deletion when the hotspot is no longer needed. The STAM Target Times associated to this hotspot can be cancelled by the LTM and Flight crews are notified accordingly if appropriate.
- With respect to changing conditions in the flight execution phase and/or detected deviations which might lead to the appearance of new hotspots or worsening of hotspots already declared, a Target Time revision may be initiated (in the form of a proposal) by an automated NMF process. dDCB (STAM) measures may be decided within INAP and coordinated if appropriate with adjacent LTMs, and then the corresponding ATC will communicate to the pilot the measure to implement (*i.e. ATC instruction as rerouting, level capping or speed adjustment*).

Target Time Revision

With respect to changing conditions in the execution phase and detected deviation, a Target Time revision process is managed in the execution phase to propose a Target Time update or cancellation. The Target Time Revision will be only managed for STAM TT (not for CASA) in the SESAR1 Phase 1 timeframe.

- NMF will detect when the Target Time constraint of a flight is obsolete and needs a revision (update or cancellation). It will be triggered according to the defined decision-making criteria. It is proposed to trigger the revision when it is detected that the TDI is outside of the associated static Target Window or when the hotspot has disappeared (i.e. when a constraint is obsolete).

- NMF will publish a Target Time Revision Proposal (TTREV) to the Local DCB actor initiator of the constraint, the local DCB actor initiator can decide:
  - ➢ To update the STAM TT measure in re-implementing the STAM Measure (according to the well-defined STAM process defining the implementation/update procedure). A STAM TT implementation/update will be notified to the affected actors and NM.
  - ➢ To cancel the STAM TT measure. A STAM TT cancellation will be notified to the affected actors and NM (based on the well-defined STAM cancellation procedure).
  - ➢ To do nothing depending of the hotspot resolution progress.

This OSED limits the TT management process to the TT revision proposal by NMF.
The TTREV (Target Time Revision Proposal) will contain:

- Reference Value (STAM)
- Flight Id

[4] *Corresponding to the 'supporting' trajectory data: all data including air or ground computed points and altitude/speed/time estimates which are predicted by the FMS or by ground tools (e.g. ETO30 'Estimated Time Over')*

- Target Time Revision Proposal (for update, for cancellation)
- New proposed TT value for update

Linkage to the Arrival Management process

The TT information and the updated ETOs on TT locations within AMAN horizon should be used as input data into the destination's AMAN system (or Extended AMAN) for the calculation and update of the ATC constraints (e.g. CTA). When the flight approaches the destination airport's AMAN horizon the TT will be replaced/overwritten by an ATC constraints (e.g. CTA) and communicated to all interested/concerned partners. The ATC constraints is expected (when feasible and not impacting overall arrival management performance) to be inside the TT time tolerance. The pilot inputs the ATC constraints (e.g. CTA) in the aircraft's Flight Management System (FMS) as an RTA (Required Time of Arrival) and confirms that it is achievable.

The objective of Arrival management is to connect TMAs to transition airspace, including Free Route Airspace. Therefore, various ATC units need to be involved in the optimisation of arrival operations for a given TMA/airport.

With the extension of arrival management in upstream sectors, due to Extended AMAN (cross-border AMAN), delay absorption in early flight phase will be enabled.

The Extended AMAN concept recognizes the following horizons:

- **Eligibility Horizon (EH)** - the point from which Extended AMAN receives data and begins processing a sequence
- **Active Advisory Horizon (AAH)** – the point from which Extended AMAN advisories are acted upon. This defines the maximum time/distance at which trajectory data of (or most of) the traffic of interest to the Extended AMAN is available and stable enough for the ATSU to act upon.
- **Frozen Horizon (FH)** - the point at which the AMAN landing sequence is fixed and cannot be changed

Figure, below, illustrates the Extended AMAN horizons.

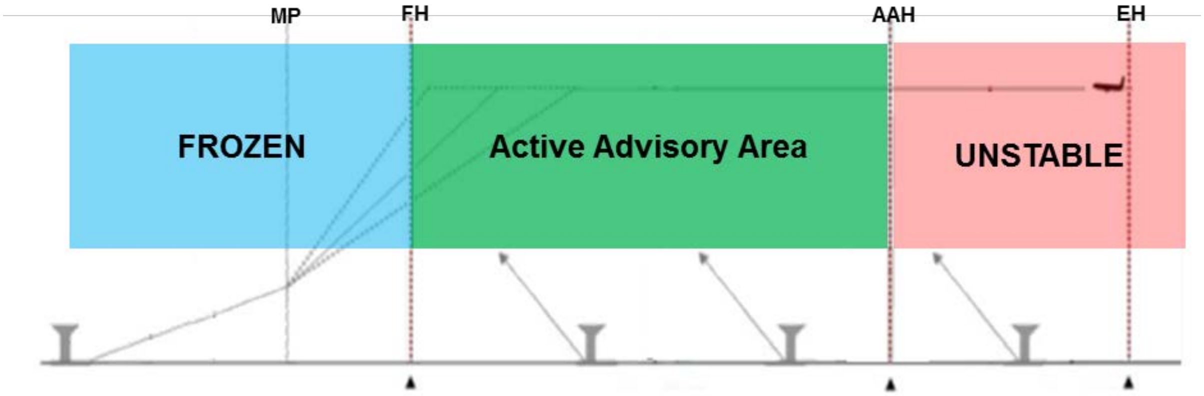


Figure 2 : Extended AMAN Horizons

The eligibility horizon, that represents the time necessary to prepare the runway planning, is 90 minutes before arrival (around 500 NM). With such a horizon, Extended AMAN will capture both ground and airborne flights and as consequence ATFCM and ATC elements will be mixed.

This means that an interface between Extended AMAN and ATFCM needs to be established because:

- Extended AMAN may impose restrictions on flight within the planning horizon (up to 500 NM and 90 minutes) for a given airport
- Extended AMAN and NMF plans must be consistent in regards to Target Time Management where and when applied.

A clear requirement that needs to be achieved, in order to establish such an interface, is that all involved actors (i.e. NMF, ATC units, Airports) share the same plan.

- The Extended AMAN shall use Airport CDM and Network information in order to prepare the arrival planning.
- The Extended AMAN Planning must be shared with the neighbouring ANSP, NMF and all relevant actors, for common situation awareness, to allow assessing the impact of the Extended AMAN operations. Data exchange (Extended AMAN measures) shall be ensured via standardised messages (i.e. common data/message format) available to the community in order to be reflected into the DCB Occupancy Counts.

In case of interferences between DCB and Extended AMAN constraints, solutions must be identified in such a way as to not increase the ATCO workload. It takes place within the framework of INAP to facilitate a seamless and coordinated process from dDCB to ATC planning.

To support such reconciliation mechanism, the following principles are recommended:

- In case of flight crossing a declared hotspot within the active advisory horizon, and already subject to a TTO (CTOT) before departure, the Extended AMAN delay sharing strategy may act on the flight, in order to meet its sequencing requirements, in the limit of the DCB static tolerance window declared by DCB until the hotspot area is crossed.
- In case of an Extended AMAN delay sharing strategy creating a hotspot within the active horizon, the concerned Local-DCB/INAP actor will be responsible for arbitrating between the Extended AMAN constraint and unexpected DCB imbalance. The local-DCB/INAP may:
    - ➢ Refuse the Extended AMAN proposal to suppress the hotspot.
    - ➢ Accept the Extended AMAN constraint and resolve the hotspot via a STAM measure.

2.2.3 Solution #21: Improved Efficiency in the management of Airport and ATFCM Planning – DCB-0310

The enhancement of the airport arrivals process is proposed through the management of a Target Time of Arrival (TTA) allocation.

The dissemination of the TTA information (for regulated flights at arrival) to the destination airport with a 2-hour time horizon will allow the airport to perform an Airport Impact Assessment aiming at reducing the knock-on effect on the aircraft departure, e.g. using the previous off-block time for the next rotation. An impact Assessment model will be used to detect deviation from the AOP, taking into account all possible circumstances such as traffic peak situation, airport layout, capacity limitation, type of aircraft, time of day, Following this Airport Impact Assessment, the Airport will inform the Network Manager of the impact of airport with value about the severity of the impact, and potentially will make proposal that is not mandatory to apply with proposed improvement window for TTA flight [TTA-min, TTA+max].

The Network Manager will analyse the Airport feedback and the situation at Network level in order to evaluate the possibility of changing the constraints, and if possible will set the final TTA which will be allocated within the proposed improvement window. In order to propose a new TTA, the Network Manager will use existing slot management procedures (sticky slot, slot shift/swapping, forcing or negotiate a flight exclusion with the LTM) in order to force CTOT and propose new TTA.

A proper use of the TTA information will allow the airport to move from the reactive management to the proactive management by feeding back with new messages to the Network Manager with the TTA impact on the airport.

This arrival monitoring and airport impact assessment will improve the ground management (park/gate management, handling resources and staff management ...) and will reduce the impact on departures. It will improve the airport capacity management process and thus improve the overall network performance by improving traffic evolution monitoring. The Network Manager would have more accurate airport capacity and demand data and new DCB measures could be triggered.

This process is supported by the data exchange update between the Airport Operations Plan (AOP) and the Network Operations Plan (NOP). In order to have a common, coherent and consistent plan for all airport and Network Manager Functions stakeholders.

2.2.4 Solution #20 - MassDiv – DCB-0103-A

To enhance the planning process, the NOP will use available information provided by the airports. The NOP will continuously provide up-to-date information on the Network situation. This is especially important in the case of unusual and unexpected situations.

A dedicated process, relying on the NOP, has been elaborated to optimise the management of a massive diversion for a major European airport or set of airports in case of unusual and unexpected situation. The process, referred to as “MassDiv” for Massive Aircraft Diversion, involves all partners concerned by the diversion (ATSUs, airports, airlines, the Network Manager). It relies on tool-sharing information among the actors and supports collaborative decision processes to identify the best option to divert aircrafts and to prepare the recovery after the end of the non-nominal situation.

The process supported by a web-based application will ensure that the controller and the flight crew are informed, as soon as possible, of the parking availabilities, according to weight category and airline preferences, in pre-defined set of alternate aerodromes.

This information will then be updated during the execution of the diversions to reflect as accurately as possible the remaining parking stands available. The process will also increase the visibility in terms of aircraft localisation to anticipate the recovery once the unusual situation is over.

2.2.5 Free Route and DCB

In current NM systems there are a few deficiencies in supporting FRA[10] In relation to the STAM concept.
In ARN and DCT networks STAM re-routings can be proposed by the NMF system avoiding the affected / overloaded airspace. However in FRA NMF currently cannot propose re-routing using Lat/Long, therefore it is limited to published waypoints or already known DCT segments. Therefore in FRA NMF can "try its best" to propose a re-routing avoiding an airspace using the Pathfinder algorhythm. The Pathfinder will best fit a route in the general direction of the flight using published Waypoints. Despite providing a Re-routing proposal, the re-routing is not expected to be optimal since it is based on Published waypoints which could in fact be 100's of NM off route (Free Routing concept is not to suppress published waypoints, but rather to offer the opportunity to Airspace Users to use them or not. So there will not be additional waypoints created for Free Routing, except for the Entry/ exit points of the FRA, but the existing waypoints will remain). To support STAM Re-routing in FRA there are 4 possible solutions:

- Not Include re-routing as part of the Catalogue of STAM measures in FRA
- Adapt NMF systems to provide optimal Re-routing proposals using Lat/Long
- Adapt FOC systems so that they know Airspace Volumes, and therefore can Re-plan to avoid
- Design FRA Airspace with additional Waypoints

As part of the DCB TTO/TTA concept it was recognised that FRA trajectories would cross airspace volumes at unknown waypoints (Lat/Longs) Therefore The TTO/TTA point would not necessarily be linked to a known published waypoint since this time is calculated at the point of entering the specific airspace volume.

A solution to this problem is described below:

NMF calculates a TT_fix (lat, long) corresponding to the Hotspot entry time and sends it to the FOC, the FOC integrates the TT_fix (as a waypoint) in the extended flight plan.

A further point to note within ATFCM is the manipulation of TMV which is carried out by ANSP's today to provide a more realistic traffic count and to remove nuisance flows from traffic counts. CHMI today allows flows to be manipulated through different parameters. One of these parameters is by Waypoint. In a FRA ATSU's will need to re-evaluate these parameters to ensure that the intended manipulations will remain in FRA.

2.2.6 SESAR 1 Exercise Outcomes for Step 1

The exercises has delivered valuable metrics and insight into today's operations and limitations. The following table shows the maturity level of the OI DCB-0308, DCB-0208, DCB-0310, DCB-0103-A

Operational Package	Operational Focus Area	OIs or Operational Services	Initial Maturity Level	Target Maturity Level	Maturity Level after the exercise
PAC05 Integrated and Collaborative Net-work Management	Enhanced ATFCM Processes.	DCB-0308 "Short-Term ATFCM"	V2	V3	V3
	Enhanced ATFCM Processes.	DCB-0208 "DCB in a trajectory management context"	V2	Intermediate V3	Intermediate V3
	Network Operations Planning	DCB-0310 "Improved Consistency between Airport and ATFCM Planning"	V2	Intermediate V3	Intermediate V3
	Network Operations Planning	DCB-0103-A Collaborative NOP (MassDiv)	V2	V3	V3

Table 7 : OIs maturity level after Step 1 Exercise outcomes

2.2.6.1 Solution #17: Advanced Short Term ATFCM Measures (STAM) - DCB-0308

- **Exercise VP-314 (2011)**

  The support tools proposed in the exercise VP314 was not completely embraced by the STAM trial participants and represented the main weakness of the experiment. In consequence, an enhanced and promising new generation of support tools for Local DCB actors (NWP – Network Working Position) is now proposed. Regards to the VP-314 results, the E-OCVM maturity level after the exercise is intermediate V3.

  An additional validation exercise (VP-522) is planned is order to assess the full OI DCB-0308 and reach the final V3 maturity :

  - ✓ Improved NWP (network Working Position)
  - ✓ Full STAM Measures catalogue
  - ✓ Implementation of the measures
  - ✓ Involvement of Airspace Users in the DCB CDM process

- **Exercise VP-522 (2014)**

The validation exercise VP-522 has identified some future improvements :

> - The concept needs to differentiate between ATC level short-notice STAM (as done in today's operations) and ATFM level tactical STAM potentially as a set of tools instead of the single tool offering a generic solution. Workflow and coordination states shall be tailored to the needs of the individual STAM measures. It needs to introduce Very Short STAM.
> - The concept needs to provide means to co-ordinate flow oriented measures (MDI, MIT) at the STAM measure level and to coordinate non-flow oriented measures (FL Cap, Reroute, Delay) at the level of individual flights.
> - STAM measures do contribute to hotspot resolution, but hotspot evolution is subject to many other external events over time. It needs to introduce the Hotspot Resolution Monitoring.
> - The look-ahead time for ground based STAM measures and the cut-off time for application of pre-tactical scenarios are sometimes overlapping. It could be investigated if the pre-tactical scenario definitions could be re-used for application of a STAM scenario on a few flights. This would make the processing at Airspace User side coherent for both cases. It needs to introduce the Predefined Scenarios.

These improvements have been developed for the OSED Release6 version.

The VP522 report concluded that the E-OCVM maturity level after the exercise is V3. Several recommendations have been proposed to improve the concept in order to reach the intermediate V3 maturity.

An additional V3 validation exercise has been planned (VP-700) in order to assess the interoperability with the DCB B2B Services and the LTM Local tool development

- **Exercise VP-700 (2015-2016)**

The validation exercise VP-5700 has identified some future improvements :

> - Enhanced CDM support tools and associated procedures: it does not impact the OSED requirements but the way they have been implemented (technical issue).
> - Enhanced what if capabilities : : the project team has decided to propose only a basic what-if capabilities (simulated Occupancy Count)
> - STAM measures for both on ground and airborne flights: it is described in the OSED requirements but not fully implemented for VP-700 (technical issue).

2.2.6.2 Solution #18: CTOT and TTA - DCB-0208

- **Exercise VP-632 (2013)**

The validation exercises VP-632 have identified limitations preventing to observe the expected benefits

> - Departure uncertainties reducing the ability to target the TTA
> - Alteration of the trajectory (Direct Route) impacting the TTA adherence
> - Lack of revision process to update/cancel the TTA when the TTA is obsolete
> - lack of smooth integration in arrival sequence; process to be developed

The VP632 report concluded that the E-OCVM maturity level after the exercise is intermediate V3. Several recommendations have been proposed to improve the concept in order to reach the maturity level V3 maturity.

Following the VP-632 validation report, some issues required:

- An additional V2 validation exercise (VP-723), planned in order to have a better understanding of the impact of uncertainties and trajectory alteration on TTA adherence and network predictability.
- An additional V3 validation exercise (VP-749), planned in order to assess the TTA revision process. The improvement concerning this point will be addressed in the next OSED version.

- **Exercise VP-749 (2016)**

The VP749 report concluded that the E-OCVM maturity level after the exercise is intermediate V3. Several recommendations have been proposed to improve the concept in order to reach the maturity level V3 maturity.

- Airspace User preferences must be integrated in the concept. SESAR 2020 projects shall work on the integration of DCB, UDPP and Airport concepts.
- Hotspot Monitoring and Revision for airport hotspots needs to be revisited within the S2020 DCB concept. On one hand hotspot centric monitoring of a feeding Traffic Volume does not work well when the true hotspot is at the runway, on the other hand, microscopic monitoring of runway landing slots during the planning phase is labour intensive and not very effective for the execution phase. We could connect this issue to the integration of Arrival Management processes and DCB.
- The integration of TTA within the AMAN needs to be continued in SESAR 2020.

2.2.6.3 Solution #21: Improved Efficiency in the management of Airport and ATFCM Planning – DCB-0310

- **Exercise VP-632 (2013)**

The validation exercise VP-632 has identified limitations :

- It has been clearly demonstrated that TTA adherence for network purposes should be followed by landing time adherence for Airport purposes, in order to prove tangible benefits to airspace users. It is recommended to initiate an activity with WP5 on the integration of AMAN and arrival management procedures into this concept
- The lack of multiple airport impact assessment for a single flight in order to monitor the improvement or degradation of the earlier impact assessment.

The VP632 report concluded that the E-OCVM maturity level after the exercise is intermediate V3. Several recommendations have been proposed to improve the concept in order to reach the V3 maturity. One of them was to add an additional V3 validation exercise (VP-749) in order to assess the ATFCM and Airport planning phase. The improvement concerning these points shall be addressed in the WP5/WP6 OSED.

- **Exercise VP-749 (2016)**

The results of the exercise VP-749 are not yet available.

2.2.6.4 #20 - MassDiv – DCB-0103-A

The concept of operations for MassDiv has been elaborated and validated during 2014, in the framework of SESAR, with the support of more than 40 experts, including ANSPs, Aerodromes, Airspace Users and the Network Manager. At the end of the validation a general consensus was agreed among the participants that the level of maturity reached in the definition of the concept, the roles and responsibilities and the operational requirements allowed to start the preparation of the operational deployment and to perform the next validation via a V4 Pilot Phase (i.e. operational procedures relying on operational systems). In May 2015, the MassDiv concept has been presented to the AOT (Airport Operations Team) which provided its formal support for the inclusion of the MassDiv tool in the NM NOP development plan. An additional support has been received from the ODSG (ATFCM Operations & Development Sub-Group) in June 2015. The maturity level reached is V3.

2.3 Processes and Services (P&S)

Two Processes have been defined in the DOD 07.02 :

- Balance Demand with Resources and Capabilities
- Dynamically Balance Network Capacity with Demand

2.3.1 Process Balance Demand with Resources and Capabilities

The details of this process can be found on:

OFA05.03.04 Enhanced ATFCM Processes;

2.3.2 Process Dynamically Balance Network Capacity with Demand

The details of this process can be found on:

OFA05.03.04 Enhanced ATFCM Processes;

2.3.3 Service

Three services have been defined in the EATMA Model :

- STAM Measures
- Hotspot Management
- M-CDM Measures

The details of this process can be found on:

OFA05.03.04 Enhanced ATFCM Processes;

2.3.4 Mapping to Service portfolio and Systems (optional for V1 and V2)

Section 5. of DOD 07.02 refers to the European ATM Architecture portal, which is updated twice a year, after each EATMA iteration cycle. The OFA05.03.04 activity views can be found on the following link:

https://www.eatmportal.eu/

➔ Working

1. Select *R&D* ;
2. Select *Operational Architecture* ;
3. Expand *OFA activity Views Step 1*;
4. Expand *OFA05.03.04*;
5. Select *Dynamically Balance Network Capacity with Demand using STAM*.

Hereafter is presented the DCB EATMA Model

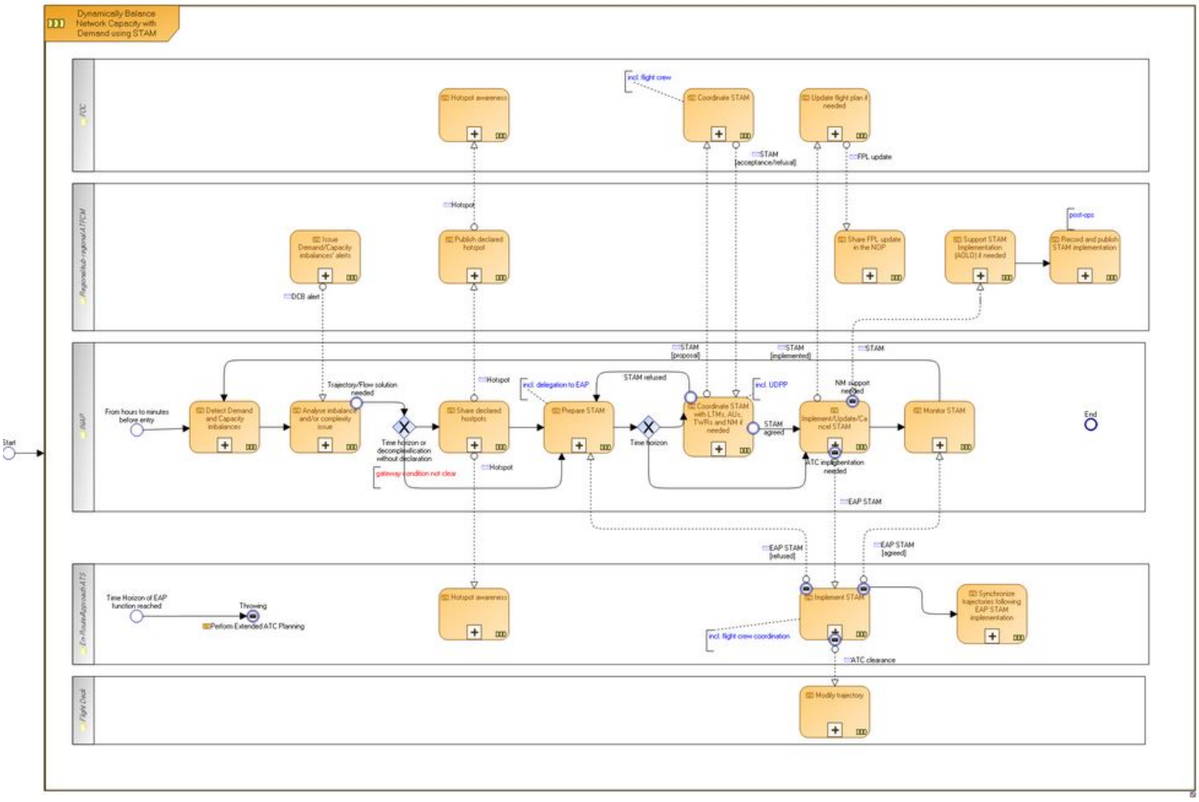


Figure 3 – DCB EATMA Model

These models can also be reviewed through the EUROCONTROL NM Hosted Application – EATMA Explorer, with a contributor licence. Main advantage is the direct access to latest versions entered in the MEGA database.

3 Detailed Operating Method

3.1 Previous Operating Method

To keep understanding with current operations, in this section the following current terms are used, although they are not formal SESAR terms:

- Strategic phase = period from 18 months to 7 days before take-off
- Pre-tactical phase = period from 6 days to 1 day before take-off
- Tactical phase = period during few hours before take-off

3.1.1 Current ATFCM implementation & Open Issues

ATFCM is currently provided by the Network Management Operational Cell (NMOC), previously called Central flow Management Unit (CFMU) in collaboration with the Airspace Users (AUs) and the Flow Management Position (LTM) of the connected Air Traffic Control Centres (ACCs). It is provided through the strategic phase, pre-tactical phase (D-6 to D-1) and tactical phase (day of operation) increasing the level of accuracy and reliability with each phase.

NMOC operations is based on Flight Plans (ICAO FPL) filed by the AUs. The NMOC builds up an overall picture of the planned traffic using also supplementary data such as route availability and ARES. The ACCs report their planned capacities to the NMOC. The NMOC matches and evaluates the forecasted demand with the reported capacity. In case of imbalances, LTM selects the appropriate ATFCM measure in close collaboration with the NMOC.

In the tactical phase the demand data is constantly updated taking into account Flight Plan updates and – for aircraft after take-off – radar data. The most up-to-date data (i.e. Departure Planning Information – DPI data from airport) often shows demand patterns that significantly differ from the predicted ones. Especially from -3 h onwards when more and more aircraft get airborne (the average duration of a flight in the ECAC area is ~1 hour), the demand figures change with every minute. Also the originally planned capacity may shift for various reasons, e.g. due to adverse weather conditions or short-term operational anomalies.

Traffic forecasts based on hourly entry counts allow for uneven distribution including unacceptable traffic bunches. This obvious deficiency led to the development and use of occupancy counts to provide for more detailed analysis of such transient overload situations. The limited accuracy of traffic predictions, even on the relative short-term, is still a major obstacle for effective selecting and timing of ATFCM measures.

In case of overload the LTMs analyse the situation and select the least penalising ATFCM measure in collaboration with the AUs and NMOC. Frequently the problem can be solved by changing just those few flights with a significant impact on the complexity and thus contribute most to the workload, a process referred to as “cherry picking”. E.g. if the overload threshold is only slightly exceeded by a few flights, it could be enough to reroute, slightly delay or level cap just a few flights and let all other flights proceed as planned without regulation.

The following are the main draw backs in current cherry picking operations.

- The solution of one problem can create further problems at up- or down-stream ACCs: E.g. in case of a level capping or rerouting flights may enter into another down-stream ACC than originally planned, causing it to be overloaded. A reduction of a landing rate at an airport may result in an overload at an up-stream ACC through queuing up.
- As long as the local measures are not communicated properly those up-/down-stream ACCs concerned will be confronted with the overload without notice, causing additional short-term knock on measures.

- In case of multiple measures for one flight, these measures can be inconsistent, e.g. a flight is first delayed and then accelerated.
- The period for restrictions at airports cannot be predicted with enough accuracy, thus necessary ATFCM measures may need to be applied on very short notice. A specific problem is the recovery from restrictions at airports. A sudden recovery in one region can result in an uncoordinated bunch of traffic in another.
- A lack of coordination impedes ACCs with available capacity to help off-load overloaded ACCs and thereby to reduce the overall impact of an ATFCM measure.
- AOs need a reporting tool for justification of “voluntary” departure delays, rerouting or flight level cappings towards management, as even minor delays and rerouting have financial effects (fuel consumption, delay costs etc).

The current ATFCM system suffers of some weaknesses:

- *Lack of flexibility*

    - For some ATSUs the current ATFCM system is too rigid and does not allow enough pro-activity in the tactical phase. Because of the high degree of uncertainty in the system, the perceived safest course of action is taken – namely regulation.

    - Often decisions to balance demand and capacity (implementation of regulations) have to be taken 2 hours and more prior to the time of occurrence of the predicted overload situation in order to ensure the needed effect of these measures.

- *Deviations in 4D flight profile from planned to actual*

  4D flight profile deviations result in Over/Under-deliveries in active ATSUs: An Over/Under delivery is the difference between the forecasted and actual traffic load. The main characteristic of an Over/Under delivery is to be unpredictable and it can vary from high negative (under-delivery) over almost matching to highly positive (over-delivery) figures. Hence the ANSP has to calculate several risk-scenarios:

    - ✓ Actual delivery of traffic exceeds the operational capacity of a regulated area and lead to an unforeseen over-delivery.
    - ✓ Actual delivery of traffic exceeds the operational capacity of an unregulated area and lead to an unforeseen over-delivery.
    - ✓ Actual delivery of traffic drops below operational capacity of a regulated area, the regulations becomes unnecessary.
    - ✓ Actual delivery of traffic drops below operational capacity of an unregulated area, in some cases human operational resources could have been applied differently with a better network effect.
    - ✓ AOs react on predicted traffic overloads and slot allocations with rerouting and level changes that transfer the over-delivery from a protected to an unprotected area.
    - ✓ Lateral and vertical rerouting by ATCOs lead to increased delivery to unprotected downstream areas without warning and ATCOs have to “close” areas for new traffic until workload has come back to an acceptable level.
    - ✓ Flights that have been subject to en-route rerouting arrive in protected areas with unforeseen delays and lead to traffic bunching.

3.1.2 Current Operational Process/procedures

The objective of this section is to describe the current state of the operational procedures in place for tactical management of traffic load at network level and local level. The two main actors involved in this process are the NMOC tactical team and the LTM (Flow Management Position) located in each ATSU.

General organisation:

The NMOC OPS room is composed of a series of blocks each with a specific function in flow management:

- IFPS: Integrated Initial Flight Plan Processing System
- ADS: Airspace Data Section, Environment Section
- AORO (Aircraft Operator RPL Office): Repetitive Flight Plan
- NMC: Network Management Cell, D-1 of operation
- FMD/Tactical Team: Flow Management Division, day of operation
- AOLO: Airspace User Liaison Officer
- MILO: Military Liaison Officer
- Engineer

Composition of the Flow Management Division:

- Team Leader: coordinator of all FMD positions
- TNC (Tactical Network Coordinator): tactical overview of the network situation, similar to a network supervisor
- CASA positions: tactical view of a network region, the number of active CASA positions depends on the regional grouping, official link between LTM and NMOC
- AOLO: representative of AU's interests in the processes of tactical flow management in coordination with FMD to :
    - filtering of rerouting proposals made by TNC taking into account AU business constraints (delay/distance/flight efficiency)
    - refusal of reroutes for delays inferior to 15 min (AU's interest)
- Support Team: assistance to the flow controller by monitoring sector load and pinpointing possible overloads (not allowed to take decisions)
- NMOC helpdesk: provision of ATFCM support to AUs
- MILO: direct link between NMOC and MIL authorities (CADF)

3.1.2.1 Capacity Monitoring

LTM:

The Flow Management Position in each ATSU is in charge in terms of monitoring/analysis of the following tasks:

- Observation of traffic load and 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;
- Analysis of delays in flight list and optimization in coordination with NMOC
- Provision of support, advice and information to ATC, airports and AUs as necessary
- Coordination with NMOC for optimum sector configuration (e.g. use of OPTICON)

NMOC:

During the Tactical phase, the NMOC monitors the delay situation and identifies flights that would benefit from a rerouting.

- *OPS Room Supervisor*
  The supervisor is in overall charge of the NMOC Operations Room.
  During the Tactical phase, all communication via fax, AFTN, SITA and e-mail between LTM and
  NMOC is addressed to the supervisor.

- *Tactical Network Coordinator (TNC)*
  The main responsibility of the TNC is to ensure that problems arising in the tactical phase are resolved in a coordinated manner that is compatible with the overall network situation. In addition TNC responsibilities include:
  Obtaining and maintaining an accurate overview of the network situation throughout the NMOC area of operations.
  Adapting and enhancing the D-1 plan from Network Management Cell (NMC) to fit into the tactical network situation.
  Ensuring assessment and revision of the operational plan in order to keep it up to date and compatible to the overall traffic situation at all times during the day of operation.

- *NMF/CASA Positions*
  Each NMF/CASA position is assigned to a predefined geographical area and responsible for:
  Observing the traffic load and comparing actual demand with monitoring values of critical sectors
  Monitoring the output of active regulations in order to reduce excessive delays and maintain equity amongst traffic partners

3.1.2.2 Coordination

NMOC:

In coordination with the respective LTM, NMOC activates regulations for sectors where it is found necessary. In NMF a regulation includes the exact activation period, the traffic volume (being the accurate description of the affected traffic flow), the declared accepted flow rate and some other parameters like the agreed reason for the regulation. In accordance with the principle of ‘First Planned - First Served’ the system extracts all affected flights and sequences according to their originally predicted arrival time in the respective airspace.

- *Tactical Network Coordinator (TNC)*
  The TNC is responsible in terms of coordination for:
  - Developing and implementing new tactical solutions to solve unforeseen problems
  - Ensuring compatibility of solutions and measures with the overall network situation using CDM
  - Ensuring appropriate information of all involved partners by adequate means of communication (telephone conferences etc)
  - Providing feedback to all partners to enhance future planning
  - Participating at teleconferences and leading the daily tactical briefing

  LTMs will normally not directly communicate with the TNC, but with the relevant NMF/CASA position.

- *NMF/CASA position:*
  The CASA position is responsible for:
  - Taking appropriate action when excess of demand over monitoring defined values is detected such as:
    - ✓ Contacting the impacted LTM to eventually coordinate additional measures like:
      - Opening additional sectors
      - Using the optimum configuration
      - Level capping
      - Rerouting traffic flows
      - Coordinating temporary additional capacity as necessary
    - ✓ Initiating the modification of an existing regulation
    - ✓ Initiating the activation of an additional regulation
  - Taking immediate action and implementing contingency plans as required following reports of sudden and unplanned changes of capacity (e.g. due to equipment failure or weather)
  - Coordinating with TNC all necessary measures impacting the network.

<u>LTM:</u>

The LTM is responsible for:

- Taking the appropriate action when excess of demand over monitoring values is detected such as:
  - Coordinating changes in ATC staff allocation to increase capacity on critical sectors
  - Coordinating with the NMOC the implementation of level capping or rerouting
  - Coordinating temporary additional capacity as required
  - Requesting NMOC to implement a regulation indicating the appropriate REASON for regulation.
- Passing details to the NMOC on:
  - All tactical changes to environmental data such as the opening and closing of airways, ATC sectors, runway changes and taxi-times at specified aerodromes, etc.
  - Changes to monitoring value figures resulting from unpredicted staffing shortages or abundances, equipment failures, adverse weather conditions, reduced runway landing rates due to low visibility, updates of military activity plan etc.
  - Changes in sector configurations, monitoring value figures, environment data and procedures affecting flight profiles for the Area of Responsibility of the LTM, in particular taxi time and runway configuration.
- Notifying the NMOC of all operational problems that could affect the traffic flow
- Ensuring the NMOC is aware of the implementation of, or changes to, local tactical ATC measures (e.g. Minimum Departure Intervals (MDIs), tactical reroutes of airborne traffic) that may affect the ATFCM network situation.

  <u>Note:</u> To avoid confusion and ensure compatibility with the Network plan, the use of tactical ATC measures that may impact the Network situation in the tactical phase is to be coordinated with the NMOC in advance whenever possible, as part of the strategic or pre-tactical planning, in particular, the use of MDIs (which shall be limited to not more than 30 minutes).

- Notifying the NMOC of ATFCM incidents ,collecting and collating data for the relevant reports as described in the LTM operating procedures.
- Executing contingency procedures and, in unforeseen and thus not described emergency situations, acting in such a manner so as to ensure that the safety of the ATC system is not jeopardised.

- Departure slot compliance monitoring for aerodromes within the LTM's area of responsibility.

3.1.2.3 Tactical measures

In this section are listed the currently used STAM measures that are applied by both NMOC and LTM after adequate coordination (see previous section). STAMs are used to mitigate the effect of regulations but also to avoid their use.

Capacity Management:
Capacity management of ATSUs consists in grouping or de-grouping sectors and managing staff upon availability in order to best adapt to the traffic load.

Tactical Rerouting
Route planning measures prepared in strategic and pre-tactical phases are applied and updated in the tactical phase. During the tactical phase, the NMOC monitors the delay situation and, where possible, identifies flights subject to delays that would benefit from a reroute.
Re-routing may be carried out either manually by a NMOC Air Traffic Flow Controller or automatically where the NMF would propose an alternative route. Additionally, AUs equipped with a NMOC Client Application may reroute their flights by means of Airspace User 'WHAT-IF' Reroute (AOWIR) system.
The AOWIR is also available for use with non-regulated flights in order to maximise the flight efficiency by allowing flights to benefit from shorter routes using opened CDR2 routes.

Level Capping
Level cappings are proposed or requested by respective NMOC and LTM to unload an overloaded sector by transferring the excessive flights into a lower sector.

Application of Minimum Departure Intervals (MDIs)
The use of MDIs may be triggered either by ATC or LTM but in any case the LTM should be informed. The use of MDI is a normal tool for normal operational use.

Miles in Trail
Miles in trail is a procedure whereby an en-route radar controller instructs a stream of traffic at the same cruising level to maintain the same speed/mach number. It is a relative short-term measure and is used to help achieving a reduction in sector complexity, thus removing the need to apply a regulation.

Slot Swapping
The NMOC will attempt to swap slots in two circumstances:

- At the request of the AU or LTM if the swap concerns the same AU
- At the request of an LTM for same or different AUs only during critical events at airports

General conditions:

- ✓ The two concerned flights must be in status slot issued.
- ✓ The two flights must be subject to the same most penalising regulation.
- ✓ The request to swap can come either via the LTM or direct from the AU.
- ✓ Only one swap per flight is accepted.
- ✓ New CTOTs must be acceptable for both flights (system parameters) and both aerodromes of departure.

It is planned for the near future to allow, under predefined circumstances, slot swapping on request of AU, even if the swap concerns more than one operator.

ATFCM Exemptions
In the regulations, a flight may be exempted for the following reasons:

- ICAO FPL exempted
- Flow Exemption
- Out of Area
- Flight Already Airborne

This measure allows mitigating the impact of a regulation.

3.1.3 Current Roles & Responsibilities

NMOC

The NMOC has a general overview of the network traffic and can act at network level on behalf of the local entities, ATSUs.

Extract from NMOC Operational Manual for Local DCB:

> *"The NMOC Tactical Team is in charge of managing the Network Daily Plan during the day of operation. The Team is staffed by Air Traffic Flow Controllers, who work at Tactical Network Coordinator, CASA and Help Desk positions, and* Tactical *Support staff. Their main activities include:*
> - *Monitor the load and developing of traffic situation.*
> - *Monitor the effect of implemented measure(s) and take any corrective action, if required.*
> - *Analyse delays in the slot list and try to resolve them in coordination with LTMs.*
> - *Provide support, advice and information to LTMs and AUs as required.*
> - *Notify LTMs of all operational problems that could affect the flow of traffic.*
> - *Collect and collate data concerning ATFCM incidents.*
> - *Execute contingency procedures."*

Local DCB

A Local DCB Position exists in every Air Traffic Control Centre throughout Europe. The LTM provides a vital flow of information from their operational ATC Unit to the NMOC as they are the "ears and eyes on the ground". They are aware of the current situation within their ATSU concerning such matters as workload, staffing, technical failures, etc. The Local DCBs are also aware of the operational situation at the airports within their area of responsibility.

Extract from NMOC Operational Manual for Local DCB:

> *"A LTM is responsible for ensuring the local implementation, by the appropriate means (national NOTAM, AIP, ATM operational instruction, etc.) of procedures which affect ATC Units or operators within the LTM's area. LTMs shall monitor the effectiveness of such procedures.*
> *Whatever the organisation, the ATSU responsible for the LTM(s) within a State is responsible for establishing local procedures, ensuring the NMOC is in possession of all relevant data during each Network phase and for checking the accuracy of that data.*
>
> *Each LTM area of responsibility is normally limited to the area for which the parent ATSU is responsible including the area(s) of responsibility of associated Air Traffic Services (ATS) units as defined in the Letter of Agreement (LoA). However, depending on the internal organisation within a State, some LTMs may cover the area of responsibility of several ATSUs, either for all Network phases or only for part of them.*
>
> *The LTM's role is, in partnership with the NMOC, to act in such a manner so as to provide the most effective ATFCM services to ATC and AUs.".*

Summary table :

Actor	NMOC	LTM
Monitoring	X(network)	X (local)
Analysis	X	X
STAM	X	X
Coordination	X	X
Implementation	X	
Dissemination	X	
Follow up	X	X
Opportunity	X	
Data update		X

Table 8 : Current roles and responsibilities NMOC/LTM

<u>Airspace Users</u>

Regarding ATFCM, the main responsibility of Airspace Users today is to comply with the measures decided between LTM and NMOC, either by refilling a flight plan if the aircraft is not airborne, or by adhering to the CTOT if the flight is regulated, or by directly executing ATC instructions.
They are today only notified in the implementation phase of the measures, they do not participate in the planning phases and are therefore not able to defend their interests (route preferences, preferred delayed flight…).

3.1.4 Recent Evolutions

The previous section describes the roles and responsibilities of the NMOC and the LTMs in the tactical management of traffic load.

Since October 2009, the Maastricht ATSU (MUAC) and the NMOC have redefined the roles and responsibilities among each other.

The main points of the Operational instruction between MUAC and NMOC are:

- during the opening hours of Maastricht, LTM MUAC is responsible for monitoring traffic loads; NMOC will only take over the monitoring as a backup in case of equipment failure at MUAC (e.g. CHMI failure)
- traffic load, flight list and delays are monitored jointly by NMOC and MUAC when a regulation is in place at MUAC
- MUAC coordinates with NMOC their intentions to use tactical measures that are planned to be applied for a significant period of time or to a significant number of flights (any other cases coordination is only required between MUAC and adjacent ATSUs)
- NMOC may propose to reroute into MUAC airspace after prior coordination with MUAC
- MUAC is responsible for providing NMOC with:
  - Environment data
  - Standard load monitoring values and standard occupancy thresholds
  - Expected Sector configuration
  - Standard Occupancy Traffic Monitoring Values (OTMVs)
  - Notification of all significant operational problems that could affect the overall flow of traffic (e.g. inability to accept reroute scenarios)
  - Implementation of, or changes to, local tactical capacity management plans (e.g. Minimum Departure Intervals (MDIs) or tactical reroutes of airborne traffic) that may

affect the overall Network situation (note: this requirement relates to the use of the measure and not to details on each individual flight affected|)

- Significant ATFCM incidents and occurrences, and collecting and collating data for those reports as detailed in the relevant LTM operating procedure

The review of the original roles and responsibilities defined in the NMOC's ATFCM operational handbook was triggered by the recent development of a new monitoring parameter: the occupancy count.

3.2 New SESAR Operating Method

In this section the following formal SESAR terms are used:

- Long term phase = period from 5 years to 6 months before take-off
- Medium/Short term planning phases start from 6 months up to a few hours before departure

3.2.1 Solution #17: Advanced Short Term ATFCM Measures (STAM) - DCB-0308

3.2.1.1 General Principles

NMF team prepares a strategy from the analysis of expected traffic, Airspace Use Plan and Airspace configuration covered when necessary by predefined scenarios Ground delay measures. This Strategy forms the baseline to start dynamic DCB (dDCB) activities.

Dynamic DCB is a process taking place on the day of operation. The goal is to maintain controlled balance between demand and capacity during the entire course of operations, by continuous and pro-active traffic monitoring to identify and manage imbalance events in real time.
It is therefore planned to apply all refinements available through the set of STAM measures including:

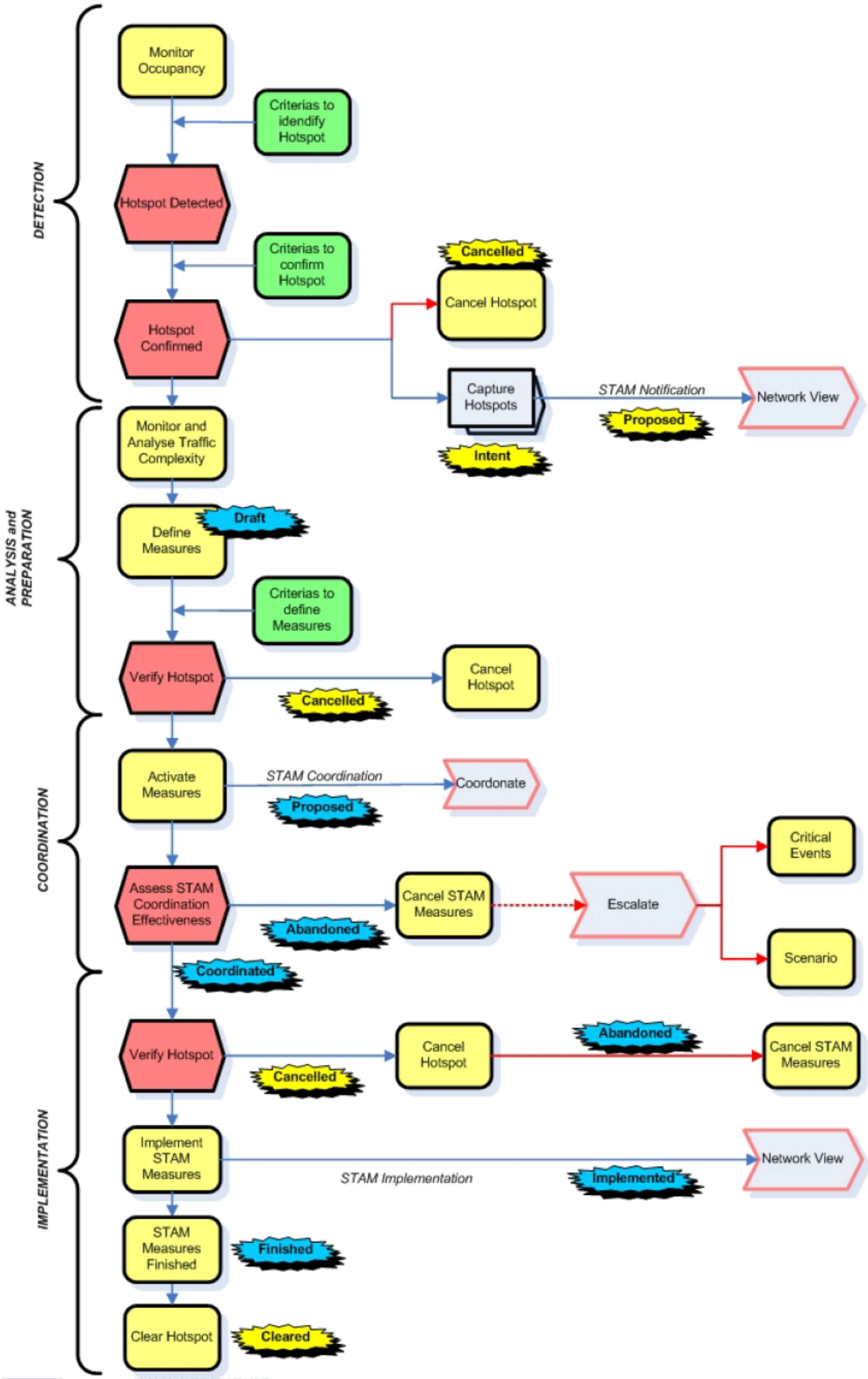
- smoothing the sector workload by reducing traffic peaks in order to maintain network stability, addressing both the on-ground flights and airborne flights
- minimizing the impact of any disruptions (e.g. compression of traffic demand due to delay in congested sectors)
- taking any opportunity (e.g. early release of ARES), involving all partners (Airspace Users, Regional/Sub-regional/LTM, ATC etc.)

The Dynamic DCB shall nominally be restricted to addressing problems of limited magnitude (e.g. traffic bunching effects), imbalances of greater magnitude shall be addressed either, if expected, during the planning phases or, if unplanned, following a network-wide pre-coordinated plan or as a critical events (UDPP). In addition dynamic DCB focuses on a look ahead from 4 hours to around 30 min prior to entry into the congested area.

Dynamic DCB aims at enhancing the ATFCM process with the following main features:

- Dynamic DCB will provide more flexibility and efficiency to the ATFCM network by the reduction of regulation effects (ATFCM slot allocation measure) and by proposing new additional measures (STAM)
- Dynamic DCB will propose a new process with new roles and responsibilities for the local/sub-regional managers, network managers and AU.

The Dynamic DCB process is decomposed in several parts (Figure **4** : The Dynamic DCB process):


DETECTION
Monitor Occupancy
Criterias to idendify Hotspot
Hotspot Detected
Criterias to confirm Hotspot
Hotspot Confirmed
Cancelled
Cancel Hotspot
Capture Hotspots
STAM Notification
Network View
Proposed
Intent
ANALYSIS and PREPARATION
Monitor and Analyse Traffic Complexity
Define Measures
Draft
Criterias to define Measures
Verify Hotspot
Cancel Hotspot
Cancelled
COORDINATION
Activate Measures
STAM Coordination
Coordonate
Proposed
Assess STAM Coordination Effectiveness
Cancel STAM Measures
Abandoned
Escalate
Critical Events
Scenario
Coordinated
IMPLEMENTATION
Verify Hotspot
Cancel Hotspot
Cancelled
Abandoned
Cancel STAM Measures
Implement STAM Measures
STAM Implementation
Implemented
Network View
STAM Measures Finished
Finished
Clear Hotspot
Cleared

1596

Figure 4 : The Dynamic DCB process

Hotspot Detection

Hotspot detection is based on accurate and reliable prediction of imbalances between capacity and demand. The imbalance prediction will be based on supporting tools displaying hourly entry counts and occupancy counts and on local analysis. The use of occupancy counts with OTMV (peak, sustain, overload duration, duration of counting) is the main enabler as advanced monitoring techniques are required for the application of targeted STAM. The confidence that some LTMs have developed in respect of this monitoring technique has allowed them to develop specific responses to specific issues, for which regulations are not or less efficient. The availability of occupancy counts has now given the LTM the opportunity to take decisions closer to real time because of advanced credibility is available from 3-2 hours prior to operation.

The occupancy counts will allow calibration of OTMV parameters for each sector to reflect workload of executive and planner controller:

- **Peak**

  The peak represents the maximum number of flight that could be handled by a sector. When the Count > Peak, it indicates a potential hotspot.[5]

- **Sustain**

  The Sustain represents an acceptable number of flights that could be handled by a sector under specific circumstance, in particular if the duration of the overload is not too long. When the Count > Sustain and Count < Peak, it indicates a potential hotspot.

- **Overload duration**

  The Overload duration represents the maximum duration beyond which a potential hotspot should be considered in case of Count > Sustain.

  As an illustration, the criteria to identify a hotspot could be: The occupancy counts are above OTMV peak or the occupancy counts are continuously between Sustain and Peak OTMV for a period of 20 minutes or longer.

- **Duration of counting**

  In general the duration of counting for occupancy counts correlates directly with the workload of the controller positions (i.e. number of flights to manage: flights on frequency and flights soon to be on frequency).

Local detection of possible hotspot will be identified by the LTM and notified to the Network Operation Plan (NOP).

- The LTM monitors the predicted workload (occupancy counts with OTMV criteria to identify hotspot or complexity methodologies).
- The LTM identifies if the peak can be dealt with using Capacity measures:
  - ➢ If a capacity measure is a solution to the traffic overload, the hotspot is not captured to the NOP and the LTM monitors the traffic evolution.
  - ➢ If a capacity measure does not solve the traffic imbalance, the LTM manages demand measures. Depending of the time-horizon and flight status, the LTM

[5] Hotspot: It represents a potential traffic peaks i.e. periods for which the defined OTMV is exceeded during a certain period of time.

- ✓ Confirmes the hotspot, captures the overload time period of the hotspot (hotspot status = intent) and notifies to the NOP. A STAM Notification is sent to NOP (hotspot status = proposed).
- ✓ Does not capture an hotspot because the flight is airborne and time horizon is too short. The LTM will manage a V-STAM (i.e. the STAM measure will be implemented without an hotspot declaration and without a coordination process).

The introduction of the network view functionality in the NOP will allow all the actors to share the information about potential STAM application areas. The development of an interactive messenger function will enable all actors to communicate and negotiate measures, the STAM coordination and implementation.

Analysis and Preparation

The LTM starts the analysis of the traffic for traffic volumes for which there is a confirmed hotspot
The key parameters analysed by the LTM to support decision-making are:

- Predictability: assessing data integrity based on the precise flight status (planned, confirmed, ATFM regulated, cleared for departure, loading terminated, doors closed, pushed back, taxiing, airborne, etc …) in order to evaluate the quality of the information.
- Complexity: complexity cruve and flight list/flow counts show the flight or flow relative complexity i.e. the contribution of the individual flight or the contribution of a flow to the complexity of the situation. This traffic complexity analysis may be based on the LTM's experience or may be supported by some basic tools.

After analysis of the complex situation, the LTM shall take an option for a measure:
CAPACITY MEASURE:

- Before resorting to demand measures, the LTM tries to adjust capacity values at short-notice to absorb the upcoming traffic overload (Capacity measure). The dynamic optimisation of the capacity within the ACC can be done through a temporary sector configuration change (e.g. a 30min sector de-grouping), if the transition can be prepared and managed in optimum safety conditions. Because sector de-grouping is a sensitive period, de-grouping should not be envisaged for less than a minimum period of time (e.g 30 min). It may be supported by coordination with military authorities as AMC (e.g. negotiation of an exercise shift by 5 or 10min) if the ATSU's capacity is affected by the activation of reserved areas.

DEMAND MEASURE

- At or close to two hours before sector entry time, there is a high probability (depending TMA sector or not, A-CDM or no A-CDM, …) that the occupancy prediction is correct, some flights are already airborne, others are close to departure, and only few flights may be re-planned. If after adapting the capacity the occupancy still calls for action, the LTM applies a STAM Measure (a Demand Measure type).
- The selection of flights candidates for STAM Measures can be proposed by predefined scenarios.
- Depending on the type of overload and the impacted sector , the LTM chooses between two types of STAM Measures:
  - ➢ Cherry-picking measures: selecting specific flights in the flight list;
  - ➢ Flow measures: selecting a group of flights belonging to a characterized flow.

The decision between flow or cherry picking type measure may be anticipated in some cases. In the case there is no straight forward identification of the type of measure, the priority is given to cherry-picking measures which are less invasive and Flow measures are used as fall-back solution if the problem cannot be solved by cherry-picking.

- In order to cherry pick**,** the LTM assesses the occupancy flight list and the associated complexity over the peak period to determine the flights eligible for STAM according to their contribution to the complexity of the situation.
- For flow identification, the LTM may use the occupancy flight list or the flow counts information to identify the flows or sub-flows contributing to the complexity of the situation.

  Decision is taken regarding the impact of the measure:

  - at the level of the individual flight
  - in terms of the number of impacted flights
  - the impact on the network

  Example of Demand measure: two or three flights are asked to avoid the sector and a group of flights is asked to delay their departure. (The number of flights that can still be held on the ground at the airport may also influence the decision.)

- Applicable measures are the following:
  - For flights still on ground (typical issue: en-route overload or overload on departure sectors):
    - ✓ Delaying specific flights on ground by a few minutes (typically less than 10min): **Take Off Not Before (TONB)**
    - ✓ Sequencing specific flights on ground by applying departure time intervals: **Minimum Departure Interval: (MDI)**
    - ✓ Negotiating Flight level or route changes (e.g. to avoid sector during a period) before flight is constrained by flight operations (flight briefing sent to pilot, fuel is loaded etc.): **level-capping measure**
    - ✓ **Change of SID**: this measure may be conditioned by the local noise abatement procedures at the airport or the existence of preferences.
  - For flights already airborne (typical issue: en-route overload or overload on TMA), if safety may be compromised and the problem could not be entirely solved by putting measures on non-departed flights:
    - ✓ Applying speed limits or targets or distance intervals: Miles in Trail (MIT)
    - ✓ Applying limited level/route reassignments to off-load sector
    - ✓ Adapting arrival routes to re-balance TMA entry times (case of arrivals)

The proposed DCB plan (STAM Measures) will be assessed with a basic what-if based on the current and simulated traffic situation reflecting the on-going planned DCB solutions, i.e. the Predicted Workload (Entry Count, Occupancy Count) will display figures based on three options:

- Traffic situation based on the current flight plan
- Traffic situation based on the STAM “proposed+for coordination+coordinated+for implementation” status

- Traffic situation based on the STAM "draft" status

Coordination

The coordination phase starts when the LTM[6] Requester decides to apply the selected STAM and informs the involved actors (ACC LTMs, Airport LTMs, AUs, and NM). A "**STAM Coordination" message** is sent to involved actors (STAM status = 'proposed') between 2hrs and 30min before entry time.

For cherry picking, involved actors are:

- The LTM Provider[7], who shall accept or reject the proposed STAM
- The LTM impacted by the measures
- The concerned AUs who shall react to the STAM Coordination message for their own flights on ground by:
    - adhering to the departure delay if a delay has been proposed
    - re-filing the flight plan in case of a proposed rerouting or FL change
    - rejecting the proposal

For Flow measure, involved actor is:

- The LTM Provider, who shall accept or reject the proposed STAM
- The LTM impacted by the measures

NOTE: The AUs, are not included in the flow measure coordination process but they are notified of the measure. Each concerned AU receives a STAM Implementation message for each concerned flight by the measure.

In case the LTM assesses the STAM does not solve the problem, the case could escalated to the Network Manager if appropriate.

When the coordination process is completed, the LTM Requester changes the STAM status to 'coordinated'.

Implementation

The implementation phase starts when STAM is "coordinated" and STAM measure is accepted. The LTM Provider implements the STAM measure with relevant local DCB actors between 2hrs and 30min before entry time, depending of the type of STAM to be applied.

- When STAM measure is applicable to flights still on ground, the AUs refile the flight plans. (STAM status = implemented)

[6] LTM Requester : It represents the LTM who initiates/requests the STAM measure
[7] LTM Provider : It represents the LTM who will implement the measure

- When STAM measure is applicable to airborne flights, the ACC changes the flight plan and all relevant ACC positions shall receive automatically updated flight plans (from NMF). (STAM status = implemented)

Hotspot Resolution Monitoring

When a DCB or a Dynamic DCB plan has been implemented, the resolution of the hotspot monitoring will be continually monitored in order to detect if the hotspot resolution is progressing normally according to the OTMV parameters. When a hotspot resolution deviation is detected an alert will be displayed to inform the LTM.

NMOC Supervision

The **DCB Monitor/MAP** function displays the monitoring of the network problems: List of traffic volumes versus the time to present the imbalance alert and the hotspot zone.

The **imbalance alert information** are characterised by:

- Start time
- End time
- Imbalance severity
  - ✓ Green Line : below the sustain threshold
  - ✓ Orange Line : between the sustain threshold and the peak threshold and a duration < 20 min
  - ✓ Red Line : between the sustain threshold and the peak threshold and a duration > 20 min OR over the peak threshold

The **Hotspot zone information** are characterised by:

- Start time
- End time
- Type of proposed measures
  - ✓ R : Regulation measure
  - ✓ S : STAM measure
  - ✓ C : Capacity measure (Military areas reservation is changed to allow civil traffic)
- Hotspot severity
  - ✓ Green Zone : below the sustain threshold
  - ✓ Orange Zone : between the sustain threshold and the peak threshold and a duration < 20 min
  - ✓ Red Zone : between the sustain threshold and the peak threshold and a duration > 20 min OR over the peak threshold
- Potentially resolved : Yes/No
- Reference delay
- New Delay

The **TimeLine function** displays the monitoring of the hotspot solutions: List of DCB Measures versus the time to present the progress of the hotspot resolution.

The **DCB Measures** are characterised by:

- Type of proposed measures
  - ✓ R : Regulation measure
  - ✓ S : STAM measure
  - ✓ C : Capacity measure (Military areas reservation is changed to allow civil traffic)

- Status (proposed, coordinated, implemented, abandoned, finished)

- Time Out value

- For Action or For Information

Additional displays will support the detailed analysis of the Network Situation

The **Occupancy Count function** is displayed when NMOC selects a Hotspot zone of the **DCB Monitor/MAP** or **the TimeLine.** It will support a better understanding of the hotspot.

The **Flight List function** is displayed when NMOC selects a Hotspot zone of the **DCB Monitor/MAP** or the **TimeLine.** It will support a better understanding of the flights involved in the hotspot.

The **Trajectory Horizontal/Vertical View** is displayed when NMOC selects a flight in the **Flight List**. It will support a better visualisation of the temporal and geographical trajectory changes between the initial flight plan and the updated flight plan.

The **Messenger** function supports the coordination between the actors.

3.2.1.2 DCB Toolbox of measures

The following is a description of the different STAM used by dynamic DCB.

3.2.1.2.1 Capacity Management:

Capacity Management offers three sets of measures:

- **Airspace volume configuration**: reorganizing, grouping or de-grouping sectors and managing available staff in order to adapt sector capacity to demanded traffic load. (Opening additional sectors, using the optimum configuration). This dynamic capacity adjustment is based on short-notice configuration changes (mainly for en-route sectors).

- **Capacity adjustment**: Requiring a more accurate traffic prediction, reducing the traffic complexity, the LTM shall review the monitoring values in order to create “extra-capacity”.

- **Dynamic negotiations with military authorities**: adapting the volume of ARES using vertical and/or possible modularity.

Capacity measures are considered as STAM but they only involve the internal organisation of the airspace structure. Their objective is to solve an overload issue without impacting the demand: they are transparent to the Airspace Users although the reconfiguration has to be notified to the Network Manager.

As a consequence, when an overload is detected by the LTM, and that the LTM has assessed that a Capacity Measure is a solution, there should not be any hotspot publication to the network.
Hotspots are used when the LTM has analysed that the issue involves actors outside of his area of responsibility.
A capacity measure may be identified as a solution to a traffic overload and applied at any time during execution phase provided that the time to be implemented is sufficient.
Note : In some cases the LTM may have identified the Capacity measure but may leave time for the traffic to evolve (predictability to improve) before reassessing the need for the measure closer in time to the identified traffic peak the same way it is done for demand measures.

3.2.1.2.2 Demand Management:

3.2.1.2.2.1 Cherry picking

1. **Assumption of cherry picking**

   Cherry-picking is based on the selection of the flights contributing most to traffic complexity assessed by LTMs in a given airspace/sector.

2. **Flight constraints for STAM:**

   The LTM shall analyse the flights and in a first iteration :

   - LTM should avoid already constrained flights (flights already regulated or subject to other STAM measures)
   - LTM should avoid clearly marked STAR flights
   - And he should consider AU preferences (concerning delay vs. flight level capping or rerouting options)

   Nevertheless these constraints are not absolute and as the analysis of the flight list progresses, if actions on those flights must be taken, they will.
   The ultimate flight selection will be provided based on the LTM's experience on a combination of flights and measures. The flights selected will be those for which the applied measure(s) will resolve the ATC worload/complexity problem.

   Note: in SESAR step 2 it may be envisaged to take into account the impact on the flights in terms of performance indicators.

   As a result, not all flights contributing to traffic complexity are impacted by a STAM measure.

3. **Formalisation of flight list**

   During coordination and implementation phases, the STAM candidate flights are referred to by:

   - Flight identifier
   - ADEP/ADES
   - Take-off time (from ADEP) or time over (RTE point X)
   - Aircraft type
   - …

4. **Cherry Picking measures**

- <u>*Short notice ground regulation*</u>

Reminder: in order to avoid misunderstanding and mix up between CTOT, slot tolerance window and EOBT,
The Occupancy counts presented to the LTM are a representation of the traffic, based on the CTOT for regulated flights or estimated Take Off time (estimation made by the NMF based on the filed EOBT and the local airport taxi-time parameters) for non-regulated flights. In the case of CTOT, there is a tolerance window of -5min; +10min and for the EOBT a +/-15min (ICAO standard).

A ground regulation is the update of the CTOT or TO time that will have as a consequence to shift the flight from one column to another in the display representation. The traffic counts do not take into account the tolerance windows of the take-off times:

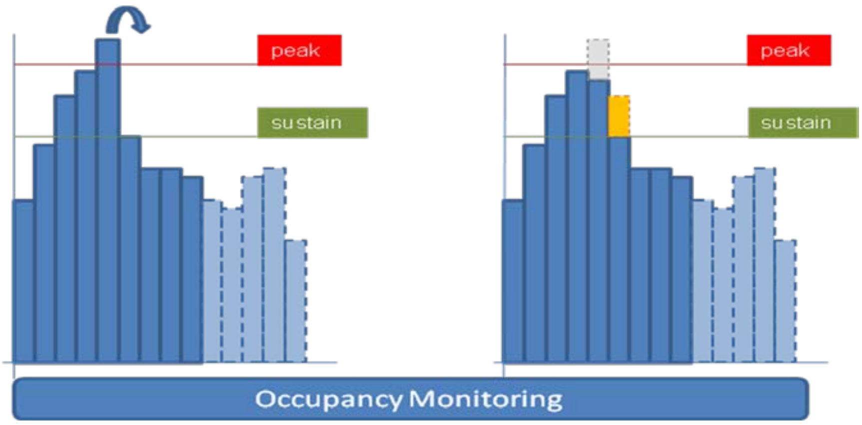


Figure 5: ground delay effect on traffic

The delay to be assigned to a flight is not limited to bounded values.
However a maximum value should be envisaged to avoid applying larger delay to flights as it is currently done for regulations.
E.g. If a delay of 15 min is applied, the flight might be out of the EOBT tolerance window and flight plan needs to be refiled.
A delay above 15 min may be considered, including a regulation, but this situation is outside the STAM scope.

- <u>*Ground delay:*</u>

Allocation of a small delay can be assimilated to targeted ground regulation (Pseudo-CTOT): slot allocation on selected flights. The flight is assigned a pseudo CTOT that is forced into the slot list and has the same characteristics as a current CASA slot: slot tolerance window of [-5min;+10min].
The delay is not limited however experience has shown that it is mostly less than 10 min.

- <u>*TONB (Take Off Not Before):*</u>

This measure consists in applying small ground delays to targeted flights valid until a given time. Afterwards the flight is not constrained on departure time.

- <u>*TONA (Take Off Not After):*</u>

This measure consists in applying a departure time constraint after a given time: until the specified time, the flight is not constrained on departure time but afterward will be constrained.
Implementation depends on following constraints:

- Flight on ground
- Flight not ATC activated
- ADEP within NMOCZ
- Coordination time with AU
- Area Traffic

- *Re-routing:*

The rerouting can be applied for airborne flight and ground flights. The route changes in coordination with AUs. The delay situation is monitored and, where possible, flights that are subject to en-route delays and would benefit from rerouting are selected. Re-routing may be carried out either manually by a Network Manager or aa LTM in coordination with AUs. Additionally, AUs equipped with a Network Manager Client Application may re-route their flights with the help of Airspace User 'WHAT-IF' Reroute (AOWIR). The AOWIR is also available for use with non-regulated or not yet regulated flights in order to maximise the flight efficiency aspect by allowing AUs to benefit from shorter routes using opened CDR2 routes.
Implementation depends on the following constraints

- Flight airborne or not (fuel)
- Refile time required
- Coordination time with AU
- Coordination time with affected LTM

- *Change of SID:*

modification of the planned SID to offload an overload departure sector
Implementation depends on following constraints:

- Flight on the ground
- ADEP within NMOCZ
- Coordination time with ATC required

- *Flight Level Reassignment/ Level capping:*

It consists of flight level reassignments regarding AUs' preferences that should be known before take-off. The use of level capping may be proposed or requested by LTM to offload an overloaded sector by transferring the excess of flights into a lower loaded sector or to solve a peak of complexity.
Implementation depends on following constraints:

- Coordination time with adjacent ACC
- Coordination time with AU

- *Speed regulation:*

Speed constraints on airborne flights are applied directly by the ATC.
Implementation depends on following constraints:

- Flight airborne
- Coordination time with adjacent LTM (optional)

3.2.1.2.2.2 Flow measure

The use of a flow measure is justified when a specific STAM measure is to be applied to a list of flights with similar characteristics. The use of flow measures is motivated by a potential reduction of the time consuming coordination workload by avoiding repetitive actions.

3.2.1.2.2.2.1 Assumption of flow

In the following paragraph two types of flows are to be considered, each type of flow for a specific purpose:

- Gross analysis of the main pre-defined flows (use LTM experience) that can be compared to identifying flow scenarios.

- Detailed analysis of flows using flow counts to identify more limited adequate sub- flows for STAM. These sub-flows will be used as the basis for STAM-F.

The focus is set on the identification of the sub-flows, based on post ops feedback.

Currently LTM only have access to pre-defined flows or Traffic Volumes that do not offer the flexibility necessary for efficient dDCB.
The introduction of sub-flows that are identified during the medium-term planning phase provide the LTM with the flexibility required for STAM.

3.2.1.2.2.2.2 Flow constraints for STAM

The definition of sub-flows are constrained by the timeframe in which the measures are applied. These constraints have to be defined per type of measure and the time to action:

- Maximum number of aircraft

- Maximum number of ACC involved/ADEP

- …

The LTM identifies the main flow that is contributing to the overall complexity of the situation and taking into account the above mentioned constraints, defines a sub-flow to which a STAM measure may be applied.
Note: The identification of main flows can be more or less easy for the LTM depending on the type of sector: in en-route sectors there are usually few major flows whereas in lower airspace sectors there may be many flows due to the various airports in the sector or close to the sector.

Note: It is foreseen that in step 2, a complexity indicator will be available to LTM to identify the flight with high contributions to the traffic complexity.

However in step 1, as it has been provided for the cherry picking, a basic display application on the LTM workspace could be available to highlight flows according to explicit criteria. (see section 4.2.2 derived requirement 3).

3.2.1.2.2.2.3 Formalization of flows

Unlike cherry picking for which flights information have a unique reference through the flight, traffic flows do not have a standardized or formalized description or name. They are specific to each ACC and referred to usually using the common characteristic of the flights (same ADEP, etc…)

For the predefined flows, usually large and major traffic flows, the identification is made by specifying a point, route, or airport (departure or destination) as pre-defined TV.

For the sub-flows (dTV) defined that will be used to apply STAM-F, the number of flights is more limited and therefore the number of parameters needed to define the flow is increased (sort of filtering of the main flow)

- Common ADEP or WPT/RTE

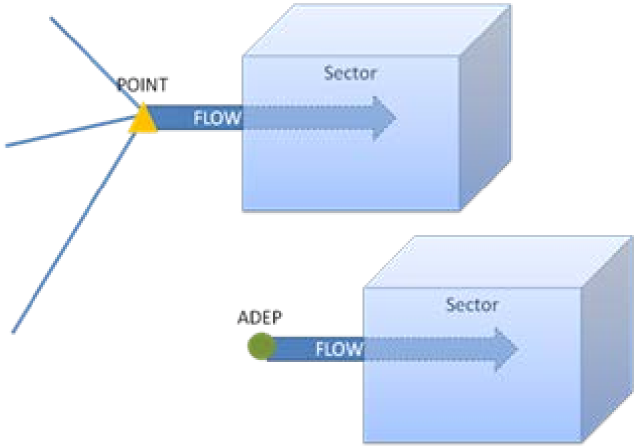


Figure 6: sub-flow definition specific to an ACC

- Time of entry
- Traffic going to… ,
- entering sector… via…,
- between FL… to FL… etc

It should be noted that as a general principle, each data from the 4D trajectory could be used to select a flow.

The coordination and implementation processes concerning measures on flows will be impacted as the description of a flow is not straight forward and is specific to an ACC. There is a real need to define a standard formalization of sub-flow (dTV) description to avoid confusion and misunderstanding between actors in different ACCs and NM.

The issue on coordination on flows is the following:

Sub-flows are defined by a LTM for a specific sector and are not part of the pre-defined set of flows/TV defined. Therefore the communication on this flow is not easily achievable by providing the main characteristics of the sub-flow. For example, if the requesting LTM refers to a flow containing departures from a particular ADEP, entering sector S between FL zzz and FL yyy, it is more than probable that the adjacent LTM will not be able to identify straight away the sub-flow (and subsequently the flights in it) in their sectors as it will not have the described characteristics in their sectors.

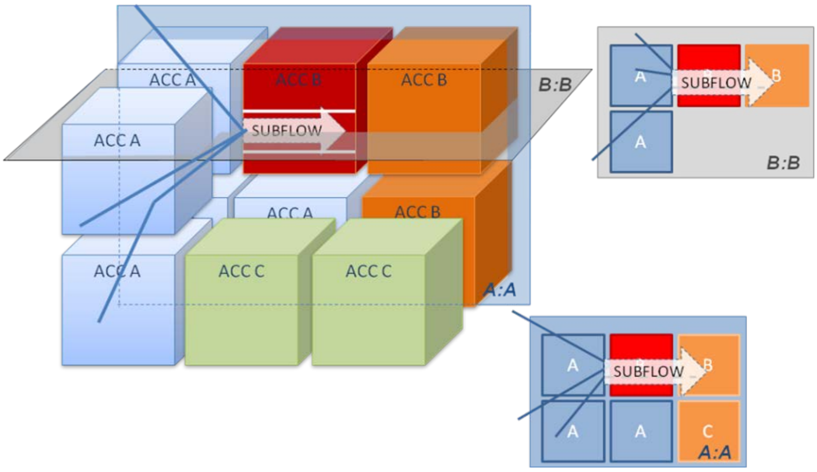


Figure 7: sub-flow definition specific to an ACC

The sub-flows shall be limited in size and in time. Number of flights within the sub-flow shall be restricted. Therefore even if the requesting LTM selects a sub-flow, the adjacent LTMs and other actors in the coordination process should be informed for each flight impacted by a STAM-F. This “translation” of the sub-flow to a flight list should be transparent to the requesting LTM to avoid increasing workload.

At the same time, the actors involved in the coordination should be informed only for the flights that will fly through their sector(s).

This principle of “translation” is applicable also for the implementation as described in the Modus operandi section concerning STAM-F for the implementation: it relies on tool support for the LTM.

The LTM working environment shall evolve in order to provide tools to support dynamically identifying sub-flows (or dynamic TV) and characterising them for coordination and implementation.

3.2.1.2.2.2.4 List of Flow measures:

- *Re-routing:*

  The route changes in coordination with AUs. The delay situation is monitored and, where possible, flights that are subject to en-route delays and would benefit from a rerouting are selected. Re-routing may be performed either manually by a Network Manager or Air Traffic Flow Controller or automatically where the NMF proposes an alternative routing.
  Implementation depends on following constraints:

  - Aircraft airborne or not (fuel consumption impact)
  - Refile time required
  - Coordination time with affected LTM

- *Change of SID:*

  A new SID is be proposed to AU, before departure, to avoid overloaded departure sector; flight pan needs to be refiled
  Implementation depends on following constraints:

  - Flight on the ground

- ADEP within NMOCZ
- Coordination time with ATC required

- *Flight Level Reassignment/ Level capping:*

  It consists of flight level reassignments regarding AUs' preferences that should be known before take-off. The use of level capping may be proposed or requested by LTM to offload an overloaded sector by transferring the excess of flights into a lower loaded sector.
  Implementation depends on following constraint:

  - Coordination time with adjacent ACC

- *Short notice ground delay:*

  Targeted ground regulation (Pseudo-CASA): Partial slot allocation on specific flows (selected flights) and for a restricted period. It is intended to give possibility to ATSU to use CASA by creating in real time the equivalent of Traffic Volume in order to apply "regulation" only on selected list of flights (Using criteria such as: traffic departing from…, going to… , entering sector… via…, between FL… to FL… etc).

  For last minute planning, the delay should be visible in occupancy counts. Therefore when ATC informs AU to delay a flight a few minutes (verbally or via a message), the AU must send a DLA, so that ATC of a TWR will not make use of the tolerance and the change is shown in the occupancy count.

- *Minimum Departure Interval measure (MDI):*

  Sequencing of specific flights on the ground by applying departure time intervals. MDI is one of the first measures to be used as they are a non-invasive performance enhancing, safety ensuring tool, mainly for traffic patterns that include a high proportion of departure flights. A MDI is initiated by the LTM, negotiated with the ATC TWR and implemented by the ATC TWR.
  Implementation depends on following constraints:

  - For MDI, the source needs to be close to the overloaded sector
  - Flight on ground
  - ADEP within NMOCZ
  - Flight not ATC activated

  The LTM/local tool communicates the MDI measure request to the ATC TWR indicating:

  - The value of the MDI
  - Adjustment parameters = [min dep separation distance / time]
  - Time banding

  The ATC TWR selects the flight to be caught within the measure depending upon start-up issues, taxi issues, etc. The information is available to other concerned actors. At the termination of the measure coordination the system should automatically highlight flights that have been subject to the measure and this forms the permanent record.

Therefore the procedure to implement MDI is the same as a ground delay. The delay necessary in order to apply the MDI is included in the CTOT if the flight is regulated a pseudo CTOT is sent to the AUs.

a) If the flight is regulated by a CASA regulation

- ✓ The LTM requests an additional ground delay on top of the CTOT to the system. The CTOTs are "forced" into the slot list.
  At this point it is needed to define how the new departure slot will be introduced into the system: either the LTM has the interface to perform the change or it is the NM that is in charge of introducing the new CTOT.
- ✓ The system sends a new slot allocation message (SAM) to the AUs.

b) If the flight is not regulated:

- ✓ The LTM requests the allocation of a pseudo CTOT to the system. The system introduces this new flight in the slot list.
- ✓ The system sends a pseudo slot allocation message to the AUs.

- <u>*Speed regulation*</u>

Miles in Trail (MIT): a STAM MIT is used when a LTM identifies a problematic flow (i.e. LFPG departures) and requests delivery at defined regular intervals (such as 10 miles) for a short period of time. The "LTM local traffic manager" coordinates this separation with en-route radar sectors. This is a relatively short-term measure taken to help achieving a reduction in sector complexity, thus removing the need to apply a regulation.
Implementation depends on following constraints:

- ➢ Flight airborne
- ➢ Coordination time with adjacent LTM (optional)

The DCB measure toolbox is summarised in following table.

TYPE	CATEGORY	dDCB MEASURES	Remarks
	Capacity Measures	**Airspace volume configuration**	Dynamic optimisation of sector configurations supported by improved tools.
		Military negotiation	FUA in medium/short-term planning phase. Improved network coordination (publication, network impact assessment).

TYPE	CATEGORY	dDCB MEASURES	Remarks
Cherry picking	Demand measures	**Re-routing**	Procedures and tools supporting better coordination at network level (e.g. publication, network impact assessment).
		Flight Level Reassignment /Level capping	Procedures and tools supporting better real-time coordination at network level (publication, network impact assessment).
		Short notice ground regulation (MDI, ADI, Targeted ground regulation…)	Progressive reduction. Replaced by targeted measures (targeted regulations and/or or other STAM).
Flow	Demand Measures	**Re-routing**	Procedures and tools supporting better coordination at network level (e.g. publication, network impact assessment).
		Flight Level Reassignment /Level capping	Procedures and tools supporting better real-time coordination at network level (publication, network impact assessment).
		Short notice ground regulation (MDI, ADI, Targeted ground regulation…)	Progressive reduction. Replaced by targeted measures (targeted regulations and/or or other STAM).
		Speed regulation to protect an airspace volume/flow (Miles in Trail)	Procedures and tools supporting better real-time coordination at network level (publication, network impact assessment).

Table 9: STAM toolbox

3.2.1.2.2.3 V-STAM[8] (Very-Short STAM Measure)

Results from exercise VP-522 validated (and results take into account from P04.0708 – EXE-VP-687):

The hotspot capture and STAM measure coordination are not consistent/efficient in terms of time spent and effort when it concerns an airborne flight with a very short time ahead (i.e 20 minutes time ahead).
The hotspot capture and notification aim at providing to the AUs information in order to support them to anticipate the potential problem. But it is related to the principle of having enough time to anticipate.
In the execution phase, for a limited time horizon, the AU does not have enough time to anticipate and to react.
In addition, in such a limited time horizon, the AU involvement in the coordination process is not possible due to the time-pressure and to decisions to be taken urgently.

[8] The naming (V-STAM) is at this stage a proposal

- To introduce the Very Short Term ATFCM Measures (V-STAM) addressing the issue of an airborne flight with a limited time ahead.
- To simplify the DCB process for V-STAM Measures:
    - The LTM shall directly select a flight for a V-STAM Measure and send it directly for implementation if no electronic coordination is needed (otherwise phone is recommended for a limited and simple coordination).
    - For V-STAM, LTM shall not be required to manually capture and to notify a hotspot. However the NM system identifies automatically the hotspot characteristics corresponding to the V-STAM measures proposed by the LTM. This hotspot is not notified to the actors but is stored in the NOP for post-ops analysis and DCB activity traceability.

3.2.1.2.2.4 Predefined Scenarios

The elaboration of STAM measures (flight selection, edit the measure…) is time consuming. However, many daily hotspots and measures are repetitive and triggered based on very well identified criteria.
Repetitive hotspots shall be identified with STAM and triggering criteria in order to elaborate predefined scenarios. A 3 stepwise process shall cover the DCB activity in medium/short-term planning phase.

1. In the long term phase for DCB: Identification of generic scenarios based on post-ops analysis
    - Hotspot
    - Type of STAM measure
    - Criteria (ADEP, ADES, TFV, …..)
    - Actors involved
    - Time-out (coordination, implementation…)
    - …..

2. In the medium-term phase for DCB: Refinement and fine-tuning of generic scenarios to build the predefined scenarios. A predefined scenario shall create a solution with mixed STAM Measures (RR, LC, TT).

3. In the short-term to execution phase for DCB: Predefined scenarios shall be applied to select flights and to create/edit automatically STAM measures

These 3 steps shall be supported by a dedicated tool.

2234 The following table describes the LTM operating method, tool, and actions according to the timeline. This table indicates the decision-making criteria at each
2235 moment.

Timeframe	LTM operating method	Tool	Action
H – 4h	Initial detection based on continuous monitoring	hourly entry counts	Check for better sector reconfiguration based on local knowledge and local tool
	In case of Entry Count load > MR (Maximum Rate)+ 10% , a regulation shall be applied to manage the demand: ***Demand Management*** In case of Entry Count load > MR, the first solution is to try to adjust the sector capacity by sector reconfiguration : ***Capacity Management*** Is overload concerning elementary or collapsed sector? • In case of overload in a collapsed sector the sector configuration should be changed. • In case of overload in an elementary sector other solutions need to be evaluated? ➢ apply a different maximum capacity rate ➢ negotiate with MIL a slot reallocation, another configuration of the ARES (thanks to modularity), different area allocation or as a very last resort in case of a severe capacity shortfall and/or unforeseen event, cancellation of the military activity	Local knowledge and expertise flight list (complexity expertise) CIV-MIL negotiation (local)	Implement Regulation OR Implement new sector configuration OR Implement capacity modification
H - 3h30	Continuous monitoring with enhanced prediction	hourly entry counts and entry counts per 20 minutes	
H – 2h30	Continuous monitoring with precise prediction	entry counts per 20 minutes <u>and</u> occupancy counts <u>and</u> complexity	

H - 2h	Cut-off time of the CASA Slot Allocation: It is no more possible to implement a regulation. Decision-criteria: A regulation can still be operative when less than 50% of the flights concerned by the regulation are departed.		
H – 2h to H – 30/H-15 min It concerns the INAP time horizon, with both dDCB and ATC planning (including traffic synchronisation) coordinating together, LTM handing over the lead to EAP when appropriate, seeking for efficiency, data sharing and continuity	In case of overload, the first step is to try to adjust the traffic demand: ***Demand Management*** Is the Entry Count overload > MR ➢ Occupancy Counts between OTMV Sustain and Peak during a period of less than 20 min => the overload is manageable without any STAM ➢ Occupancy Counts > OTMV Peak => STAM required Is the Entry Count overload < MR ➢ Occupancy Counts between OTMV Sustain and Peak during a period of less than 20 min => the overload is manageable without any STAM ➢ Occupancy Counts > OTMV Peak => STAM required Is the Entry Count overload > MR or < MR ➢ Occupancy Counts between OTMV Sustain and Peak during a period of 20 min or more => STAM required Depending on the type of overload and the affected sector, the LTM chooses between: ➢ Cherry-picking measures: affecting specific flights chosen from the flight list ➢ Flow measures: affecting a group of flights (fall-back solution if problem cannot be solved by cherry-picking)	entry counts per 20 minutes and Occupancy counts and complexity what-if capabilities	Select STAM Coordinate STAM Implement STAM
	Monitor the effectiveness of the STAM and escalate to the Network Manager if needed.	Occupancy counts and complexity	

2236 **Table 10 : Decision Criteria**

3.2.1.3 DCB Time-Based Measures and MPR

The Most Penalizing Regulation (MPR) shall allow to keep consistency between Multiple distributed DCB Time-based measures, i.e. STAM time-based measure and CASA time-based mechanism.
To be noted that the MPR mechanism will be more sophisticated and automated for the Step2 while it will be very basic for the Step1.
For Step1, CASA constraints shall overrule the STAM constraints. The “flight-under-constraint” flag information (LTM HMI, B2B Services) shall be defined with the following rules:

> The flag “Flight-under-constraint **S**” shall be created at the first flight ‘STAMed’ or the flag “Flight-under-constraint **R**” will be created for flight affected by a regulation.

It should be noted that:

- Flight with a status “flight-under-constraint **S**” or “flight-under-constraint **R**” cannot be eligible for another STAM Measure.

- Flight with a status “flight-under-constraint **S**” shall be eligible for another regulation and the on-going STAM Measure shall be cancelled.

- Flight with a status “flight-under-constraint **R**” shall be eligible for another regulation and the MPR principle shall be applied as currently.

In case a CASA regulation applies on a flight as “flight-under-constraint S” with a STAM measure not yet implemented, an automated STAM Measure cancellation shall be processed.

It must be noted that this rule is not applicable for airborne flight. It will be still possible to apply a STAM for an airborne flight under a current CASA regulation. Even if has to be avoided as much as possible (double constraint), it might be the best solution in some cases

3.2.1.4 Specific Safety Issue

The current Air Traffic Flow and Capacity Management (ATFCM) system provides a service complementary to Air Traffic Control (ATC). Constrained Air Traffic Control capacity requires a regulatory mechanism to prevent potential demand and capacity imbalances. The objectives of ATFCM are:

- safety-related function : to protect ATC from demand/capacity imbalances and thus avoid dangerous situations in the flow of air traffic
- to provide an optimal flow of traffic by best use of the available capacity in order to reduce delays and traffic congestions

Because of current low level of traffic prediction Regulation is currently used, at least 2 hours ahead of the time the problem occurs. Once decision is taken whether to regulate or not, a reversal is impossible, even if the predicted situation worsens or improves to the point that slot allocation would not have been necessary. On one hand the regulation is considered to be rigid and does not allow pro-active planning in the short-term planning phase, on the other hand it provides a strong safety protection.

The introduction of Dynamic DCB and STAM, replacing parts of current Regulations, shall provide more flexibility and better use of airspace capacity.

But a critical safety issue is identified and concerns the cut-off time of a regulation.

The cut-off time of a regulation represents the time limit for which a regulation can still be operative. Beyond this time limit and in case a STAM has been decided, there is no way to reverse and come back to implement a superseding regulation.
This safety issue is critical because it is necessary to ensure safety at the same level when implementing STAM and when implementing a regulation.

This safety issue is closely related to the criteria to define the regulation cut-off time.

For example, at Reims ACC, decision criteria are to consider that a regulation can still be effective when not more than 50% of the initially impacted flights are airborne.

3.2.1.5 STAM Measure Modus Operandi:

The following assumptions set the scope of the operating methods that are described in the following sub paragraphs. The objective is to clearly identify the initial state of the STAM process from which the implementation is going to start.

- the STAM measure has been identified, characterised, coordinated and approved by involved actors during the coordination process.
- the STAM measure only deals with one hotspot
- the system capabilities are SESAR Step 1 based on current upgraded systems.

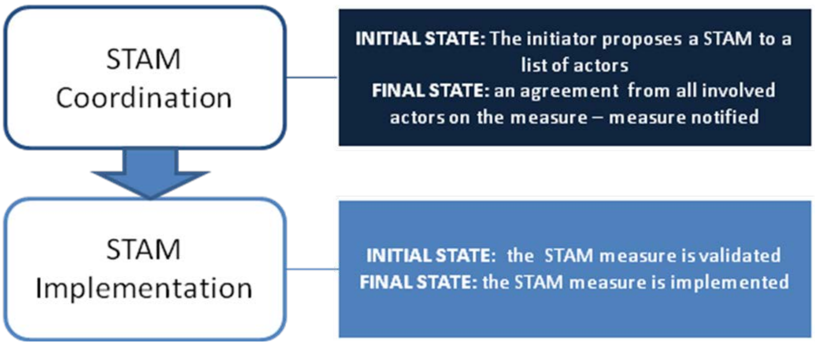


Figure 8: Implementation starting state

The objective of this section is to describe the steps required to implement the measure i.e. update the flight plan /trajectory in the system.
In the following paragraphs the modus operandi follows the rules:

- Once the flight is activated in the ATC systems (around AOBT), airborne or not, STAM measure has to be implemented through ATCO/Pilot coordination;
- Beforehand the measure is implemented by NMF (targeted delay), through a STAM Implementation Message or through IFPS refilling (route/FL CHG)

This section focuses on the implementation steps required for each type of STAM measure and application scope (cherry picking or flow).

The following elements influence the modus operandi of the STAM measures and are to be taken into account:

- STAM should preferably be applied to non-regulated flights (to avoid interference between STAM measure and remote regulation);
- In short-term planning before flight execution, a cherry-picking measure is coordinated with the concerned AU (to decide on the preferred option);
- It does not seem realistic to involve AUs in the coordination of a flow measure that should be mainly defined for the sake of network performance optimisation; however the STAM is notified to the AUs through STAM Implementation Message.
- Consider airline behaviour (cooperative or not, system / staffing capabilities) and possible incentives (STAM delay vs. regulation CTOT etc.);
- The status of the system considered in this section are the following for Step1:
  - No evolution of CASA (no tactical TV definition, slot forcing only on regulated flights)
  - Basic complexity display

3.2.1.5.1 Capacity Measures

Their objective is to solve an overload issue without impacting the demand: they are transparent to the Airspace Users although the reconfiguration has to be notified to the Network Manager.
As a consequence, when an overload is detected by the LTM and when the LTM has assessed that a Capacity Measure is a solution, there should not be any hotspot publication to the network.
Hotspots are used when the LTM has analysed that the issue involves actors outside of his area of responsibility and wants to share this data to improve situation awareness"
A capacity measure can be envisaged 4h before the overload but actually applied 30 min before. The need to implement the capacity measure will be reassessed closer to the identified traffic peak the same way it is done for demand measures.

3.2.1.5.1.1 Airspace Volume Configuration

<u>Example through a scenario:</u>

LFBBRL2 is overloaded, mainly during the first morning arrival peak in Paris (+/- 9hUTC).

The LTM monitors the collapsed group of sectors (RL2 = R2+ L2) from the early morning on.

When the overload starts to appear in the hourly entry counts, the LTM checks the exact time when the peak will happen using 20-min entry counts.

Sitting beside the ACC supervisor, the LTM knows about the airspace structure, MIL airspace reservation and activation, which is depicted in the LTM-daily plan and has been prepared by the LTM.

The LTM can now immediately check the load for LFBBR2 and LFBBL2, when the sectors are split.

If he judges this solution sufficient and safe, the LTM will coordinate with the ACC-supervisor the optimum moment for splitting the sectors.

In consequence the LTM will update the LFBB-LTM Monitor via ATC configuration.

3.2.1.5.1.2 Capacity adjustment

It is commonly recognised that sector capacity figures cannot apply to all possible situations.

Depending on traffic complexity only known in the short-term planning phase capacity values are computed more accurately considering the workload limits of the controller in charge of the respective sector.

<u>Example through a scenario:</u>

LFBBRL2 is overloaded, mainly during the first morning arrival peak in Paris (+/- 9hUTC).

The LTM monitors the load of the split sectors LFBBR2 and LFBBL2.

If this does not give a satisfactory image of the situation, the LTM also monitors the load of the collapsed sector LFBBR2 because it is known to be the most complex sector in this area.

The LTM will use occupancy counts and flow counts (Figure **9** : Example of “FLOW COUNTS view”) to check elements of complexity:

- number of flights with ADES LFP*?

=>these flights will have a descending profile

- number of flights with ADES LFPO?

=> these flights will have a descending profile and cross LFBR1

- number of flights with ADES LFRS?
- number of flights with ADEP LFRS?

=> both of these flows will cross the traffic with ADES LFP* at 90°

- number of flights overflying on odd levels?

=> these flights will cross at VELIN and require radar separation by the controller.

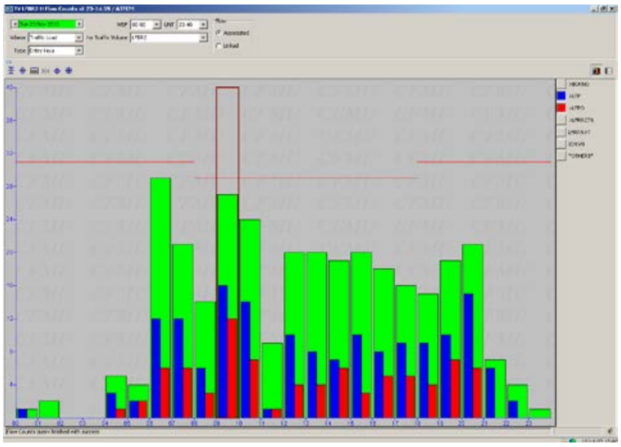


Figure 9 : Example of “FLOW COUNTS view”

Once this analysis has been done, the LTM will, if complexity allows, propose to the ACC-supervisor to increase the capacity of the respective sector by 4, from “monitoring value” to “maximum rate”, during a predefined and limited period of time.

The LTM will then update the LFBB-LTM ATC capacity of this sector via ATC environment-traffic capacity-update “read & write”.

3.2.1.5.1.3 Dynamic negotiations with military authorities

Negotiate additional airspace by requesting late changes in Mil Activity program by

- Swapping areas
- Shifting activity
- Reducing areal limits (geographical or diverse levels), using modularity of areas,
- Cancelling activity in last resort.

Example through a scenario (Figure **10** : Military Negotiation Scenario):

LFBBRL2 is overloaded, mainly during the first morning arrival peak in Paris (+/- 9hUTC).

The LTM monitors the load for the split sectors LFBBR2 and LFBBL2.

There are two important MIL areas, one on each side of the LFP* arrival routes:

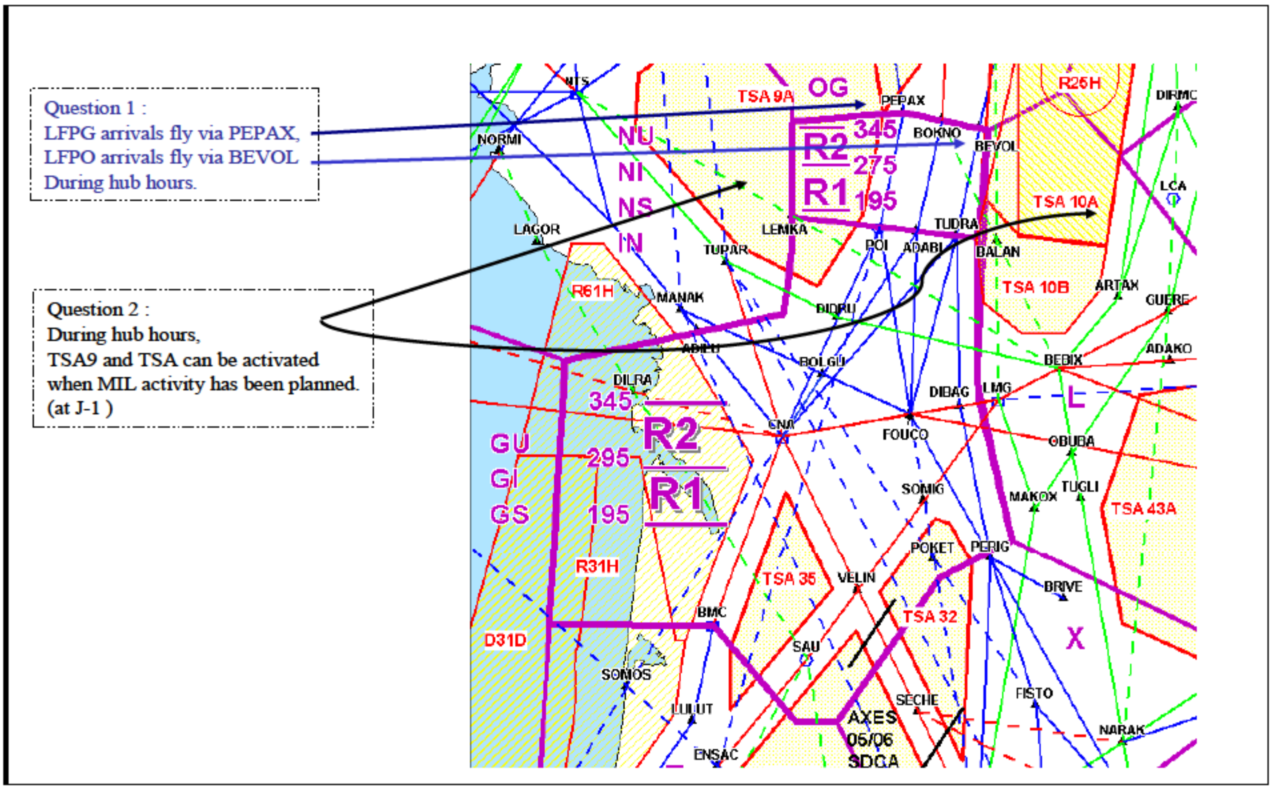


Figure 10 : Military Negotiation Scenario

The LTM receives at Day-1 the expected MIL planning and schedules, that are then sent to the Network Manager for Update (as AUP message).

Upon detection of an overload in the LFBR2 sector, the LTM analyses if the overload has a direct link to the MIL activity and if it could be reduced by the deactivation of MIL areas.

If one of the 2 MIL areas is active, the LTM suggests to the ACC-supervisor to ask the MIL authorities if the activity has already started or finished, or if it is possible to postpone the activation to a time after the detected overload (Or negotiate reshaping in horizontal and/or vertical) of the ARES).

The negotiation will include both time of activity and affected flight levels that would need to be vacated for GAT traffic.

If an agreement is reached, the LTM updates the LFBB-LTM ATC capacity of the respective sector via ATC environment-traffic capacity-update.

3.2.1.5.2 Demand Measure

During the STAM implementation various parameters will define the implementation steps:

- By whom?(the implementer(s) of the STAM may not be the one requesting/validating it)
  - ✓ *Define case by case (time to action, type of STAM, type of flights?*
- How? (through which system, what actions)

3.2.1.5.2.1 Implementation Approach

STAM measures can be applied following 2 approaches:

- Stepped approach: in prevision for a STAM, a regulation is put before the CASA cut off time in order to protect the sector from the foreseen overload. As entry time approaches,
  - ✓ Situation **a**: the foreseen overload is solved by the regulation but the LTM may propose to AUs to release flights from the regulation “in exchange” of a STAM (level capping, rerouting…). In order to update properly the flight plan at the level of the NMF, the flight must be manually excluded from the regulation and updated according to the STAM.
  - ✓ Situation **b**: the actual traffic is much lower than expected and the LTM releases flights from the regulation (exclusion).

  The general procedure scheme for this approach is the following:

  - ➢ The LTM requests a regulation to the at least NMOC 2h before entry time on a pre-defined sector/traffic volume
  - ➢ The LTM monitors the evolution of the traffic (OC) and takes the decision to release flights from the regulation using STAM-C
  - ➢ The LTM coordinates the STAM-C measures with affected stakeholders (ACC and AO)
  - ➢ The LTM implements the STAM-C by:
    - ▪ Following the implementation steps described below and sending a STAM Implementation message to the stakeholders.
    - ▪ Exempting the selected flights from the regulation in coordination with NMOC

  This approach can be useful during the transition period or training of LTM to the use of OC and STAM.

- Direct approach: the LTM does not protect the sector with a regulation and applies directly STAM measures when required as described below.

3.2.1.5.2.2 Flow measure implementation

Independently of the STAM measure, preliminary results have identified a specific requirement for the implementation of flow measures:

The main benefit of STAM-F is to be able to apply a STAM to series of flight through a single implementation step (no need to send an individual STAM Implementation Message for each flight). The implementation is to be communicated to all involved actors using a STAM Implementation Message including the STAM-F measure taken and the affected flow description (using the established formalism).

One of the risks identified for this flow measure implementation is that specifying the flow in the STAM Implementation Message might lead AUs not to take actions as the Implementation Message is not specific to them. The solution to avoid this issue would be to send a Implementation Message to each AU for each flight affected, cancelling the main benefit of using flow measures: avoiding repetitive actions.

3.2.1.5.2.3 Rerouting

3.2.1.5.2.3.1 Cherry Picking

Flight rerouting: For ADEP close to the congested area and short haul flights, the LTM may call the Operator of individual flights and suggest slight rerouting in order to avoid a congested sector.

<u>Example through a scenario:</u>

LFBBR2 is overloaded, mainly when the first morning arrival peak in Paris coincides with overflights to UK and northern Europe (see CNA at even levels).

The LTM monitors the load of these specific flows via flow counts:

In case of significant overload, the LTM analyses the flight list of the critical period of time.

One action could be to call AFR (Air France Operation Center) dispatch in LFPG and to coordinate a possible route and/or level adjustment so as to reduce traffic complexity within LFBB airspace without implementing a global ATFCM measure.

In some occasions, LFBB-LTM can also coordinate with LFRR-LTM to deliver traffic on an additional route, especially on traffic-intensive Fridays. The coordination would then take place between LFRR-LTM and the flight crew directly as AU representative.

Flight rerouting in the case of flow will be assessed by the LTM and coordinated with affected ACCs and the Network Manager. The LTM notifies to the Airspace users the decision through the STAM Implementation Message.

- If the rerouting occurs before the flight is activated by ATC, the Airspace User refiles the flight plan. For terminal rerouting, as the SID is not mandatory in the ICAO FPL, it will be applied by the TWR ATC after coordination with Terminal ATC. In case the rerouting occurs less than 30 min before take-off, coordination with the ATC is necessary.
- If the rerouting occurs after the flight is activated by ATC, the ATC introduces in the system a route CHG through ICAO FPL update message.

3.2.1.5.2.3.2 Flow

Rerouting is a change in the initially planned route in order to avoid an overloaded sector by transferring flights to another sector or to use less saturated routes. For the STAM measures the rerouting is usually a small rerouting that will solve locally the issue but may impact the network.

It is possible to distinguish 2 types of rerouting:

1. En-route rerouting: affects the planned route during the en-route phase of the flight which is the most critical for the Airspace User Cost index and may have an important impact on the network.
2. Terminal rerouting: this includes change of SID (Standard Instrument Departure) which can provide an easy solution to a local problem without major impact on the network

Flight rerouting in the case of flow will be assessed by the LTM and coordinated with affected ACCs and the Network Manager. The LTM notifies to the Airspace users the decision through the STAM Implementation Message.

- If the rerouting occurs before the flight is activated by ATC, the Airspace User refiles the flight plan. For terminal rerouting, as the SID is not mandatory in the ICAO FPL, it will be applied by the TWR ATC after coordination with Terminal ATC. In case the rerouting occurs less than 30 min before take-off, coordination with the ATC is necessary.
- If the rerouting occurs after the flight is activated by ATC, the ATC introduces in the system a route CHG through ICAO FPL update message. The Airspace user is also informed and sends an update of the trajectory to the aircraft FMS (airborne) by datalink.

This type of measure applied to flow is closely linked to the definition of rerouting scenarios. The use of this type of measure should be analysed during the post flight phase in order to:

- Analyse the real impact of the measure on the network (unforeseen by the what-if tool for example)
- Produce proposal for medium-term planning phase rerouting scenarios

<u>Example through a scenario:</u>

When LFBBP12 is overloaded in the morning, the traffic mainly consists of the first Paris departures and overflights from UK and northern Europe.

The LTM monitors the load of the specific LFP DEP flows via flows counts:*

LFBB-LTM lists the inbound traffic of LFBBP12, sorted by the 3 possible exit points in this sector, and coordinates with LFFF-LTM to select traffic regarding an optimum distribution of traffic via the 3 exit points.

LFBB-LTM selects traffic both in regard of the 3 entry points in LFBBP12 coming from LFFF TMA, and in regard of the best possible spread of traffic outbound LFBBP12.

3.2.1.5.2.4 Level capping

Level cappings are used to transfer some flights causing an overload in one sector to a lower loaded and not overloaded sector in order to equalize the workload between the sectors.
Level cappings are preferably used for short distance flights or on short portions of longer flights in order to keep the increased fuel burn to a possible minimum. It can be applied to entire traffic flows as well as for individual flights and is the least complicated way to avoid traffic congestions.
Nevertheless there are several limitations to this practice:

- this practice may be used preferably in high altitude layered sectors only
- transatlantic flights are excluded from level capping
- changes of more than 2000 ft are to be avoided or coordinated with AU prior to departure

Level capping may be applied on airborne flights and thus do not require an ICAO FPL update, coordination may be done directly by ATC.
Level cappings may also be used in APP/ARR and in DEP sectors by early descent initiation or late climbing after DEP.

3.2.1.5.2.4.1 Cherry Picking

Flight level capping on a specific flight will be assessed by the LTM and coordinated with affected ACCs and the Network Manager. The LTM coordinates the proposal with the Airspace users and when the measure is agreed the LTM sends a STAM Implementation Message.

- If the flight level capping occurs before the flight is activated by ATC, the Airspace User refiles the flight plan.
- If the flight level capping occurs after the flight is activated by ATC, the ATC introduces in the system a FL CHG through ICAO FPL update message.

3.2.1.5.2.4.2 Flow

Flight level capping for traffic flow is assessed by the LTM and coordinated with affected impacted ACCs and the Network Manager. The LTM notifies to the Airspace users the decision through the STAM Implementation Message.

- If the flight level capping occurs before the flight is activated by ATC, the Airspace User refiles the flight plan.
- If the flight level capping occurs after the flight is activated by ATC, the ATC introduces in the system a FL CHG through ICAO FPL update message.

Note that level capping on airborne flights within the same sector can also be used by EAP to solve a complexity issue in the sector to lower the ATC workload.

3.2.1.5.2.5 Flight Level Reassignments

Flight Level modification: The LTM calls AUs and suggests RFL modifications impacting only the ACC involved (early descents/late climbs).

The LTM coordinates with upstream/downstream LTMs to better balance the loads of layered sectors.

Some individual procedures have been agreed between adjacent ACCs to get rid of Letter of Agreement Level Transfers when there's a benefit to the traffic (for specific flows on specific routes).

3.2.1.5.2.5.1 Cherry Picking

Flight level reassignment on a specific flight is assessed by the LTM and coordinated with affected ACCs and the Network Manager. The LTM coordinates the proposal with the Airspace users and when the measure is agreed the LTM sends a STAM Implementation Message.

- If the flight level reassignment occurs before the flight is activated by ATC, the Airspace User refiles the flight plan.
- If the flight level reassignment occurs after the flight is activated by ATC, the ATC introduces in the system a FL CHG through ICAO FPL update message.

3.2.1.5.2.5.2 Flow

Example through a scenario:

LFBBR2 is overloaded, mainly when the first morning arrival peak coincides with overflights from UK and northern Europe (see VELIN at odd levels and CNA at even levels).

The LTM monitors the load of these specific flows, via flows counts:
In case of significant overload, the LTM analyses the flight list of the critical period of time.

The action of the LTM is to reassign FL for LFP* departures, for LFBB-FIR departures and/or arrivals (LFBO dep to UK).

3.2.1.5.2.6 Short notice ground regulation (MDI, ADI, targeted ground regulation) to adjust departure flow

The main drawback of ground delay pin pointed by most AUs is that above EOBT +15 min delay there is a need to send a DLA message and above ETOT +30 min to refile the flight plan as it is suspended in the NMF.

In order not to limit the maximum delay (although it has been shown through experience that most of the allocated delays were below 10 min), the STAM ground delay allocation should not require any specific action from the AU. The AU should be notified of the new departure time constraint.

Currently in the CASA process, when a flight is regulated, the regulation is implemented by Network Manager and AU directly receives a slot (CTOT) without refiling: the flight plan is automatically updated in the system by the CASA system.

The allocation of ground delay should be considered as pseudo-CTOT assigned by a pseudo CASA system taking into account CTOT and pseudo CTOT (linked to a STAM). The System automatically sends the AU a pseudo-slot allocation message with the constrained departure time.

3.2.1.5.2.6.1 Cherry Picking

Targeted ground regulation:

This measure consists in applying ground delay to flights still on ground.

When LTM decides to apply a ground delay to specific flights, he coordinates with impacted ACCs, Network Manager and negotiates with AUs. The delay to be assigned to a flight is not limited to bounded values however a maximum delay should be envisaged to avoid applying large delay to flights as it is currently done for regulations. If delay is more than 15 min, the flight is out of the EOBT tolerance window and the flight plan should be refiled. In addition it is possible to consider that if the delay needed is above 15 min, a regulation may be necessary.

Depending on the assigned delay, the implementation modus operandi varies:

- The LTM assesses the impact of the delay on the flight/network
- The LTM coordinates the STAM ground delay with involved actors
- The LTM confirms the STAM and the system sends a STAM Implementation message specifying the flights and the STAM data to each involved actor
- If the flight is regulated by a CASA regulation
  - The LTM requests an additional ground delay on top of the CTOT (to the system). The CTOT is “forced” into the slot list.

    At this point there is the need to define how the new departure slot will be introduced into the system: either by the LTM through a HMI or either by NM .
  - The system sends a new slot allocation message (SAM) to the AUs.
  - In the case of A-CDM airports, the new CTOT is translated into a TSAT and sent to the AU.

- If the flight is not regulated:
  - The LTM requests the allocation of a pseudo CTOT (to the system). The system introduces this new flight in the slot list.
  - The system sends a pseudo slot allocation message to the AUs.
  - In case of A-CDM airports, a Departure Planning Information (DPI) message sent by the tower could be a solution to force the departure time of a flight.

Take off not before (TONB):

The implementation of a TONB is identical to the implementation of a ground delay as described above. The only difference is if the AU with a TONB sends a DLA message that shifts departure time after the TONB, the flight will not be constrained anymore.

Take off not after (TONA):

The implementation of a TONA requires a completely new logic compared to the current one:

- it is a reduction of the tolerance window of a slot if the flight is regulated (CASA).
- It is a limitation of the maximum delay to a flight within the EOBT tolerance of +/- 15 min.

3.2.1.5.2.6.2 Flow

A MDI measure may be used to move or diffuse traffic in a congested area and time period or to alleviate an overload in a sector between TMA and en-route airspace.

The implementation of a MDI to a flow is similar to the implementation of a ground delay but to a flow of flights departing from the same airport. The MDI is a minimum time separation implying a small ground delay to some flights.

The implementation of the MDI is to be implemented locally by the ADEP TWR. However preliminary conclusion from trials and experience have shown that in addition to coordination with TWR ATC, it is necessary to introduce the small time shift of departure into the system in order to have the flight plan updated automatically.
Two approaches can be considered to implement ground delay to a defined sub-flow depending on the systems evolution

1. No evolution on CASA (step1): this approach is done in 2 steps, the first being the implementation of a CASA regulation to the pre-defined flow (containing the selected sub-flow) and in a second step, releasing flights that are not in the sub-flow from the regulation.
2. Evolution of CASA (step2): the ground delay is directly applied to the targeted sub-flow using pseudo-slots.

Therefore the procedure to implement MDI is the same as a ground delay described above for a flow of flights departing from the same ADEP: the delay necessary in order to apply the MDI is included in the CTOT if the flight is regulated, else a pseudo CTOT is sent to the AUs.

- The LTM assesses the impact of the delay on the flight/network
- The LTM coordinates the STAM ground delay with involved actors except AU.
- The LTM confirms the STAM measure and the system sends a STAM Implementation message specifying the flights and the STAM data to each involved actor on a per flight basis (one message for each flight)

3.2.1.5.2.7 Speed regulation (Miles In Trail)

A “Miles in trail” (MIT) STAM is a procedure where a stream of traffic with same direction and at same cruising flight level is imposed to maintain the same speed/mach number. This is done to achieve a reduction of sector complexity, mainly for arrival hubs.

3.2.1.5.2.7.1 Flow

The LTM applies a MIT and coordinates with adjacent LTMs and Network Manager. The LTM notifies to the Airspace users the decision through the STAM Implementation Message.

A MIT is applied to airborne flights therefore it occurs after the flight is activated by ATC,

- Trajectory update: is performed by the ATC who introduces in the system an ICAO FPL CHG through ICAO FPL update message.
- Communication is necessary and the measure is applied by the ATC who communicates the speed adjustment to the pilot.

<u>Example through a scenario:</u>
LFBBR2 is overloaded, mainly when the first morning arrival peak in Paris coincides with transatlantic flights overflying French airspace.
The LTM monitors the load of this specific flow via flow counts:
In case of significant overload, the LTM analyses the flight list of the critical period of time.
LFBB-LTM can coordinate with LFMM-LTM to deliver traffic with an assigned speed, e.g. when encountering various flights from KJFK to LI. Through this the implementation of a regulation might be avoided and an overload due to a specific traffic can be solved*

3.2.2 Solution #18 Solution #18: CTOT and TTA - DCB-0208

3.2.2.1 Target Time for Flight subject to a Hotspot

Two types of hotspot are defined as follows:

- **Initial Hotspot**: it corresponds to the area of congestion in time that is captured by the Local DCB actor. It is based on the prediction performed by the Predicted Workload (Occupancy Count, Complexity).

- **Final Hotspot**: it corresponds to the area of congestion captured by the Local DCB actor and in addition to the area of the recovery period due to the smoothing effect. DCB time-based constraints are assigned to the flights possibly shifting from the initial Hotspot to the next time window where there are available slots. The greater shift duration corresponds the hotspot recovery period. It is based on the prediction performed by the Simulated Occupancy Count.

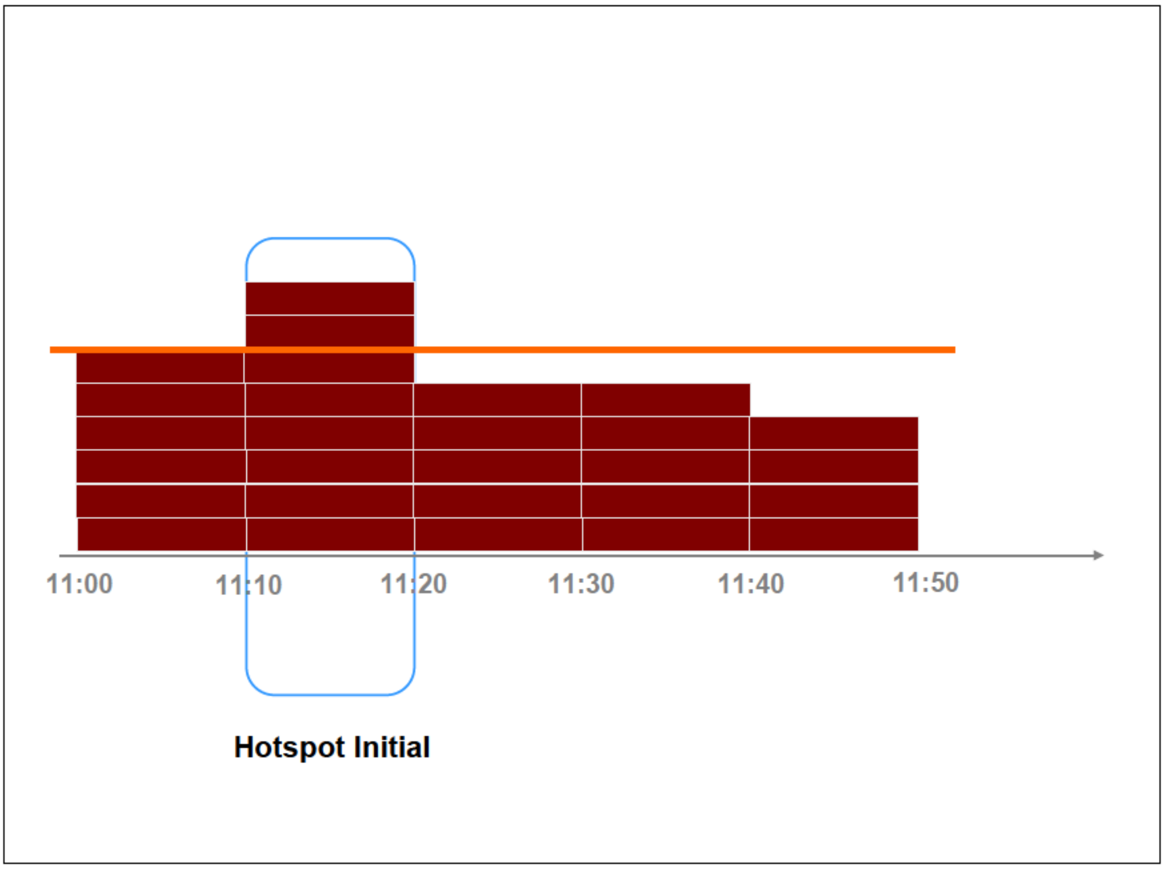


Figure 11 : Initial Hotspot

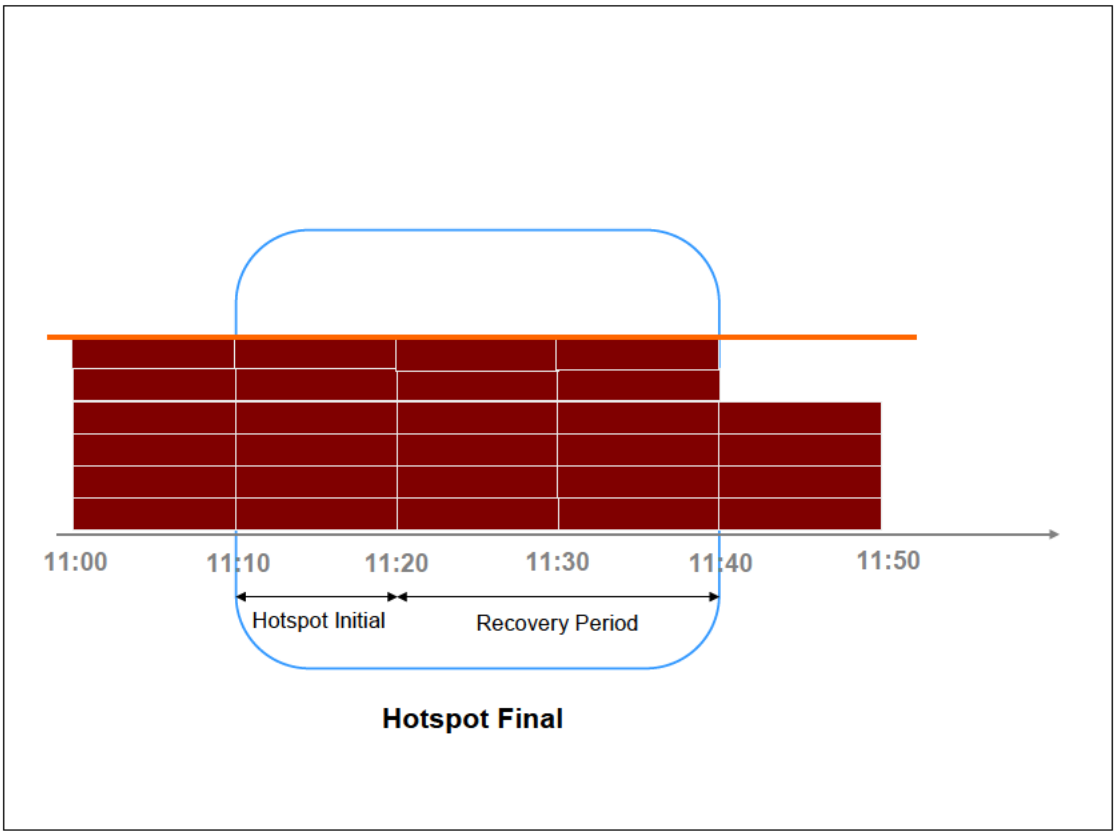
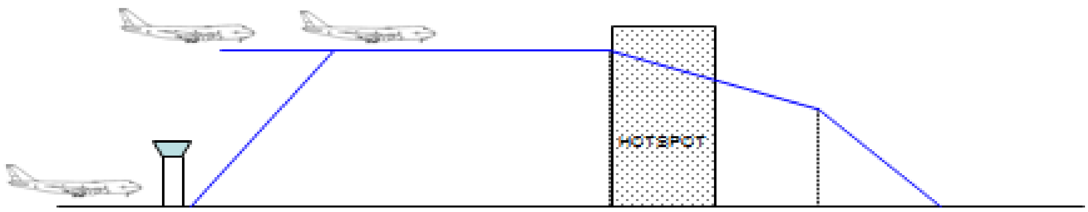


Figure 12 : Final Hotspot

This new concept assumes the same level of adherence is applied to all flights involved in the final hotspot area because the common level of adherence is of particular importance in the implementation of the hotspot resolution. However, the Local DCB is responsible for deciding which flight should be assigned a Target Time or not.

- A DCB delay is assigned to the flight. It can be issued upon the following cases:
  - CASA TT with a DCB delay in the pre-departure phase
  - STAM TT with a DCB delay in the pre-departure phase
  - STAM TT with a DCB delay in the execution phase

- The flight can be constrained with a zero DCB delay : A Target-Time is assigned to the flight but with a zero delay, i.e. TTO (ETO) or TTA (ETA). It does not add any delay to the iRBT/iSBT but defines a specific Target Window for entering the congested sector. This Target Window limits the iRBT/iSBT deviation and improves predictability of the hotspot resolution.



Airborne	TTO (0)
Pre-departure	TTO (delay)
Pre-departure	TTO (0)
Airborne	TTO (0)

Figure 13 : Target-Time Assignment for Ground and Airborne Flights

3.2.2.2 Calculation and Reconciliation of Target-Time

Target-Time is calculated at the TT_fix point taking into account the EET for the concerned point of the iSBT route:

- In the case where the Airspace Users (AU) use the ICAO FPL 2012, the Flight operation Centre (FOC)/AU files its flight plan and provides EET for the concerned point of the ICAO FPL route.
- In case the AUs use the iSBT and iRBT, the FOC/AU files its iSBT and provides the full 4D profile.

If the flight is involved in several hotspots, only the most penalising constraint is taken into consideration, out of which a Target Time is derived. The principle of the Most Penalizing Regulation (MPR) is applied both for CASA and for time-based STAM Measures. To be noted that the MPR mechanism will be more sophisticated and automated for the Step2 while it will be very basic for the Step1.

For the Step1, CASA constraints shall overrule the STAM constraints. the “flight-under-constraint” flag information (LTM HMI, B2B Services) applies the following rules:

The flag “Flight-under-constraint S” is created at the first flight ‘STAMed’ or the flag “Flight-under-constraint R” is created for flight impacted by a regulation.

- Flight with a status “flight-under-constraint S” or “flight-under-constraint R” cannot be eligible for another STAM Measure.

- Flight with a status "flight-under-constraint S" can be eligible for another regulation and the on-going STAM Measure will be cancelled.
- Flight with a status "flight-under-constraint R" can be eligible for another regulation and the MPR principle is applied as currently.

In case a CASA regulation is applied on flight "flight-under-constraint S" with a STAM status not yet implemented, an automated STAM Measure cancellation is processed.

It must be noted that this rule is not applicable for airborne flight. It will be still possible to apply a STAM for an airborne flight under a current CASA regulation. Even if has to be avoided as much as possible (double constraint), it might be the best solution in some cases.

NM publishes only one Target-Time information (Most Penalizing Constraint).

The Target-Time information for the concerned flight contains :

- Reference Measure (CASA, STAM)
- Flight Id
- Target Time (TT)
- TT_fix point
- Status TT {creation, update, Cancellation}

3.2.2.3 Dissemination of Target-Time information in the pre-departure phase

For a flight in the pre-departure phase, the dissemination of Target-Time (create, update, cancel) is based on:

- ✓ B2B Services/Messaging to inform DCB, Flight Operation Centre (FOC), ATC and Airports

3.2.2.4 Dissemination and Management of Target-Time information in the execution phase

FOCFor a flight in the execution phase, the dissemination of target-Time (create, update, cancel) is provided by NM and based on:

- B2B Services to inform the DCB actors and Flight Operation Centre (FOC) actors
- STAM process to inform ATC, Airports, pilots

TT events	Addressees	Pre-departure phase	Execution phase
TT Creation	Pilot	FOC sends a 'TT creation' based on ACARS or other support	ATC sends a 'TT creation' based on the STAM process (INAP Local DCB/ATC)
	DCB, FOC	NM sends a 'TT creation' based on B2B Services	NM sends a 'TT creation' based on B2B Services
	ATC, Airport	NM sends a 'TT creation'	NM sends a 'TT creation' based on

TT events	Addressees	Pre-departure phase	Execution phase
		based on Messaging (SAM, SRM)	B2B Services or messaging. Provided local systems allow the dissemination of the info until the ATCOs.
TT Update	Pilot	FOC sends a ‘TT update’ based on ACARS or other support	ATC sends a ‘TT update’ based on the STAM process (INAP Local DCB/ATC)
	DCB, FOCFOC	NM sends a ‘TT update’ based on B2B Services	NM sends a ‘TT update’ based on B2B Services
	ATC, Airport	NM sends a ‘TT update’ based on Messaging (SAM, SRM)	NM sends a ‘TT update based on B2B Services or messaging
TT Cancellation	Pilot	FOC sends a ‘TT cancellation’ based on ACARS or other support	ATC sends a ‘TT cancellation’ based on the STAM process (INAP Local DCB/ATC)
	DCB, FOCFOC	NM sends a ‘TT cancellation’ based on B2B Services	NM sends a ‘TT cancellation’ based on B2B Services
	ATC, Airport	FOC sends a ‘TT cancellation’ based on ACARS or other support	NM sends a ‘TT cancellation’ based on B2B Services or messaging

Table 11 : Dissemination of Target-Time Information

3.2.2.5 Target-Time Deviation

The Target-Time adherence is the key assumption to manage properly the predictability of the entry time at the hotspot and therefore the planned resolution of the hotspot problem. A continuous process takes place to re-evaluate the correct achievement of the Target-Time. It is based on the Target Deviation Indicator (TDI) measuring the difference between the Target-Time at the TT_fix point and the Achievable Target-Time at the TT_fix point.

The Network Management Function (NMF) shall determine the ATT (ETO/ETA).

The calculation of the Target-Time deviation is:

- TDI = TT – ATT

Hence, the decision should be based on a shared Air/Ground ETO/ETA estimate.

With the information provided by NMF via the B2B Services or messaging capabilities, the local systems receive the Target Deviation Indicator (TDI).

In addition, a static Target Window (i.e. [-x,+x]), is associated with a Target Time. The target times have fixed tolerances attached much like the situation with the current CTOT. This Target Window corresponds to the margin of manoeuvre of the flight to achieve the Target Time. The static Target Window may depend on the status of the flight (e.g. +- 10 min after TOBT, +- 5 min after TSAT, +- 3 min after ATOT…).

The TDI is provided by NM to the LTM ATC and AU actors.

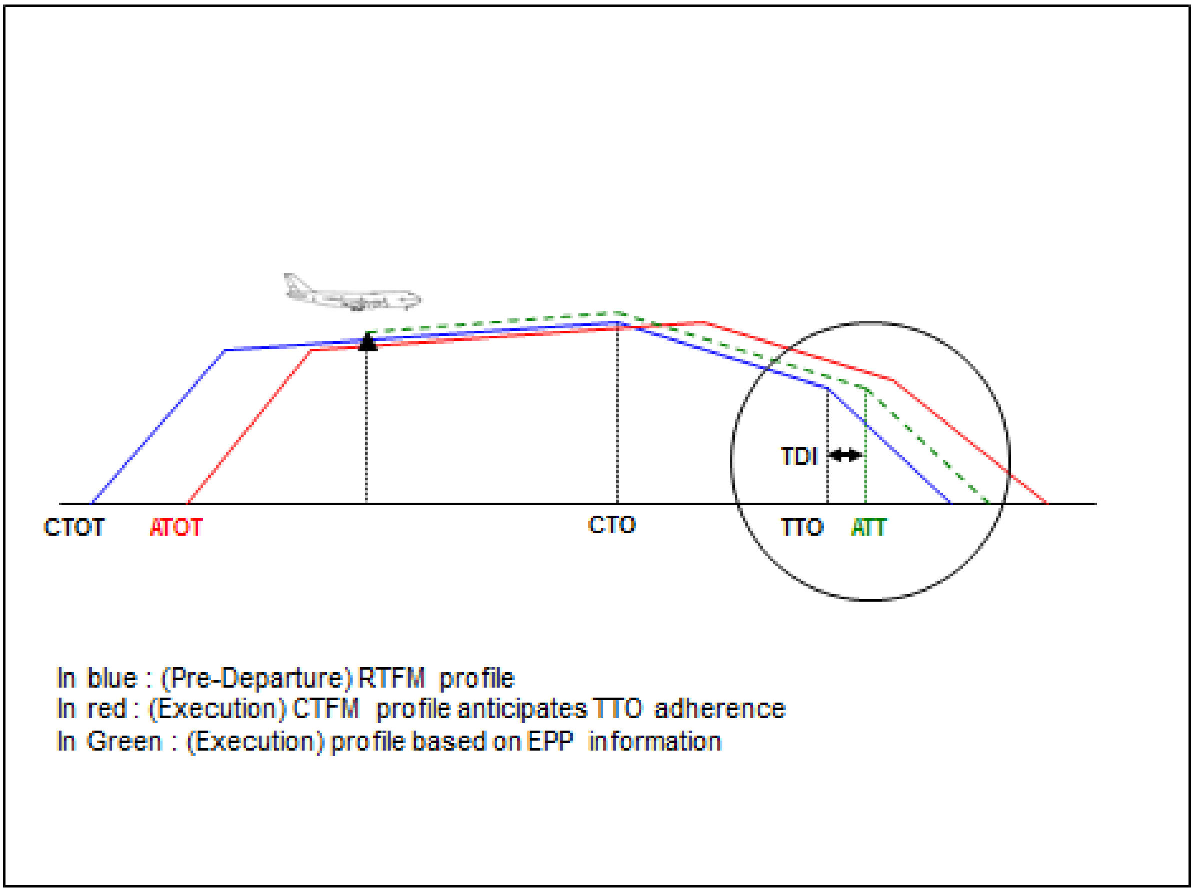


Figure 14 : Target-Time deviation

3.2.2.6 DCB Revision Process

The DCB Revision Process is activated by the Local DCB whenever

- A deviation of the hotspot resolution is detected. In addition, an automatic detection of Hotspot Resolution Deviation shall alert the LTM
- The Target Time of a flight is obsolete and must be revised (update/cancellation).

NM publishes a Target Time Revision Proposal (TTREV) to the Local DCB actor initiator of the constraint :

- The local DCB actor initiator can decide
  - ➢ To update the STAM TT measure in re-implementing the STAM Measure (according to the well-defined STAM process defining the implementation/update procedure). A STAM TT implementation/update is notified to the affected actors and NM.
  - ➢ To cancel the STAM TT measure. A STAM TT cancellation is notified to the affected actors and NM (using the well-defined STAM cancellation procedure).
  - ➢ To do nothing depending of the hotspot resolution progress.

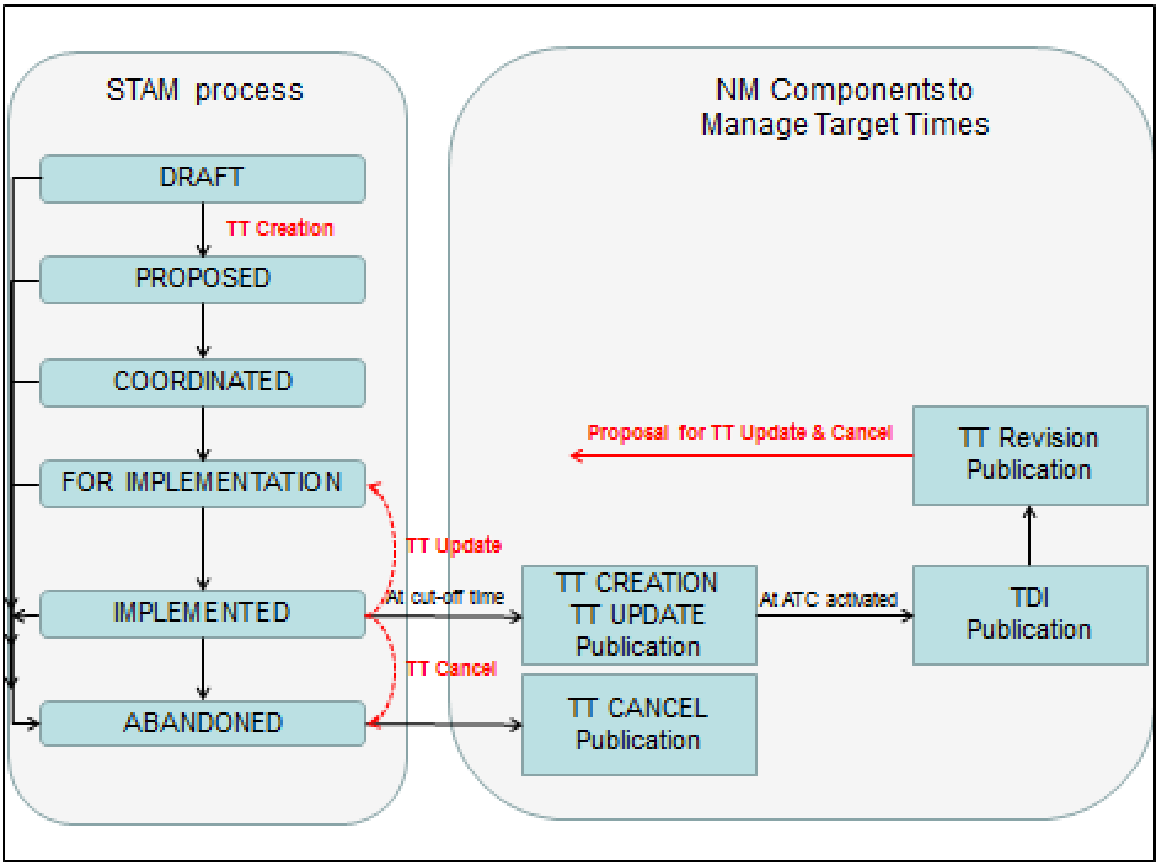


Figure 15 : DCB Revision Process

3.2.2.7 Cooperative Execution in the Extended AMAN Horizon

Extended AMAN enables optimization of arrival traffic management in the en-route phase. Once an aircraft enters the eligibility Horizon (up to 500NM from arrival), Extended AMAN starts to prepare the sequence planning based on the latest Network Manager System data. With such a horizon, Extended AMAN captures both ground and airborne flights.

In the Eligibility Horizon, Extended AMAN does not request actions on the aircraft from upstream ATSUs. He uses updated information from the Network Management system (e.g. NMF) to refresh the previewed sequence.

Once the aircraft enters the Active Advisory Horizon (AAH), and depending on the delay sharing strategy selected for Extended AMAN operations, the Extended AMAN may send time constraints for concerned flights in the form of time to leave the metering fix (TOM) or time to loose (TTL) or Controlled Time of Arrival (CTA) to upstream ATSUs.

Therefore, within the Eligibility Horizon, an aircraft may be subject at the same time to both:

- A STAM measure or a regulation due to a declared hotspot.

- A time constraint (i.e. linear absorption of delay) requested by Extended AMAN to optimise arrival operation at the airport.

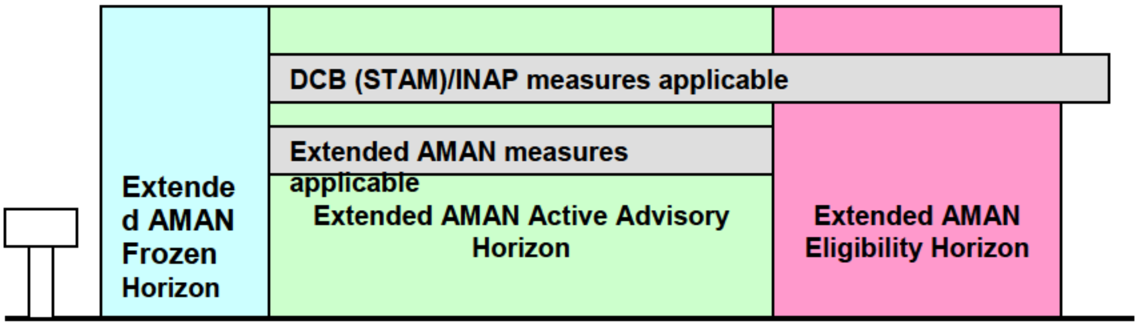


Figure 16 : AMAN & DCB horizons

In the Step 1 DCB process, flights crossing a declared hotspot receive a Target Time (entry in the hotspot) associated with a static Target Windows (e.g. +/- 4 minutes), illustrated in red in the figure below. That static Target Windows represents the margin available for the flight to achieve the Target Time without negatively impacting the hotspot resolution.

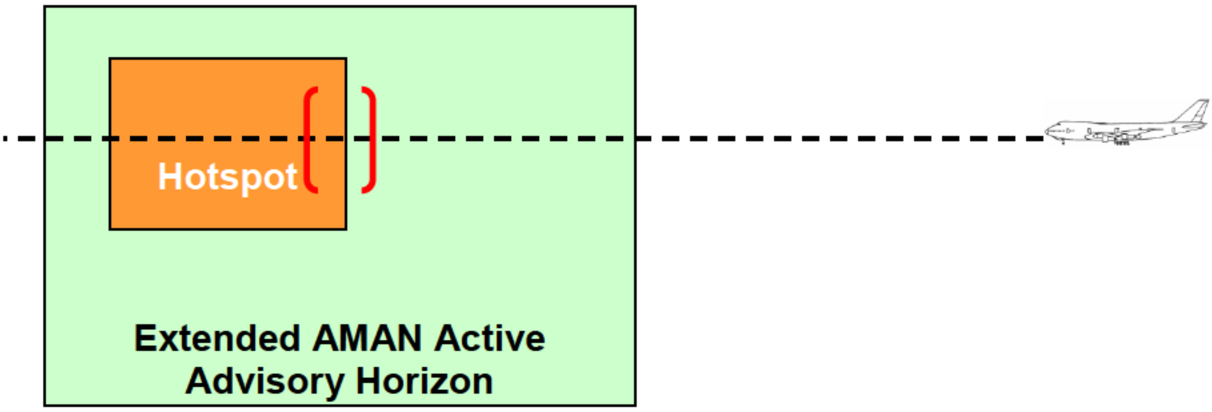


Figure 17 : DCB Target Windows for hotspot resolution

In the context of facilitating optimisation of arrival management in the en-route phase, it can be envisaged to allow the Extended AMAN to propose actions on flights subject to DCB TTO and crossing a declared hotspot within the limits of the DCB static Target Window (TTW) declared by DCB until the hotspot area is crossed. If an AMAN measure falls within the TTW, there is no problem. On the other hand, when a AMAN measure would push the flight outside the TTW, hence possibly creating a hotspot, the AMAN measure must be (pre-)assessed in the same way as a STAM measure (pre-assessment of the proposal, CDM resolution before implementation).

Hotspot Detection and Resolution

Extended AMAN planning activity within the Active Advisory Horizon, even if of low magnitude, facilitating the arrival management of the concerned airports, may result in creating unexpected bunching of traffic in upstream ATSUs. The multiplication of such bunch of traffic could create demand/capacity imbalances resulting into declared hotspot.

Therefore, it is necessary that Extended AMAN activity is presented to local-DCB/INAP actors in order to allow them to correctly monitor the traffic situation within their area of responsibility and to detect if Extended AMAN proposals may disturb the current operations.

The Extended AMAN activity shall be quantified (induced workload) and presented to the local-DCB actor in terms of:

- Number of Extended AMAN proposal per unit of time and or per aircraft

- Occupancy/Entry/Complexity load variation due to Extended AMAN

The more the Extended AMAN sequence and associated proposals are anticipated and shared, the more the dDCB process will be efficient

In case of Extended AMAN constraints creating a hotspot (i.e. within the active horizon), the concerned Local-DCB/INAP actor is responsible for arbitrating between the Extended AMAN constraint and unexpected DCB imbalance. The local-DCB/INAP may:

- **Option1**: local-DCB rejects the Extended AMAN proposal, leading to the disappearance of the detected imbalance.

- **Option 2**: local-DCB accepts the Extended AMAN proposal, and starts the resolution of the hotspot by selecting an appropriate STAM measure to be applied to the same flight (i.e. subject to Extended AMAN).

- **Option 3**: local-DCB accepts the Extended AMAN proposal, and starts the resolution of the hotspot by selecting an appropriate STAM measure to be applied on a different flight candidate.

- **Option 4**: local-DCB initiates a CDM coordination process for Extended AMAN to adapt the delay absorption strategy leading to the disappearance of the detected imbalance.

3.2.2.8 Process, Roles & Responsibilities in the pre-departure phase

DCB actors

Once the DCB actors confirm an en-route hotspot, a collaborative decision is taken to resolve it. The Local DCB assigns Target-Time constraints to flights involved in the hotspot.

- Once activated, NM notifies the departure aerodromes and the Flight Operation Centres (FOC) sending the CTOT[9] and the TTO/TTA target information, two hours prior to the cut-

[9] CTOT The CTOT is determined through a back calculation taking into account the Target Time (corresponding to the most penalising regulation) and the flight duration extracted from the Extended

off Time of each flight. NM continue notifying FOCs and departure aerodromes of pertinent updates to CTOT and TTO/TTA target information, if any.

The Network Manager Function continuously monitors the network situation for hotspots through the Network Infrastructure Management System (NIMS) and Local tools. Where necessary, coordinated measures can be taken to resolve newly identified imbalances. These measures can include tuning the original DCB regulation measure or alternatively by invoking a DCB STAM time-based measure (TONB, MDI, MIT).

The FOC and the flight crew

A SAM message is sent to the FOC, requesting the missing EET at the TT Fix. The FOC will send a CHG message and then subsequent SRM (Slot Revision Message) will contain an updated CTOT and the TT based upon the supplied EET information.

Upon receiving an ACK from IFPS system containing the approved route, the FOC/AU checks the route and verifies that the provided EET is still achievable. In the event that the approved route is acceptable but it is no longer possible to comply with the EET provided in the ICAO FPL 2012 or in the full 4D profile, the FOC/AU sends a CHG message to simply update this EET (ICAO FPL 2012) or to update its 4D profile (ISBT/IRBT).

If the route proposed by IFPS is not acceptable, the FOC/AU resubmits a new ICAO FPL/iSBT and the above process is repeated.

Once an agreement is reached, the complete flight plan /iRBT is transmitted to NMF and all the ATSU's.

NMF receives the Traffic Demand data from the IFPS in the form of Flight Plan data, the EET over the concerned point of the ICAO FPL route.

If FOC/AU wishes to update its CTOT but still keep its TT, it modifies its EET (ICAO FPL 2012) over the concerned point of the ICAO FPL route or modifies its complete 4D profile by sending a CHG message to IFPS.

IFPS transmits the update to all ATSU's as well as NMF that calculates a new CTOT for the given TT.

<u>Example</u>: EOBT 12:00 }
Taxi Time 10' } ETOT 12:10 }
EET 01:10 } ETA 13:20

According to the traffic demand NMF calculates TTO 13:35 and by reverse calculation CTOT 12:25 (TT – EET).

If FOC/AU wants to depart on time (so earlier than the attributed CTOT) with a CTOT 12:10 but still wants to maintain its TTO, it simply needs to update its EET or its 4D profile. NMF will issue a SRM with new CTOT+original TT

If FOC/AU wants to depart later than the attributed CTOT, it needs to send a DLA message like in current operations. The FOC will also receive a later TT for the flight.

If FOC/AU wants to obtain an earlier TT by departing earlier, the ICAO FPL needs to be canceled with a CNL message and replaced by new correct ICAO FPL, as in current operations.

In our example, FOC/AU needs to send an updated EET value of 01:25 . This value is the maximum EET value of our example as it represents the difference between the TT and the CTOT.

If FOC/AU sends a New value > TT - ETOT, NMF will attribute a later TT based on ETOT and new EET and will send a SRM with new CTOT+ new TT

Flight plan 4D trajectory. This ensures that the CTOT and the TTs published are consistent with the 4D trajectory planned by the airspace user.

At approximately 30 minutes prior to EOBT, the CTOT, TT are sent by the FOC to the Flight Crew, possibly by ACARS.
The FOC updates the flight crew with any further CTOT, TT updates received from the network and any derived OFPL changes.

The Flight Crew updates its flight management process (including Flight Management System) with any operational flight plan information received from the FOC including CTOT and TT targets.

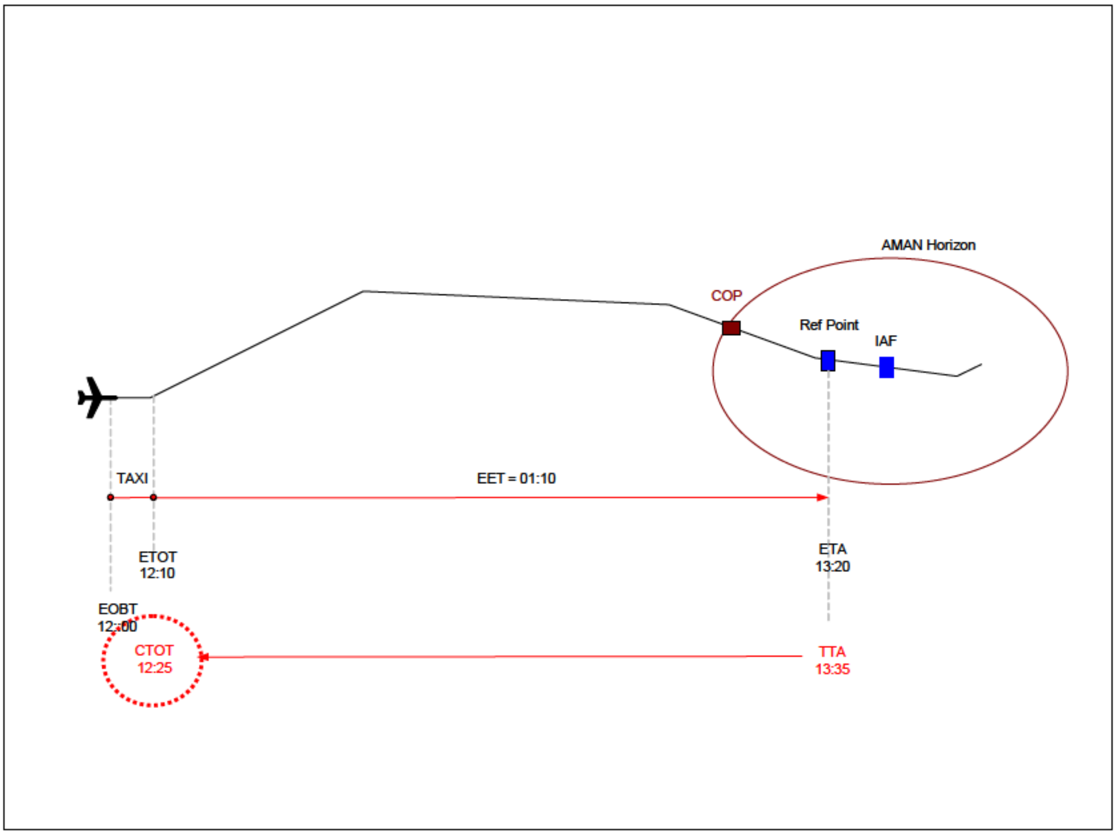


Figure 18 : CTOT and TTA Calculation

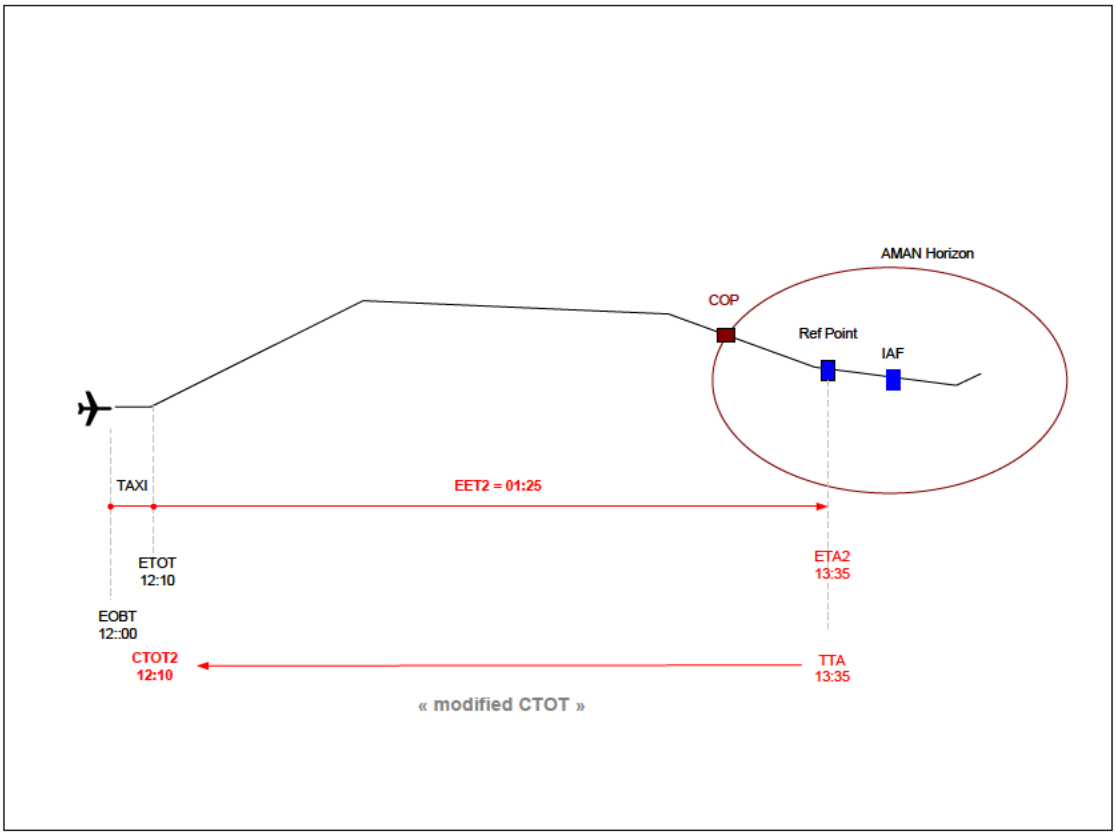


Figure 19 : New CTOT calculation based on EET change

Departure Manager

At the TT issuance cut-off time, the En-Route ACC receives notification of the CTOT and TTO and any subsequent updates from the Network. The updates may continue until a parameter prior to the flight Off Block Time.

Network Infrastructure Management System (NIMS)

The Network Functions System will manage

- The NIMS systems receive EFPLs from the FOCs and based on known regulations it calculates the target times to enter in that congested location in addition to the CTOT (for the flights impacted by the regulation). The NM systems will also compute TOs (Time Over) for the entry points of the flights in each ATSU's Area along the flights' routes. These are derived intermediate 4D points that would be used to ensure consistent view on the trajectory calculated by each IOP system.

- The Most Penalizing Constraint is calculated.

- The planning constraints (TT, DCB measures) communicated to the FOC will amend the original EFPL and the FOC could provide an updated EFPL taking into consideration the planning constraints.

- The proposed Target Time is inserted in the flight proposal function in order to reflect the TT in the simulated occupancy count .

- At the cut-off time, once the network system notifies the Airport, ATC and the FOCs of the CTOT and the TT target information of each flight.

- It notifies Airport, ATC and FOCs of pertinent updates to CTOT and TTO target information, if any**.**

3.2.2.9 Process, Roles & Responsibilities in the execution phase before the Extended AMAN/AMAN horizon

Local DCB

The Local DCB continuously monitors the network situation and the proper execution of the DCB plan to resolve hotspots. The LTM responsible for the hotspot receives the TDI information and Target Time Revision Proposal. It will allow the LTM to monitor the evolution of predicted Target Time of flights impacted by the DCB time-based measures and the detected deviation against issued targets, in order to assess the actual effectiveness of the implemented DCB measures.

The Local DCB decides to maintain, update or cancel the Target Time. S/he will use the STAM process, procedure and tool to re-implement or to cancel a Target-Time. It is based on the STAM measure implementation procedure in which the Local DCB will coordinate with the concerned LTM, then the corresponding ATC will communicate with the pilot the measure to implement.

Where necessary, coordinated measures can be taken to resolve newly identified imbalances or residual overload in hotspots. These measures can include applying geographical trajectory adjustment (level cap, rerouting) or alternatively by invoking additional time-based measures.

Network Infrastructure Management System

- The Target Time deviation is notified to Local DCB, Airport, ATC and FOC
- The Target Time Revision Proposal is notified to Local DCB, Airport, ATC and FOC
- The Target Time revision issued by Local DCB is notified to Local DCB, Airport, ATC and FOC

3.2.2.10 Process, Roles and Responsibilities in the Extended AMAN horizon

Local DCB

The Local DCB continuously monitors the network situation and the proper execution of the DCB plan to resolve hotpots.

It is anticipated that, within the local-DCB area of responsibility, Extended AMAN activities may influence sector workload due to:

- The necessity for ATCOs to read Extended AMAN information

- The additional R/T load to implement Extended AMAN proposals

- The potential consequences on traffic in downstream sectors

To support the local-DCB/LTM in monitoring this additional workload, Extended AMAN activity is reflected in Occupancies and Entries load variations via classical graphs. Due to this support the local-DCB/LTM is able to determine if the unit will participate in Extended AMAN operations or not.

In particular, the local-DCB/LTM responsible for hotspot monitors the evolution of Extended AMAN delay proposals on flights impacted by a DCB time-based measure, in order to detect potential deviations against the issued targets and to assess the actual resolution of the hotspot (i.e. effectiveness of the implemented DCB measures).
In case of Extended AMAN proposals creating an unexpected hotspot or disturbing the actual resolution of a declared hotspot, the local LTM/INAP shall arbitrate between the implementation of the Extended AMAN proposal and the resolution of the hotspot.

Where necessary, coordinated measures may be taken to resolve newly identified imbalances or residual overload in hotspots. These measures include applying geographical trajectory adjustments.

Executive ATC

An active collaboration between executive controllers and local-DCB is expected. Extended AMAN information is displayed to ATCOs in order to make Extended AMAN process transparent. When requested and feasible, ATCOs implement Extended AMAN requests by issuing to the flight crew the necessary ATC instructions related to the linear delay absorption.

The FOC and the Flight crew

The flight, in the airborne phase, enters the Extended AMAN active horizon. The Flight Crew follows all ATC instructions related to safety and separation. The Flight Crew considers all ATC proposals related to Extended AMAN delay linear absorption (speed adjustment). The flight crew endeavours to continue their flight in accordance with the optimised arrival management procedure.

3.2.3 Solution #21: Improved Efficiency in the management of Airport and ATFCM Planning – DCB-0310

The procedure shall describe how the Network Manager performs decision-making based on the criteria described in the table hereafter.

- how to prioritise the severity
- how to make TTA re-allocation (based on existing slot management procedures)

AIMA-turnaround	Airport	Airport Impact Assessment Feedback	Network Manager
On time Arrival (no impact)	-tolerance for arrival ≤ Arrival Deviation ≤ +tolerance for arrival ➔ arrival on time, no impact on AOP and severity "0 + Airline contribution", no proposal for improvement window.	AIMA message • Severity=0 • Deviation=No • Improvement window=0 min	No action
Early Arrival (no impact)	Arrival Deviation < -tolerance for arrival➔ early arrival, no impact on AOP and severity=0 ", no proposal for improvement window.	AIMA message • Severity=0 • Improvement window [TTA; TTA+Arrival Deviation]	There is no request to allocate a new TTA but this flight is a potential candidate for swapping or shifting to improve the TTA of any other arrival flight at the destination airport.
Late Arrival (no impact)	Arrival Deviation > +tolerance for arrival➔ late arrival Next Departure Deviation <+tolerance for departure ➔ no departure delay , impact on AOP and severity=1". The proposal for improvement is – X minutes (X represents the Arrival Deviation)	AIMA message • Severity=1 • Improvement window [TTA-Arrival Deviation; TTA]	Action to try to allocate a new TTA
Early Arrival (with impact)	Arrival Deviation < -tolerance for arrival ➔ early arrival, impact on AOP and severity=1,2 or 3. The Impact Assessment model proposes a window improvement of X minutes.	AIMA message • Severity=1,2 or 3 • Improvement window [TTA; TTA+X]	Action to try to allocate a new TTA
Late Arrival (with impact)	Arrival Deviation > +tolerance for arrival➔ late arrival Next Departure Deviation >+tolerance for departure ➔ departure delay , impact on AOP and severity=2 or 3". The proposal for improvement is – X minutes (X represents the Arrival Deviation)	AIMA message • Severity=2 or 3 • Improvement window [TTA-Arrival Deviation; TTA]	Action to try to allocate a new TTA

Table 12 : AIMA proposed severity

Summary

1) The Network Manager shall create and activate an arrival regulation (Current operation).
2) Triggered by NMOC issuance of the regulated flights' SAM and SRM messages (and corresponding B2B service updates), local AOP will perform the AIMA.
3) The arrival airport AOP shall distribute AIMA updates.
4) NMOC shall receive and parse AIMA updates
5) NMOC shall manually assess the AIMA presented information (Flight, severity, TTA, TTA time margins) against the NMF HMI regulation slot list.
6) Supported by NMF network impact assessment tools, NMOC shall identify potential: empty slots candidate swap flights, force slot actions or flight exclusions as solutions to satisfy subject flight AIMA's minimum and maximum margin times.
7) NMOC shall assess the suitability of each solution where:
    a) there is mutual benefit in swapping the position of flight(s) in the slot list to respect the AIMA margins.
    b) the subject flight has Sev 3, a force slot and deep rectification may be considered.
    c) the subject flight has Sev 3 and a flight exclusion is coordinated with the local LTM.
8) NMOC shall assess the network impact assessment of the chosen slot list action.
9) NMOC shall apply slot list actions where positive outcome is indicated in the network impact assessments.
10) NMOC system shall update and issue SRM, SLC and B2B updates.
11) NMOC shall manually review the success of the implementation based upon the receipt of subsequent AIMA updates.

Details

Margins

The NMOC requires that the AIMA updates reflect the full TTA margin that supports the airport turnaround operation. This implies that an on-time arrival flight with a wide margin for delay could be sacrificed for a more needy flight. The current table only considers that no improvement is necessary for such an on-time flight.

The NMOC procedure requires a different granularity of AIMA data.

Required AIMA data Definitions

TTA is the TTA_time as presented to the Airport. This parameter is used by NMOC to ensure that the AIMA and slot list versions are aligned with the latest delay information.

The TTA time cannot be used as a common reference because the TTA_fix varies between different flights.

TTA_Max and **TTA_Min** describe the maximum and minimum delta time values that can be applied to the flight TTA in accordance with the AOP. These values are in the range of -60 to +60 minutes.

TTA_Max delta value shall never be smaller than TTA_Min delta value.

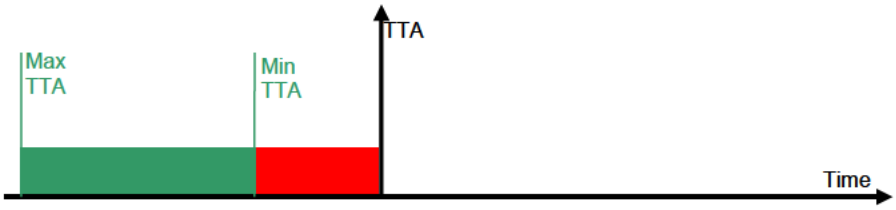
Note: The Network Manager shall not allow for a TTA to be earlier than the NMF planned ETA at the TTA fix, this is a Network System Requirement and protects ADEP no-take-off before parameters.

Sev represents AIMA severity 0,1,2,3 where 3 is the highest priority for NMOC action.

Turnaround Cases

The procedure for airport turnaround depends on different cases:

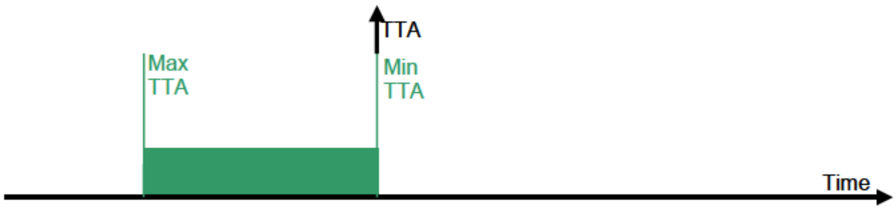
Case C1: Flight delayed beyond Turnaround Process. The red indicates that this is **severity 2 or 3** for the network to make the TTA earlier. The required TTA is between TTA- Min and TTA-Max.



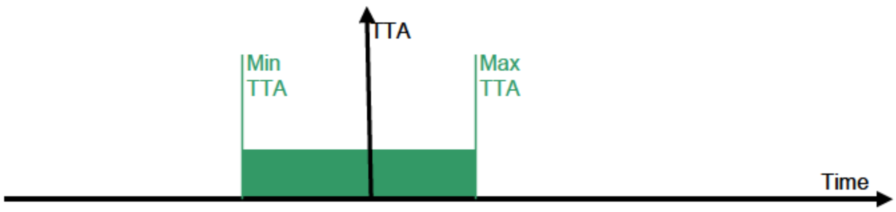
Case C2a: Flight delay acceptable for turnaround process, improvements are anticipated.

This is a **severity 1** delayed flight.

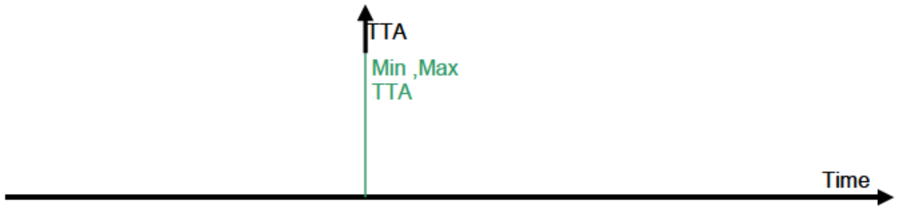
Case C2b: Severity 0 delayed flight



Case C3: Flight delayed acceptable for turnaround process but with margin for improvement and for sacrifice. This is a severity 0 delayed flight.

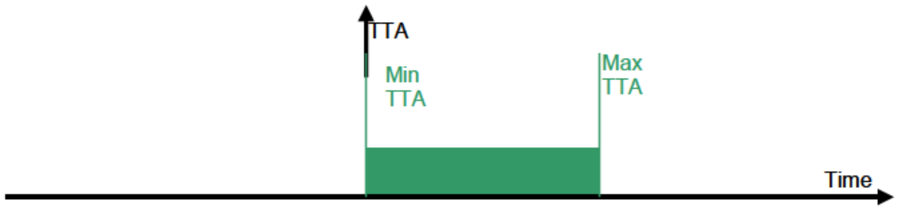


Case C4: Flight delayed acceptable for turnaround process but with no margin for improvement or for sacrifice. This is severity 0.

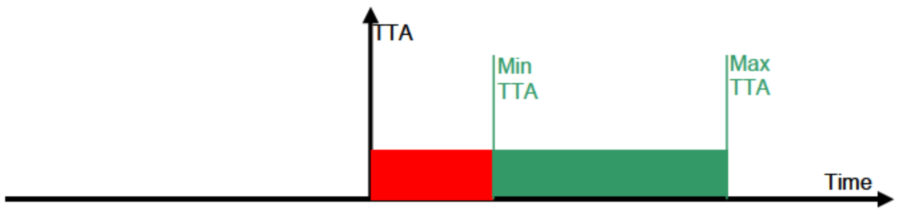


Case C5a: Flight is acceptably delayed. The turnaround process will accept additional sacrifice delay up to the max. This flight is severity 1.

Case C5b: Flight is severity 0.



Case C6: This flight is going to arrive too early for the turnaround process. **This is a severity 1,2,3** The flight requires a minimum amount of delay and can take further sacrifice delay up to Max TTA.



Severity

Summarising the Cases by Severity and Margin classifications.

Note: [XX.YY] represent the minimum (XX) and maximum (YY) values of margin in minutes. Earlier and later time values are represented by – and + values respectively.

NMOC proactively processes network compatible solutions for the high priority flights whose severity is indicated as 1,2,3 in the AIMA update. The network compatible solutions shall largely make use of sev 0 flights with sufficient margin to satisfy higher severity flights.

Case	Turnaround Assessment	Sev	Margin (Min,Max)	NMOC action interpretation
C1	Late arrival with **impact**	2,3	[-XX,-YY]	**Reduce C1 delay**
C2a	Late arrival no impact	1	[0,-YY]	**Reduce C2a delay**
C2b	Late arrival no impact	0	[0,-YY]	**Reduce C2b delay to improve C6 and C5a**
C3	On time arrival no impact	0	[-XX,+YY]	**Increase C3 delay to improve C1, C2a, or** **Reduce C3 delay to improve C6 and C5a**
C4	On time arrival no impact	0	[0,0]	Ignore
C5b	Early arrival no impact	0	[0,+YY]	**Increase C5b delay to improve C1 and C2a**
C5a	Early arrival no impact	1	[0,+YY]	**Increase C5a delay**
C6	Early arrival with **impact**	~~1,~~2,3	[+XX,+YY]	**Increase C6 delay**

Table 13 : Summary of Cases with AIMA assessment and NMOC action

AOP Impact is noted by severity > 1. (i.e., Sev 2 or 3). This general rule is not currently followed where case (C6) of early arrival (with impact) includes sev 1. The case C2a and C5a usage of Severity 1 implies a no impact delay but for which an improvement is requested. C1 is the case of arrival with impact and uses severity 2 and 3 only can be used. Case C6 early arrival with impact is closer to C1 than C2a/C5a and so should only use severity 2 and 3.

Table hereafter harmonises AIMA assessment and network manager actions

AIMA-turnaround	Network manager requirement
On time Arrival (no impact)	**C3**: The flight can be sacrificed or improved without impacting the turnaround process **C4**. The flight punctuality must not be manipulated. (TTA=ETA) and there is no margin.
Early Arrival (no impact)	**C5a**: Flight is acceptably ATFCM delayed. There is a sev 1 request to action a later TTA. **C5b:** Same as C5a with **severity 0,** no action to try to allocate a new TTA. This flight is a potential candidate for swapping or shifting to improve the TTA of a late arrival flight.
Late Arrival (no impact)	**C2a:** Flight is acceptably ATFCM delayed. There is a **sev 1** request to action an earlier TTA. **C2b:** Same as C2a with **severity 0,** no action to try to allocate a new TTA. This flight is a potential candidate for swapping or shifting to improve the TTA of an early arrival flight.
Early Arrival (with impact)	**C6:** This flight is going to arrive too early for the AOP turnaround process. **This is a severity 2,3** The flight requires a minimum amount of network delay and can take further sacrifice delay up to Max TTA. Action to try to allocate a new TTA.
Late Arrival (with impact)	**C1**: Flight delayed beyond Turnaround Process this is **severity 2 or 3** for the network to improve (advance) the TTA. The required TTA is between TTA- Min and TTA-Max. Action to try to allocate a new TTA.

Table 14 : Cross reference

<u>Process</u>

1) The Network Manager creates and activates an arrivals regulation (Current operation).

2) Triggered by NMOC issuance of the regulated flights' SAM and SRM messages (and corresponding B2B service updates), local AOP will perform the AIMA. [Process steps not included here].

3) The arrival airport AOP shall distribute AIMA updates.

- AIMA will be an electronic communication (not by telephone)
- AIMA updates shall contain batched AOP assessments for all flights whose TTA has been processed by the AOP (for the reference arrival regulation).
- AIMA updates shall be human readable and intuitive.
- AIMA updates shall order flights by TTA time.
- An AIMA update contains a version number to assist with synchronisation.
- NMOC operations will manually process the latest received AIMA update every twenty minutes from time of activation until termination or cancellation of the regulation.

4) NMOC shall receive and parse AIMA updates

- NMOC will manually assess the timeliness of the AIMA update by comparing the TTA values with those contained within NMF.
- If a TTA difference is noted during the AIMA update timeliness check, then no action will be performed on that flight.
- AIMA updates shall contain Flight ARCID, Severity, TTA and TTA time margins (minimum, maximum).
- TTA time margins (minimum, maximum) shall contain positive or negative times in minutes that reflect the acceptable time margins relative to the TTA for the flight to meet its airport turnaround commitments.

5) NMOC shall manually assess the AIMA presented information (Flight, severity, TTA, TTA time margins) against the NMF HMI regulation slot list.

- Subject flights shall be prioritised for processing based upon AIMA severity (3 highest and 1 lowest priority) then by TTA time (earliest is highest priority);

6) Supported by NMF network impact assessment tools, NMOC shall identify potential: empty slots candidate swap flights, force slot actions or flight exclusions as solutions to satisfy subject flight AIMA's minimum and maximum margin times.

7) NMOC shall assess the suitability of each solution where:

a) there is mutual benefit in swapping the position of flight(s) in the slot list to respect the AIMA margins.

b) the subject flight has Sev 3, a force slot and deep rectification may be considered

c) the subject flight has Sev 3 and a flight exclusion is coordinated with the local LTM

8) NMOC shall assess the network impact assessment of the chosen slot list action.

9) NMOC shall apply slot list actions [as per current NMOC process] where positive outcome is indicated in the network impact assessments.

10) NMOC system shall update and issue SRM, SLC and B2B updates

11) NMOC shall review the success of the implementation based upon the receipt of subsequent AIMA updates.

3.2.4 Solution #20 - MassDiv – DCB-0103-A

The MassDiv process is standard process developed for major airports in Europe to support the selection of diversion aerodromes in case of significant reduction of the arrival capacity at a major airport.

When facing diversion requests in case of non-nominal situation in a major airport or a set of aerodromes, the Area Control Centre shall be informed, as soon as possible, of the parking availabilities, according to weight category and airline preferences, in pre-defined set of alternate aerodromes.

The process shall increase the visibility in terms of aircraft localisation to anticipate the recovery once the non-nominal situation is over.

The process includes several phases:

- The Preparation Phase allows the actors involved in the MassDiv process to prepare their plans in anticipation of occurrences of non-nominal situation. The plans include the Diversion Plans for each major airport (or set of airports), the default preferences for the Airspace Users, scenarios anticipating the best network management measures. This phase allows as well configuration of the MassDiv system according to these plans. This phase is of particular importance for non-nominal situations initiated without notice.

- The Pre-Diversion Phase is initiated in case a high risk is observed that an unusual situation will develop in the coming hours, leading to a significant reduction of the arrival capacity at a major airport or multi-hub terminal area (e.g. high risk of severe snow expected for following day). The expected period during which the diversion will take place is identified, allowing capturing the flights which will be likely subject to the process. This gives the opportunity to Airspace Users to start determining which alternate aerodromes should be considered for diversion, as well as to the Alternate Aerodromes to start informing how many parking stands they might have available to receive diverted aircraft. During this phase, a number of measures are launched to ensure that all actors are properly advised and necessary information is being collected. Measures include local organization of the ops room, coordination with approaches, implementation of preventives measures, information of adjacent centres, and contact with Meteo Centre (if unusual situation is weather). It is important to note that the duration of the Pre-Diversion Phase might be very short (typically less than 30 minutes) depending on the cause of the non-nominal situation.

- The Diversion Phase is launched when the unusual situation is confirmed and when aircraft are likely to be diverted. Based on information managed by the Diversion Information Manager, the process will support the flight crew to decide on which alternate aerodrome to divert, in coordination with the air traffic controller, as well as with the airline for the company's business needs. Each time an alternate aerodrome is confirmed by a flight crew, a parking stand is booked at the alternate aerodrome, and the MassDiv system is updated accordingly, ensuring up-to-date information about the remaining availabilities. During the whole Diversion phase, the alternate aerodromes and the airlines maintain the information up to date in the MassDiv system.

- The Recovery Phase is initiated when unusual situation is clearing up, in order to prioritize flights that have been diverted and to re-position them to their original destination. The Recovery Phase is the most critical period for the airspace users. They want to get their aircraft back to base as soon as possible to reduce negative impact on their schedule.

3.3 Differences between new and previous Operating Methods

3.3.1 Solution #17: Advanced Short Term ATFCM Measures (STAM) - DCB-0308

Compared to the previous operating method, the new method includes the following evolutions:

Evolution of rules for Demand Capacity Balancing

It is recognised that the previous ATFCM system is rigid and does not allow for pro-activity in the medium/short-term planning phase of operation due to the CASA regulation slot algorithm. The main evolution within the future operating methods is the move from a system of regulations to a more dynamic and reactive system based on STAM processes and procedures allowing adjustment of demand and capacity in an optimised way.

Evolution of roles and responsibilities

There is a significant expansion of role and responsibilities of the LTMs in detection of demand capacity imbalances and in the selection, coordination and implementation of STAM in the short-term to execution phases.

There is an initial integration of the airspace users' priorities in the hotspot notification and the STAM coordination process.

Role and responsibilities of the Network Manager will be limited to providing a framework to allow LTM, Airports and AUs to share information (Network View), to coordinating (CDM) and to preparing scenarios to be used at network level whenever necessary. Escalation to the Network Manager will take place only upon specific request for investigation of alternatives and in case of undesired interaction and network impact of multiple STAM.

Under normal circumstances the Network Manager should not be part of the work flow. A majority of the dDCB problems will be solved either ACC-internally by the LTM or by limited coordination between adjacent LTMs and AUs. Network Manager's operations will be reduced in term of staff. Once extended to the complete ECAC area an involvement of the Network Manager will be decreasingly feasible and increasingly time consuming. The involvement of the Network Manager will be upon request of the other actors only when a local or sub regional solution cannot be found.

In addition, the project P04.07.08 has introduced the INAP role/function with the introduction of the Extended ATC Planner (EAP) role linking closely the DCB and ATC planning.

Evolution of procedures

The new operating method includes the formalisation of the STAM catalogue and the definition of ECAC-wide harmonised procedures. It will address

- The parallel use of entry counts, occupancy counts and complexity
- The decision-making criteria to identify a hotspot (STAM area) and the selection of measures according to the timeline and the traffic situation analysis

Evolution of the quality of information

The increase of accuracy of predictions on demand and capacity imbalances provided by the NMF will allow the generalisation of the Occupancy Counts. The P13.02.03 Live Trials have demonstrated the relevance of Occupancy Counts to predict imbalance in a time horizon of 3 hours.

The Collaborative NOP supports:

- Data sharing
- Common situation awarness
- CDM (DPI/API)

Evolution of the support tools

New tools and functions to support to the analysis and selection of STAM will be provided. These include

- a network view
  - ➢ to manage hotspot creation/update/cancellation
  - ➢ to manage selection of STAM
  - ➢ to make visible all STAM actions, information and discussion
- What-if capabilities
- Collaborative Framework
- Data sharing
- a workspace: provision of a coordination tool to support the negotiation process
- a supervision tool to monitor the STAM activity

Solution #18: CTOT and TTA - DCB-0208

Evolution of the process to improve flight adherence to TTO & TTA constraints

It is recognised that the previous system is not efficient as it allows deterioration of the DCB Measures mechanism. Many factors contribute to the deviation of flights from their planned trajectory and by so doing deteriorate the planned sequence. The consequence of this deterioration is either underutilised available capacity or reactive measures taken in the execution to re-establish a smoothed traffic sequences which can often result in inefficient flight profiles. Instead, it is proposed that the DCB time-based Measures (regulation, STAM) will be properly distributed to the actors, in particular to the flight crews and controllers, to allow them to implement it efficiently within their processes. The principle is based on the dissemination of the TTO & TTA to the concerned actors and to the respect of this Target Time. The plan however needs to be of sufficient accuracy, e.g. updates in the execution phase need to be taken into account : the Target Time will be continuously monitored during the execution phase in order to detect deviation. Depending of the deviation, the Target Time will be revise in order to fit with the DCB plan execution.

New NM components will be developed to enable the NMF, ATC, AU and pilots to manage the Target Time. B2B made available can support indeed ATC, AU and pilots but the way this is achieved is beyond the scope of this OSED. The NM components provide :

- Target-Time Collector, Processing and Publisher
  This component aims at
  - ➢ collecting the Target-Time planning from CASA and STAM processes
  - ➢ Processing the Most Penalizing Constraint
  - ➢ Publish the Target-Time (CTOT, TTO, TTA) at the slot issue time
- Target Deviation Indicator Processing and Publisher
  This component aims at
  - ➢ Processing the ETO/ETA value to determine the Target Deviation Indicator
  - ➢ Publish the TDI
- Target Time Revision Processing and Publisher (only for STAM Measures)

This component aims at

- Processing the decision-making criteria to trigger a TT revision (update/cancel)
- Publish the Proposal for a Target Time revision (Update/Cancellation)

Evolution of the quality of information

The effectiveness of the TTO & TTA mechanism is highly dependent upon timely and accurate airspace and flight data to be used. It requires the Network to provide access to the very best and timely information available.

DCB and Extended AMAN integration

The DCB and Extended AMAN constraints will be reconciliate in order to provide a consistent Trajectory constraint accomodating the different business need (DCB, ATC, TMA, ….).

Evolution of the support tools

New tools and functions to support the TTO & TTA management are proposed. These include:

- TTO & TTA information provision to the Regional, Sub-Regional and Local Flow Manager
- TTO & TTA information provision to the FOC

Evolution of the process to provide flexibility to the Airspace User

The second operational improvement is to adapt the DCB process in order to hide the CTOT mechanism as an answer to Airspace Users' request.
It is proposed to provide more flexibility concerning the CTOT mechanism allowing the Airspace Users to adjust their flight profile (with new flight performance) while maintaining the TTO & TTA in order to adapt the CTOT to their preference.
It will allow the Airspace Users to depart on time (scheduled time) and to absorb the delay during the flight phase (reduction, cruising FL modification, climbing/descending rate diminution) for delay not exceeding 10min / flown hour.
To implement this process evolution, the FOC/AU files its ISBT and provides EET for the concerned point of the ICAO FPL route. The NMF calculates CTOT and TTO/TTA based on EOBT and EET (including taxi-time) over the concerned point of the ICAO FPL route and restrictions along the 4D IRBT.
If FOC/AU wants to depart on time (so earlier than the attributed CTOT) but still wants to maintain its TTO/TTA, it simply needs to update its EET. NMF will issue a SRM with new CTOT+original TTO/TTA.

3.3.2 Solution #21: Improved Efficiency in the management of Airport and ATFCM Planning – DCB-0310

The enhancement of the airport arrivals process is proposed through the management of a Target Time of Arrival (TTA) allocation. In case of regulation for the arrival, a proper use of the TTA information will allow the airport to move from the reactive management to the proactive management by feeding back with new messages to the Network Manager with the TTA impact on the airport.

Following this Airport Impact Assessment, the Airport will inform the Network Manager of the impact of airport with value about the severity of the impact, and potentially will make proposal that is not mandatory to apply with proposed improvement window for TTA flight [TTA-min, TTA+max].

The Network Manager will analyse the Airport feedback and the situation at Network level in order to evaluate the possibility of change the constraints, and if possible will set the final TTA which will be allocated within the proposed improvement window. In order to propose a new TTA, the Network Manager will use existing slot management procedures (sticky slot, slot shift/swapping, forcing or negotiate a flight exclusion with the LTM) in order to force CTOT and propose new TTA.

This arrival monitoring and airport impact assessment will improve the ground management (park/gate management, handling resources and staff management ...) and will reduce the impact on departures. It will improve the airport capacity management process and thus improve the overall network performance by improving traffic evolution monitoring. The Network Manager would have more accurate airport capacity and demand data and new DCB measures could be triggered.

This process is supported by the data exchange update between the Airport Operations Plan (AOP) and the Network Operations Plan (NOP). In order to have a common, coherent and consistent plan for all airport and Network Manager Functions stakeholders.

3.3.3 Solution #20 - MassDiv – DCB-0103-A

TheATSU associated with the main European airports have diversion plans ready to cope with significant reduction in the arrival capacity of these airports in case of unusual situations such as very severe weather situations or runway closures due to accident, in order to divert safely arriving flights to alternate aerodromes. Some procedures exist as well, agreed with the Network Manager, to ensure a smooth recovery of the operations after the unusual situation clears up.

These current diversion plans however suffer from a number of limitations:

- Being often defined in a national context, the diversion plans offer only alternate aerodromes within the national territory. As a consequence, when the unusual situation is due to severe weather conditions, the probability is high that the weather is also very poor at the alternate aerodromes. Furthermore, many of the alternate aerodromes in the national plans are secondary aerodromes, for which the arriving flights from out-of-Europe airlines do not have the required documentation on board. Eventually airlines prefer being diverted towards aerodromes where they have their own handling stations, which is hardly the case in secondary aerodromes.
- Another limitation of the current diversion plans is that they rely on intensive manual process to capture and disseminate the necessary information, meaning an intensive workload, prone to errors.
- The selection of the diversion aerodrome remains with the flight crew, in close coordination with the ATC controller. This decision should take also into account considerations the business requirements of the Airspace Users not necessarily known to the flight crew. Similarly the network impact of the diversion decision should be considered. Nevertheless

neither the Airspace Users nor the Network Manager have the opportunity to contribute so far to the diversion decision.

- Moreover, procedures may vary from one ATSU to another. Harmonisation should be sought in order to ease appropriation of the procedure by all the actors.

The MassDiv process shall be developed for major airports in Europe to support the selection of diversion aerodromes in case of significant reduction of the arrival capacity at a major airport or a set of airports.

When facing diversion requests in case of non-nominal situations in a major airport, the Area Control Centre shall be informed, as soon as possible, of the parking availabilities, according to weight category and airline preferences, in pre-defined set of alternate aerodromes.

The MassDiv process shall be supported by a Web-Based tool, accessible via the NOP, allowing sharing of information about available aerodrome slots, among the actors (ATSUs, Airports, Airspace Users, NM). The level of workload experienced by the actors when sharing information about available aerodrome slots shall be significantly lower than within current processes.

The level of situational awareness about available aerodrome slots shall increase among the actors with the usage of MassDiv tool. The number of opportunities about available aerodrome slots shall increase by supporting the execution of Diversion Plans involving aerodromes outside the national borders.

The process shall increase as well the visibility in terms of aircraft localisation to anticipate the recovery once the non-nominal situation is over.

4 Detailed Operational Environment

4.1 Operational characteristics

4.1.1 Airspace Design

The Design of the European Route Network is laid down in the European Route Network Improvement Plan. The document addresses the requirements expressed in the EC Regulation No.677/2011 Annex I part B article 5 (a).

The EC Regulation No 677/2011 of 7 July 2011 lays down detailed rules for the implementation of air traffic management (ATM) network functions and amends Regulation (EU) No 691/2010. The regulation establishes several ATM network functions to be performed by a Network Manager. EUROCONTROL has been nominated as the Network Manager entrusted to perform these network functions.

The EC Regulation No 677/2011 lists in Chapter II Article 3 paragraph 4, the ATM network functions to be performed by the Network Manager; amongst them, the design of the European Route Network is identified (para (a) refers).

The design of the European Route Network, as described in Annex 1 of EC Regulation No 677/2011 calls for the establishment of the **European** Route Network Improvement Plan that shall include, inter alia, common general principles complemented by technical specifications for airspace design (Annex I, Part B, art. 5 (a) refers).

4.1.2 Free Route Operations

The Concept of Operations for Free Route is described in the OSED of the Free Route OFA[10].

4.1.3 The SESAR 2020 Target Concept

The next step will be to achieve a transition to the SESAR situation which will consider the implementation of Business trajectories and the definition of the airspace and its corresponding organisation, trajectory oriented. The Business/Mission Trajectory is the User Preferred Trajectory and would include the preferred airspace demand (MT) if required. It is ideally established without the need to adhere to a published route structure. The Business Trajectory will respect all known constraints (e.g. environmental, permanent exclusions).

A general route network may, in some FRA of high and very high complexity, continue to be available, in a transition phase towards Free Routing, according to possible NSA requirements and to each ANSPs Roadmap. The Route Network will evolve to fewer pre-defined routes and replacement of permanent routes by conditional (but plannable) DCTs/Direct Routings. Then in the Free Routing Area it will eventually be withdrawn.

The over-riding principle is that where and whenever possible the User Preferred Trajectory should be facilitated and that constraints such as mandatory route structures should only be deployed reactively where and when needed to provide the necessary capacity.

Therefore route network elements will be retained in managed airspace to cater for:

- Non capable aircraft;
- High density/complexity airspace.

In the SESAR 2020 target concept, User preferred flight trajectory would be likely direct at optimal flight level after considering environmental constraints.

4.1.4 Air Traffic Pattern and Complexity

Traffic complexity is a generic term to express the degree of difficulty an air traffic controller is expected to encounter to maintain an acceptable level of safe and fluid service.

It is also an important factor in demand and capacity balancing when traffic complexity is assessed for planning purposes and managed as a precursor to the Separation Management Process.

Complexity is the result of several factors acting at the same time. The main elements that contribute to complexity are traffic demand and the characteristics of the areas of responsibility.

Examples of key elements affecting traffic complexity are:

Airspace organisation and environmental aspects:

- Airspace classification;
- Route structure;
- Approach and Departure procedures;
- En-Route Procedures;
- Free Route options in the airspace, i.e. direct routings or user defined routes;
- Airspace Reservations/Restrictions;
- Sectorisation;
- Permeability of airspace structures;
- Extended use of secondary airports adding complexity in TMAs;
- Weather – e.g. Cb, wind, turbulence.

Aerodrome characteristics:

- Runway, taxiway, apron and/or stands configuration, geometry and dimensions;
- Interface runway-taxiway and/or taxiway-apron.

Traffic pattern and demand:

- Traffic volume;
- Traffic distribution over time;
- Summer / Winter scenario;
- Week day / Week end;
- North / south about jet streams;
- Axes - i.e. major traffic flows such as SE axis, SW axis, Ski Flow;
- Arrival/departure ratio;
- Aircraft characteristics;
- Flight rules.

Other factors relevant to specific situations.

4.1.5 Traffic Demand

The long term information regarding demand can be extracted from the STATFOR forecast revised with actual data from 2010 and 2011 in the "Challenges of Growth 2013" study[11]. For total Europe[10], the Medium Term Foresast (MTF) [11] remains quite aligned with the Long Term study. Current forecast is slightly lower than previous forecast (dated September 2015), with narrower short-term uncertainty.

In parallel, without any official statistics, military air traffic is linked to political decisions of European States which are heading in the direction of downsizing their forces. The total of hours flown will be going down to a certain threshold. Nevertheless the nature of training missions, their complexity and diversity, as well the volumes of airspace needed to use new generation of weapon systems will still be a challenge for accommodation.

Note: As far as the fleet mix and aircraft size information is concerned, it should be possible to extract the information based on historical past data, but it is currently not planned and will not be possible to do it without taking into consideration formal request and consider the corresponding effort versus timing versus quality.

4.1.6 SBT/SMT Information Availability over Time Horizon

According to the SESAR ConOps, Shared Business/Mission Trajectories (SBT/SMT) should be made available to the Network Management Plan as early as possible.

The main Airlines systems can now (and as such also for Step 1) share via a point to point (but not yet via SWIM, expected for Step 2) data exchange with the concerned stakeholder system, a User Preferred 4D Trajectory that is their operational flight plan currently destined for the flight crew; this includes much more information than the flight plan for the ATC, for example the list of all points over flown by the aircraft with time estimates and also the fuel consumption as computed by the airline tools.

In reality, however, not all elements of a trajectory are known and/or reliable in the same time horizon.

Scheduled Airlines operate the most predictable flight schedule. Their business model is highly depending on predictability to optimise service quality and operating cost.

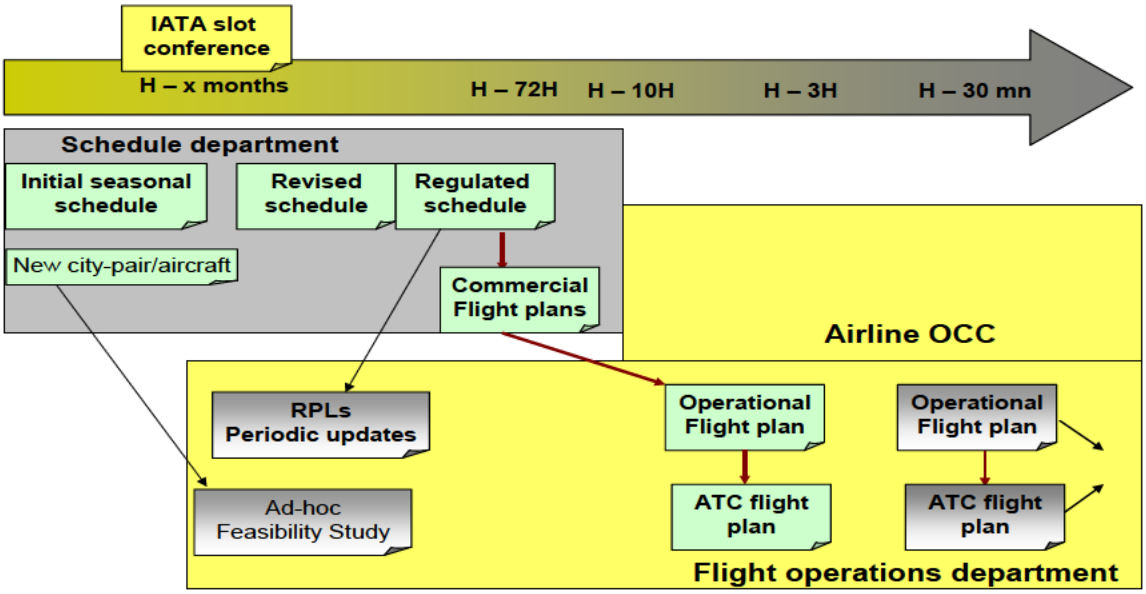


Figure 20: Flight Planning for Scheduled Airlines

[10] Only be done for the traffic region ESRA08 since ECAC was not yet calculated in the previous versions of the forecast[11] These notions are developed by FF-ICE **Error! Reference source not found.**.

The availability and reliability of incoming iSBT/iSMT information over time horizon varies significantly between Airspace Users with different business models (see Table below), and the quality of the airspace user tool to build the 4D profile.

Business Model	Flight Planning
Legacy scheduled airlines	See figure above
Low fare airlines	Similar to legacy airlines but have more flexibility to adapt the schedule for commercial reason at short term
Regional airlines	Close to legacy airlines. Innovata schedule updated less frequently
Leisure carriers (Charter)	Commercial part is handled by a third party: tour operators. More unstable schedule and available at shorter term
General cargo airlines	Close to charters. Annual program + ah-hoc schedule. Schedule provided over a longer period
Express cargo airlines	They operate a more stable annual program than general cargo carriers with some ad-hoc/short term adjustments.
Business aviation	No information available 48 h before operations apart in the case of special events or airport slots
General aviation	No information available 24h prior to departure subject to short term changes due to user travel requirements.

Table 15: Flight Planning by Business Model

The table below shows for Step 1 an anticipation of flight data availability over the time horizon (subject to negotiation with airspace users).

	Civil/military planning		Civil /Military operational information			
	Next season	Monthly	d-6 to d-1	d-1	d-1 to -3h	-3h to -30min
ADEP-ADES	**Schedules issued**	Schedules update if required. **Military planned missions**	Schedules / Missions update if required	Schedules/ Missions update if required	Update information if required	
Scheduled / Estimated Block Times	**Scheduled block times issued**	Update information if required	Update information if required	**Estimated block times issued**	Update information if required	Update information if required
Aircraft type	**Information on preferred Aircraft Type**	Update information if required	Update information if required	Update information if required	Update information if required	Update information if required

	Civil/military planning		Civil /Military operational information			
	Next season	Monthly	d-6 to d-1	d-1	d-1 to -3h	-3h to -30min
Airspace Reservation / Restriction Demand	**Big events or exercises**	Big events or exercises updates and **expected military training schedules** including specific procedures	Updates to big events or exercises and military training schedules if required	Updates to big events or exercises and military training schedules if required on **AUP**	Updates to big events or exercises and military training schedules if required on **UUP**	Agreed airspace reservation/ restriction allocation
User Preferred Route	**Information on User preferred Route to handle flight including ranked alternatives**[11]	Update information if required	Update information if required including ranked alternatives	Update information if required	Update information if required	Update information if required
Shared Business / Mission Trajectory	**Information on 2D route waypoints, including RFL**	Update information if required	**Information on 4D route including aircraft performance**	Update information if required	Update information if required	Update information if required
Flight Priority			**Information on required priorities to handle specific flights**	Update if required	Update if required	Update if required
Reference Business / Mission Trajectory					**Agreed 4D trajectory including constraints (on request)**	Agreed 4D trajectory including constraints

Table 16: SBT Information Availability over Time Horizon

4.1.7 Capacity Data Information Availability over Time Horizon

Over time information relating to environmental constraints and capacity limitations will evolve, increasing in sources, granularity and accuracy. The table below highlights the anticipated availability of this data (subject to ATSU's involvement).

[11] These notions are developed by FF-ICE **Error! Reference source not found.**.

	Next Season	x-1 months	x-2 weeks	x-1 week	x-1 day	x-3h
ATSU capacity	Maximum range of planned ATSU capacities	Maximum range of planned ATSU capacities	Maximum capacity given anticipated resource availability	Maximum capacity given anticipated resource availability and infrastructure outage	Maximum capacity given anticipated resource availability and infrastructure outage	
Seasonal Axis Flows	Planned airspace change based on historical data	Offload routes and profile limitations in place	Offload routes and profile limitations in place	Environmental restrictions fine-tuned, based on better SBT data	Axis plan agreed between relevant actors	
Special Events and Planned Military Activity	Likely capacity impact from very large events	Impact from smaller events and military programs known	Impact from smaller events and military programs known	The effect of traffic orientation plans TRA's & TSA's known	Fine tuning of planned constraints, to match SBT granularity	Agreed airspace reservation/restriction allocation
Sector Opening Plan	Default Sector Opening plan based on business planning	Default Sector Opening plan based on resource planning	Default Sector Opening plan based on resource planning	Sector Opening plan based on updated resourcing levels and expected demand levels	Sector Opening Plan based on likely resource and demand levels	Updated Sectorisation plan based on live resource availability and demand
Sector Capacities		Default Sector Capacities	Default Sector Capacities	Default Sector Capacities	Amended Capacities based on forecast weather, staff, segregated areas and other parameters	Capacities Revised based on live complexity / workload forecast assessments .

3618 Table 17: Capacity Data Availability over Time Horizon

3619 4.1.8 Aircraft Mix and Equipage

3620 The current mix of aircraft types, operating characteristics and pattern are not expected to significantly
3621 change in the close future. There is no information available on fleet renewal according to
3622 environmental pressure or oil price and balance between turbo prop, jet.

Regarding the GAT Military flight, the statistics from STATFOR can be used. Complementary information from the Civil-Military ATM Coordination Directorate gives the split by flight level of the military GAT shows the following figures[12]:

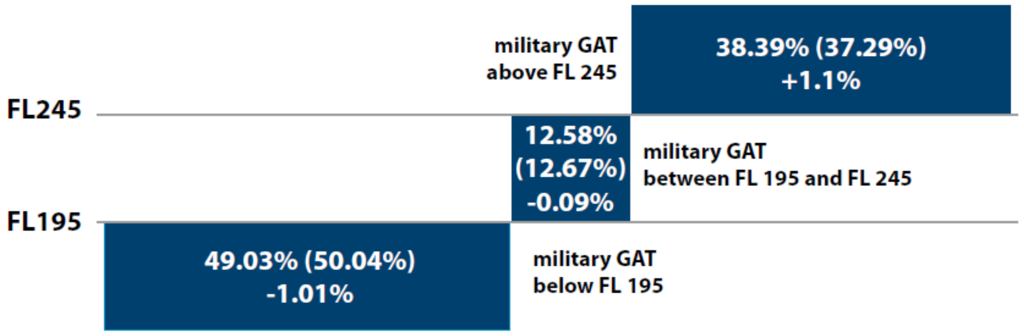


Figure 21: Split by Flight Level of military GAT (Military Statistics, Edition 2014)

The relative contribution of GAT Military flights to the overall global traffic is expected to remain unchanged by 2016 (see Figure 22).

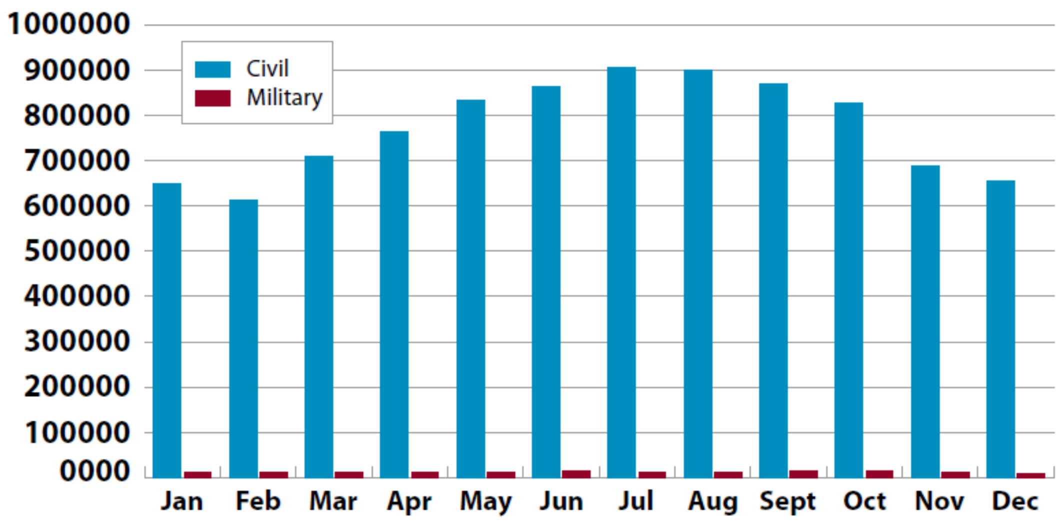


Figure 22: Comparison of civil and military GAT (Military Statistics, Edition 2014)

The average contribution of military OAT/IFR to the overall traffic will remain between 1,5 and 2% with local various at State level.

At this stage no figures regarding the demand by city pairs about the general aviation and very light jet were available. According to experts such aircraft will be mainly on secondary airports (except for feeder flight to/from intercontinental commercial flights).

[12] These figures represent the split in 2013 and figures between brackets provide difference over 2012.

Additional Aircraft Capabilities Available in Step 1	
COM	Technical capability, both in pre-departure and during execution, to receive by ACARS[13] from FOC and easily load in airborne Navigation functions 3D trajectories based either on published routes (SIDs, Airways, STARs) or User Preferred Routes with non-published waypoints. Air / ground data link exchange of CPDLC messages allowing the flight crew to receive, load in avionics and acknowledge ATC clearance/instruction for departure (DCL), silent transfer, below FL280 (in TMA) Single time constraint allocation (CTA or CTO on a waypoint with a required accuracy) ASAS Spacing (ASPA); In Trail Procedures (ATSA-ITP); seamless transition from oceanic to continental airspace and vice versa. Air ground data link exchange of FIS messages allowing the flight deck to receive, load and display aeronautical and meteorological information[14]. Automatic downlink of 4D trajectory data (fix and FMS computed or Pilot's defined waypoints with associated altitude, speed and time estimates and/or constraints) and aircraft derived data (gross weight and speed schedule) according to contract terms (on request, periodic basis or event in case of change or deviation more that thresholds) individually and dynamically specified during flight by ATC (e.g. ADS-C EPP). Automatic downlink of ETA min/max on the point specified in the ATC request (e.g. ADS-C ETA min/max report).
NAV	Advanced RNP as per current draft of Minimum Aviation System performance Standards: Required navigation performance for area ED-75D (DO-236 C change 1) : • RNP 1 (continental) and RNP 2 (oceanic) on any published trajectory (including DCTs if encoded with Route identifiers in the Navigation data base) • FRT (Fixed Radius Transition) inside published Trajectories as instantiated in the FMS Navigation data base (not applicable to DCT) Improved on-board management of a single time constraint (CTA or CTO) thanks to improved avionics meteorological model (using more wind/temperature forecasts from FOC), improved prediction of wind/temperature (using data from on-board sensor), computation of ETA min/max interval facilitating more reliable CTA allocation, improved CTA algorithm through wider CTA speed range, adapted CTA accuracy (+/- 30'' or 10'') and more robust CTA guidance. On-board management of ASAS Spacing manoeuvres delegated to the Flight Crew (e.g. "Remain behind" and "Merge then remain behind" a designated target aircraft flying to a Metering Point) with the Controller still responsible for separation.
SUR	ADS-B Out functionalities as per standards DO-260A (current), then -260B (future). Low cost / low power consumption ADS-B (OUT and IN) transponder for General Aviation.[15]
Specificities per aviation	• Mainlines are mainly driven these new aircraft capabilities • Key issue for Military aviation is the certification of equivalent military enablers, e.g. MIDS/L16 for ATM, Mode 5 including Mode S for ADS-B • Regional/Business aviation have some limitations related to legacy interfaces, e.g. limited or no integration of ATN/VDL2 with other on-board functions. • General aviation needs "light" enablers e.g. Fit low power ADS-B out/in, DME/DME, FIS/MET broadcast.

Table 18: Aircraft Equipage

[13] *A large majority of mainlines (A/C & FOC) are and should be ACARS capable.*
[14] As-is D-ATIS/ACARS should not be replaced by D-ATIS/ATN in Step 1 due to no need for ATN technology to convey ATIS information; D-OTIS/ATN should be challenged versus Air-ground SWIM in Step 2
[15] There is no SESAR project working on such an enabler

4.1.9 CNS Capability

CNS Capabilities in Step 1 are described in the architecture document from B.04.03.

4.1.10 Aircraft Performance

In the Step 1 initial implementation period, only minor changes to the aircraft performance are expected.

This includes the onboard ability to handle late notice amendments and revisions to the iRBT/iRMT as well as enhanced accuracy in the adherence to a time constraint, derived from initial 4D operation (e.g. computation of ETA min/max interval facilitating more reliable CTO/CTA allocation, improved CTO/CTA algorithm through wider CTO/CTA speed range, adapted accuracy – i.e. +/- 30'' for CTO or 10'' for CTA, and more robust CTA guidance).

In the longer term, aircraft will adhere more closely, i.e. more accurate horizontal and vertical adherence, to the planned 4D trajectory.

With regard to the representation of aircraft performance in the ATM systems, the figures and assumptions of BADA will be included and / or aircraft performance data will be provided by the airspace users.

For military aircraft to be considered for 4D compliance as currently BADA contains a Generic Fighter model (FGTR with performance data assuming this aircraft is flown as a "civil" aircraft), ït will be crutial to complete the database with specific performance models for military aircraft.

4.2 Roles and Responsibilities

This section describes the roles related to ATM Network Operations in Step 1 with their associated tasks and responsibilities.

These roles contribute to the ATM Network Management Function[16]. The objectives of the ATM Network Management Function (NMF) is to enable the optimum use of airspace and ensure that Airspace Users can operate to the maximum extend preferred trajectories while allowing maximum access to airspaces and air navigation services. The NMF integrates and manages all the tasks related to the ATM Network, i.e. the dynamic, integrated management of air traffic and airspace including Air Traffic Services (ATS), Airspace Management (ASM) and Air Traffic Flow and Capacity Management (ATFCM) — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

The Network Management Function is truly performed at all geographical levels (regional, sub-regional, local) with a level of involvement and responsibilities depending on the activities and on the ATM phases. The following roles described in this chapter participate to this function.

Roles and actors:

Implementation and distribution of these roles among the various ATM actors will vary throughout Europe dependent upon the local stakeholders' policy, procedures, operating methods, traffic environment.

The responsibilities devoted to a role may be assumed by one actor, several actors, or an organised structure. In some cases a particular actor may also be responsible for part of the tasks of a given role or part of the tasks of several roles.

[16] **ATM Network Management Function** (commonly stated as NMF in the text): The Network Management Function is an integrated ATM activity with the aim of ensuring optimised Network Operations and ATM service provision meeting the Network performance targets. To avoid confusion with the "*ATM Network functions*" stated in Regulation (EC) N°677/2011 and designated as European Route Network Design, Radio Frequency, Transponder code and ATFM functions, wording has voluntarily been modified.

4.2.1 European Network Manager (NM)

The European Network Manager acts as catalyst and facilitator for an efficient overall network management by all ATM stakeholders.

The Network Manager role will be enabling, facilitating and promoting the Network Operations Plan, providing a framework to allow Local/Sub-regional Network Manager and Airspace Users actors to share information (Network View), to coordinate (CDM) and to prepare scenarios to be used at network level when necessary.

Role:

- Has a key role within the long-term planning phase to ensure the most efficient performance of the European Network. The NM provides a consolidated and coordinated approach to all planning and operational activities of the network, including monitoring and improvement of its overall performance;
- In conjunction with the Network Management Board, develops, maintains and implements the Network Strategy Plan which covers the area of responsibility of the Network Manager (Network Manager Implementing Rule), defines the strategic objectives and includes the Network Manager Performance Plan;
- Monitors all the long-term local or sub-regional activities and identifies situations where the Network performance may be affected by national and/or sub-regional decisions;
- Closely coordinates with all the involved HLAPBs in order to ensure coherency of the European Network operations;
- Provides to the national/sub-regional HLAPBs all the required information, data and expertise;
- Prepares, through appropriate coordination, seasonal plans or plans for special events;
- Participates to airspace design activities and simulation activities to improve the overall process;
- Develops an integrated European Route Network Design, through a cooperative decision-making process;
- At the end of the long-term planning phase, delivers an initial integrated Network Operations Plan based on the local/sub-regional activities outcomes;
- Develops, maintains and implements the rolling Network Operations Plan based on the local/sub-regional ANSP activities outcomes and Airport planning activities;
- Ensures that any change to the airspace design, organisation and management, is accommodated in the Airspace Data Management systems and reflected in the NOP as appropriate;
- Ensures that any change to the capabilities possibly impacting ATM operations is accurately reflected in the NOP as appropriate;
- Disseminates a consolidated regional ASM plan, currently in the form of an AUP (Airspace Use Plan) and updated AUP's, via the NOP;
- Supports the submission of the iSBT by the AUs, verifies their consistency with regard to the ATM environment described in the NOP and ensures their dissemination to all relevant partners;
- During the medium to short term phases the Network Manager (NM) will be working towards identifying and mitigating significant DCB issues, which affect the network at a regional level. Dependent upon the related FABs and ANSP involved, such mitigation is also likely to require Network Management influence at sub-regional and local levels.

- The factors that will influence NM to address DCB initiatives are likely to be broadly similar to today; rules and performance targets (2011 NM IR) governing the Department of Network Management (NM), seasonal variations (currently referred to as Axis), large scale military activity, and reductions in normal capacity, due to things like weather, major infrastructure implementation and industrial action.
- During DCB the NM will be working closely with the Airspace Users, Airspace Managers, Flow Managers and Local Traffic Managers. The role of the NM in this activity is to coordinate and provide most optimum solutions at Network level (optimized Airspace Configurations and other DCB solutions if required), as well as ensure that any DCB measure is decided considering the global optimum of the network. The subsequent agreed outcomes are then published via the NOP.
- The NM supports the Airspace User Driven Prioritisation Process (UDPP).
- The UDPP process at CDM airports is transparent to NM through the DPI messages. The role of NM in the UDPP Enhanced Slot swapping is not changed with regards to current operations.
- During the execution phase, the NM assures that every actor has proper access to the Network view. He also assures the stability of the NOP (Network Operations Plan), in partnership with the sub-regional and local layers, reacting to unexpected events, which impact on overall network performance, such as unusual meteorological conditions or loss of significant assets (e.g. runways, airports). In this respect, the NM consolidates local DCB solution at regional level and participates to iRBT/iRMT revisions. Among other means, activation of pre-agreed scenarios is a solution to restore Network stability.
- The activity addressed at Network level includes also the compilation of the NOP, the successive integration of initial Shared Business/Mission Trajectories, the collection and dissemination of constraints, the real-time identification of potential interactions between (accepted and agreed) initial Reference Business/Mission Trajectories and (newly published) initial Shared Business/Mission Trajectories and the communication of these interactions to the corresponding Airspace Users.

The NM provides support for Network crisis management and UDPP activities.

4.2.2 Local Traffic Manager (LTM)

The Local Traffic Manager is a role exercised at local level that contributes to the Network Management Function.

- The Local Traffic Manager (LTM) functionally lies in between the Flow Manager and the extended ATC planner, taking a view over a group of sectors (potentially a complete ACC) and any Airfield Towers that fall within the LTM’s area of responsibility. He acts as the coordinating link between the ANSP, sub-regional and regional flow and airspace management.
- The LTM is a major actor of the DCB processes both for the medium to short term planning phase and the execution phase..
- The LTM has the leading role in the DCB/dDCB processes in execution phase (and appropriately in the short-term planning phase close to execution). He monitors the situation at local level and anticipates hotspots and workload issues. In case of an imbalance, he is responsible for:
- Declaring the hotspot
- Identifying the adequate solutions (Airspace Configuration and flow / trajectory management if necessary),
- Assessing their impact, looking for optimisation,

- Coordinating and refining them with concerned partners (other LTMs, AUs, Airports, FM, NM, ATC actors,…) using CDM process or UDPP activities, except if time doesn't permit,
- Implementing them (or delegating the implementation to the adequate actors),
- Requiring a sub-regional or regional action where necessary.
- The output of this DCB/dDCB process is decision on the ATM Network Management which is integrated into the rolling NOP.
- The LTM provides a bridge in understanding between operational perceptions of complexity, workload & demand and how that translates into DCB requirements as deliverable occupancy & workload values.
- In execution phase and appropriately in short term planning, the LTM works closely with Supervisors and extended ATC Planners, through INAP (Integrated Network Management and extended ATC planning) function. The LTM is also likely to be either a Supervisor, or report to one, and as such will retain local safety accountability. Any DCB initiatives will have to be approved by him.

The LTM is one of the roles related to the INAP function: he brings the expertise of workload/complexity assessment and resolution with Network Management dimension awareness to facilitate a continuous and coherent activity with extended ATC planning process.

4.3 Constraints

- General
  - change management : new roles and responsibilities (Network managers, LTM, AUs)
- Procedure Design
  - Applicability to various airspace configuration taking into account local constraints
  - Applicability to various types of organisation in terms of flow management/traffic management at ATSU
  - Need to include ATSU, AUs and all involved stakeholders, from an early stage, in the design process.
  - traceability of measures, proposals, alternatives and responses
- Enablers
  - Improved NMF accuracy will enable Demand and Capacity Balance monitoring at the scale of hourly entry count density down to instantaneous count density (occupancy count).
  - The implementation of Dynamic DCB requires updated information available through the development of standard interfaces and access services that will allow CDM between enlarged set of types of actors.
  - STAM implementation information available for Local DCB actors
- Operating method
  - Adequate training to handle Dynamic DCB process/procedure
  - provision of training/information material to involved actors, including AUs
  - Adequate support tools (problem detection, network view, interaction, communication)
  - Need for specific recovery and fallback procedures (system failure)

5 Use Cases

5.1 Operational Scenario DCB-0308- Non-severe capacity shortfalls impacting multiple nodes of the network on short-term followed by capacity recovery

5.1.1 Scenario Summary

NB: Non-severe (or non-significant) capacity shortfalls can be solved without UDPP use, contrary to severe (significant) capacity shortfalls.

This operational scenario describes the resolution of 3 local imbalances facing 2 European airports (Airport1 called "Sunshine" and Airport2 called "Riviera") and an en-route sector (sector S1) on the day of operations.

The 3 nodes are strongly connected through trajectories. Therefore the resolution of the 3 imbalances is prone to network effect – meaning that a Dynamic DCB solution applied at one node may impact another node. As a consequence, local actors also have to coordinate at regional level, to determine the most appropriate Dynamic DCB Solutions.

This cooperative Dynamic DCB mechanism is described in the scenario text.

5.1.2 Additional Information and Assumptions

5.1.2.1 Additional Information

Scenario environment

<u>Airports:</u>

Airport 1 = Sunshine

- international airport
- major destination for leisure travellers from May to September located at the Mediterranean coast
- passengers mainly transit to Sunshine via Riviera
- strong connection to Riviera, execution phaseally coordinated with Riviera
- at one hour flying time from Riviera

Airport 2 = Riviera

- international airport
- main hub in the area and primary transit airport for Sunshine
- strong connection to Sunshine, execution phaseally coordinated with Sunshine
- at one hour flying time from Sunshine

<u>Airspaces</u>

Sector Family A:

- busy group of enroute sectors
- preferred routing to Sunshine through sector family A
- multiple crossing points and high portion of climbing and descending traffic
- managed during waves of traffic with destination Sunshine
- consists of 3 elementary sectors
    - **sector 1 = S1**
        - overlaps with TS4
        - directly impacted by activation of TS4
        - point B1-2 is located within S1 and a major crossing point of routes through S1
        - the portion of S1 (basic sector block 1-2) containing B1-2 may be assigned to S2 to balance workload between S1 and S2
    - **sector 2 = S2**
        - indirectly impacted by activation of TS4 and thus airspace reconfiguration and use of temporary route structures
        - a portion of S1 containing point B1-2 may be assigned to S2 to balance workload between S1 and S2
    - **sector 3 = S3**
        - indirectly impacted by activation of TS4 and thus airspace reconfiguration and use of temporary route structures

Point B1-2

- located within S1 and within basic sector block 1-2
- may be controlled either by S1 or by S2, when basic sector block 1-2 has been assigned to S2
- major crossing point of routes within S1

Military Airspace TS4:

- occasionally reserved for special airspace use by neighbouring air force bases
- overlaps with S1

NMOC1 (subpart of the Network Manager's area) manages network operations over a part of the Mediterranean region including Sunshine, Riviera and S1.

During waves of flights with destination Sunshine these flights are separated from flights with other destinations that are handled by S2 and S3.

When TS4 is activated, pre-defined dynamic DCB tools exist to cope with military activities that adversely impact S1. Some demand can be rerouted via S2 and S3, depending on respective complexity.

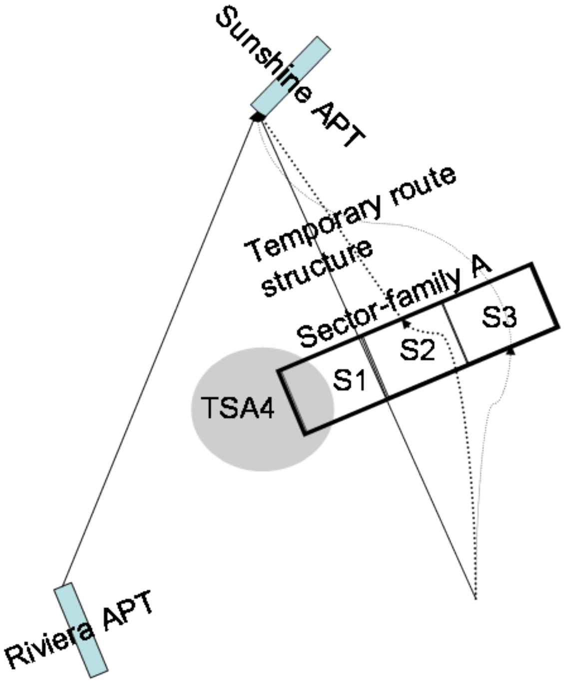


Figure 23 : Multiple nodes

Scenario triggers

The imbalances created at airport level are the result of non-severe capacity shortfalls.

<u>First imbalance:</u>

- impacting Sunshine
- capacity shortfall results from un-forecasted and capacity limiting weather conditions

<u>Second imbalance:</u>

- impacting Riviera
- subsequent to application of dynamic DCB measure at Sunshine
- modified departure sequence for Riviera is considerer to rebalance the demand

<u>Third imbalance:</u>

- impacting S1
- subsequent to activation of TSA4 and dynamic DCN measure at Sunshine
- known sector demand is pushed into a time period when S1 suffers from reduced capacity due to planned activation of TS4

The declared arrival capacity of Sunshine has to be reduced by 20% due to the adverse weather conditions in the vicinity. Local actors are familiar with such imbalances and a prepared set of ATFCM tools already exists, enabling the network to quickly react to the changing situation. The LTM at the ACC doesn't hesitate to select and apply dynamic DCB solutions as he knows by experience that beyond local level no significant impact will be generated.

5.1.2.2 Assumptions

- Connection between actors and network "Information support system" (Network View):
  - Option 1: all actors connected
  - Option 2: airports not connected

- Availability of indicators for density and complexity in the support tools.
  - Option 1: occupancy counts are available
  - Option 2: occupancy counts and “complexity elements" are available
- European airport operating close to its capacity limits when the shortfall occurs.
- Non severe weather-related capacity shortfall is identified at short notice.
- Trajectories are handled on a most appropriate basis: most positive network effect achieved with impact on minimum number of trajectories in least adverse way.
- A departure sequence, if any, provides a Target Take-Off Time (TTOT) on the basis of the Estimated Take-Off Time (ETOT):
  - Option 1: departure sequence is locally managed by DMAN if airport is equipped and integrated with or part of the management of departure and pre-departure sequences
  - Option 2: there is no DMAN, the departure sequence is managed locally or supported by slot allocation system.

5.1.2.3 Actors in the Scenario

Note: Local and Sub-regional Network Managers are considered as a single actor referred to as LTM.

NMOC1:

The Network Manager:

- provides a framework to allow ACC (LTM) and AU to share information (Network View) and to coordinate (CDM)
- in case of necessary escalation of issues investigates on alternatives and implements them accordingly (i.e. scenarios)
- assesses the network impact with other STAM when necessary
- implements “classical regulation” when necessary

ACC (LTM):

The LTM:

- monitors demand and capacity within local en-route areas (such as sector-groups and TMA’s) and airfield performance to ensure early awareness of any developing DCB imbalance
- receives status information from airfields within their area of responsibility (such as landing rates, airfield congestion and infrastructural status)
- identifies periods of excessive workload within the local network and in consequence agrees, coordinates (with LTM and AU) and carries out appropriate mitigation activities as required (STAM)
- where necessary updates relevant information support systems (Network View)

Sunshine:

The ATS Tower Supervisor:

- identifies that a reduction of capacity is required
- quantifies this reduction as a rate (i.e. 20/60)
- communicates the rate to the LTM for assessment

The APOC Staff:

- modify airfield operations in consideration of the reduced landing rate

Approach Control:

- deliver the appropriate arrival intervals at Sunshine

<u>Riviera:</u>

The ATS Tower Supervisor:

- is responsible for revising the departure sequence and allocate new TTOT, in response to the dynamic DCB measure applied

The Tower Ground Controller:

- where possible optimises the departure sequence to limit the impact to unaffected flights

The APOC Staff:

- modify airfield operations in consideration of the reduced departure rate to Sunshine

<u>Operators and military airspace users:</u>

The Airspace Users (FOC Staff, Flight Crews):

- involved in the coordination and the implementation of the Dynamic DCB solutions through trajectory revisions

5.1.3 Layered Planning Process

A general principle of the layered planning process is that all planning benefits from feedback on current events and operations. These are made available through the NOP. The events which take place during each of the planning phases are described in detail in the scenario text as appropriate.

There are three phases: the execution phase, the long-term planning phase and the medium/short-term planning phase.

The scenario takes place at the end of the long-term planning phase and during the medium/short-term planning phase, depending on the status of the flight.

5.1.4 Scenario

Scenario Part 1: Sunshine International capacity is reduced at short notice

Sunshine International, 1st August 2020, 12:00

Today is a very busy day at Sunshine International. A wave of arrivals is scheduled for the late afternoon. Moreover, the last MET forecast available for Sunshine indicates a risk of thunderstorms with a probability of 20% for the next 3 hours. The Tower Supervisor takes good note of it however no action is taken due to the low probability of the occurrence.

Sunshine International, 15:00

The Tower Supervisor obtains the latest forecasts from the MET Office and finds out that they have been revised: a new warning has been issued and the risk level increased dramatically.

Based on this information, the Tower Supervisor evaluates the evolving situation and decides to inform the LTM that a reduction in the arrival capacity is to be implemented "as soon as possible" and for the next three and a half hours (i.e. from 15:00 to 18:30), the capacity reduction is from 40 a/c every hour to 32 (40/60 to 32/60). The Tower Supervisor updates the Network Management Systems (Network View) accordingly.

ACC, 15:00-15:10

The LTM reviews the situation and confirms that a DCB imbalance exists, initiated by the Sunshine arrival restriction. He selects an ATFCM solution that is most likely to provide the best network outcome. As there is insufficient surface airfield capacity available at Riviera to generate a satisfactory city pair solution, an arrival slot allocation solution is applied to all flights bound to Sunshine. The Network Manager then applies the arrival regulation.

Because the dynamic DCB solution of Sunshine (Slot allocation) may have an adverse network impact above the local level, the LTM assesses any network effect using appropriate support tools and his expertise.

Network effect assessment: impact on Riviera Airport

The adopted solution can restore the balance at Sunshine, but at the expense of an imbalance created at Riviera for the following reasons:

a) Riviera is a hub. It is also the main feeder airport for Sunshine: the city-pair is strongly connected

b) Riviera is close to Sunshine (1h). Most flights departing from Riviera and delayed due to Sunshine will have to wait on the ground and this will have an impact on departure management at Riviera

c) Riviera is about to enter a "hub-and-spoke" time period: many connecting flights are scheduled to depart within the next couple of hours and convey passengers to their final destination, Sunshine, notably. Therefore at that time Riviera has little capacity margin and little flexibility to reallocate departure flights, flights delayed due to Sunshine and kept on the ground because of it are likely to spoil departure operations

Thus the Dynamic DCB solution applied for arrivals at Airport1 cannot be applied on its own: the LTM needs to coordinate arrivals at Sunshine and departures at Riviera so that the performance of network operations is maintained.

The LTM therefore liaises with the APOC Staff at Riviera to set up the departure sequence and make sure that the balance is maintained while the Dynamic DCB solution is applied at Sunshine.

Network effect assessment: impact on Sector-family A

The dynamic DCB solution (Slot allocation) implemented at Sunshine would create an imbalance in sector family A for the following reasons (Figure **24** : Expected situation in sector group A before activation of TSA4):

a number of flights with destination Sunshine that are subject to the dynamic DCB slot allocation, are planning to re-route via sector S1

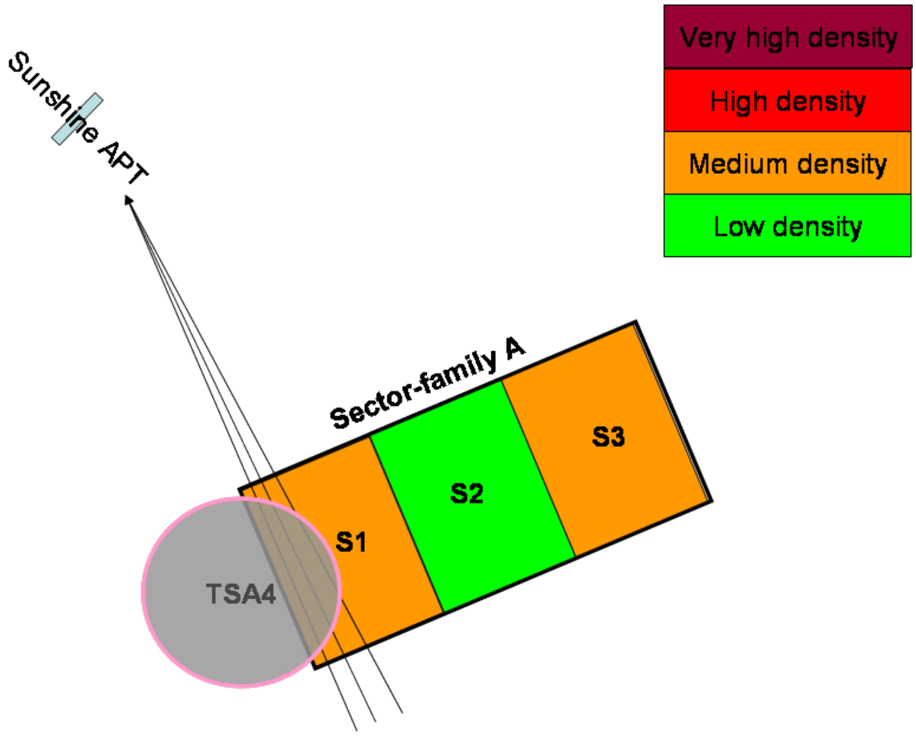


Figure 24 : Expected situation in sector group A before activation of TSA4

In addition to the pushing back of demand, sector S1 suffers from a capacity reduction due to a military airspace reservation (TSA4). The LTM monitors the situation in his area (Figure **25** : Expected situation in sector group A after activation of TSA4). He checks the indicators available for S1:

- a high demand is predicted
- a complexity close to the maximum permissible for the controllers
- conversely, a lower complexity is anticipated for neighbouring sector S2

The LTM will coordinate with other LTMs and AUs and update the information support system (Network View) (i.e. Notification of “possible implementation” of Dynamic DCB solution)

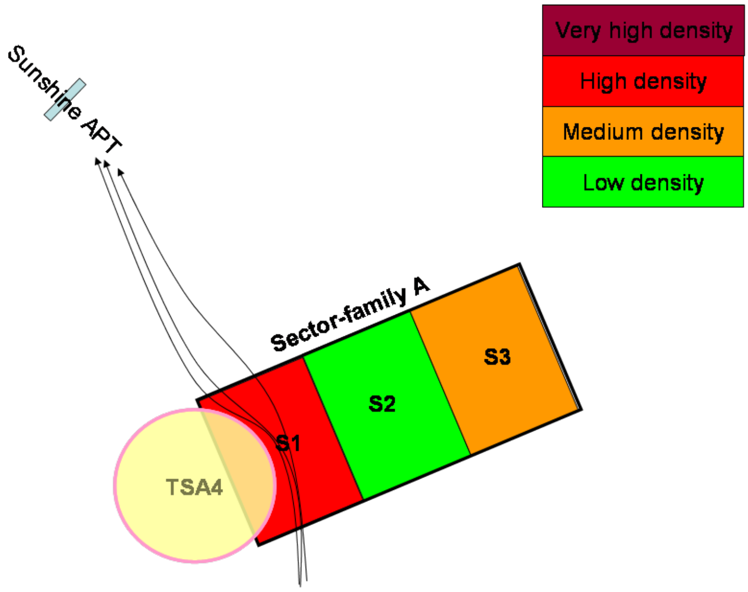


Figure 25 : Expected situation in sector group A after activation of TSA4

The LTM reasons that if a Dynamic DCB slot allocation was implemented at Sunshine, several flights would be forced into S1 during the reservation period (Figure **26** : Slot allocation for Sunshine generates adverse network effect in sector family A). This would raise S1 demand and complexity above acceptable levels.

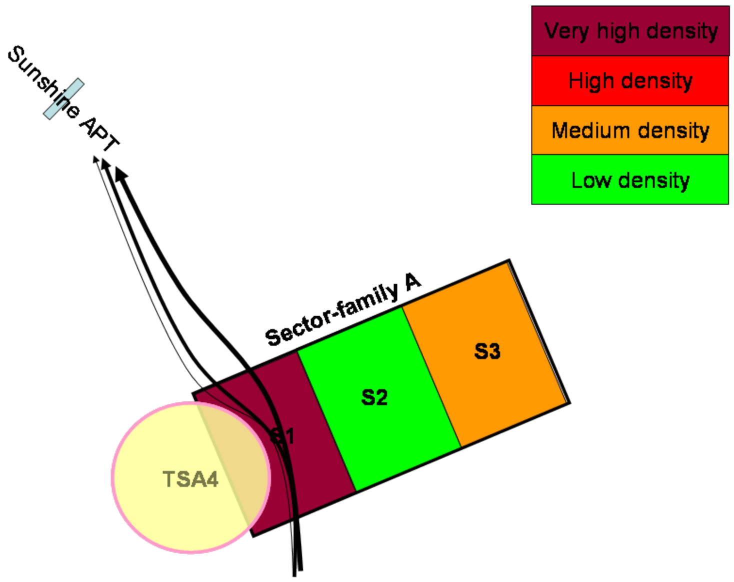


Figure 26 : Slot allocation for Sunshine generates adverse network effect in sector family A

Some of the flights are delayed, entering S1 while TSA4 is active, trajectories must therefore be adjusted. The LTM responsible for the management of traffic within sector family A coordinates with the LTM and AUs.

The LTM in charge of Sector group A determines the most appropriate course of action to keep the situation inside sector family A balanced when the dynamic DCB solution is applied at Sunshine.

The LTM explores different options to resolve the predicted excess of complexity within S1. The 3 choices are:

- To allocate the basic sector block 1-2 (which is currently assigned to ATC sector S1) to the ATC sector S2, as the predicted complexity within ATC Sector 2 is to be low. One of the major crossing points – point B1-2 of the ATC Sector 1 is within the basic sector block 1-2 and by allocating this block to ATC Sector 2, the workload would be significantly balanced between all sectors

or

- To negotiate the reduction of the vertical limits of the ARES (TSA4), to FL 345+ and enable the use of the additional airspace in S1 made available by this step

or

- To cherry-pick[17] and re-route some of the flights that fly through ATC sector S1 through ATC sectors S2 and S3. This option would modify the AU's preferred route and should therefore be used as last option.

The military partners express their concern not to be able to use TSA4 only above FL345. Solution 2 is discarded.

Solution 3 would change trajectories for several flights. This solution is passed over in favour of solution 1, which requires no trajectory changes (Figure **27** : Network effect mitigation: thanks to sector family A re-sectorisation).

After coordination with the LTMs, solution 1 is implemented by the LTM who then updates the information support system (Network View) as appropriate.

By catching the Basic Sector Block 3 of ATC Sector 1, ATC Sector 2 becomes slightly denser.

ATC Sector 1s demand and complexity levels are now acceptable.

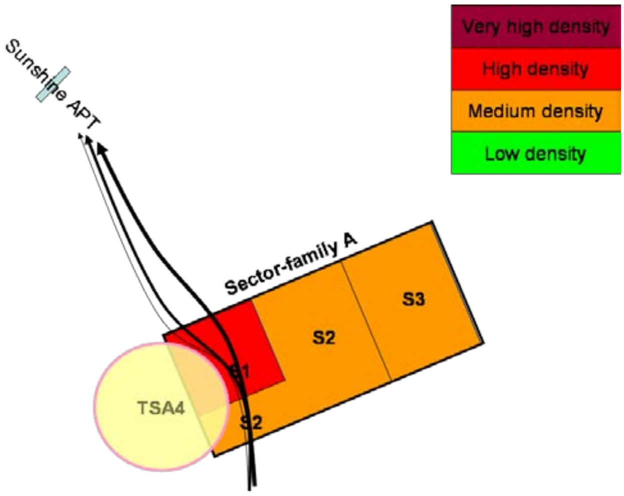


Figure 27 : Network effect mitigation: thanks to sector family A re-sectorisation

Scenario Part 2: airport capacity is recovered at short notice (Figure **28** : Capacity increase at Sunshine generates adverse network effect in sector family A**)**

<u>Sunshine International, 16:25</u>

The Tower Supervisor (via pilot checks) ascertains that the cross-wind is weakening; the MET Office sends an improvement message. This allows for an improvement to the arrival rate, and in coordination with the LTM sets the rate at 35 a/c an hour (35/60). Information support system is updated by LTM in the NOP.

<u>Riviera International, 16:25</u>

[17] Based on his expertise or according to specific indicators available for each flight.

As a consequence, the departure rate at Riviera is increased accordingly in order to take full advantage of the additional capacity offered. The departure sequence is adjusted.

<u>Sector family A, 16:25</u>

A significant number of flights bound for Sunshine route via sector-family A. Due to the capacity increase at Sunshine International, ATC Sectors S1, S2 and S3 are directly impacted. Demand and complexity within Sector 1 again increases to an unacceptable level.

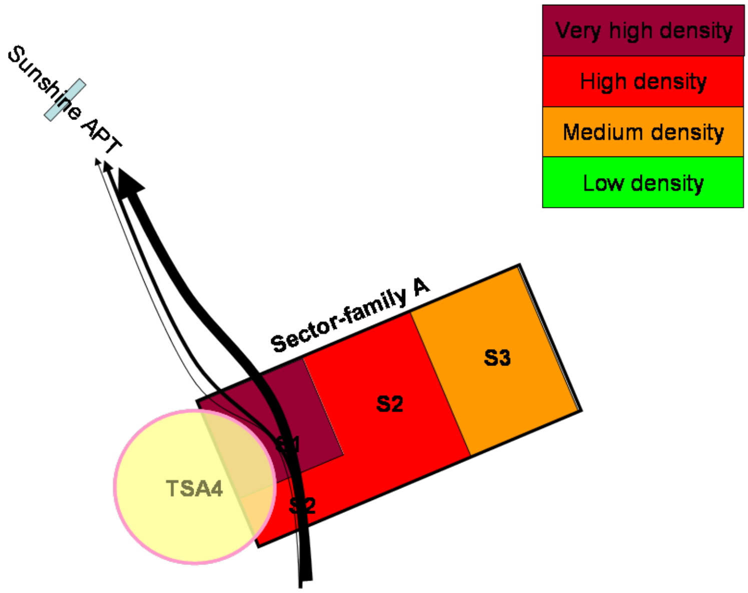


Figure 28 : Capacity increase at Sunshine generates adverse network effect in sector family A

A traffic bunch is anticipated in S1 while TSA4 is still active. The LTM monitoring sector family A looks for an alternative that will keep the situation balanced inside A. The solution that is validated and retained consists in proposing to Airspace Users off-loading S1 while on-loading S2 and S3. After coordinating with the relevant actors (LTMs and AUs), the LTM implements the solution and updates the information support system (Network View).

By re-routing some of the additional flights from S1 to S2 and S3, the resulting traffic demand within S1 decreases to an acceptable complexity (Figure **29** : Network effect mitigation: flights are re-routed through S2) while TS4 remains activated.

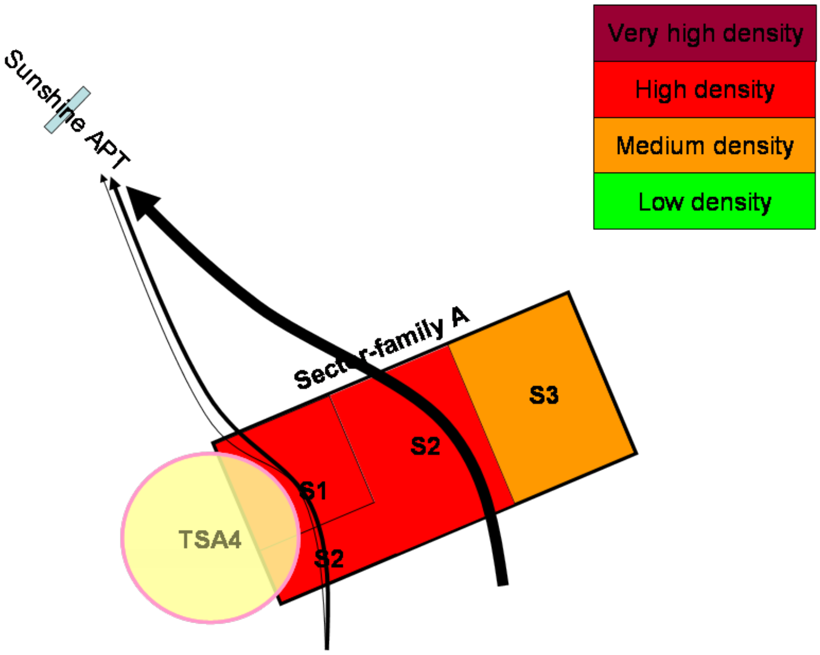


Figure 29 : Network effect mitigation: flights are re-routed through S2

Scenario Part 3: Back to standard operations

17:30

The arrival/departure capacities of Sunshine International and of Riviera have come back to their declared values. All constraints are cancelled.

TSA4 activity is terminated as planned.

LTM terminates the re-routing process.

Airspace Users have started modifying their trajectories back to their originally preferred routes.

The temporary route structure through S1, S2 and S3 is no more used.

Information support system (Network View) is updated.

5.2 Operational Scenario DCB-0208- Demand capacity imbalance impacting the En-Route flow

5.2.1 Scenario Summary

This operational scenario describes the resolution of an imbalance (hotspot) in an En-Route Sector. A STAM time-based measure is implemented during flight planning phase and managed in timely accordance with the Step 1 CDM processes. The operational scenario follows the handling of the CTOT and TTO parameters by the different actors and focuses upon a TTO-constrained flight through its pre-departure and execution phase up until the TTO is performed.

The Scenario objective is to demonstrate the success of the step 1 DCB measure supported by communication and adherence to the CTOT and TTO parameters by each FOC, flight crew and all ATM actors in the resolution management of the hotspot at Step 1.

5.2.2 Additional Information and actors

5.2.2.1 Additional Information

Noosa En-Route ACC, 10 August 2018, 12:00

Today is a busy day at Noosa ACC. An overload is predicted in the ABC Sector (15:00 to 16:00). After analysis the LTM decides to select three flights to apply a STAM time-based Measures (TONB) that will support the hotspot resolution. The LTM updates the Network Management Systems (Network View) accordingly.

Airport Noosa International: (Departure)

Airport Noosa International (Departure) prepares the pre-sequence departure taking into account the TONB information.

APOC : identifies concerned flights and tries to provide a TSAT = CTOT± 3'

FOC:

The Flight Operation Centre (FOC) will send their ICAO FPL or share their Initial Shared Business Trajectory (ISBT) and will motivate their Flight crews to operate in accordance with the agreed ICAO FPL route or Initial Reference Business Trajectory (IRBT).

In the case where the AUs use the ICAO FPL 2012, the FOC/AU files its flight plan, provides EET for the concerned point of the FPL route and receives TTO with CTOT information.

In case the AUs use the ISBT and IRBT, the FOC/AU files its ISBT, provides the full 4D profile and receives TTO with CTOT information.

Flight Crew:

The Flight Crew remains ultimately responsible for the safe and orderly operation of the flight in compliance with the ICAO Rules of the Air and within airline standard operating procedures. It ensures that the aircraft operates in accordance with ATC clearances and does its outmost to try to adhere to the FPL route or the IRBT and comply with the agreed TTO.

IFPS:

IFPS operator: no special procedure for this scenario

NMF:

NMF system: will calculate a TTO and a CTOT.

For FOC using ICAO FPL 2012, if the EET information of the concerned point of the route, NMF will suspend the flight pending the reception of an update containing this information

Flow Controller: no special procedure for this scenario. In case of a query about the reason of the suspension, whether over the phone or via the e-helpdesk, will request the necessary information to be sent

LTM : will do its outmost not to interfere with concerned flights

ACC (en route and TMA):

Multi-sector and Sector Planner : will bring to the controller's attention the special character of the flight affected by this scenario and will not plan any deviation from planned trajectory or IRBT.

Executive Controller: Is made aware that a flight has a DCB constraint

Whenever safety and separation permit, allows the flight to proceed along its planned trajectory to meet the TTO.

Ends this Scenario.

5.2.3 Scenario

<u>Planning phase</u>

<u>ISBT Filing</u>

The FOC/AU files its Flight Plan Data / ISBT and provides EET for the concerned point of the ICAO FPL route. Upon receiving an ACK from IFPS system containing the approved route, the FOC/AU checks the route and verifies that the provided EET is still achievable. In the event that the approved route is acceptable but it is not possible to comply anymore with the EET provided, the FOC/AU sends a CHG message to update this EET.

If the route proposed by IFPS is not acceptable, the FOC/AU resubmits a new ICAO FPL/ISBT and the above process is repeated.

Once an agreement is reached, the complete IRBT flight plan is transmitted to NMF and all the ATSU's

NMF receives the Traffic Demand data from the IFPS in the form of Flight Plan data, the EET over the concerned point of the ICAO FPL route and STS/ATFMTTO.

If EET over the concerned point of the ICAO FPL route is missing in the transmitted IRBT, NMF will suspend the flight via a FLS message, pending the reception of the missing information

<u>Detection of congestion at Noosa ACC, ABC Sector</u>

The Network Manager is notified of a significant hotspot generated for an hour period at Noosa ACC, Sector ABC.

<u>Calculation of CTOT and TTA</u>

The LTM initiates the STAM time-based measure. NMF calculates CTOT and TTO based on EOBT, EET over the concerned point of the ICAO FPL route and restrictions along the 4D IRBT

<u>Dissemination of CTOT and TTA</u>

The network immediately updates the NOP.

NMF then disseminates the CTOT and the TTO information to FOC, departure aerodrome (ADEP). and destination aerodrome (ADES) .

The DCB regulation mechanism continues to update the planned sequence after modification or with received information until regulation termination. It notifies FOCs, and ATM systems (ACCs ,departure and destination aerodromes) of pertinent updates to CTOT and TTO information prior to flight execution.

If FOC/AU wishes to update its EOBT but still keep its TTO, it will need to modify its EOBT as well as its EET over the concerned point of the ICAO FPL route by sending a CHG message to IFPS.

IFPS will transmit the update to all ATSU's as well as NMF that will calculate a new CTOT for the given TTO.

<u>Example</u> : EOBT 12:00 }
Taxi Time 10' } ETOT 12:10 }
EET 01:10 } ETO 13:20

According to the traffic demand NMF calculates TTO 13:35 and by reverse calculation CTOT 12:25.

If FOC/AU wants to update its EET in the ICAO FPL, it can only update it to a greater value . If it wants to use a smaller value, the ICAO FPL needs to be canceled with a CNL and replaced by new correct ICAO FPL.

If FOC/AU wants to depart on time (so earlier than the attributed CTOT) with a CTOT 12:10 but still wants to maintain its TTO, it simply needs to update its EET. NMF will issue a SRM with new CTOT+original TTO

In this scenario FOC/AU needs to send an updated EET value of 01:25 . This value is the maximum EET value for this scenario as it represents the difference between the TTO and the CTOT.

If FOC/AU sends a New value > TTO - ETOT, NMF will attribute a later TTO based on ETOT and new EET and will send a SRM with new CTOT+ new TTO

Pre-Departure

FOC/ARO transmits IRBT with CTOT and TTO information to the crew/pilot

The flight crew shall now be responsible for managing the flight in such a way that aircraft respects TTO. They would also now be responsible for managing the time tolerance (tolerance window). The flight crew use the TTO as an RTA in the FMS.

Start Option 1 :- A-CDM airport

On reception of the ICAO FPL data (including CTOT and TTO), the APOC, as central manager of the AOP (Airport Operations Plan), assigns a specific TTOT (Target Take-Off Time) to the flight, within a CTOT tolerance window ± 5'.

The airport system issues the Target Start-up Approval Time (TSAT) to the FOC/AU and informs Network Manager of the TSAT, TTOT and the Variable Taxi Time (VTT). The TSAT will match the TTOT, taking into account the FOC/AU determined TOBT and taxi route from the flight's stand to the holding point and the associated taxi time.

Based on this TSAT and the VTT, the FOC/AU has the possibility to again adjust and distribute its operational flight plan so as to enable the flight to meet the TTA whilst flying closely to its optimum business flight profile. The AU sends any ICAO FPL revisions (including the operational flight plan information) to the Network Manager.

Network Manager responds to operational flight plan information and disseminates updates of CTOT and possibly TTO information to FOC, Aerodromes, LTMs and ACCs

End Option 1

Flight Execution - Cruise

Target Time constrained flights are indicated to the ATC controllers on their situation displays. It allows the ATC controller to be informed that the flight is under a Target Time constraint and the Target Time deviation value (± minutes)
An active collaboration between executive controllers and the flight crew is expected in order to best adhere to issued TTO for flights affected by DCB time-based Measures (Regulation, STAM) during the flight phase. Having noted that the flight is TTO-constrained, the ACCs sector controllers allow the flight to progress safely on its planned trajectory. The sector controllers will be aware that the flight may be operating at slower or faster speeds than ordinary as the flight crew pursue their TTO target.

The Flight Crew and their associated flight management process progress their flight targeting the TTO via the FMS. The Flight Crew follows all ATC executive instructions related to safety and separation. The Flight Crew considers all ATC proposals for improvement but in reference to achievement of the TTO target. On reception of a new TTO message from ATC, the flight crew will disregard the previous target and replace it with the new TTO (in case of new dDCB measure for example). The flight crew will endeavour to continue their flight in accordance with the new target.

5.3 Operational Scenario - Demand capacity imbalance impacting the arrival flow of an aerodrome

5.3.1 Scenario Summary

This operational scenario describes the resolution of an imbalance (hotspot) between the available capacity of a civil airport and the traffic demand forecast on the day of operation. A traditional time-based regulation DCB measure is implemented during flight planning phase and managed in timely accordance with the Step 1 CDM processes. The operational scenario follows the handling of the CTOT and TTA parameters by the different actors and focuses upon a regulated flight through its pre-departure and execution phase up until the point that the Controlled Time of Arrival is issued to the flight crew and the TTA is superseded.

The Scenario objective is to demonstrate the success of the step 1 DCB measure supported by communication and adherence to the CTOT and TTA parameters by each FOC, flight crew and all ATM actors in the resolution management of the ATFCM hotspot at Step 1.

5.3.2 Additional Information and actors

5.3.2.1 Additional Information

<u>Noosa International, 10 August 2018, 12:00</u>

Noosa is major International airport situated within the IFPZ

Today is a busy day at Noosa International. A wave of arrivals is scheduled for the late afternoon. Moreover, the last MET forecast available for Noosa international indicates a substantial risk of weather deterioration in three hours time with a probability of 99%.

Based on this information, the Tower Supervisor evaluates the evolving situation and decides to inform the LTM that a future reduction in the arrival capacity is to be implemented “as soon as possible” and for one hour duration (15:00 to 16:00), the capacity reduction is from 40/60 to 20/60 flights per hour). The Tower Supervisor updates the Network Management Systems (Network View) accordingly.

<u>Airport Noosa International: (Tower and approach)</u>

The ATS Tower Supervisor: Identifies that a reduction of capacity is required

Quantifies this reduction as a rate (i.e. 20/60)

Communicates the rate to the LTM for assessment

<u>APOC</u> : identifies concerned flights and tries to provide a TSAT = CTOT± 3’

ACC

The LTM reviews the situation and in coordination with the Network Manager, an ATFCM DCB measure solution is selected to most likely provide the best network outcome. An arrival slot allocation solution is applied to all flights inbound to Noosa international.

FOC:

The Airline Operations and Control Centre (FOC) will send their ICAO FPL or share their Initial Shared Business Trajectory (ISBT) and will motivate their Flight crews to operate in accordance with the agreed ICAO FPL route or Initial Reference Business Trajectory (IRBT).

In the case where the AUs use the ICAO FPL 2012, the FOC/AU files its flight plan, provides EET for the last point of the FPL route/first point of the STAR and receives TTA with CTOT information.

In case the AUs use the ISBT and IRBT, the FOC/AU files its ISBT, provides the full 4D profile and receives TTA with CTOT information.

Flight Crew:

The Flight Crew remains ultimately responsible for the safe and orderly operation of the flight in compliance with the ICAO Rules of the Air and within airline standard operating procedures. It ensures that the aircraft operates in accordance with ATC clearances and does its outmost to try to adhere to the FPL route or the IRBT and comply with the agreed TTA.

IFPS:

IFPS operator: no special procedure for this scenario

NMF:

NMF system: will identify flights concerned by this scenario according to the destination aerodrome (ADES) in ICAO FPL , Noosa in our case.

It will then calculate a TTA and a CTOT.

For FOC using ICAO FPL 2012, if the EET information over the last point of the route/first point of the STAR is missing, NMF will suspend the flight pending the reception of an update containing this information

Flow Controller: no special procedure for this scenario. In case of a query about the reason of the suspension, whether over the phone or via the e-helpdesk, will request the necessary information to be sent

LTM : will do its outmost not to interfere with concerned flights

ACC (en route and TMA):

Multi-sector and Sector Planner : will bring to the controller's attention the special character of the flight affected by this scenario and will not plan any deviation from planned trajectory or IRBT.

Executive Controller: Is made aware that a flight has an ATFCM constraint

Whenever safety and separation permit, allows the flight to proceed along its planned trajectory to meet the TTA.

Issues CTA and thereby supersedes the TTA. i.e., Ends this Scenario.

5.3.3 Scenario

Planning phase

ISBT Filing

The FOC/AU files its Flight Plan Data / ISBT and provides EET for the last point of the ICAO FPL route/first point of the STAR. Upon receiving an ACK from IFPS system containing the approved route, the FOC/AU checks the route and verifies that the provided EET is still achievable. In the event that the approved route is acceptable but it is not possible to comply anymore with the EET provided, the FOC/AU sends a CHG message to update this EET.

If the route proposed by IFPS is not acceptable, the FOC/AU resubmits a new ICAO FPL/ISBT and the above process is repeated.

Once an agreement is reached, the complete IRBT flight plan is transmitted to NMF and all the ATSU's

NMF receives the Traffic Demand data from the IFPS in the form of Flight Plan data, the EET over the last point of the ICAO FPL route/first point of the STAR and STS/ATFMTTA.

The Network Manager is also in possession of the best available airspace and aerodrome capacity information.

If EET over the last point of the ICAO FPL route/first point of the STAR is missing in the transmitted IRBT, NMF will suspend the flight via a FLS message, pending the reception of the missing information

Detection of congestion at an arrival airport

The Network Manager is notified of a significant hotspot generated by an arrival capacity reduction of 50% within three hours' time, for an hour period at Noosa International. The capacity reduction is put in place after a weather update forecasts adverse weather in the vicinity of the airport.

The Network Manager coordinates the collaborative decision making processes with the Local Traffic/Flow Manager and TWR/ACC Supervisor. The collaboration quickly discounts using dynamic DCB (STAM measures) to resolve the situation. This necessitates the application of a classical time based regulation DCB measure to smooth the congested airport arrival flow.

Calculation of CTOT and TTA

The Network Manager initiates the ATFCM measure. The DCB regulation mechanism will determine the planned sequence of flights, their TTAs and CTOTs to resolve the congestion .

NMF calculates CTOT and TTA based on EOBT, EET over the last point of the ICAO FPL route/first point of the STAR and restrictions along the 4D IRBT

Dissemination of CTOT and TTA

The network immediately updates the NOP.

NMF then disseminates the CTOT and the TTA information to FOC, departure aerodrome (ADEP) and destination aerodrome (ADES) .

The DCB regulation mechanism continues to update the planned sequence after modification or with received information until regulation termination. It notifies FOCs, and ATM systems (ACCs ,departure and destination aerodromes) of pertinent updates to CTOT and TTA information prior to flight execution.

If FOC/AU wishes to update its EOBT but still keep its TTA, it will need to modify its EOBT as well as its EET over last point of the ICAO FPL route/first point of STAR by sending a CHG message to IFPS.

IFPS will transmit the update to all ATSU's as well as NMF that will calculate a new CTOT for the given TTA.

Example : EOBT 12:00 }
Taxi Time 10' } ETOT 12:10 }

EET 01:10 } ETA 13:20

According to the traffic demand NMF calculates TTA 13:35 and by reverse calculation CTOT 12:25.

If FOC/AU wants to update its EET over last point of the route in the ICAO FPL/first point of the STAR, it can only update it to a greater value . If it wants to use a smaller value, the ICAO FPL needs to be canceled with a CNL and replaced by new correct ICAO FPL.

If FOC/AU wants to depart on time (so earlier than the attributed CTOT) with a CTOT 12:10 but still wants to maintain its TTA, it simply needs to update its EET. NMF will issue a SRM with new CTOT+original TTA

In this scenario FOC/AU needs to send an updated EET value of 01:25 . This value is the maximum EET value for this scenario as it represents the difference between the TTA and the CTOT.

If FOC/AU sends a New value > TTA - ETOT, NMF will attribute a later TTA based on ETOT and new EET and will send a SRM with new CTOT+ new TTA

Pre-Departure

FOC/ARO transmits IRBT with CTOT and TTA information to the crew/pilot

The flight crew shall now be responsible for managing the flight in such a way that aircraft respects TTA. They would also now be responsible for managing the time tolerance (tolerance window). The flight crew use the TTA as an RTA in the FMS.

Start Option 1 :- A-CDM airport

On reception of the ICAO FPL data (including CTOT and TTA), the APOC, as central manager of the AOP (Airport Operations Plan), assigns a specific TTOT (Target Take-Off Time) to the flight, within a CTOT tolerance window ± 5'.

The airport system issues the Target Start-up Approval Time (TSAT) to the FOC/AU and informs Network Manager of the TSAT, TTOT and the Variable Taxi Time (VTT). The TSAT will match the TTOT, taking into account the FOC/AU determined TOBT and taxi route from the flight's stand to the holding point and the associated taxi time.

Based on this TSAT and the VTT, the FOC/AU has the possibility to again adjust and distribute its operational flight plan so as to enable the flight to meet the TTA whilst flying closely to its optimum business flight profile. The AU sends any ICAO FPL revisions (including the operational flight plan information) to the Network Manager.

Network Manager responds to operational flight plan information and disseminates updates of CTOT and possibly TTA information to FOC, Aerodromes, LTMs and ACCs

End Option 1

Flight Execution - Cruise

Target Time constrained flights are indicated to the ATC controllers on their situation displays. It allows the ATC controller to be informed that the flight is under a Target Time constraint and the Target Time deviation value (± minutes)
An active collaboration between executive controllers and the flight crew is expected in order to best adhere to issued TTA for flights affected by DCB regulation or dDCB measures during the flight phase. Having noted that the flight is TTA-constrained, the ACCs sector controllers allow the flight to progress safely on its planned trajectory. The sector controllers will be aware that the flight may be operating at slower or faster speeds than ordinary as the flight crew pursue their TTA target.

The Flight Crew and their associated flight management process progress their flight targeting the TTA via the FMS. The Flight Crew follows all ATC executive instructions related to safety and separation. The Flight Crew considers all ATC proposals for improvement but in reference to achievement of the TTA target. On reception of a new TTA message from ATC, the flight crew will disregard the previous target and replace it with the new TTA (in case of new dDCB measure for example). The flight crew will endeavour to continue their flight in accordance with the new target.

Flight Execution – Entering in the AMAN horizon

The flight enters the Area of Responsibility of ACC X the flight crew establishes VHF communication and is identified.

The flight crew aim to meet a TTA at a known waypoint at or adjacent to the ASMA boundary, within ACC X, typically 70 Nm from the destination aerodrome. TTA enables the delivery of traffic to APP Y protected airspace at an acceptable rate in order to meet the declared capacity.

At a defined time parameter a notification message is initiated by the ACC X FDPS. The notification message contains the last up to date flight data for the flight including the co-ordination point (COP) between the two ATSUs, estimated time over the co-ordination point and the corresponding flight level.

The APP FDPS receives and processes the notification message. The trajectory prediction takes into account the estimated time over the COP and the AMAN tool places the flight in the initial arrival sequence. As soon as radar data becomes available on the flight at APP Y a precise arrival time may be calculated. In the event that there is a need to manage the sequence the arrival management tool will calculate a CTA with reference to the IAF for the flight. This information is displayed to the APP controller.

At the same time the AMAN information is made available to the en-route controller in ACC X.

The En-route controller instructs the aircraft to cross the Initial Approach Fix (IAF) at the CTA required by the AMAN. If this is prior to the TTA waypoint the flight crew will disregard the TTA and fly to comply with the CTA and ATC instructions.

The flight crew request descent having analysed their flight profile to meet the CTA.

The En-route controller assesses that the descent will not create any traffic conflict and grants the descent clearance.

The flight continues to progress and two minutes before crossing the boundary is handed over by the En-route controller to the Approach controller.

The flight crew establishes communication with APP Y and is identified. The flight enters the Area of Responsibility of APP Y and the controllers clear the aircraft to fly the appropriate STAR which includes the IAF and CTA. Level clearances will be given by the approach controller and eventually the aircraft will be cleared for the approach.

APP Y transfers the flight to the TWR which then clears the aircraft to land.
The flight lands.

5.4 Operational Scenario DCB-0208– Target Time Monitoring and Revision

5.4.1 Scenario Summary

This operational scenario describes the monitoring of the resolution of a hotspot in an En-Route Sector and the process to ensure its proper resolution. To resolve the hotspot, a set of DCB time-based measures (Target Time) have been implemented the during the flight planning phase and managed in timely accordance with the Step 1 CDM processes. The operational scenario follows both the monitoring of the hotspot resolution progress and the flight Target Time achievement in the execution phase.

The Scenario objective is to demonstrate the proper execution of the DCB plan and Target Time Management supported by a continuous monitoring and revision mechanism in the resolution management of the hotspot at Step 1.

5.4.2 Additional Information and actors

MEIJE En-Route ACC, 10 August 2018, 13:00

Today is a busy day at MEIJE ACC. An overload is predicted in the ABC Sector (15:00 to 16:00). An hotspot “HSPT1” is notified (15:00-16:00) After analysis the LTM decides to select 4 flights (XF1, XF2, XF3, XF4) to apply a DCB time-based Measures (TTO) that will support the hotspot resolution. The LTM updates the Network Management Systems (Network View) accordingly.

The assigned DCB constraints are :

	ETO (FTFM Profile)	TTO (RTFM profile)	CTOT
XF1	15:45	16:10	14:10
XF2	15:50	16:15	14:20
XF3 (Airborne)	16:15	16:20	N/A
XF4	16:00	16:25	14:25

Table 19 : Assignment of Target-Time

The duration of the hotspot resolution area is recalculated in order to take into account the recovery period due to the smoothing effect. The “HSPT1” duration is (15:00 to 16:25).

- XF1, XF2, XF4 are still on the ground and the pilots will receive from FOC the TTO.
- For XF3, the LTM (MEIJE ACC) is coordinating/implementing with the LTM (Mouchou) the STAM TT. This coordination process is based on the existing STAM process/procedure. Then, the LTM (Mouchou) coordinates with ATC (Mouchou), then ATC (Mouchou) coordinates with XF3 to implement the measure.

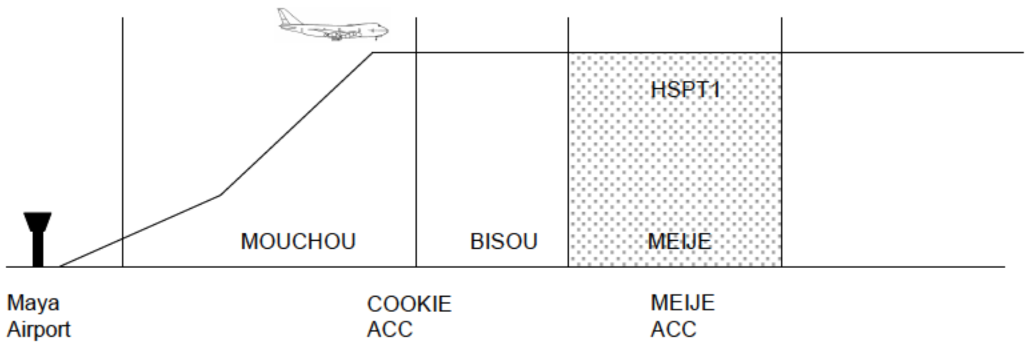


Figure 30 : Scenario Sectors

<u>Airport Maya International: (Departure)</u>

Airport Maya International (Departure) prepares the pre-sequence departure taking into account the CTOT & TTO information.

<u>APOC</u> : identifies concerned flights and tries to provide a TSAT = CTOT± 3'

<u>FOC</u>:

The Airline Operations and Control Centre (FOC) sends their ICAO FPL or share their Initial Shared Business Trajectory (ISBT) and motivates their Flight crews to operate in accordance with the agreed ICAO FPL route or Initial Reference Business Trajectory (IRBT).

<u>Flight Crew:</u>

The Flight Crew remains ultimately responsible for the safe and orderly operation of the flight in compliance with the ICAO Rules of the Air and within airline standard operating procedures. It ensures that the aircraft operates in accordance with ATC clearances.

<u>IFPS</u>:

IFPS operator: no special procedure for this scenario

<u>NMF</u>:

<u>NMF system</u>: will calculate a TTO and a CTOT.

<u>Flow Controller</u>: no special procedure for this scenario.

LTM : will do its utmost not to interfere with concerned flights

5.4.3 Scenario

Maya Airport, 14:00-14:30

Airport Maya International (Departure) manage the departure phase and the TSAT for XF1, XF2, XF3. The FPL of XF1, XF2, XF4 is planned to cross the COOKIE ACC (MOUCHOU Sector, BISOU Sector), then the MEIJE ACC.

MEIJE ACC, 14:00-14:45

The LTM monitors the progress of the hotspot resolution and Flight Target Time Achievement. The resolution of HSPT1 is “GREEN”. The LTM receives the TDI information.

XF1 : TDI = +2 min

XF2 : TDI = +1 min

XF3 : TDI = -3 min

XF4 : TDI = 0

MEIJE ACC (LTM), 15:00-15:02

The LTM monitors the progress of the hotspot resolution and Flight Target Time Achievement. The resolution of HSPT1 is still “GREEN” but the NM system has detected that XF3 is now outside of the Target Window [-2,+2] associated with the TTO. The flight is now in the COOKIE ACC, BISOU Sector.

The NM system sends a Target Time Revision Proposal to the LTM. The LTM analyse the situation and decide to update the Target Time for XF3. Using the STAM CDM tool, the LTM wil re-implement (update) the Target Time.

COOKIE ACC, Sector Mouchou 15:02-15:05

The INAP function receive a request from LTM (MEIJE ACC) to implement a new Target Time for XF3. The LTM coordinates with the ATC, then the ATC coordinates with the pilot the TT implementation.

MEIJE ACC, 15:00-16:30

XF1, XF2, XF3, XF4 arrive at the HSPT1 entry time inside the [-2,+2] tolerance window supporting a proper resolution of the hotspot.

5.5 Operational Scenario DCB-0310- Airport Arrivals Management using TTA Allocation

It is a very busy day at LEPA airport and in the European core area in general. Most of the flights planned to arrive for their second rotation have already been delayed in the morning due to some fog in the British Isles.
The following batch of aircrafts is planned to arrive within 5 minutes of each over at an already crowded airport

Callsign	ADEP	ADES	EOBT	ETA
TOM1AT	EGKK	LEPA	09:10	11:15
EZY1911	EGCC	LEPA	09:00	11:16
EZY714M	EGGP	LEPA	09:10	11:16
TOM1YJ	EGNX	LEPA	09:15	11:18
TOM21K	EGCC	LEPA	09:00	11:18
TOM1464	EIDW	LEPA	09:00	11:18
MON958	EGBB	LEPA	09:25	11:19
TOM9FY	EGCC	LEPA	09:15	11:20
EZY6427	EGNT	LEPA	09:15	11:20
RYR4UC	EGBB	LEPA	09:35	11:20

Network Manager in agreement with LEPA decide to put in place an arrival regulation and assigns following CTOT's and TTA's :

Callsign	ADEP	ADES	EOBT	CTOT	ETA	ATFM Delay	TTA
TOM1AT	EGKK	LEPA	09:10	09:35	11:15	8'	11:23
EZY1911	EGCC	LEPA	09:00	09:20	11:16	9'	11:25
EZY714M	EGGP	LEPA	09:10	09:20	11:16	10'	11:26
TOM1YJ	EGNX	LEPA	09:15	09:25	11:18	9'	11:27
TOM21K	EGCC	LEPA	09:00	09:20	11:18	10'	11:28
TOM1464	EIDW	LEPA	09:00	09:15	11:18	11'	11:29
MON958	EGBB	LEPA	09:25	09:40	11:19	12'	11:31
TOM9FY	EGCC	LEPA	09:15	09:35	11:20	13'	11:33
EZY6427	EGNT	LEPA	09:15	09:25	11:20	14'	11:34
RYR4UC	EGBB	LEPA	09:35	09:50	11:20	16'	11:36

LEPA AOP needs to be revised to accommodate the new schedules and to try to minimise the impact on the rest of the day flights. After doing an Airport Impact Assessment, the LEPA airport manager, in agreement with the AU's concerned, decides to request some changes to be made.

The LEPA airport manager sends the following request to Network Manager via AIMA message. The "Turnaround Assessment column" is only shown for explanation purpose and is not transmitted to Network Manager.

Callsign	ADEP	ADES	SEVERITY	IMPROVEMENT	Turnaround assessment
TOM1AT	EGKK	LEPA	2	[+5 , +10]	Early arrival with impact.
EZY1911	EGCC	LEPA	0	[0 , 0]	On time arrival. No impact.
EZY714M	EGGP	LEPA	1	[0 , +6]	Early arrival. No impact. Can be delayed
TOM1YJ	EGNX	LEPA	2	[0 , -7]	Late arrival with impact.
TOM21K	EGCC	LEPA	1	[0 , -8]	Late arrival. No impact. Can be improved
TOM1464	EIDW	LEPA	0	[0 , +4]	Early arrival. No impact. Can be delayed
MON958	EGBB	LEPA	0	[0 , 0]	On time arrival. No impact.
TOM9FY	EGCC	LEPA	0	[0 , 0]	On time arrival. No impact.
EZY6427	EGNT	LEPA	0	[0 , +6]	Early arrival. No impact. Can be delayed
RYR4UC	EGBB	LEPA	3	[-10 , -16]	Late arrival with impact.

Upon reception of the AIMA message, the Network Manager analyses the situation :

Callsign	ADEP	ADES	SEVERITY	IMPROVEMENT	NMOC action interpretation
TOM1AT	EGKK	LEPA	2	[+5 , +10]	Increase delay
EZY1911	EGCC	LEPA	0	[0 , 0]	Ignore
EZY714M	EGGP	LEPA	1	[0 , +6]	Increase delay
TOM1YJ	EGNX	LEPA	2	[0 , -7]	Reduce delay
TOM21K	EGCC	LEPA	1	[0 , -8]	Reduce delay.
TOM1464	EIDW	LEPA	0	[0 , +4]	Can be delayed to help others
MON958	EGBB	LEPA	0	[0 , 0]	Ignore
TOM9FY	EGCC	LEPA	0	[0 , 0]	Ignore
EZY6427	EGNT	LEPA	0	[0 , +6]	Can be delayed to help others
RYR4UC	EGBB	LEPA	3	[-10 , -16]	Reduce delay.

The Network Manager will need to take actions, taking into account the severity provided by LEPA.

- Severity 0 with [0 , 0] improvement will maintain their TTA
- Severity 3 will then be given priority, followed by severity 2, 1 and severity 0 that can be move to help accommodate other arrivals

Within each severity reduction of delay will take priority on Increase of delay

1- Reduce RYR4UC delay.
2- Reduce TOM1YJ delay
3- Increase TOM1AT delay
4- Reduce TOM21K delay
5- Increase EZY714M delay
6- Increase TOM1464 delay to accommodate others
7- Increase EZY6427 delay to accommodate others

Network Manager issues following revised arrival list :

Callsign	ADEP	ADES	TTA
RYR4UC	EGBB	LEPA	11:20
TOM1YJ	EGNX	LEPA	11:22
TOM21K	EGCC	LEPA	11:24
EZY1911	EGCC	LEPA	11:25
TOM1AT	EGKK	LEPA	11:26
TOM1464	EIDW	LEPA	11:29
MON958	EGBB	LEPA	11:31
EZY714M	EGGP	LEPA	11:32
TOM9FY	EGCC	LEPA	11:33
EZY6427	EGNT	LEPA	11:34

5.6 Operational Scenario DCB-0103-A- Massive Aircraft Diversion (MassDiv)

5.6.1 Scenario Summary

A dedicated process, relying on the NOP, has been elaborated to optimise the management of a massive diversion for a major European airport or set of airports in case of unusual and unexpected situation. The process, referred to as “MassDiv” for Massive Aircraft Diversion, involves all partners concerned by the diversion (ATSUs, airports, airlines, the Network Manager). It relies on tool-sharing information among the actors and supports collaborative decision processes to identify the best option to divert aircrafts and to prepare the recovery after the end of the non-nominal situation.

The process supported by a web-based application will ensure that the controller and the flight crew are informed, as soon as possible, of the parking availabilities, according to weight category and airline preferences, in pre-defined set of alternate aerodromes..

The MassDiv process is executed along 4 phases:

- The Preparation Phase: during which the diversion plans are prepared, including identificationMassDiv
- of the actors and their role, selection of the Alternate aerodromes, elaboration of Diversion policies and ATC preferences.
- The Pre-Diversion Phase: initiated when the risk of triggering the process is very high, and allowing the capture of key data such as list of flights likely to be diverted, available slots in alternate aerodromes, updates of Airspace Users’ preferences.
- The Diversion Phase: launched when the unusual situation is confirmed and when aircraft are likely to be diverted. The booking of alternate parking slots is performed this phase, as well as decision to divert.
- The Recovery Phase. initiated when the unusual situation is clearing up in order to prioritize flights that have been diverted and to re-position them to their original destination.

5.6.2 Actors

The actors playing a role in the MassDiv process are listed below. The description of their role is limited here to their contribution to the MassDiv process.

The **Major Airport(s)** undergoing a significant decrease of the capacity and away from which a high number of aircraft need to diverted (in the text, it will be simply referred to as the “Major Airport”.

The **Alternate Aerodromes** are aerodromes identified as possible diversions for the Major Airport (thus not being affected by the situation). These can be regional aerodromes in the vicinity of the Major Airport, or important airports further away but which might also receive diverted aircraft from the Major Airport.

The **Diversion Information Manager (DIM)** is in charge of collecting and managing information about available slots, parking and facilities at alternate aerodromes associated with the Major Airport. He is also in charge of providing the ATCOs with the necessary information to support the diversion decision, for flights within the AOR of the controller. A DIM will be designated for each ACC involved in the MassDiv process. Furthermore, a DIM may be designated at the sub-regional (FAB) level. The role of DIM can be taken by actors already identified within ATM structures, and might depend on local organisations (e.g. the role of DIM is taken by Flight Information Centres in French ACCs, by the supervisor in German ACCs …

The **Arrival DIM** and the **En-route DIMs**: Because alternate aerodromes are not necessarily located in the same Flight Information Region as the Major Airport, several DIMs might be involved in the MassDiv process. These DIMs (referred to as En-Route DIMs to distinguish them from the arrival DIM) are in charge of the coordination and the capture of information from alternate aerodromes located in the AoR.

The **Air Traffic Controller (ATCO)** is in charge of informing the Flight Crew that its destination airport is closed and to provide it with necessary information about diversion possibilities. Once the alternate aerodrome is selected, the ATCO triggers the submission of an AFP for diversion.

The **Flight Crew (FC)** is responsible for the execution of the flight and decides on the selection of the diversion aerodrome.

The **Airspace User (Airline)** is in charge of providing its preferences among the list of available alternate aerodromes, and its priorities for the recovery phase.

The **Local Traffic Manager (LTM)** having the Major Airport in its area of responsibility will take the leading role in the DCB/dDCB processes in the arrival area during the Diversion phase. The LTM coordinates with the Major Airport and the NMOC to set-up the recovery phase according to the established priorities.

The **Flow Manager (FM)** having the Major Airport in its (FAB) area of responsibility might take the leading role in the DCB/dDCB processes instead of the LTM, in particular when the aircraft to be recovered have been mainly diverted in alternate aerodromes located in the FAB AoR.

The **Network Manager Operations Center** (NMOC) is in charge of performing the Network Management functions at regional level, assessing the impact of the diversions on the network during the Diversion phase and ensuring optimum use of the Network during the recovery phase.

5.6.3 Scenario

Each phase of the MassDiv process is detailed in the following operational scenarios:

5.6.3.1 The Preparation Phase

In anticipation of non-nominal situations that might reduce dramatically the arrival capacity at airports, different actors elaborate plans to improve the remedial actions when such situation is actually occurring.

Diversion plans are elaborated by Area Control Centres for each major airport (or set of airports) in their area of responsibility, in coordination with these airports. Alternate aerodromes are identified and associated with these major airports. Diversion policies are elaborated, capturing the preferences of the ATC authorities (e.g. the “quadrant approach for Paris ACC).

Airspace users have to possibility to select their own preferences about the alternate aerodromes, depending on the traffic flows (origin of the traffic) and the type of aircraft.

The Network Management prepares diversion scenarios to reduce the impact of massive diversions on flight efficiency.

This phase allows as well configuring the MassDiv system according to the ATC and AU plans. Diversion policies and AU default preferences are stored in preparation of the following diversion phases.

This phase is of particular importance for non-nominal situations initiated without notice, preventing the execution of the pre-diversion phase.

5.6.3.2 The Pre-Diversion Phase

An unusual situation is expected in the coming hours at a Major Airport, with a potentially significant impact on the arrival capacity.

The notice duration depends on the type of non-nominal situation. For example severe snow can be anticipated the day before the operations; a storm is confirmed only a few hours before, while for an accident on a runway, there would be no lead time at all.

A pre-alert status is triggered by the Diversion Information Manager (DIM) in coordination with the Major Airport and the Arrival Local Traffic Manager (ALTM).

The MassDiv system is updated with the alert status of the Major Airport.

The ATSU associated with the Major Airport has a diversion plan ready, which includes the list of Alternate Aerodromes identified as possible diversions for the Major Airport and potential additional constraints (e.g. "quadrant policy"). When the pre-alert is triggered, all associated Alternate Aerodromes are advised of the expected situation and are requested to start feeding the MassDiv system with diversion data. Any information that is relevant to the situation is disseminated (e.g. the diversion policy).

The diversion plan includes all airlines that are likely to be involved in the process. Furthermore, the long-term planning phase (and medium/short-term planning phase) traffic demand allows identifying all flights planned to arrive during the unusual situation period, hence the related Airspace Users. These airlines are informed about the pre-alert status. They start feeding and updating the MassDiv system with their Alternate Aerodrome preferences.

Besides the actions taken in direct relation with the MassDiv process, a number of preventive measures are taken by the ATSU associated with the Major Airport:

- Local organization of the ops room
- Coordination with approaches
- Implementation of preventives measures with the Network Manager
- Information of adjacent centers

5.6.3.3 The Diversion Phase

The alert status is activated by the Diversion Information Manager (DIM) in coordination with the Major Airport when the unusual situation is confirmed, with an important impact on the arrival capacity of the Major Airport, imposing the diversion of a high number of aircraft.

The Arrival DIM lists the flights that are likely to be diverted from the NOP (list of flights with Major Airport as destination, with time of arrival between start and end of the unusual situation period), as well as their current location (i.e. in the ATSU where they are currently located).

The Arrival DIM informs all En-route DIMs concerned (i.e. associated to FIR where flights to be diverted are currently located) about the need to divert traffic arriving at the Major Airport.

For the flights to be diverted located in its FIR, each En-route DIMs retrieves the diversion information available in the MassDiv systems (available alternate aerodromes according to airline preferences) and provides it to the ATCO.

Flight crews in direct connection with their FOC are informed about airline diversion preferences without getting this information from the MassDiv system.

The ATCO coordinates with the flight crew, which decides towards which alternate aerodrome the flight will divert.

When the decision about the alternate aerodrome is taken by the flight crew, a parking stand is booked at the alternate aerodrome for this aircraft, even if the flight crew did not decide yet to actual divert towards this alternate aerodrome. The ATCO coordinates with his DIM who update the MassDiv system accordingly (parking stand booked for which aircraft).

When the flight crew takes the decision to divert to the alternate aerodrome, the ATCO initiates the publication of an AFP (ATC Flight Plan) which allows updating the flight trajectory in the Network Management systems. He coordinates with his DIM who updates the MassDiv system with the decisions about the diversions (parking stand confirmed for which aircraft).

The Network Management (regional and local) assesses the impact of new trajectories on the balance between traffic and demand and apply DCB measures where necessary, relying where possible on scenarios prepared and validated during the preparation phase.

During the whole Diversion phase, the alternate aerodromes and the airlines maintain the information up to date in the MassDiv system, i.e.

- Aerodromes capabilities for the alternate aerodromes and
- Diversion preferences for the airlines.

In case the flight crew continues its flight towards its original destination, it informs the ATCO accordingly in order to release its booked parking stand.

During the Diversion phase, the residual capacity at alternate aerodromes is maintained up to date. This information will be available with a graphical display, with a map with different colours corresponding to the saturation of the alternate aerodromes.

5.6.3.4 The Recovery Phase

The Recovery Phase scenario is designed to prioritise flights that have diverted to re-position to their original destination.

This phase is initiated by the Arrival DIM when it declares the end of the Diversion status.

Airlines concerned by diverted flights contact the Major Airport.

The Major Airport requests the NMOC to apply an arrival regulation. The rate will be defined through coordination between the Major Airport and the Arrival Local Traffic Manager according to the number of diverted flights, to the Major Airport Arrival actual Capacity and to the en-route and terminal sectors demand/capacity balancing.

A priority flight list will be established by the Major Airport in collaboration with the Airlines. Unless specified otherwise by the AU, the diverted aircraft have higher priority than the scheduled aircraft (some deviations from this rule might come due to specific policies in the company). Furthermore, the AU will have the possibility to specify relative priorities among diverted aircraft. The MassDiv system will be used by the AUs to elaborate and communicate the priorities about the diverted aircraft. These priority lists are communicated to the Arrival Local Traffic Manager.

The Arrival Local Traffic Manager communicates the priority flight list to the NMOC.

The NMOC forces the priority flights into the arrival regulation.

The NMOC ensures that all reasonable steps are taken to achieve minimal delay for the diverted flights affected by other regulations.

In all cases, flight plans must be updated to reflect the CDM process.

The recovery phase terminates when all diverted aircraft have recovered and are back to scheduled operations.

At the end of the Recovery Phase, the DIMs reset the data of the MassDiv system to their default values.

5.7 Process Description & Use-Cases

This section analyses a series of Dynamic DCB processes to illustrate the procedure in a scenario-driven analysis. This decomposition of the process will make evident the different functionalities required for the Dynamic DCB processes.

The following list is an overview of the processes that will be detailed following the use case syntax/format

UC16: Crisis Management for Airport Disruption and Massive Diversion

Use-Case Title	Use-Case Title	OI
UC1	Detection of Demand and Capacity Imbalance	DCB-0308
UC2.a	Analysis and Preparation of the STAM Solution for Cherry-Picking Measures	DCB-0308
UC2.b	Analysis and Preparation of the STAM Solution for Flow Measures	DCB-0308
UC3	Coordination of the STAM Solution	DCB-0308
UC4	Implement STAM Solution	DCB-0308
UC5	Network Manager Escalation	DCB-0308
UC6	Post-Ops Analysis	DCB-0308
UC7	Pre-Flight phase – Notify TTO in addition to the CTOT	DCB-0208
UC9	Pre-Flight phase – Notify TTA in addition to the CTOT	DCB-0208
UC11	Flight phase from the AMAN horizon – Transition between TTA and CTA issued from AMAN horizon	DCB-0208
UC12	Target Time Monitoring and Revision Process	DCB-0208
UC13	Implement DCB measures using TTA to resolve resurgence or residual hotspots, as corrective measures (ground regulation)	DCB-0208
UC14	Airport arrivals management using TTA allocation	DCB-0310
UC15	DCB Supervision	DCB-0308

5.7.1 UC1: Detection of Demand and Capacity Imbalance (DCB-0308)

5.7.1.1 Scope

The reference scenario to which this Use Case is applicable is *'Operational Scenario: STAM Phase 1 – Non-severe (no UDPP) capacity shortfalls impacting multiple nodes of the network in the short-term followed by capacity recovery'.*

5.7.1.2 Level

User Goal

5.7.1.3 Summary

This Use Case is triggered when an imbalance is detected at the local level (e.g. LTM) between the traffic demand and the sector capacity within a defined time period. The NMF assesses the nature and extent of the predicted imbalance and proposes automatically a hotspot that represents the potential imbalance problem (specific to a defined area(s) and limited to a specific time period) to the LTM Manager. The hotspot attributes are:

- Traffic Volume (TFV) Name
- WEF
- UNTL
- Severity
- Reason of decision
- Severity
- Status = {Proposed, Intent, Cancelled, Cleared}

The LTM manager shall be able to confirm or dismiss the proposed hotspot.
In case of confirmation:

- The hotspot information remains local to the LTM under the status INTENT while the LTM decides to notify the network of potential imbalance problems, specific to a defined area(s) and limited to a specific time period.
- When the LTM decides to make the hotspot visible at the Network View level a STAM notification message aiming at alerting the relevant actors about potential problems will be visible in the Network View. The hotspot status turns to PROPOSED. To be noted that the STAM notification does not contain any information about a specific envisaged/selected measure.
- The STAM Notification will feed the consolidated Network View.

In case of no confirmation:

- The hotspot is cancelled. The hotspot status is CANCELLED. The LTM shall fill in the "reason of decision" hotspot attribute in order to justify the choice to clear the hotspot.

5.7.1.4 Actors

5.7.1.4.1 Primary Actor

The Sub-regional and/or LTM (typically the LTM) is responsible for the monitoring, assessment, coordination, implementation/initiation and subsequent analysis (post-ops) of a demand capacity imbalance which occurs at local level.
The Sub-regional and/or LTM wants to notify the Network (Local/Sub-regional/Regional Network manager, Airspace Users) of potential "hotspot warning" which aim to provide more visibility about the STAM events to all actors

5.7.1.4.2 Supporting Actor(s)

N/A

5.7.1.4.3 Off-Stage Actor(s)

N/A

5.7.1.5 Preconditions

The NMF detects the traffic load within the designated area of responsibility, or;
The LTM monitors the traffic load within the designated area of responsibility, or;
Sufficiently accurate knowledge of the traffic load and associated complexity is known to the LTM.

5.7.1.6 Postconditions

5.7.1.6.1 Success End State

Potential STAM notification, conceived at local level, is/are notified to the network.

5.7.1.6.2 Failure End State

Potential STAM notification, conceived at local level, is/are not notified to the network.

5.7.1.7 Notes

This Use Case describes the process by which local actors (LTM) notify the network (adjacent LTM, AU) of potential application of STAM. The purpose of such notification(s) is to ensure that all concerned parties are able to perform assessment of STAM. It is important to note that this Use Case simply ***notifies*** the network of potential application of STAM and should not be confused with *'Define/Refine/Implement STAM Measure'.*

5.7.1.8 Trigger(s)

The Uses Case starts when the LTM detects a risk of a demand capacity imbalance occurring within the area of nominated responsibility during a period of 4 hours, but not less than 1 hour, in advance of the predicted occurrence.

5.7.1.9 Flows

5.7.1.9.1 Main Flow

1. The NMF detects and proposes a Hotspot
2. The LTM assesses the excess of traffic against Entry Counts and Occupancy peak/sustain/duration criteria and validates the overload/imbalance occurrence.
3. The LTM manager shall be able to confirm or to clear a hotspot (STAM area) and timeframe for which the application of STAM is anticipated. Some attributes are attached to the STAM area (traffic volume name, duration (WEF, UNTL), severity, status).
4. The LTM manager confirms the hotspot, the status of the hotspot turns to INTENT.
5. The Use Case ends when the LTM sends a STAM Notification message to all affected users (Network Manager, AUs) concerning possible implementation of STAM on the affected sector/node during the identified period P.
6. The status of the hotspot is PROPOSED.
7. The hotspot information is visible at the Network View level.

5.7.1.9.2 Alternative Flows

None.

5.7.1.9.3 Failure Flows

Failure at 2 => the assessment of data does not exceed values against peak/sustain/duration criteria.

Failure at 3 =>the LTM manager shall justify the decision to clear the hotspot and shall fill in the “reason of decision” hotspot attribute.

Failure at 4 =>the LTM does not validate risk of overload/imbalance occurrence, the LTM manager clears the hotspot, the status of the hotspot turns to CANCELLED.

5.7.2 UC2.a: Analysis and Preparation of the STAM Solution for Cherry-picking Measures (DCB-0308)

5.7.2.1 Scope

This Use Case has been identified through the work performed by SESAR project P13.02.03 within the OSED Step 1 V3 tasks. The reference scenario to which this Use Case is applicable is *'Operational Scenario: STAM Phase 1 – Non-severe (no UDPP) capacity shortfalls impacting multiple nodes of the network in the short-term followed by capacity recovery'.* (REF)

5.7.2.2 Level

User Goal

5.7.2.3 Summary

This Use Case is triggered when the Flow Manager/Local Capacity Manager/Local Traffic Manager identifies an existing demand capacity imbalance and the need for positive action to resolve the imbalance. The primary Actor(s) works to assess and prepare mitigations that support local goals and objectives while contributing to and maintaining wider network coherence and stability.

5.7.2.4 Actors

5.7.2.4.1 Primary Actor

The Flow Manager and Local Traffic Manager comprise the Network Management functions at sub-regional/local level (LTM). The LTM wants to ensure that solutions to detected imbalances are assessed and prepared in a manner that is appropriate, proportionate, fair and equitable.

5.7.2.4.2 Supporting Actor(s)

None.

5.7.2.4.3 Off-Stage Actor(s)

None.

5.7.2.5 Preconditions

Use Case 1 (UC1) achieves success state. The identification of a demand capacity imbalance requiring positive mitigating action is a pre-requisite for this Use Case (i.e. this Use Case is only triggered on UC1 reaching success criteria).

5.7.2.6 Postconditions

5.7.2.6.1 Success End State

A measure, or a series of measures, which constitute a targeted solution to a detected demand capacity imbalance is prepared.

5.7.2.6.2 Failure End State

The assessment and preparation activity fails to construct an appropriate solution to a detected demand capacity imbalance.

5.7.2.7 Notes

None.

5.7.2.8 Trigger(s)

The Use Case starts when the Primary Actor(s) determine that positive action is required to address a detected demand capacity imbalance.

5.7.2.9 Flows

5.7.2.9.1 Main Flow

1. The LTM consults demand data: flight list with some attributes such as
    - accurate flight status
    - aircraft attitude
    - hotspot entry/exit time
    - specific mark on flights with previous penalisations in other LTMs
    - specific mark on flights concerned by on-going other hotspots
    - specific mark on flights concerned by on-going other hotspots associated to a proposed/coordinated/released STAM

    in order to gain a more detailed understanding of the anticipated demand and to consider what mitigation measures might be available to which flight, which flights are to be preferably excluded and which flights are to be addressed first concerning any mitigation measures.
2. The LTM shall be able to select individual flights and change manually their profile in order to simulate and analyse the impact on Occupancy Counts and Entry Counts. The LTM shall be able to select individual flights to exclude from the potential STAM or regulation.
3. The LTM shall be able to identify flights creating complexity.
4. The LTM shall be able to evaluate the impact of a regulation or STAM (or a combination of both) in terms of performance indicators such as minutes and delay.
5. The LTM selects the most likely solution(s) for detected imbalance.

    A) For cherry-picking STAM solution, the LTM HMI proposes a menu with possible STAM actions:
    - Time-based : The LTM need to check the MPR rules as defined in section 3.2.1.3 (cannot overrule flight-under-constraint **S/** flight-under-constraint **R)**
    - Flight level capping
    - Rerouting

    B) For flow STAM solution, the LTM HMI proposes to group STAM and to display a menu with possible STAM actions.
6. The STAM status turns to DRAFT
7. The Use Case ends when the analysis and preparation of the solution has been completed.

5.7.2.9.2 Alternative Flows

5.7.2.9.2.1 Alternative at step 1: The LTM monitors the hotspot validity and identifies that it is no longer valid

8. The hotspot is cancelled.
9. The hotspot status is now CANCELLED.
10. The Use Case ends.

5.7.2.9.3 Failure Flows

Failure flow 1: No cherry picking measure is suitable to solve the imbalance
Failure flow 2: The cherry picking measure identified are not sufficient to resolve the imbalance.

5.7.3 UC2.b : Analysis and Preparation of the STAM Solution for Flow Measures (DCB-0308)

5.7.3.1 Scope

This Use Case has been identified through the work performed by SESAR project P13.02.03 within the OSED Step 1 V3 tasks.
The reference scenario to which this Use Case is applicable is *'Operational Scenario: STAM Phase 1 – Non-severe (no UDPP) capacity shortfalls impacting multiple nodes of the network in the short-term followed by capacity recovery'.* (REF)
This Use case describes the interactions between the LTM and the system presented as black box.

5.7.3.2 Level

User Goal: it is the goal primary actor has in trying to get work done or the one the user has in using the system.

5.7.3.3 Summary

This use case is triggered when the Flow Manager/Local Capacity Manager/Local Traffic Manager identifies an existing demand capacity imbalance and that the adequate solution to resolve this imbalance is a Short Term ATFM measure applied to a flow of traffic.

5.7.3.4 Actors

5.7.3.4.1 Primary Actor

The Flow Manager and Local Traffic Manager comprise the Network Management functions at sub-regional/local level (LTM). The LTM wants to ensure that solutions to detected imbalances are assessed and prepared in a manner that is appropriate, proportionate, fair and equitable.

5.7.3.4.2 Supporting Actor(s)

None.

5.7.3.4.3 Off-Stage Actor(s)

None.

5.7.3.5 Preconditions

Use Case 1 is achieved in a success state: the identification of a demand capacity imbalance requiring positive mitigation action is a pre-requisite for this use case.

Use Case 2.a (corresponding to analysis B) is performed and finalized: no need for specific failure or success state.

5.7.3.6 Postconditions

5.7.3.6.1 Success End State

A flow measure associated to a traffic volume (sub-flow) is identified as a targeted solution of the demand/capacity imbalance. The measure is prepared and defined.

5.7.3.6.2 Failure End State

The assessment and preparation activity fails to construct an appropriate solution to a detected demand/capacity imbalance.

5.7.3.7 Notes

Triggering values and decision making criteria (see Decision Criteria to select STAM) have been defined for the sector affected by demand/capacity imbalance.

The use case is for an identified hotspot.

5.7.3.8 Trigger(s)

The use case starts when either:

- The outcome of the initial analysis B indicated to the LTM that the positive action to be taken is a STAM flow measure
- The outcome of the initial analysis B does not orient the LTM toward a clear measure type (cherry-picking or flow) and the LTM has gone through Use Case 2 a) and ended in a failure case (no cherry-picking measure found or the cherry picking measure(s) are not sufficient to resolve the imbalance)

5.7.3.9 Flows

5.7.3.9.1 Main Flow

1. The LTM configures the system to display occupancy counts for the selected sector and the selected timeframe
2. The LTM instructs the system to display the list of flights for the studied hotspot
3. The system presents the flights corresponding to the hotspot and provides the marginal contribution of each flight to the situation's complexity.
4. The LTM inputs query criteria to filter traffic
5. The systems displays the filtered traffic
6. The LTM uses the system to identify the main flow contributing to the complexity of the situation
7. The LTM check the status of the flights in the flow using the system and evaluates the dispersion of flight characteristics
8. The LTM inputs in the system criteria to identify possible sub-flows with more homogeneous characteristics
9. The LTM creates sub-flows and saves them in the system for future assessment
10. The LTM selects from system toolbox of measure the candidate STAM flow measures. In case of STAM Time-based measures the LTM need to check the MPR rules as defined in section 3.2.1.3 (cannot overrule flight-under-constraint **S/** flight-under-constraint **R)**
11. The STAM status turns to DRAFT.
12. The system displays to the LTM the selected measures and the created sub-flows
13. The Use Case ends when the LTM selects the optimal STAM-F measure.

5.7.3.9.2 Alternative Flows

5.7.3.9.2.1 Alternative at step 6: The LTM does not identify the main traffic flow using the occupancy counts

14. The LTM selects flow counts on the system display
15. The LTM uses flow counts to identify main flow contributing to the complexity of the situation
16. The flow continues at step 7.

5.7.3.9.3 Failure Flows

None

5.7.4 UC3: Coordination of the STAM Solution (DCB-0308)

5.7.4.1 Scope

This Use Case has been identified through the work performed by SESAR project P13.02.03 within the OSED Step 1 V3 task. The reference scenario to which this Use Case is applicable is *'Operational Scenario: STAM Phase 1 – Non-severe (no UDPP) capacity shortfalls impacting multiple nodes of the network in the short-term followed by capacity recovery'.* (REF)

5.7.4.2 Level

User Goal

5.7.4.3 Summary

This Use Case is triggered when the Flow Manager/Local Capacity Manager/Local Traffic Manager starts to coordinate the STAM with the affected actor's solution. The primary actor(s) works to coordinate and negotiate the solution that supports local goals and objectives while contributing to and maintaining wider network coherence and stability.

The STAM coordination statuses are the following:

- DRAFT
- PROPOSED
- COORDINATED
- IMPLEMENTED
- ABANDONED
- FINISHED

5.7.4.4 Actors

5.7.4.4.1 Primary Actor

The Flow Manager, Local Capacity Manager and Local Traffic Manager comprise the Network Management functions at sub-regional/local level (LTM). The LTM coordinates the STAM solutions with the affected actors.

5.7.4.4.2 Supporting Actor(s)

The stakeholders taking part in the coordination process are the supporting actors: they do not gain value from the system but their responsibilities and actions on the system bring value to the system. The actors that can be considered as supporting are:

- Adjacent LTM
- AOLO
- AO
- Network Manager

5.7.4.4.3 Off-Stage Actor(s)

None.

5.7.4.5 Preconditions

The Use Cases attached to UC2.a/UC2.b achieve success status. The identification of an adequate solution for a demand capacity imbalance is a pre-requisite for this Use Case.

5.7.4.6 Postconditions

5.7.4.6.1 Success End State

The STAM solution has been successfully coordinated and negotiated with all relevant actors.

5.7.4.6.2 Failure End State

The activity fails to coordinate and negotiate an appropriate solution for a detected demand capacity imbalance.

5.7.4.7 Notes

None.

5.7.4.8 Trigger(s)

The Use Case starts when the Primary Actor(s) determine that coordination is required to negotiate a STAM solution.

5.7.4.9 Flows

5.7.4.9.1 Main Flow

1. The LTM initiates coordination with affected actors (identified in #3). This coordination will typically involve actors within the ACC. The STAM status turns to PROPOSED and a "STAM Coordination" message (including STAM area, timeframe, type of STAM and concerned flight) will be sent to the network.
2. The LTM coordinates with the selected actors that are going to be affected by the proposed measure and/or that require consultation and negotiation of proposed measure (e.g. those ACCs who might receive additional traffic, and/or individual operators whose flights are affected). A default list of actors will be computed by the system retrieving the AUs and adjacent LTMs concerned by the STAM coordination. The LTM shall be able to manually select additional actors to involve in the negotiation process of the proposed STAM.
3. The LTM shall give a time-out indicating the time frame for the coordination process.
4. A dialogue between the initiating LTM and the other concerned LTMs and AUs will start in order to agree on a STAM solution. The initiating LTM will conduct the workflow of the negotiation process by
    - Indicating the role of the concerned actor in the negotiation :"for action" or "for information"
    - Managing the scheduling of the negotiation process

   The coordination workflow will be tracked and recorded in order to provide history and traceability capabilities.
    - The actor will have access to the list of all on-going and terminated actions requested by or to the logged user regardless of the traffic volume or flight for the selected action from the list
    - The actor will have access to the list of actors and the list of actions and discussion
5. The adjacent/cross-border LTMs shall be able to perform an assessment of all individual STAM Notification messages in their area of interest. They will ensure that the proposed STAM are not conflicting with one another or acting in opposition to network goals. They will coordinate and negotiate with the initiating LTM.
6. The AUs shall be able to identify mitigation options for individual flights affected by the STAM and assess their impact on the operation (assessment of both schedule impact and impact on individual flights). They will coordinate and negotiate with the initiating LTM.
7. The Use Case ends when the coordination with affected actors yields a positive result such that a solution, being the most appropriate to resolve the detected imbalance, is being agreed

upon. The STAM status turns to COORDINATED. The LTM Manager shall be able to publish the time frame in which the agreed STAM measure shall be implemented.

5.7.4.9.2 Alternative Flows

8. The initiating LTM shall be able to cancel the implementation of a STAM or regulation. The STAM Measure status would then turn to ABANDONED.
9. The LTM Manager shall receive an alarm within the time frame for the negotiation process. The flow resumes at 4.

5.7.4.9.3 Failure Flows

Failure at 4:

10. Negotiations fail to achieve a positive result (e.g. proposed solutions are not acceptable to local actor): Possible need to escalate to the Network Manager or to regulate.
11. The Use Case ends. The STAM Measure status turns to ABANDONED.

5.7.5 UC4: Implement STAM Solution (DCB-0308)

5.7.5.1 Scope

This Use Case has been identified through the work performed by SESAR project P13.02.03 within the OSED Step 1 V3 task. The reference scenario to which this Use Case is applicable is *'Operational Scenario: STAM Phase 1 – Non-severe (no UDPP) capacity shortfalls impacting multiple nodes of the network in the short-term followed by capacity recovery'.* (REF)

5.7.5.2 Level

User Goal

5.7.5.3 Summary

This Use Case is triggered after the Flow Manager/Local Capacity Manager/Local Traffic Manager has assessed, prepared co-ordinated and agreed mitigating actions (DCB solution) to an existing demand capacity imbalance requiring positive remedial action. This Use Case describes the process by which sub-regional/local network management actors implement a negotiated and agreed DCB solution.

5.7.5.4 Actors

5.7.5.4.1 Primary Actor

The Flow Manager, Local Capacity Manager and Local Traffic Manager comprise the Network Management functions at sub-regional/local level (LTM). The LTM implements the STAM solution in coordination with the affected actors. Solutions to detected imbalances are implemented in a manner that is appropriate, proportionate, fair and equitable, and that adequately mitigates the identified imbalance.

5.7.5.4.2 Supporting Actor(s)

- Network Manager
- Adjacent LTMs
- ATC
- AUs

5.7.5.4.3 Off-Stage Actor(s)

None.

5.7.5.5 Preconditions

Use Case 3 (UC3) achieves success state. The finalized coordination of the DCB solutions is a pre-requisite for this Use Case.

5.7.5.6 Postconditions

5.7.5.6.1 Success End State

A measure, or a series of measures, which constitute a targeted solution to a detected demand capacity imbalance is/are implemented. Note: success criteria in the context of this Use Case is limited to the *implementation* of a DCB measure only, it should not be confused with the success (or failure) of the DCB measure in rectifying (or not) the detected imbalance.

5.7.5.6.2 Failure End State

The prepared DCB measure is not successfully implemented.

5.7.5.7 Notes

Success criteria in the context of this Use Case is limited to the implementation of a DCB measure only, it should not be confused with the success (or failure) of the DCB measure in rectifying (or not) the detected imbalance.

5.7.5.8 Trigger(s)

The Use Case starts when the Primary Actor(s) is/are in possession of a coordinated DCB measure/solution(s) to address a detected demand capacity imbalance.

5.7.5.9 Flows

5.7.5.9.1 Main Flow

1. The LTM enters the coordinated STAM definition into the system:
   a. Type of STAM and STAM characteristics
   b. Deadline of STAM application
2. The LTM uses the system to send out a “STAM implementation” message to the Network View.
3. The system switches the STAM Measure status turns to IMPLEMENTED. (Note: this step is inextricably linked with UC3).
4. The systems displays the STAM implementation message on the Network view of the system
5. The Network Manager acknowledges the message reception and updates accordingly the flight plan in the NMF for Delay measures on flights that are not ATC activated.
6. The Network Manager uses the system to confirm update action
7. The AU acknowledges the message reception and refiles accordingly the flight plans for RR or FL change measures on flights that are not ATC activated
8. The AU uses the system to confirm refile action
9. The system displays to the LTM the update confirmations
10. The LTM monitors the flight plan update and checks that all flight plans have been updated correctly
11. The LTM changes the STAM status to FINISHED
12. The Systems updates the hotspot status at the hotspot exit time to CLEARED

5.7.5.9.2 Alternative Flows

5.7.5.9.2.1 Alternative at step 5: the flight plan is ATC activated.

13. The ATC acknowledges the message reception and updates accordingly the flight plan by sending a Flight plan update message
14. The ATC uses the system to confirm update action.
15. The flow continues in step 9

5.7.5.9.2.2 Alternative at step 11: the confirmations have not been received before STAM application deadline

16. The system sends an alarm when timeframe is within STAM application deadline –xmin to the LTM and concerned actors
17. The system sends the status of the imbalance in line with the operational cases.
18. The flow continues in step 5.

5.7.5.9.3 Failure Flows

None.

5.7.6 UC5: Network Manager Escalation (DCB-0308)

5.7.6.1 Scope

This Use Case was developed in support of the Dynamic DCB Step1 Concept description, first concept element: “*STAM Measures: Fine Tuning techniques to adjust imbalances*”.

The Dynamic DCB concept foresees a less central role for Network Managers in DCB management than today, still the concept envisages cases where Network Managers may intervene. This is specified in the context of “Escalations to Network Managers”. These escalations take place nominally upon request by local DCB managers, typically when a local resolution is rendered too difficult or inappropriate as regard to the scope of the problem detected. It is important on the other hand to note that Network Manager operations shall be restricted to punctual interventions, notably in order to account for limited staff resources. These operations shall as well be highly system-supported. This Use Case describes the flow(s) of system-supported actions involved in this escalation process.

The reference scenario to which this Use Case is applicable is *‘Operational Scenario: STAM Phase 1 – Non-severe (no UDPP) capacity shortfalls impacting multiple nodes of the network in the short-term followed by capacity recovery’.*

5.7.6.2 Level

User Goal

5.7.6.3 Summary

The cases so far identified for Network Manager escalation are

- Scenarios implementation
- Axis management: notably in cases when a local DCB manager wants to signal to the Network management that specific conditions are developing locally (e.g. altered weather conditions) which require adapting and coordinating a planned “axis management” scenario implementation with special and possibly earlier scenario activation.
- Complex coordination : e.g. in cases when too many LTM are concerned at same time with a developing hotspot, which can bring about practical difficulties for establishing the coordination process, such as e.g. difficulty to determine which LTM shall take the lead, in which case arbitration by a transfer of leadership to Network manager may be required.
- Critical/special events
- Crisis
- Support to LTMs which have no sufficient resource/expertise. It should be addressed as delegation mechanism, possibly supported by other parties than Network manager, such as e.g. private support companies).

This Use Case describes the interactions with the system necessary for LTM (primary actors) to establish the conditions for a successful escalation to the Network Manager. The system shall in particular support LTM in making sure that the escalation is established according to applicable rules and procedures, and that the context, rationale, information sharing necessary for an effective escalation (and subsequent transfers or responsibility) are secured with all concerned actors.

5.7.6.4 Actors

5.7.6.4.1 Primary Actor

LTM (*The Flow Manager, Local Capacity Manager and Local Traffic Manager comprise the Network Management functions at sub-regional/local level (LTM)*).

5.7.6.4.2 Supporting Actor(s)

(*they do not gain value from the system but their responsibilities and actions on the system bring value to the system*)

The actors that can be considered as supporting are:

- Network Manager
- Adjacent LTM
- Airspace User

5.7.6.4.3 Off-Stage Actor(s)

5.7.6.5 Preconditions

The system knows that a LTM has confirmed a hotspot detected within LTM area of responsibility.

5.7.6.6 Postconditions

5.7.6.6.1 Success End State

The system is updated in line with the final decision on escalation to the Network Manager, as agreed between the Network Manager and the LTM who has issued the request. All concerned actors (primary and support,) are aware of the decision. In case of decision for escalation, the ATM community is informed of it.

5.7.6.6.2 Failure End State

n/a

5.7.6.7 Notes

In case it is unclear to LTM or Network Manager whether the escalation is necessary, the process may include a temporary suspension of the system-supported process to allow for a direct discussion between LTM and Network Manager via another communication channel (outside of the system), like e.g. phone call.

Unilateral rejection of a request for escalation by Network Manager, in this context, is considered inadequate (no failure end state).

5.7.6.8 Trigger(s)

The Use Case starts when the Primary Actor decides that the hotspot identified cannot be addressed without direct support from the Network Manager, and that an escalation to the Network Manager is thus required.

5.7.6.9 Flows

5.7.6.9.1 Main Flow

1. The LTM indicates to the system that he/she wants to escalate to Network Managers for a co-joined resolution of a hotspot.
2. The system presents a list of cases for escalation in order for LTM to select the appropriate one, among which:
    a. Scenario implementation
    b. Axis management
    c. Complex coordination
    d. Critical/special events

e. Crisis development
f. Resource/expertise shortage
g. Other reason

3. The LTM selects a reason and the system delivers a template for LTM to further specify his/her request and rationale for the escalation. The system delivers a template adapted to the specific reason selected, including whenever applicable, relevant lists of options associated to scenarios, axis management, type of critical / special events, type of crisis.
4. The LTM further specifies his/her request for the escalation based on the template delivered by the system, and completes it, if judged appropriate, with free text explanations.
5. The system presents the completed request for escalation to the LTM and the LTM confirms the request for escalation for the specific hotspot under consideration.
6. The system alerts the Network Manager responsible for LTM area of responsibility that the LTM has made a request for an escalation to the Network Manager, together with the completed template including the LTM rationale for the request, as well as all relevant information on the concerned hotspot.
7. The Network Manager acknowledges receipt of the escalation request to the LTM via the system.
8. The Network Manager accepts the escalation and the system informs LTM of the acceptance, together with the procedure to be followed in the context of the specific escalation case. As well the system informs all the other actors that have been so far involved in the hotspot resolution process that the issue escalated to the Network Manager (this includes all actors involved in the STAM coordination process, has such a coordination already been started), and the system ensures full information sharing between these actors.
9. The use case ends with the system notifying the escalation to the wider stakeholder's community through the network view.

5.7.6.9.2 Alternative Flows

5.7.6.9.2.1 Alternative 1 – all Steps but 1 - The LTM wants to cancel his/her request for escalation

10. The LTM indicates to the system that he/she wants to cancel his/her request for escalation.
11. The system requests that LTM confirms his / her request for cancellation together with rationale for it.
12. The LTM confirms the cancellation and the system informs all actors to whom the request for escalation was communicated of the cancellation.
13. The use case ends with the system updating the network view accordingly (if applicable).

5.7.6.9.2.2 Alternative 2 – Step 7,8 - The system fails to obtain a reply from the Network Manager after a certain elapse time, set by LTM

14. The system, as soon as the response elapse time is reached, alarms the LTM and the Network Manager that a reply on the escalation request is required from the Network Manager.
15. The Flow continues at same step.

5.7.6.9.3 Failure Flows

None

5.7.7 UC6: Post-Ops Analysis (DCB-0308)

5.7.7.1 Scope

This Use Case was developed in support of the Dynamic DCB Step1 Concept description, first concept element: "*STAM Measures: Fine Tuning techniques to adjust imbalances*".

The Dynamic DCB concept encompasses a set of processes, concluded by a Post-Operations analysis and reporting. This process is essential in allowing a progressive improvement of the overall Dynamic DCB activity and an appropriate service performance control. This Use Case describes the flow(s) of system-supported actions involved in the post-analysis activity.

The reference scenario to which this Use Case is applicable is *'Operational Scenario: STAM Phase 1 – Non-severe (no UDPP) capacity shortfalls impacting multiple nodes of the network in the short-term followed by capacity recovery'.*

5.7.7.2 Level

User Goal

5.7.7.3 Summary

Post-Ops analyses of Dynamic DCB activities are nominally carried out by LTM, once the end result(s) of the Dynamic DCB initiatives is known.

Post-ops analyses are carried out in order to meet different objectives, among which:

- ensuring adequate communication of information supporting operational performance assessments of Dynamic DCB activities
- gathering lessons from experience in view of establishing a continuous learning and improvement process in Dynamic DCB activities
- consolidating the CDM approach applicable to Dynamic DCB activities through providing a forum for analysing, further justifying and discussing dynamic DCB decisions made, under less time pressured conditions.

The system shall support LTM in meeting these objectives through providing support for, *inter alia*:

- accessing relevant records of past Dynamic DCB activities progress with time, impact, key events, and decision-making contexts
- facilitating common situational awareness of past Dynamic DCB activities during post-ops discussions and de-briefings
- alleviating LTM workload through providing adequate information management support, including appropriate post-ops analysis templates and data filtering tools

5.7.7.4 Actors

5.7.7.4.1 Primary Actor

LTM

(*The Flow Manager, Local Capacity Manager and Local Traffic Manager comprise the Network Management functions at sub-regional/local level (LTM)*).

5.7.7.4.2 Supporting Actor(s)

The stakeholders who took part in the STAM coordination process are the supporting actors.

(*they do not gain value from the system but their responsibilities and actions on the system bring value to the system*)

The actors that can be considered as supporting are:

- Adjacent LTM
- Airspace Users
- Network Manager

5.7.7.4.3 Off-Stage Actor(s)

(local) Performance managers (ATSU authority) (*specify the performance indicators to be considered internally / for post-ops reporting)*

5.7.7.5 Preconditions

UC4 has reached End State (hotspot status has turned to CLEARED).
(*The completed implementation of adequate STAM solution for a demand capacity imbalance is a pre-requisite for this Use Case*.)
The system knows which post-analysis reports have been already completed on which Dynamic DCB activities.
The system knows the standard template applicable for the Dynamic DCB activities reporting. (these templates shall be defined in line with the requirements set by local performance managers (ANSP authority))

5.7.7.6 Postconditions

5.7.7.6.1 Success End State

A validated post-analysis report on the Dynamic DCB activity that LTM wanted to analyse is stored in the system.

5.7.7.6.2 Failure End State

No validated post-ops report is recorded in the system on the Dynamic DCB activity that LTM wanted to analyse

5.7.7.7 Notes

Post-ops activities may include as well off-stage discussions organised in an ad-hoc manner, using communication channels other than system-enabled, like e.g. teleconferencing tools. Such activities are not described here since they are not necessarily system-based. Yet, these shall support LTM in the task described herein.

5.7.7.8 Trigger(s)

The Use Case starts when the Primary Actor indicates to the system that he/she wants to carry out a Dynamic DCB activity post-analysis.

5.7.7.9 Flows

5.7.7.9.1 Main Flow

1. The LTM indicates to the system which specific past hotspot(s), or Dynamic DCB activity time periods or STAM process carried out in his/her area of responsibility it wants to post-analyse.
2. The System presents to the LTM the draft post-ops report(s) available in the System, partially completed with automatically generated information that are relevant to the selected scope of analysis, including:
    - STAM measures applied,

- records of DCB predictions evolution at hotspot(s) at key decision-making times during the associated STAM CDM process(es) (including, if relevant, at hotspot notification time, at STAM implementation time(s), at hotspot cancellation time, at hotspot clearance time), end DCB status at hotspot(s),
- STAM measures impact on demand (including list of impacted flights, delay / route extension per impacted flights, and per STAM)

3. The LTM selects a report and completes it with indications on the quality of the outcome, including
    - overall assessment of the effectiveness of the resolution of the imbalances within the selected scope of analysis
        a) in terms of traffic load (including, if appropriate, actually perceived ATCO workload at analysed hotspot(s))
        b) in terms of service to users (assessment of impact on trajectories, in the form of e.g. extra miles, on-ground delay, en-route extra-time, as compared to ICAO FPLs), possibly based on feedback from airspace users
        c) in terms of overall network performance; in the form e.g. of estimates of overall ground delay savings enabled by the STAM(s) as alternative(s) to CASA regulations;
    - if relevant, potential problems encountered at STAM coordination(s) stage (e.g. refusal of one/several actors involved and rationale for it), and estimated impact on achieved performance,
    - if relevant, potential problems encountered at STAM implementation(s) stage, and estimated impact on achieved performance
    - Any other relevant item, including reporting of escalation(s) to Network Manager and rationale for it
4. The LTM completes the report with indications on lessons learnt and areas of improvement, including
    - potential adjustments of
        d) the Monitoring Values used to reflect perceived ATCO workload in line with feedback from ATCO on previous hotspot experience
        e) STAM measures parameters depending on Airspace Users feedback
    - if relevant, elaboration of new resolution scenarios based on traffic and operational patterns detected, and Airspace Users preferences expressed
    - if relevant, potential preventive actions addressing problems encountered at implementation stage
5. The LTM indicates to the system that he/she wants to validate the report and the system presents the report with all information inputted for LTM final review.
6. The LTM validates the report and the system records the report as validated and makes it accessible notably to other participating (support) actors for possible review and to the local performance managers (off-stage actors) for use for overall service performance assessment purposes.
7. The Use Case ends.

5.7.7.9.2 Alternative Flows

5.7.7.9.2.1 Alternative 1 – Step 2: the report is already validated

8. The system indicates to the LTM that a validated report already exists.
9. The use case ends.

5.7.7.9.2.2 Alternative 2 – Step 3: the LTM wants to add comments on automatically calculated figures

10. The LTM selects an automatically generated Dynamic DCB information field and indicates to the system that he/she wants to add a comment on it.
11. The system adds a free text box attached to the selected information field.
12. The LTM inputs comments in the text box.
13. The flow continues at Step 3.

5.7.7.9.2.3 Alternative 3 – step 3: the LTM wants to further assess the quality of the result obtained with the STAM, notably through consolidating the assessment with detailed analysis of impact on airspace users

14. The LTM indicates to the system that he / she wants to compare actual impact on flights caused by a STAM with expressed users preferences
15. The system presents to the LTM the result of the comparison based on previously expressed user's preferences and the recorded impact on flights, together with clear indications of the flights where no Airspace User preference is recorded.
16. As judged appropriate, the LTM validates, modifies, and/or comments the output analysis and requests to the system to annex the result to the main report, if appropriate.
17. The Use Case continues at same step.

5.7.7.9.2.4 Alternative 4 – step 3: the LTM wants to further assess the quality of the result obtained with a STAM, through a benchmarking with alternative STAM

18. The LTM indicates to the system that he / she wants to compare actual aggregated impact of a STAM with other ones that LTM has selected
19. The system presents to the LTM the result of the comparison of the aggregated impact of the STAM analysed and those selected, using the performance indicators specified in the post-ops analysis report template.
20. As judged appropriate, the LTM validates, modifies, and/or comments the output analysis and requests to the system to annex the result to the main report, if appropriate.
21. The Use Case continues at same step.

5.7.7.9.2.5 Alternative 5 – step 3: the LTM wants to further assess the quality of the result obtained with a STAM, against longer-term performance (monthly or yearly) targets

22. The LTM indicates to the system that he / she wants to make an analysis of the result obtained with a STAM under study, in light with the performance targets set for the month / year
23. The system presents to the LTM the result of the aggregated impact of the STAM together with other past STAM implemented in the relevant performance assessment period, using the performance indicators specified in the post-ops analysis report template.
24. As judged appropriate, the LTM validates, modifies, and/or comments the output analysis and requests to the system to annex the result to the main report, if appropriate.
25. The Use Case continues at same step.

5.7.7.9.2.6 Alternative 6 – Step 4: the LTM wants to carry out a DCB trend / pattern analysis

26. The LTM indicates to the system that he / she wants to complete the assessment of the Dynamic DCB activity under study with a DCB trend / pattern analysis, based on the analysis of specific times and locations where the LTM has noticed similarities in the Demand and/or Capacity and or Demand / Capacity balance patterns

27. The system presents to the LTM the different records of demand, capacity, and demand / Capacity balance evolutions at the specific times and locations selected by LTM for a trend analysis, together with various options of comparative charts.
28. As judged appropriate, the LTM selects, validates, modifies, and/or comments the output analysis and requests to the system to annex the result to the main report.
29. If appropriate, the LTM requests to the system to catalogue the trend / pattern identified as a basis for a pre-defined scenario and to document the Dynamic DCB actions successfully implemented in such cases as "best practice"
30. As appropriate the LTM asks the system to annex it to the report.
31. The Use Case continues at same step after the system has annexed the outcome accordingly to the report.

5.7.7.9.2.7 Alternative 7: the LTM is aware that one or several actors who have participated in the STAM coordination process or actors impacted by a STAM under analysis have issued comments on it and has opted for a collaborative review of the STAM action(s)

32. The LTM indicates to the system that he / she wants to consult the list of comments received on the Dynamic DCB activity under analysis, or on its associated STAM or associated hotspot(s)
33. The system presents to the LTM the different comments recorded based on messages received via e-mail addressed to the LTM or via dedicated e-forum that concern the Dynamic DCB activity, STAM and/or hotspot(s) under analysis.
34. As appropriate, the LTM requests to the system to plan a teleconference with the actors who have issued the comments (supporting) and possibly other actors that LTM indicates to the system in order to address these comments / complains. The system sends the invitations to the concerned actors, collects the responses and draws a teleconference plan proposal accordingly.
35. As appropriate, the LTM requests to the system to annex the minutes of the teleconference held, and requests to the system to annex it to the report
36. The Use Case continues at same step after the system has annexed the outcome accordingly to the report.

5.7.7.9.3 Failure Flows

5.7.7.9.3.1 Failure 1 – Step 7: The LTM is not fully satisfied with the content of the report

37. The LTM requests to the system to record the report as draft only.
38. The Use Case ends when the system records the report as draft

5.7.8 UC7: Pre-flight phase – Notify TTO in addition to the CTOT (DCB-0208)

5.7.8.1 Scope

This Use Case concerns the pre-flight phase defining how to notify the TTO in addition to the CTOT, for regulated flights affected by regulation protecting their destination terminal area. The reference scenario to which this Use Case is applicable is 'Operational Scenario : *Demand capacity imbalance impacting the arrival flow of an aerodrome*'.

5.7.8.2 Level

User Goal

5.7.8.3 Summary

This Use Case is triggered for a constrained flight affected by a time-based measure. Where the decision is taken to apply a DCB time-based constraint on En-Route this use-case is invoked.
The DCB/dDCB processes provide time based measures to manage hotspots. These can be traditional ATFCM regulation measures or STAM cherry picked/flow measure flight delays.

- The Network calculates and stores a TTO value for each flight affected by an En-Route time-based measure.
- The Network actors/infrastructure disseminate the TTO information to the affected actors (AO, Flow controller, LTM, TWR, ADEP, ATC, ….) using either a manual procedure or electronic communication/support tool.
- The Network actors handle the TTO information.

5.7.8.4 Actors

5.7.8.4.1 Primary Actor

The affected actors hereafter are responsible to handle the TTO information

- ADEP Departure Tower (A-CDM and non A-CDM Airport)
- FOC
- ATC En Route
- ATC TMA
- Flight Crew
- Flow Controller
- LTM

5.7.8.4.2 Supporting Actor(s)

- Network Management Infrastructure Systems (NMIS)

5.7.8.4.3 Off-Stage Actor(s)

N/A

5.7.8.5 Preconditions

- Constrained flight affected by aDCB time-based Measure.
- The Use-Case intends to act upon flights departing from aerodromes inside the Network Manager area.

5.7.8.6 Post-conditions

5.7.8.6.1 Success End State

The TTO has been calculated, disseminated and handled to/by the affected actors.

5.7.8.6.2 Failure End State

- The TTO is not notified to the network
- The TTO is not handled by some affected actors
- The TTO is not accepted by FOC or flight crew

5.7.8.7 Notes

The Use Case describes

- the process to disseminate to the network TTO which affected actors (AO, Flow controller, LTM, TWR, ADEP, ATC, flight crew ….)
- the process to handle the TTO by the different actors.

The purpose of such TTO dissemination is to ensure that all concerned parties are able to handle the TTO.

5.7.8.8 Trigger(s)

The Use Case starts at the pre-flight phase.

5.7.8.9 Flows

5.7.8.9.1 Main Flow

1. The FOC/AU files its ISBT or its Flight Plan Data with EET for the concerned point of the ICAO FPL route. Upon receiving an ACK from IFPS system containing the approved route, the FOC/AU checks the route/trajectory and verifies that the provided EET is still achievable. In the event that the approved route is acceptable but it is not possible to comply anymore with the EET provided, the FOC/AU sends a CHG message to update this EET. If the route proposed by IFPS is not acceptable, the FOC/AU resubmits a new ICAO FPL/ISBT and the above process is repeated. Once an agreement is reached, the complete ICAO FPL/IRBT is transmitted to NMF and all the ATSU's NMF receives the Traffic Demand data from the IFPS in the form of an IRBT or Flight Plan data with EET over the concerned point of the ICAO FPL route and STS/ATFMTTO. The Network Manager is also in possession of the best available airspace and aerodrome capacity information. For FOC/AU using ICAO FPL 2012, if EET over the concerned point of the ICAO FPL route is missing, NMF will suspend the flight via a FLS message, pending the reception of the missing information.

2. Once activated the DCB constraint, the Network calculates and stores TTO value for each flight affected by a hotspot measure (STAM, regulation).

   The TTO information will contain:

   - Point in Airspace
   - Target Time
   - Target Time tolerance at the airspace point

3. The NIMS notifies the concerned actors of the CTOT and TTO target information two hours prior to the filed Off Block Time of each flight. The DCB regulation mechanism continues to update the planned sequence after modification or with received information until regulation termination. It notifies concerned actors of pertinent update to CTOT and TTO target information. The NIMS may update the planned sequence based upon the following updates: Flight plan route or OBT change, airborne flight diversion, flight cancellation, meteorological (wind) update, change of SID, change of STAR, aerodrome of destination runway direction change or modification of the implemented measure (period or rate change).

4. FOC/AU can update its EET:
    - If FOC/AU wants to update its EET over the concerned point of the route in the ICAO FPL, it can only update it to a greater value . If it wants to use a smaller value, the ICAO FPL needs to be canceled with a CNL and replaced by new correct ICAO FPL.
    - If FOC/AU wants to depart on time (so earlier than the attributed CTOT) with a CTOT 12:10 but still wants to maintain its TTO, it simply needs to update its EET. NMF will issue a SRM with new CTOT+original TTO
    - If FOC/AU sends a new EET value > TTO – ETOT, NMF will attribute a later TTO based on ETOT and new EET and will send a SRM with new CTOT + new TTO

5. TTO Dissemination to the LTM.

   The NMIS disseminates the TTO to the LTM through Tool electronic supports.

6. TTO Dissemination to the Flow Controller.

   The NMIS disseminates the TTO to the Flow Controller through Tool electronic supports

7. TTO Dissemination to ADEP
    - Preferred Option (OPS) : The NIMS disseminates the TTO to ADEP via legacy messaging (e.g. EFD and FUM mechanisms)
    - Proposed Option (TRIAL bypass) : The NMIS communicates the TTO to the ADEP through the Tool electronic support
8. TTO Dissemination to FOC
    - The NMIS disseminates the TTO to FOC via legacy messaging (e.g. EFD and FUM mechanisms)
    - The NMIS disseminates the TTO to the FOC through the Tool electronic supports

9. TTO Dissemination to ATC En route and ATC TMA
    - The NMIS disseminates the TTO to ATC via legacy messaging (e.g. EFD and FUM mechanisms)
    - The NIMS disseminates the TTO to the ATC through specialised ATFM Terminal

10. TTO Dissemination to Flight Crew

- At approximately 30 minutes prior to fight off blocks, the FOC derives an Operational Flight Plan (OFPL) that accommodates the CTOT and TTO. Where flight plan changes necessitate, the FOC will file a Flight Plan (ICAO FPL) change message. FOC communicates the TTO information to the flight crew:
    a) The FOC electronically communicate the TTO to the flight crew (e.g. ACARS)
    b) Special procedure for the long haul: The FOC communicates to the flight crew a CTO as attributed in the NMF slot list
- ADEP communicates TTO to flight crew as part of start-up clearance request procedure or at the time the TSAT is passed to the flight crew.

11. TTO handling by the LTM

The LTM performs the normal dynamic DCB management of their traffic volumes, hotspots and STAM Measures.

12. TTO handling by ADEP

- The ADEP performs normal business
- For ADEP with CDM: it needs to treat the TTO differently due to the TSAT information.

  On reception of the ICAO FPL data (including CTOT and TTO), the APOC, as central manager of the AOP (Airport Operations Plan), assigns a specific TTOT (Target Take-Off Time) to the flight, within a CTOT tolerance window ± 5’. The airport system issues the Target Start-up Approval Time (TSAT) to the FOC/AU and informs Network Manager of the TSAT, TTOT and the Variable Taxi Time (VTT). The TSAT will match the TTOT, taking into account the FOC/AU determined TOBT and taxi route from the flight’s stand to the holding point and the associated taxi time. Based on this TSAT and the VTT, the FOC/AU has the possibility to again adjust and distribute its operational flight plan so as to enable the flight to meet the TTO whilst flying closely to its optimum business flight profile. The AU sends any ICAO FPL revisions (including the operational flight plan information) to the Network Manager. Network Manager responds to operational flight plan information and disseminates updates of CTOT and possibly TTO information to FOC, Aerodromes, LTMs and ACCs
- For ADEP without CDM: the TTO is displayed to the departure control function.
- The ADEP distributes TTO to flight crew as part of start-up clearance request procedure or at the time that TSAT is passed to the flight crew.

13. TTO handling by FOC

- If FOC wishes to modify their constraints
    a) If FOC/AU wants to update its EET over the concernt point of the route in the ICAO FPL/first point of the STAR, it can only update it to a greater value . If it wants to use a smaller value, the ICAO FPL needs to be canceled with a CNL and replaced by new correct ICAO FPL.
    b) If FOC/AU wants to depart on time (so earlier than the attributed CTOT) with a CTOT 12:10 but still wants to maintain its TTO, it simply needs to update its EET. NMF will issue a SRM with new CTOT+original TTO

c) If FOC/AU sends a new EET value > TTO – ETOT, NMF will attribute a later TTO based on ETOT and new EET and will send a SRM with new CTOT+new TTO

- FOC communicates the TTO information to the flight crew

14. TTO handling by the flight crew

- The flight crew determines if the TTO is achievable
    - The flight crew accepts the TTO
- The flight crew records the TTO received
    - Manage the TTO

5.7.8.9.2 Alternative Flows

None

5.7.8.9.3 Failure Flows

None

5.7.9 UC9: Pre-flight phase – Notify TTA in addition to the CTOT (DCB-0208)

5.7.9.1 Scope

This Use Case concerns the pre-flight phase defining how to notify the TTA in addition to the CTOT, for constrained flights affected by a time-based Measure protecting their destination terminal area. The reference scenario to which this Use Case is applicable is 'Operational Scenario : *Demand capacity imbalance impacting the arrival flow of an aerodrome*'.

5.7.9.2 Level

User Goal

5.7.9.3 Summary

This Use Case is triggered for a constrained flight affected by a time-based Measure protecting his destination terminal area. This use-case is invoked where the decision is taken to apply a DCB regulation at an arrival airport.
The DCB/dDCB processes provide time based measures to manage hotspots. These can be traditional ATFCM regulation measures or STAM cherry picked/flow measure flight delays.

- The Network calculates and stores a TTA value for each flight affected by the hotspot measure.
- The Network actors/infrastructure disseminate the TTA information to the affected actors (AO, Flow controller, LTM, TWR, ADEP, ATC, ….) using either a manual procedure or electronic communication/support tool.
- The Network actors handle the TTA information.

5.7.9.4 Actors

5.7.9.4.1 Primary Actor

The affected actors hereafter are responsible to handle the TTA information

- ADEP Departure Tower (A-CDM and non A-CDM Airport)
- FOC
- ATC En Route
- ATC TMA
- Flight Crew
- Flow Controller
- LTM

5.7.9.4.2 Supporting Actor(s)

- Network Management Infrastructure Systems (NMIS)

5.7.9.4.3 Off-Stage Actor(s)

N/A

5.7.9.5 Preconditions

- Regulated flights affected by regulation protecting their destination terminal area.
- The Use-Case intends to act upon flights departing from aerodromes inside the Network Manager area.

5.7.9.6 Postconditions

5.7.9.6.1 Success End State

The TTA has been calculated, disseminated and handled to/by the affected actors.

5.7.9.6.2 Failure End State

- The TTA is not notified to the network
- The TTA is not handled by some affected actors
- The TTA is not accepted by FOC or flight crew

5.7.9.7 Notes

The Use Case describes

- the process to disseminate to the network TTA which affected actors (AO, Flow controller, LTM, TWR, ADEP, ATC, flight crew ….)
- the process to handle the TTA by the different actors.

The purpose of such TTA dissemination is to ensure that all concerned parties are able to handle the TTA.

5.7.9.8 Trigger(s)

The Use Case starts at the pre-flight phase.

5.7.9.9 Flows

5.7.9.9.1 Main Flow

1. The FOC/AU files its ISBT or its Flight Plan Data with EET for the last point of the ICAO FPL route/first point of the STAR. Upon receiving an ACK from IFPS system containing the approved route, the FOC/AU checks the route/trajectory and verifies that the provided EET is still achievable. In the event that the approved route is acceptable but it is no longer possible to comply with the EET provided, the FOC/AU sends a CHG message to update this EET. If the route proposed by IFPS is not acceptable, the FOC/AU resubmits a new ICAO FPL/ISBT and the above process is repeated. Once an agreement is reached, the complete ICAO FPL/IRBT is transmitted to NMF and all the ATSU's NMF receives the Traffic Demand data from the IFPS in the form of an IRBT or Flight Plan data with EET over the last point of the ICAO FPL route/first point of the STAR and STS/ATFMTTA. The Network Manager is also in possession of the best available airspace and aerodrome capacity information. For FOC/AU using ICAO FPL 2012, if EET over the last point of the ICAO FPL route/first point of the STAR is missing, NMF will suspend the flight via a FLS message, pending the reception of the missing information.

2. Once activated the DCB regulation mechanism determines the planned sequence of flights to resolve the congestion. A TTA is assigned in addition to CTOT. The Network calculates and stores TTA value for each flight affected by a hotspot measure (STAM, regulation).

   The TTA information will contain:

- Point in Airspace
- Target Time
- Target Time tolerance at the airspace point

3. The NIMS notifies the concerned actors of the CTOT and TTA target information two hours prior to the filed Off Block Time of each flight. The DCB regulation mechanism continues to update the planned sequence after modification or with received information until regulation termination. It notifies concerned actors of pertinent update to CTOT and TTA target information. The NIMS may update the planned sequence based upon the following updates: Flight plan route or OBT change, airborne flight suspension, flight cancellation, meteorological (wind) update, change of SID, change of STAR, aerodrome of destination runway direction change or modification of the implemented measure (period or rate change).
4. FOC/AU can update its EET:
   - If FOC/AU wants to update its EET over last point of the route in the ICAO FPL/first point of the STAR, it can only update it to a greater value . If it wants to use a smaller value, the ICAO FPL needs to be canceled with a CNL and replaced by new correct ICAO FPL.
   - If FOC/AU wants to depart on time (so earlier than the attributed CTOT) with a CTOT 12:10 but still wants to maintain its TTA, it simply needs to update its EET. NMF will issue a SRM with new CTOT+original TTA
   - If FOC/AU sends a new EET value > TTA – ETOT, NMF will attribute a later TTA based on ETOT and new EET and will send a SRM with new CTOT + new TTA

5. TTA Dissemination to the LTM.

   The NMIS disseminates the TTA to the LTM through Tool electronic supports.

6. TTA Dissemination to the Flow Controller.

   The NMIS disseminates the TTA to the Flow Controller through Tool electronic supports

7. TTA Dissemination to ADEP
   - Preferred Option (OPS) : The NIMS disseminates the TTA to ADEP via legacy messaging (e.g. EFD and FUM mechanisms)
   - Proposed Option (TRIAL bypass) : The NMIS communicates the TTA to the ADEP through the Tool electronic support
8. TTA Dissemination to FOC
   - The NMIS disseminates the TTA to FOC via legacy messaging (e.g. EFD and FUM mechanisms)
   - The NMIS disseminates the TTA to the FOC through the Tool electronic supports

9. TTA Dissemination to ATC En route and ATC TMA
   - The NMIS disseminates the TTA to ATC via legacy messaging (e.g. EFD and FUM mechanisms)

- The NIMS disseminates the TTA to the ATC through specialised ATFM Terminal

10. TTA Dissemination to Flight Crew

    At approximately 30 minutes prior to the flight off blocks time, the FOC derives an Operational Flight Plan (OFPL) that accommodates the CTOT and TTA. Where flight plan changes necessitate, the FOC will file a Flight Plan (ICAO FPL) change message. FOC communicates the TTA information to the flight crew:

    a) The FOC electronically communicates the TTA to the flight crew (e.g. ACARS)

    b) Special procedure for the long haul: The FOC communicates to the flight crew a CTO as attributed in the NMF slot list

    c) ADEP communicates TTA to flight crew as part of start-up clearance request procedure or at the time the TSAT is passed to the flight crew.

11. TTA handling by the LTM

    The LTM performs the normal dynamic DCB management of their traffic volumes, hotspots and STAM Measures.

12. TTA handling by the Flow controller

    The flow controller performs the normal dynamic DCB management of their traffic volumes, hotspots and STAM Measures.

13. TTA handling by ADEP

    The ADEP performs normal business

    - For ADEP with CDM: it needs to treat the TTA differently due to the TSAT information.

      On reception of the ICAO FPL data (including CTOT and TTA), the APOC, as central manager of the AOP (Airport Operations Plan), assigns a specific TTOT (Target Take-Off Time) to the flight, within a CTOT tolerance window ± 5'. The airport system issues the Target Start-up Approval Time (TSAT) to the FOC/AU and informs Network Manager of the TSAT, TTOT and the Variable Taxi Time (VTT). The TSAT will match the TTOT, taking into account the FOC/AU determined TOBT and taxi route from the flight's stand to the holding point and the associated taxi time. Based on this TSAT and the VTT, the FOC/AU has the possibility to again adjust and distribute its operational flight plan so as to enable the flight to meet the TTA whilst flying closely to its optimum business flight profile. The AU sends any ICAO FPL revisions (including the operational flight plan information) to the Network Manager. Network Manager responds to operational flight plan information and disseminates updates of CTOT and possibly TTA information to FOC, Aerodromes, LTMs and ACCs

    - For ADEP without CDM: the TTA is displayed to the departure control function.

    - The ADEP distributes TTA to flight crew as part of start-up clearance request procedure or at the time that TSAT is passed to the flight crew.

14. TTA handling by FOC

    If FOC wishes to modify their constraints

    - If FOC/AU wants to update its EET over last point of the route in the ICAO FPL/first point of the STAR, it can only update it to a greater value . If it wants to use a smaller value, the ICAO FPL needs to be canceled with a CNL and replaced by new correct ICAO FPL.
    - If FOC/AU wants to depart on time (so earlier than the attributed CTOT) with a CTOT 12:10 but still wants to maintain its TTA, it simply needs to update its EET. NMF will issue a SRM with new CTOT+original TTA
    - If FOC/AU sends a new EET value > TTA – ETOT, NMF will attribute a later TTA based on ETOT and new EET and will send a SRM with new CTOT+new TTA

15. FOC communicates the TTA information to the flight crew

16. TTA handling by the flight crew

    - The flight crew determines if the TTA is achievable
    - The flight crew accepts the TTA
    - The flight crew records the TTA received

5.7.9.9.2 Alternative Flows

None

5.7.9.9.3 Failure Flows

None

5.7.10 UC11: Flight phase from the AMAN horizon – Transition between TTA and CTA issued from AMAN horizon (DCB-0208)

5.7.10.1 Scope

This Use Case concerns the flight phase of an aircraft from a point prior to it reaching its TTA until touchdown. It includes a description of the transition from the TTA to its inclusion in the Arrival Management process for the destination aerodrome with the need to comply with a CTA. The description is in the context of Step1. The reference scenario to which this Use Case is applicable is 'Operational Scenario : *Demand capacity imbalance impacting the arrival flow of an aerodrome*'.

5.7.10.2 Level

User Goal

5.7.10.3 Summary

This Use Case is triggered for a regulated flight in the flight phase from just prior to top of descent to touch down and is affected by regulation protecting its destination aerodrome and terminal area. It is assumed that:

- The flight crew fly to meet the TTA within set parameters
- Apart from separation purposes ATC will comply with adherence to the flight plan and facilitate the means for the flight to reach its TTA
- Arrival management between ATSUs is in operation to the level of CTA allocation where necessary
- The central and local network functions will monitor any flight plan deviation

TTA is set at a point ~70 Nm from the aerodrome which approximates to the ASMA boundary and prior to the top of descent point for most flights. Even though descent profiles will vary according to different business models it is important to maintain stability during the descent phase of flight in order for an aircraft to achieve its CTA. The trade off between speed changes and the consequent impact on rate of descent and vice versa will always remain a key factor to the success of this operation.

5.7.10.4 Actors

5.7.10.4.1 Primary Actor

Those actors affected by the transition from TTA to CTA

- Airport Operator (A-CDM and non A-CDM Airport)
- FOC
- ATC En Route
- ATC TMA
- ATC Aerodrome and Approach
- Flight Crew
- Flow Controller
- LTM

5.7.10.4.2 Supporting Actor(s)

- Network Management Infrastructure Systems (NMIS)

5.7.10.4.3 Off-Stage Actor(s)

N/A

5.7.10.5 Preconditions

Regulated flights affected by regulation protecting their destination aerodrome and terminal area.

5.7.10.6 Postconditions

None

5.7.10.6.1 Success End State

TTA has enabled a smooth transition to sequencing and metering to the destination aerodrome, to avoid holding and CTA compliance during arrival phase of flight.

5.7.10.6.2 Failure End State

- Over delivery of flights by the TTA method exceeds declared capacity leading to holding and even controller overload in protected airspace
- Under delivery of flights by the TTA method leads to underutilisation of available airspace capacity and poor runway utilisation.

5.7.10.7 Notes

N/A

5.7.10.8 Trigger(s)

The Use Case starts at the in-flight phase prior to the TTA and ASMA

5.7.10.9 Flows

5.7.10.9.1 Main Flow

1. The flight enters the Area of Responsibility of ACC X the flight crew establishes VHF communication and is identified.

2. The flight crew aim to meet the TTA at a known waypoint at or adjacent to the ASMA boundary, within ACC X, typically 70 Nm from the destination aerodrome. TTA enables the delivery of traffic to APP Y's protected airspace at an acceptable rate in order to meet the declared capacity.

3. At a defined time parameter a notification message is initiated by the ACC X FDPS. The notification message contains the last up to date flight data for the flight including the co-ordination point (COP) between the two ATSUs, estimated time over the co-ordination point and the corresponding flight level.

4. The APP FDPS receives and processes the notification message. The trajectory prediction takes into account the estimated time over the COP and the AMAN tool places the flight in the initial arrival sequence. As soon as radar data becomes available on the flight at APP Y a precise arrival time may be calculated. In the event that there is a need to manage the sequence the arrival management tool will calculate a CTA with reference to the IAF for the flight. This information is displayed to the APP controller.

5. At the same time the AMAN information is made available to the en-route controller in ACC X.

6. The En-route controller instructs the aircraft to cross the Initial Approach Fix (IAF) at the CTA required by the AMAN. If this is prior to the TTA waypoint the flight crew will disregard the TTA and fly to comply with the CTA and ATC instructions.

7. The flight crew request descent having analysed their flight profile to meet the CTA.

8. The En-route controller assesses that the descent will not create any traffic conflict and grants the descent clearance.

9. The flight continues to progress and two minutes before crossing the boundary is handed over by the En-route controller to the Approach controller.

10. The flight crew establishes communication with APP Y and is identified. The flight enters the Area of Responsibility of APP Y and the controllers clear the aircraft to fly the appropriate STAR which includes the IAF and CTA. Level clearances will be given by the approach controller and eventually the aircraft will be cleared for the approach.

11. APP Y transfers the flight to the TWR which then clears the aircraft to land.

12. The flight lands.

5.7.10.9.2 Alternative Flows

None

5.7.11 UC12: Target Time Monitoring and Revision Process (DCB-0208)

5.7.11.1 Scope

This Use Case concerns dDCB measure using a Target Time to resolve hotspot. The description is in the context of Step1. The reference scenario to which this Use Case is applicable is 'Operational Scenario : *Target Time Monitoring and Revision Process*.

5.7.11.2 Level

User Goal

5.7.11.3 Summary

This Use-Case is triggered when a DCB solution is published, the Local DCB/INAP has to monitor that the DCB solution is fit for purpose (solve a hotspot) over time: the DCB solution is designed and published based on traffic forecast that may most probably evolve during execution phase. A continuous re-assessment of the hotspot resolution and flight adherence (Target-Time progress) will be processed to re-evaluate the operational situation.

The monitoring will be performed at two levels :

- Hotspot level : To indicate the progress of the Hotspot Resolution
- Trajectory level : To indicate the progress of the Target-Time for individual flight involved in the Hotspot

With respect to changing conditions and detected deviation, a DCB revision process will

- Cancel, maintain or update the hotspot resolution plan
- Maintain, revise or cancel the Target Time of flights which where set in the planning phase.

5.7.11.4 Actors

5.7.11.4.1 Primary Actor

- Airport Operator (A-CDM and non A-CDM Airport)
- FOC
- ATC En Route
- ATC TMA
- ATC Aerodrome and Approach
- Flight Crew
- Local DCB/INAP
- Network Manager Function

5.7.11.4.2 Supporting Actor(s)

- Network Management Infrastructure Systems (NIMS)

5.7.11.4.3 Off-Stage Actor(s)

N/A

5.7.11.5 Preconditions

DCB Hotspot resolution is planned

5.7.11.6 Postconditions

5.7.11.6.1 Success End State

DCB Hotspot resolution is properly executed

5.7.11.6.2 Failure End State

DCB Hotspot is not satisfactorily resolved in the execution phase

5.7.11.7 Notes

The Use Case describes

- the process to monitor the Hotspot Resolution and Flight Target Time progress
- the process to recover the DCB plan and to revise Target Time

The purpose of such process is to use the Target Time management (TTO/TTA) to resolve hotspot.

5.7.11.8 Trigger(s)

The Use-Case starts in the execution phase when the LTM monitors the DCB plan and Target Time achievement to resolve the hotspot..

5.7.11.9 Flows

5.7.11.9.1 Main Flow

1. The LTM/INAP-1 starts to continuously monitor the proper resolution of the hotspot in the flight execution phase. The Hotspot Deviation Monitoring will be based on the comparison of
   - the planned hotspot resolution
   - the current hotspot resolution taking into account the Flight Target Deviation Indicator (TDI) information

2. On the DCB HMI, an automatic alert highlights the deviation at two levels:
   - Hotspot level : To indicate the progress of the Hotspot Resolution
   - Trajectory level : To indicate the progress of the Target-Time for individual flight involved in the Hotspot

3. The LTM1/INAP-1 analyses on displays the evolution of the hotspot monitoring and takes decision according to the following decision-making criteria :

	Hotspot Resolution GREEN	**Hotspot resolution RED**
TDI ∈ [-TW, +TW] ATT inside the hotspot area	(3.a) - TT is maintained	(3.b) - TT is maintained - Action for LTM to resolve the residual imbalance
TDI ∉ [-TW, +TW] *and* ATT inside the hotspot area	(3.c) - NM Notification for TT update (TT updated with the ETO value)	(3.d) - NM Notification for TT update (TT updated with the ETO value) - Action for LTM to resolve the residual imbalance
TDI ∉ [-TW, +TW] *and* ATT outside the hotspot area or TDI ∈ [-TW, +TW] and ATT outside the hotspot area" (ie the hotspot	(3.e) - NM Notification for TT cancellation	(3.f) - NM Notification for TT cancellation - Action for LTM to resolve the residual imbalance

dissappeared, leading to TT cancellation)		

3.a The hotspot resolution is properly on-going and the flight is adhering to the TT with a detected deviation inside the Target Window. The TT is maintained and no LTM action is required.

3.b The hotspot is no longer resolved. The LTM1 (INAP-1) actor will take additional DCB measures to resolve the hotspot.

3.c The hotspot resolution is properly on-going despite the fact that there is a flight outside of the Target-Time ± Target Window. The detected deviation does not allow the flight to achieve the Target. A NM notification for a TT update is sent to the LTM.

3.d The hotspot resolution is no longer resolved and the flight is outside of the Target-Time ± Target Window. The detected deviation does not allow the flight to achieve the Target.

3.e The hotspot resolution is properly on-going despite the fact that there is a flight outside of the Target-Time ± Target Window. The detected deviation does not allow the flight to achieve the Target. In addition, the ATT indicates that the flight is outside of the hotspot area. A NM notification for a TT cancellation is sent to the LTM.

3.f The hotspot resolution is no longer resolved and the flight is outside of the Target-Time ± Target Window. The detected deviation and its capability to absorb the deviation does not allow the flight to recover to the Target. In addition, the ATT indicates that the flight is outside of the hotspot area. A NM notification for a TT cancellation is sent to the LTM.

5.7.11.9.2 Alternative Flows

None

5.7.12 UC13: Implement dDCB measures using TTO/TTA to resolve resurgence or residual significant hotspots, as corrective measures (ground regulations) – (DCB-0208)

5.7.12.1 Scope

This Use Case concerns dDCB measure using a TTO/TTA to resolve resurgence or residual significant hotspot for congested area at arrival airport. The description is in the context of Step1. The reference scenario to which this Use Case is applicable is ‘Operational Scenario : *Demand capacity imbalance impacting the arrival flow of an aerodrome*’.

5.7.12.2 Level

User Goal

5.7.12.3 Summary

This Use-Case is triggered when an imbalance is detected at an arrival airport between the traffic demand and the arrival flow airport capacity within a defined time period. Instead of activating an arrival flow regulation the LTM Airport will analyse the traffic situation and will identify the minimum amount of flights that should be shifted to another time. The LTM will decide by how many minutes each flight shall be shifted and will transmit a time-based constraint for the entry point of the concerned hotspot.

5.7.12.4 Actors

5.7.12.4.1 Primary Actor

- Airport Operator (A-CDM and non A-CDM Airport)
- FOC
- ATC En Route
- ATC TMA
- ATC Aerodrome and Approach
- Flight Crew
- Flow Controller
- LTM

5.7.12.4.2 Supporting Actor(s)

- Network Management Infrastructure Systems (NMIS)

5.7.12.4.3 Off-Stage Actor(s)

N/A

5.7.12.5 Preconditions

Imbalance detected on arrival area.

5.7.12.6 Postconditions

5.7.12.6.1 Success End State

Imbalance resolved on arrival area

5.7.12.6.2 Failure End State

Imbalance not resolved on arrival area

5.7.12.7 Notes

The Use Case describes

- the process to detect and analyse a hotspot at the Arrival Area
- the process to resolved the hotspot at the Arrival Area

The purpose of such process is to use the TTO/TTA and CTO mechanism to resolve hotspot.

5.7.12.8 Trigger(s)

The Use-Case starts when the LTM Airport detects a risk of a demand capacity imbalance occurring in the area of nominated responsibility during a period of 2 hours, but not less than 1 hour, in advance of the predicted occurrence.

5.7.12.9 Flows

5.7.12.9.1 Main Flow

1. The NMF/Occupancy Count detects a Hotspot at an Arrival Airport Area
2. The LTM assesses the excess of traffic against Entry Count and Occupancy Count based on OTMV Values (peak, sustain, duration)
3. The LTM captures and confirm the Hotspot
4. The LTM analyses the traffic situation (based on the flight list information) and identifies the minimum amount of flights that should be shifted to another time
5. The LTM will decide to assign a delay (minutes) to some candidate flights in order to smooth the traffic to resolve the hotspot
6. The Hotspot Resolution area will be calculated (Hotspot Resolution = Hostpot captured + recovery period due to the smoothing effect)
7. For each flight in the Hotspot Resolution area a Target Time will be issued
    - Target-Time based on delay (minutes) for flight with a delay assigned
    - Target-Time with zero delay (delay 0) for the others (no delay assigned)
8. The LTM initiates and manages the coordination with affected actors if necessary
9. At the cut-off time, the Target Time will be notified to the actors in the form of TTO/TTA and associated CTOT.

5.7.12.9.2 Alternative Flows

None

5.7.13 UC14: Airport Arrivals Management using TTA Allocation (DCB-0210)

5.7.13.1 Scope

This Use Case concerns the Airport Arrival Management using TTA allocation. It describes how the TTA procedures are used to optimize network and airports management, in particular, how the destination airport assesses the impact of TTA for the arrival flights on its AOP and how the Network Manager uses the airport feedback, when there is no significant impact on the AOP.
All actions take place at the end of the Short Term Planning Phase, when the aircraft is still at the origin airport (2-3 hours time horizon).

5.7.13.2 Level

User Goal

5.7.13.3 Summary

This Use Case is triggered for a regulated flight affected by regulation protecting his destination terminal area. Where the decision is taken to apply a DCB regulation on arrival airport this use-case is invoked.
It starts when the destination Airport receive the TTA and ends when the NOP/AOP is updated with the final TTA.

- The destination airport receives the TTA information and perform the Airport Impact Assessment
- The airport sends the Airport Impact Assessment Feedback to the Network Manager with severity value and TTA margin proposed improvements
- The Network Manager analyses the situation and performs TTA improvements
- The final TTAs are updated in the NOP/AOP

5.7.13.4 Actors

5.7.13.4.1 Primary Actor

The affected actors hereafter are responsible to handle the TTA information

- Destination Airport
- Network Manager

5.7.13.4.2 Supporting Actor(s)

- Network Management Infrastructure Systems (NMIS)

5.7.13.4.3 Off-Stage Actor(s)

N/A

5.7.13.5 Preconditions

- The Use-Case intends to act upon flights departing from aerodromes inside the Network Manager area.
- Availability of B2B connection between Network Manager system and the destination airport;
- The destination airport is operating under congested situation;
- The TTA at the destination airport is calculated by the Network Manager system as soon as the aircraft is at a predetermined time from its EOBT/TOBT at the origin airport
- There are AOP and Impact Assessment Model available at the destination airport and agreed by all airport stakeholders.

5.7.13.6 Postconditions

5.7.13.6.1 Success End State

The TTAs are allocated by the Network Manager taking into account the proposed improvement window, if possible, and the AOP and NOP are updated accordingly.

5.7.13.6.2 Failure End State

The AOP is unable to assess the TTA impact and/or the NOP is unable to process and use the AIMA (Airport Impact Assessment) messages to refine the TTA allocation.

5.7.13.7 Notes

The impact of the TTAs received from the NM system on the AOP is assessed, evaluating for each arrival aircraft:

- Deviation from the planning (deviation from Scheduled In Block Time (SIBT) in minutes);
- Severity of the impact on AOP (0 = no impact, 1 = low impact, 2 = medium impact, 3 = high impact);
- Proposed Improvement Window to improve the TTA;
- Impact on the associated departure flight in a “Do-Nothing” situation.

The airline could increase the Severity of the impact calculated by the Impact Assessment Model through an “Airline Contribution” parameter based on its business interests.
The Network Manager analyses the information received from the airport and assesses the possibility of complying with the airport proposals.
The Network Manager system sends Updated TTA messages to the airport, ATSUs affected by the aircraft trajectories and the concerned FOCs.
The NOP and AOP are updated accordingly.

5.7.13.8 Trigger(s)

This Use Case starts when the TTA at the destination airport is calculated by the Network Manager system, typically two hours ahead of the departure at origin airport.

5.7.13.9 Flows

5.7.13.9.1 Main Flow

1. Destination airport receives the TTA for an arrival flight

2. The Airport Impact Assessment is started to detect deviation from the AOP, assess its severity and propose an improvement window if applicable.

3. An AIMA Message is sends from the AOP to the NOP with the following information for the concerned flights:
    - Flight Id
    - Severity {0,1,2,3}
    - Proposed Improvement {TTA; ± x min} (± x min represents the time improvement window)

4. The Network Manager analyses the situation at Network Level and adjust the TTA which will be allocated within the proposed improvement window using existing slot management procedures.

The situation analysis and TTA re-allocation will be performed according the criteria described in the table hereafter.

	Airport	Airport Impact Assessment Feedback
On time Arrival (no impact)	-tolerance for arrival ≤ Arrival Deviation ≤ +tolerance for arrival ➔ arrival on time, no impact on AOP and severity “0 + Airline contribution”, no proposal for improvement window.	AIMA message • Severity=0 • Deviation=No • TTA
Early Arrival (no impact)	Arrival Deviation < -tolerance for arrival➔ early arrival, no impact on AOP and severity=0 “, no proposal for improvement window.	AIMA message • Severity=0 • TTA
Late Arrival (no impact)	Arrival Deviation > +tolerance for arrival➔ late arrival Next Departure Deviation <+tolerance for departure ➔ no departure delay , impact on AOP and severity=1“. The proposal for improvement is – X minutes (X represents the Arrival Deviation)	AIMA message • Severity=1 • TTA
Early Arrival (with impact)	Arrival Deviation < -tolerance for arrival ➔ early arrival, impact on AOP and severity=1,2 or 3. The Impact Assessment model proposes an improvement in arrival sequence of X minutes.	AIMA message • Severity=1,2 or 3 • TTA
Late Arrival (with impact)	Arrival Deviation > +tolerance for arrival➔ late arrival Next Departure Deviation >+tolerance for departure ➔ departure delay , impact on AOP and severity=2 or 3“. The proposal for improvement in the arrival sequence is – X minutes (X represents the Arrival Deviation)	AIMA message • Severity=2 or 3 • TTA

5. The NOP and AOP are updated accordingly.

5.7.13.9.2 Alternative Flows

None

5.7.13.9.3 Failure Flows

Failure at step 4: The TTA is not updated

The Network Manager analyse the situation and cannot adjust the TTA using existing slot management procedures (sticky slot, swap/shift slot, cancel slot).

5.7.14 UC15: DCB Supervision (DCB-0308)

5.7.14.1 Scope

This Use Case concerns the STAM Supervision. It describes how STAM activities will be monitored by the NMOC actor.

5.7.14.2 Level

User Goal

5.7.14.3 Summary

This Use Case is triggered when NMOC has to monitor the STAM activity in the Network.
The STAM Supervision shall support the elaboration of the NMOC mental picture in term of network situation awareness and understanding.

- Monitoring unresolved imbalance
- Activating a regulation measure
- Monitoring the Network situation with the DCB Monitor/MAP
- Monitoring the Network situation with the Time-Line

5.7.14.4 Actors

5.7.14.4.1 Primary Actor

The affected actors hereafter are responsible to handle the STAM Supervision

- NMOC

5.7.14.4.2 Supporting Actor(s)

- Network Management Infrastructure Systems (NMIS)

5.7.14.4.3 Off-Stage Actor(s)

None

5.7.14.5 Preconditions

- Availability of hotspot and STAM information in the AOP-NOP
- Availability of B2B connection between Network Manager system and the Local DCB system

5.7.14.6 Postconditions

5.7.14.6.1 Success End State

Ability of the NMOC actor to monitor the STAM activity

5.7.14.6.2 Failure End State

The NMOC is unable to monitor the STAM activity

5.7.14.7 Notes

None

5.7.14.8 Trigger(s)

This Use Case starts when the NMOC actor has to monitor the STAM activity. Flows

5.7.14.8.1 Main Flow

5.7.14.8.1.1 Monitoring unresolved imbalance

6. The NMOC monitors the network situation on the DCB Monitor/MAP. It allows to monitor the imbalance alert and the hotspot situation.

7. The NMOC detects that a severe imbalance (red) is not yet resolved and this situation is becoming time-critical.

8. The NMOC clicks on the imbalance to select a 'new message'. It automatically opens a dial box with the concerned LTM actor in the messenger window to ask details about the imbalance status and proposed solutions.

5.7.14.8.1.2 – Activating a regulation measure

1. The NMOC monitors the network situation on the DCB Monitor/MAP. It allows to monitor the imbalance alert and the hotspot situation.

2. A hotspot is displayed in the DCB Monitor TimeLine with the information R (Regulation). It means that the concerned LTM has identified a hotspot for the TFV and is proposing a regulation to resolve the overload.

3. The NMOC receives a message from the LTM in the Messenger window. The message asks for a regulation activation.

4. A Regulation measure is displayed in the left hand side of the TimeLine. It indicates that an action is required for NMOC.

5. The NMOC selects the measure label in the TimeLine and selects in the menu the activation of the regulation.

6. The Regulation is activated. This new state is reflected in the TimeLine and in the DCB Monitor Time/MAP.

7. In the TimeLine the measure is moved on to the right hand side and labelled as finished.

8. In the DCB Monitor/MAP, the hotspot is labelled as 'Resolved'

5.7.14.8.1.3 Monitoring the Network Situation with the DCB Monitor/MAP

1. The NMOC monitors the network situation with the DCB Monitor/MAP and with the TimeLine. The DCB Monitor/MAP allows to monitor the imbalance alert and the hotspot situation. The TimeLine allows to monitor the details of the hotspot resolution progress.

2. In the DCB Monitor/MAP, the NMOC has access to hotspot information displayed :
   - start time
   - end time
   - Type of proposed measures
     - R : Regulation measure
     - S : STAM measure
     - C : Capacity measure (Military)
   - Hotspot severity
     - Green Zone : below the sustain threshold
     - Orange Zone : between the sustain threshold and the peak threshold and a duration < 20 min
     - Red Zone : between the sustain threshold and the peak threshold and a duration > 20 min OR over the peak threshold

3. The NMOC selects an hotspot to have more detailed information (reference delay, new delay). The associated occupancy count is displayed. The associated flight list is displayed with the detailed information about the DCB measures (regulation, STAM…).

4. The NMOC selects a flight in the flight list. The associated Trajectory Vertical/Horizontal profile is displayed with the hotspot zones. It will allow to display the initial flight plan and the updated flight plan.

5.7.14.8.1.4 Monitoring the Network Situation with the TimeLine

1. In the TimeLine, the NMOC visualizes the hotspot resolution progress according to the time horizon. All the on-going DCB measures are displayed (regulation, STAM …).

2. The NMOC selects a hotspot on the timeline. It displays the associated Occupancy Count and the associated flight list.

3. The NMOC selects a DCB Measures. It highlights the concerned flight in the hotspot flight list.

4. The NMOC selects a flight in the flight list. The associated Trajectory Vertical/Horizontal profile is displayed with the hotspot zones. It allows to display the initial flight plan and the updated flight plan.

5.7.14.8.2 Alternative Flows

None

5.7.14.8.3 Failure Flows

None

6 Requirements

6.1 Requirements for Process / Service

6.1.1 Solution #17: Advanced Short Term ATFCM Measures (STAM) - DCB-0308

6.1.2 Solution #18: CTOT and TTA - DCB-0208

6.1.3 Solution #21: Improved Efficiency in the management of Airport and ATFCM Planning – DCB-0310

6.1.4 Solution #20 - MassDiv – DCB-0103-A

[REQ]

Identifier	REQ-07.06.05-OSED-0001.0000
Requirement	The DCB actors shall be able to access the predictions of entry counts and occupancy counts for the next 4 to 6 hours and for all monitoring TV / flows defined within the network
Title	PDT-01 Prediction of Occupancy Counts and Entry counts
Status	<Validated>

Rationale	Occupancy Counts and Entry Counts provide essential and complementary indications of the ATC capacity supply required to fully accommodate the demand on day of operations. - Entry counts provide indications of e.g. the number of Flight Plans that shall be simultaneously handled by planning ATC - Occupancy counts provide indications of e.g. the number of aircraft that shall be simultaneously handled in a sector /portion of controlled airspace by organic ATC. Recent R&D results have shown the added value of conjoint use of EC/OC indicators as primary means of DCB monitoring. Legacy ATFCM services have delivered at first (Hourly) Entry counts as primary DCB indicators. More recently legacy ATCFM services have considered delivering to FMP Occupancy Counts as complementary primary DCB indicators. Horizon of prediction of 4 to 6 hours is considered adequate to deliver EC and OC that have become sufficiently stable / reliable for FMP use, at present. A “duration” parameter may be added for each flight in the calculation of Occupancy counts. This parameter shall be adjusted according to local conditions. This enables to apply a correction to the time the flight shall be considered as “taken into account by the radar controller”, thus providing a more realistic estimate of ATCO workload associated to the traffic occupying the sector at any time. This parameter shall give account of the actual moment when the flight is considered by the radar controller, which occurs before the moment the flight enters the sector (e.g. 11 minutes). Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0002.0000
Requirement	DCB actors shall be able to access the Predictions of entry counts and occupancy counts with additional information concerning the traffic load severity estimates based on a comparison of predicted entry counts and occupancy counts with two alert thresholds assigned to each monitoring TV / flow (the Monitoring value sustain and the Monitoring value peak) and a comparison of the duration of predicted Monitoring value sustain excesses with a max. tolerated sustain threshold.
Title	PDT-02 local Traffic load Severity estimation
Status	<Validated>

Rationale	Entry and Occupancy Counts are indicators of the demand. In order to build a comprehensive picture of the Demand / Capacity balancing status, these shall be completed with estimations of the capacity offer. This is what this requirement is about. Estimation of local capacity offer is no easy, straightforward process. It shall reflect what ATCO teams in duty on the day of operations can reasonably handle in terms of workload. A programmable method based on EC / OC information was recently developed to support ANSP (FMP) in this task. This method is based on three locally measurable threshold values that provide relevant indications of when EC/OC attain critical values in terms of workload for ATCO: the monitoring value sustain, the monitoring value peak, the maximum acceptable duration of sustained heavy traffic. The estimation of local traffic load severity shall use this method in the context of Step 1 as basis for the estimation (cf. REQ-07.06.05-OSED-0015.0000 for more detailed description of the method). More sophisticated programmable methods for assessing traffic load severity may be envisaged at longer time horizon, taking account of other factors influencing ATC workload such as traffic complexity considerations, which are not fully taken into account in the method prescribed here. This requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0003.0000
Requirement	The Network actors shall be able to access the list of flight predicted (Entry Count/Occupancy Count) to enter the monitoring TV/Flow
Title	PDT03 - prediction of flights entries and flights occupancies per local monitoring TV / flow
Status	<Validated>

Rationale	Entry Counts and / or Occupancy Counts provide essential yet gross / aggregated predictions of the demand prediction. By having access to the lists of flights captured in these EC/OC functions, d-DCB actors can visualise the predicted demand using a large variety of view points, such as predicted flights 2D tracks and current aircraft positions. This function shall constitute an essential enabler for a large variety of additional analyses of the predicted demand both at local and at network level. Network-wide consistency of the output delivered by this core DCB monitoring enabler is essential for ensuring common DCB situational awareness. Whilst this requirement is applicable with both Entry Counts and Occupancy Counts, it is worth noting that usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0004.0000
Requirement	FMP shall be able to configure the monitoring threshold values - Monitoring Value Sustain; Monitoring Value Peak; duration parameter - specific to each monitoring TV / flow defined within FMP area of responsibility.
Title	PDT-04 local Occupancy (/ Entry) Threshold Monitoring Values (ETMV / OTMV) Configurations
Status	<Validated>

Rationale	FMP shall be responsible for setting the Monitoring thresholds used for traffic load severity estimation within FMP area of responsibility. Traffic load severity estimation shall be based on the method described in REQ-07.06.05-OSED-0015.0000. These thresholds shall reflect local capacity limitations, themselves depending on local ATCO performance. FMP are therefore considered the better positioned to adequately adjust these values. This is in line with legacy ATFCM practices with FMP been in charge of setting local capacity limitations to be taken into account over the network by ATFCM services. FMP shall be able to adjust such monitoring thresholds in an ad-hoc manner, notably according to the local operational conditions that may fluctuate from a day to another, as well as in order to account for the improvements made at local level in assessing actual ATCO capacity limits, or in order to account for local capacity increases due e.g. to improved airspace organisation. Some of these adjustments might be anticipated (at pre-tactical stage) whilst others may be operated only on day of operations, when actual operational conditions are better known. This requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0005.0000
Requirement	FMP shall be able to configure the time slice and time step applicable to the calculation of Occupancy Counts and Entry Counts evolution through time.
Title	PDT-05 Configuration of Entry and Occupancy Counts time slice and time step
Status	<Validated>
Rationale	Flights Entries and Occupancies may be counted using different count periods (time slides) and different intervals between successive counts (time steps).The possibility for FMP to change these parameters enables to refine the analysis of Entry and Occupancy Counts, notably in view of identifying possible traffic bunching, i.e. heavy traffic concentrations over very short periods of time (classical dynamic DCB issue). Legacy ATFCM services already offer this capability.

Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0006.0000
Requirement	FMP shall be able to dynamically create/adapt new Monitoring flow(s) attached to a TV for DCB monitoring purposes
Title	PDT-06 Creation and adaptation of flow associated to a traffic volume
Status	<Validated>
Rationale	The Dynamic DCB concept shall enable to implement solutions (STAM) that apply to much smaller amounts of traffic, determined in much more dynamic manner, than what is currently done with CASA regulations.This implies that with the introduction of STAM solutions, a much larger number of smaller sub-flows shall be dynamically created and manipulated by FMP than what was traditionally observed with CASA regulations. In the context of the CASA service, legacy ATFCM services offer possibilities for FMP to modify monitoring TV / flows using a procedure based on official FMP requests addressed to the Network Management. The Network Management, upon receipt of the request, analyses the validity of the request and, if valid, creates the new TV/flow.This procedure is not straightforward, hence does not permit fully dynamic creation of new monitoring TV/flows. It is thus regarded as restrictive in the context of dynamic DCB activities. Instead the creation of new monitoring TV/flow based upon simple /rapid automated queries and quasi immediate response is regarded as better tailored to Dynamic DCB activities.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0007.0000
Requirement	FMP shall monitor predicted entry counts and occupancy counts evolutions for each monitoring TV/ flow.
Title	PDT-07 primary EC/OC evolution monitor at FMP level
Status	<Validated>

Rationale	FMP shall be responsible for local STAM activities within FMP area of responsibility. This primary local d-DCB monitoring service shall support the identification of critical EC/OC evolutions, which constitute the triggering event of any STAM activity. The identification of critical EC/OC evolutions shall be made possible with sufficient anticipation (up to 4 hours ahead of time) in order to leave enough lead time for completing the various processes leading to a STAM implementation, be this implementation required to restore acceptable local Demand / Capacity Balance. The “bar diagram” is the display format adopted by the legacy ATFCM services to deliver such monitoring support. This format was widely recognised as well adapted for presenting EC/OC evolutions with time.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0008.0000
Requirement	FMP shall be assisted with automated pre-filtering of potential imbalance detection with the severity estimations using a colour code.
Title	PDT-08 local pre-filtering of critical EC/OC values
Status	<In Progress>
Rationale	FMP shall be responsible for local STAM activities, starting with tactical DCB monitoring within FMP area of responsibility and the identification of critical EC/OC evolutions. FMP shall be assisted with automated pre-filtering of critical EC/OC evolutions in view of facilitating anticipated problems detection. The pre-filtering function shall be designed in accordance with the harmonised method for traffic load severity estimation (cf. interoperability requirement REQ-07.06.05-OSED-0015.0000) The “bar diagram” shall be the by-default format for presenting (EC/)OC evolution through time (cf. REQ-07.06.05-OSED-0007.0000); the pre-filtering output shall be integrated in this “bar diagram display”. The severity estimation requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>

Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0009.0000
Requirement	FMP shall consult the predicted entry counts and occupancy counts evolutions with load severity estimations for each monitoring TV/ flow
Title	PDT-09 primary EC/OC evolution monitor at Network level
Status	<Validated>
Rationale	Network Manager shall be responsible for the coordination of STAM activities over regions covering several FMP areas of responsibility. Network Managers may be solicited at all times by FMP in view of conjoint resolution of local demand and capacity imbalances. Therefore NM shall share minimum common DCB situational awareness with FMP. This shall be achieved by enabling NM to consult the EC/OC predictions within FMP area of responsibility that FMP would like to address co-jointly with NM. In addition NM shall support FMP/ ANSP in coordinating their actions for DCB imbalances spread over regions exceeding local FMP areas of responsibility. It is therefore important that NM are made aware of the critical EC/OC values that are simultaneously identified at different FMP areas. Notably output of the “critical EC/OC values pre-filtering function “(cf. REQ-07.06.05-OSED-0008.0000) shall assist NM in handling this responsibility. The severity estimation requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0010.0000

Requirement	FMP shall access to synthetic maps of the airspace of FMP area of responsibility that integrate occupancy counts and severity estimates positioned at their relevant reference locations.
Title	PDT-10 local airspace view of Severity of Occupancy Count information
Status	<Validated>
Rationale	At FMP level, the analysis of the respective positions / location at different times of critical Occupancy Counts values (as identified using OC + traffic load severity estimates) within the airspace structure of FMP area of responsibility shall provide FMP with essential indications e.g.: - of potentially linked critical OC values identified at different moments in different yet structurally linked monitoring TV / flow - of local airspace structure complexity at monitoring TV / flow where critical OC values are identified Occupancy counts and traffic load severity estimates shall be delivered in line with REQ-07.06.05-OSED-0001.0000 and REQ-07.06.05-OSED-0002.0000.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0011.0000
Requirement	The FMP/NM actors shall access to all ATFCM relevant flight details of the flights predicted to enter and to occupy the monitoring TV / flows defined in the network and primarily within FMP/NM area of responsibility.
Title	PDT-11 Flights data monitor
Status	<Validated>

Rationale	ATFCM relevant flight details shall include all up-to-date information available at network level on the following fields (General Flight Information, Timing Information (including EOBT, CTA), Status information (including Later filer ind., REA status, TIS..), Airport CDM information, Regulation information, Re-routing information, Hotspot information Data contained in the flight details shall provide information to FMP/NM that are essential in interpreting the predictions of critical Demand and Capacity imbalances within FMP/NM area of responsibility based on EC/OC predictions. For example, the flights status information shall support FMP estimation of the accuracy / integrity of the EC/OC predictions, and notably indicate e.g. whether or not FMP shall wait until uncertainties like actual Take-of-times are alleviated, leading to more reliable demand predictions. FMP, based on this complementary information shall be able to consolidate their judgment of the criticality of the situation and decide on appropriate course of action Legacy ATFCM services through the NOP portal already give access to flight details addressing most of the required information sets prescribed here, except for “hotspot information”. Under nominal circumstances, detailed demand analysis shall not be required from Network Manager. Yet, it is important that Network Manager has access to such information, be one or several of these detailed data required to coordinate joint NM-FMP action.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0012.0000
Requirement	FMP shall access to comprehensive descriptions of the horizontal and Vertical initial profiles of the flights predicted captured in EC/OC counts.
Title	PDT-12 initial flights profile description
Status	<Validated>
Rationale	An important factor influencing ATC capacity to accommodate a predicted demand is the complexity of the resulting traffic situation. The analysis of the flights profiles captured in OC / EC can help FMP anticipating this complexity. Complexity varies notably according to the phase of flight, or to the number of instructions required per flight e.g. at convergence of two routes. The information contained in the vertical / horizontal flight profiles shall help estimating such complexity per flight. These flight profiles descriptions shall be accessible to FMP for the entire flight, and shall not be restricted to the portions of flight within FMP area of responsibility.
Category	<Operational>
Validation Method	<Live Trial>

Verification Method	

6705

6706 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6707

6708 [REQ]

Identifier	REQ-07.06.05-OSED-0013.0000
Requirement	FMP shall access to comparative charts of predicted Entry / Occupancy counts per composite sub-flows attached to a monitoring TV / flow.
Title	PDT-13 comparative EC/ OC charts of composite sub-flows associated to a monitoring TV / flow
Status	<Validated>
Rationale	This requirement shall apply to all monitoring TV/flows defined in the network and primarily monitoring TV/flows defined within FMP area of responsibility. Composite sub-flows might be automatically identified, as well as defined by FMP in an ad-hoc manner. A monitoring TV / flow might be composed of a number of sub-flows, depending on the structure of the airspace surrounding the reference location associated to the monitoring TV / flow (a monitoring TV/ flow can be e.g. a sector crossed by various sub-flows or a flow of traffic arriving at a specific aerodrome composed of a variety of converging inbound sub-flows). The analysis of the predicted demand load per sub-flow within a monitoring TV/ flow may help FMP determining which sub-flow(s) are the most loaded, hence help FMP narrowing down the analysis of the DCB situation to the analysis of most demand critical sub-flows within the critical monitoring TV/flow. In order to best support FMP in this task, a display facilitating this comparison is required. Occupancy counts per monitoring TV/ flow do not necessarily equal to the sum of occupancy counts per composite sub-flows. In addition, a large number of sub-flows might be considered within a single monitoring TV/flow. Legacy ATFCM services already provide such a facility. However the display format adopted so far (sub-bar diagram) shows some limitations; notably readability is altered as the number of sub-flows to consider increases. Note that this requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6709

6710 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6711
6712 [REQ]

Identifier	REQ-07.06.05-OSED-0014.0000
Requirement	FMP shall visualise the traffic situation predicted in the TV/flow as decomposed per sub-flows displayed in the map representing the local airspace structure of FMP area of responsibility.
Title	PDT-14 predicted traffic load situation within local airspace structure associated to a traffic volume
Status	<Validated>
Rationale	An important factor influencing ATC capacity to accommodate a predicted demand is the complexity of the resulting traffic situation. The analysis of OC (/ EC) as represented within the local airspace structure shall support FMP in anticipating this complexity. As an example, in the case where a monitoring TV is a group of sectors with converging and non-converging routes: when the analysis reveals that most of the predicted traffic concentrates on converging routes rather than on non-converging routes, FMP may infer from the analysis that traffic complexity is higher in the former configuration than in the latter, hence that the situation may be more critical in terms of Demand / Capacity Balance. This requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6713
6714 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6715
6716 [REQ]

Identifier	REQ-07.06.05-OSED-0015.0000
Requirement	The FMP/NM actors shall share minimum common understanding of Demand / Capacity imbalances severity and subsequent resolution options to be considered, based on (EC/)OC information shared at local and network levels.
Title	PDT-15 harmonised method for traffic load Severity estimation
Status	<Validated>

Rationale	This common understanding shall be based on the following principles: - IF Entry/Occupancy Count (t) < Monitoring Value Sustain , THEN no need to intervene - IF Monitoring Value Sustain < Entry/Occupancy Counts (t) < Monitoring Value Peak FOR less a sustain threshold (typically 20 min); THEN Traffic and capacity monitoring required, STAM may be applied, CASA regulation not required - IF Monitoring Value Sustain < Entry/Occupancy Counts (t) < Monitoring Value Peak FOR more than a sustain threshold; THEN traffic and capacity monitoring required, STAM may be applied, CASA regulation may be required in complement - IF Entry/Occupancy Counts (t) > Monitoring Value Peak THEN depending on traffic complexity at hotspot, resolution action is absolutely needed, CASA regulation may become a must Network Managers may be solicited at all times by FMP in view of conjoint resolution of local demand and capacity imbalance. Therefore NM shall share minimum common DCB situational awareness with FMP. In particular FMP and the Network Management shall share common baseline understanding of the severity of the situation and the conditions when a co-joined resolution action (CASA regulation + STAM) might be required, based on the DCB information that is simultaneously available at local and at Network level. This harmonised approach shall serve as common baseline to automated supports to DCB severity assessment (cf notably REQ-07.06.05-OSED-0008.0000). The severity estimation requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0016.0000
Requirement	Traffic load severity estimations associated to entry counts and occupancy counts shall operate on harmonised estimate method highlighted using a standard colour code.

Title	PDT-16 Harmonised code for traffic load severity presentation
Status	<Validated>
Rationale	The standard colour code shall be defined as follows: - IF Entry/Occupancy Count (t) < Monitoring Value Sustain , THEN Entry/Occupancy Count (t) colour green - IF Monitoring Value Sustain < Entry/Occupancy Counts (t) < Monitoring Value Peak FOR less than a sustain threshold (typically 20 min); THEN colour yellow - IF Monitoring Value Sustain < Entry/Occupancy Counts (t) < Monitoring Value Peak FOR more than a sustain threshold; THEN colour orange - IF Entry/Occupancy Counts (t) > Monitoring Value Peak THEN colour red Network Managers may be solicited at all times by FMP in view of conjoint resolution of local demand and capacity imbalance. Therefore NM shall share minimum common DCB situational awareness with FMP. In particular FMP and the Network Management shall share common baseline understanding of the severity of the situation and the conditions when a co-joined resolution action (CASA regulation + STAM) might be required, in line with the harmonised method described in REQ-07.06.05-OSED-0015.0000 The use of a harmonised colour code that highlights key output of the application of this harmonised method shall facilitate rapid and consistent interpretation at network and local levels. The use of the “colour code” prescribed here was tested and regarded as a form that can be immediately and unambiguously understood by all parties. The severity estimation requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0017.0000
Requirement	Automated warning of potential hotspots shall support FMP for the detection of problem.
Title	PDT- 17 Early hotspot warning
Status	<Validated>

Rationale	At the stage of early warning, hotspot status shall be: PROPOSED. Automated detection of potential hotspots shall be made available for each traffic volume and flow defined for monitoring purposes within FMP area of responsibility, and having monitoring threshold values defined for them (Sustain, Peak, tolerated sustain duration). As a minimum requirement, and in the absence of more sophisticated detection function (including e.g. traffic complexity considerations), automated detection shall be based on the harmonised method applicable for traffic load severity estimation The identification of critical EC/OC evolutions constitute the triggering event of any STAM activity at FMP level. Critical EC/OC evolutions may lead to the forming of hotspots defined as the time window + monitoring TV/flow where the demand / capacity balance has turned into unsatisfactory state and must be corrected, potentially through a STAM. FMP shall identify potential hotspots with sufficient anticipation (up to 4 hours ahead) in order to leave enough lead time for completing the various processes leading to actual correction, be a STAM required to restore acceptable local Demand / Capacity Balance. Automated warning of hotspots forming shall facilitate anticipation. Automated detection shall be based on the harmonised method applicable for traffic load severity estimation, in line with REQ-07.06.05-OSED-0015.0000 Terminologies used to designate hotspot statuses shall be in line with REQ-07.06.05-OSED-0030.0000 The severity estimation requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0018.0000
Requirement	FMP shall create a hotspot within FMP area of responsibility t that the system automatically detected and proposed for FMP analysis.
Title	PDT- 18 Hotspot confirmation
Status	<Validated>

Rationale	FMP shall keep full control over the management of hotspots within FMP area of responsibility, whilst automated warning of hotspots forming shall be regarded as a mere decision-aid. In addition, Automated detection shall be based on the harmonised method applicable for traffic load severity estimation, essentially based on EC/OC information. FMP expert judgment and FMP analysis of information made available to FMP in complement to EC/OC information, may equally confirm or contradict what EC/OC results and early hotspot warning tool suggest. Terminologies used to designate hotspot statuses shall be in line with REQ-07.06.05-OSED-0030.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0019.0000
Requirement	FMP shall manage the hotspot cancellation
Title	PDT- 19 Hotspot cancellation
Status	<Validated>
Rationale	FMP shall keep full control over the management of hotspots within FMP area of responsibility. Notably if FMP decides to interrupt definitely the processing of a hotspot earlier detected, FMP shall be able to doing so in a straightforward manner. Notably, if the DCB situation evolves in a favourable sense without corrective action or with corrective action transparent to the external world (e.g. sectors de-groupings), FMP shall be able to interrupt the course of corrective actions associated to the hotspot. At the stage of STAM implementation, the processing of the hotspot has reached a stage when several corrective actions launched cannot be undone, hence the process can no longer be cancelled. The hotspot status, upon cancellation decision by FMP, shall be modified to "CANCELLED". It shall not be possible to interrupt a hotspot (when the STAM Measure status=IMPLEMENTED). Terminologies used to designate hotspot statuses shall be in line with REQ-07.06.05-OSED-0030.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0020.0000
Requirement	FMP shall share information about a confirmed hotspot with other actors (FMP, NM, AU).
Title	PDT- 20 Hotspot Notification
Status	<Validated>
Rationale	FMP shall keep full control over the management of hotspots within FMP area of responsibility. Notably FMP shall decide whether and at what time a hotspot confirmed within FMP area of responsibility shall be notified to external parties. The notification shall be made visible to all network stakeholders but primarily to all parties that may be impacted by the hotspot, most notably to Airspace Users operating flights captured in the hotspot. Hotspot notification shall encourage Airspace Users to take “free” own initiatives to avoid the hotspot according to Airspace Users preferred options (e.g. through submission of a modified flight plan). Under nominal circumstances, sufficient lead time shall be made available to airspace users to proceed to these changes; this notably implies for FMP to notify the hotspot with sufficient notice time. The hotspot status, upon request by FMP, shall be modified to “READY”. Terminologies to designate hotspot statuses shall be in line with REQ-07.06.05-OSED-0030.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0021.0000
Requirement	A hotspot shall be considered cleared when the predicted updated Demand and Capacity balance at hotspot turns back to a defined OTMV acceptable state.
Title	PDT- 21 Hotspot clearance
Status	<Validated>

Rationale	The resolution achievement of the hotspot with a STAM Measure shall be notified in the status change. The status=CLEARED. The status change shall occur automatically at the hotspot exit time. FMP shall keep full control over the management of hotspots within FMP area of responsibility. Notably FMP shall judge whether and under which conditions a hotspot shall be considered cleared. In the context of Step 1, the conditions of successful hotspot resolution shall be assessed exclusively based on FMP expert judgment. (no automated support envisaged). Only in cases when FMP did not clear the hotspot at hotspot exit time, automated change to “clear” shall be implemented. Terminologies to designate hotspot statuses shall be in line with REQ-07.06.05-OSED-0030.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0022.0000
Requirement	Flight data of all flights captured in the hotspot shall contain the hotspot information
Title	PDT- 22 Hotspot information in the flight data
Status	<In Progress>
Rationale	As indicated in REQ-07.06.05-OSED-0011.0000, DCB actors shall have an access to detailed flight data, among which hotspot information data, integrated in a specific “hotspot information” field. In order to meet this requirement, automated update of flight details with hotspot information for all flights captured in the hotspot is required, and this as soon as the hotspot is confirmed.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0023.0000

Requirement	FMP concerned with a potential hotspot detected in FMP area of responsibility (with status “intent”, “proposed”, “cleared” or “cancelled”) shall modify the following hotspot attributes field: - associated Location [TV Id, flow Id] (peaked from a list of pre-defined TV) - period [state time; end time] - Reason of decision [predefined list of reasons + free text field] - Status Intent, Proposed, Cancelled, Cleared Whilst this hotspot attribute field shall be automatically refreshed along time: - severity [load severity estimation result].
Title	PDT- 23 hotspot attributes management
Status	<Validated>
Rationale	Early hotspot warning (cf. REQ-07.06.05-OSED-0017.0000) shall provide initial indications of a potential hotspot forming within FMP area of responsibility. Automated warning shall be mostly based on EC/OC information and automated traffic load severity estimation (hotspots with status “proposed”). FMP shall as well be able to early identify hotspots in an ad-hoc manner. based on EC/OC information available (hotspots with status “Intent”) (cf. REQ-07.06.05-OSED-0018.0000) FMP shall keep full control over the management of hotspots within FMP area of responsibility, and shall, based on expert judgment and analysis of information available in complement to EC/OC information notably e.g. flights details, be able to ?modify the hotspot characteristics suggested by automated decision-aids or earlier defined by FMP. ?provide additional free text input informing other actors of what primarily motivates FMP decision Hotspot attribute “Severity” shall be automatically updated with output from automated (Entry /) Occupancy counts and traffic load severity estimates functions. The severity estimation requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller. Terminologies to designate hotspot statuses shall be in line with REQ-07.06.05-OSED-0030.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0024.0000
Requirement	FMP shall visualise the hotspot information integrated in the graphical view of the predicted entry counts and occupancy counts evolutions through time (“bar diagrams” Summary Display) as soon as a hotspot is detected within a specific monitoring TV / flow in FMP area of responsibility,
Title	PDT- 24 hotspot information integrated in local primary (EC/)OC evolution monitor
Status	<Validated>
Rationale	FMP shall clearly visualise hotspots in their primary d-DCB monitoring display (“bar diagram”) (cf. REQ-07.06.05-OSED-0007.0000). This shall notably ease FMP adjustment of hotspot attributes in line with the predicted EC/OC evolution through time. This display shall be adopted as the by-default hotspot information display. The severity estimation requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0025.0000
Requirement	Network Manager shall visualise the hotspot information integrated in the graphical view of the predicted entry counts and occupancy counts evolutions through time (“bar diagrams” Summary Display) at corresponding monitoring TV / flow, as soon as FMP confirms a hotspot at a specific monitoring TV / flow in NM area of responsibility,
Title	PDT-25 hotspot information integrated in Network-based primary EC/OC evolution monitor
Status	<In Progress>

Rationale	Network Managers may be solicited at all times by FMP in view of conjoint resolution of local demand and capacity imbalance. Therefore NM shall share minimum common DCB situational awareness with FMP. This shall be achieved inter alia by a sharing of hotspot information as soon as FMP confirms the problem. In addition NM shall support FMP/ ANSP in coordinating their actions for DCB imbalances spread over regions exceeding local FMP areas of responsibility.It is therefore important that NM are made aware in due time of all hotspots detected and confirmed by FMP in their respective areas of responsibility. In line with REQ-07.06.05-OSED-0007.0000 and REQ-07.06.05-OSED-0009.0000) The primary d-DCB monitoring display shared between FMP and the Network Management, shall be based on EC/OC evolutions (“bar diagram”). Display of hotspots information shall thus be integrated to this primary monitoring support.This display provides a sufficient level of details on hotspot characteristics and appropriate synthesis of the DCB situation to coordinate corrective actions between FMP and NM. The severity estimation requirement applies primarily to Occupancy Counts predictions. Usually Entry Counts and Occupancy Counts are used for different purposes, and the system shall be designed in accordance with these differentiated purposes. Whilst Entry Counts are mostly used for identifying those moments and locations where a close monitoring of the DCB evolution is required, based on the raw analysis of Entry Counts and declared Capacities, Occupancy Counts are rather used to further determine whether or not a STAM measure is required and which one, through a better estimate of the actual demand distribution and resulting workload of the controller.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0026.0000
Requirement	FMP shall have an access to the list of flights captured in a hotspot through direct designation of the hotspot (e.g. click on hotspot), together with specific indications for each flight of: - Flight concerned by on-going others hotspots - Flight concerned by on-going others hotspots associated to a proposed/coordinated/ for implementation STAM measure - Flight concerned with a previous regulation in other FMP - Hotspot Entry/exit time
Title	PDT- 26 Identification of combined hotspots and constraints per flights
Status	<Validated>

Rationale	As a general requirement, dynamic DCB activities shall be carried out taking account of equity of treatment between Aircraft Operators. Equity can notably be improved by trying to avoid constraining a flight already constrained by another DCB process (be it a STAM or a regulation). FMP awareness of flights already captured in other hotspots or regulations is thus essential for FMP to address equity aspects in an adequate manner. In addition, FMP awareness of flights already captured in other hotspots or other regulations facilitates FMP identification of potentially combined hotspots, including hotspots outside of FMP area of responsibility. This information is essential in identifying those hotspots that might need co-joined corrective action (with NM or other concerned FMP).
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0027.0000
Requirement	FMP shall visualise the hotspot information integrated in the horizontal/vertical profiles descriptions of all flights captured in the hotspot, in case of a detection of a hotspot within a specific monitoring TV / flow in FMP area of responsibility,
Title	PDT- 27 Hotspot information in the horizontal/vertical profile
Status	<In Progress>
Rationale	Direct visualisation of the specific segment(s) of flights captured in a hotspot (both on 2D tracks and vertical profiles) shall facilitate FMP judgment on the appropriateness of implementing a STAM as a solution to the hotspot. This view may clearly reveal for instance that for most flights, the specific segment captured in the hotspot is at end of climb phase and beginning of cruise phase. A level capping at hotspot may hence constitute an adequate solution. This analysis shall in particular (1) consolidate FMP judgment for confirming / notifying a Hotspot, (2) permit to anticipate the type of STAM that would be most effective in addressing the hotspot, (3) help, if relevant, FMP issuing advices tailored to Airspace Users at hotspot notification stage.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0028.0000

Requirement	FMP shall have access to the list of hotspots within FMP area of responsibility.
Title	PDT-28 List hotspot per sector cluster
Status	<Validated>
Rationale	The combined analysis of hotspots per sector clusters shall provide essential indication to FMP on whether, e.g. ? several hotspots in different sectors within FMP area of responsibility are linked and may be addressed using a single corrective action ? a sector re-configuration within FMP area of responsibility can constitute adequate solution to multiple hotspots detected within FMP area of responsibility. This might justify that no hotspots (if managed locally through internal capacity redeployment) or only a sub-set of the hotspots detected within FMP area of responsibility are notified to the network. Hotspot information shall be provided in line with REQ-07.06.05-OSED-0031.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6769

6770 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6771

6772 [REQ]

Identifier	REQ-07.06.05-OSED-0029.0000
Requirement	FMP shall have access to synthetic maps of the airspace of FMP area of responsibility that integrate hotspots information positioned at their relevant reference locations.
Title	PDT- 29 Hotspot information in the airspace display
Status	<In Progress>
Rationale	Direct visualisation of the specific hotspots locations within the airspace structure of FMP area of responsibility shall support FMP assessment for instance of - the airspace structure complexity at hotspot, which would provide indications in turn of actual Demand / capacity imbalance severity at hotspot - potential hotspots locations inter-connected in the airspace structure Hotspot information shall be provided in line with REQ-07.06.05-OSED-0031.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6773

6774 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0030.0000
Requirement	The hotspot statuses shall be expressed using a terminology harmonised at network level, defined as follows: - INTENT: the hotspot has been identified by the FMP but not yet notified to the network. - PROPOSED: the hotspot is notified to the network - CANCELLED : the hotspot resolution process is cancelled. - CLEARED: The hotspot resolution process is completed or the hotspot exit time is reached.
Title	PDT- 30 harmonised terminology for hotspot Status
Status	<In Progress>
Rationale	The hotspot status information, once the hotspot is notified to the network, shall be shared by all actors in the network, including FMPs, NM, Airspace Users (and Airport Operators) which might all need to correctly interpret this information for own use and collaborative decision-making. It is thus essential that all actors adopt a common terminology for designating the different statuses of a hotspot in its various processing phases. Four different hotspot processing statuses have been identified, in line with the key milestones identifies in the overall STAM process.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0031.0000
Requirement	The hotspot shall be characterised by a standard set of attributes defined as follows: - associated Location [TV Id, flow Id] (picked from a list of pre-defined TV/flows) - period [start time; end time] - rationale [list of commonly applicable reasons; free text field] - Status Draft, Proposed, Intent, Cancelled, Cleared - severity [load severity estimation result]
Title	PDT- 31 standard set of hotspot attributes
Status	<Validated>
Rationale	The hotspot information, once the hotspot is notified to the network, shall be shared by all actors in the network, including FMPs, NM, Airspace Users (and Airport Operators) which might all need to correctly interpret this information for own use or for collaborative decision-making. It is thus essential that all actors adopt a common information structure, limiting the risks of misinterpretations.As a minimum requirement, shared hotspot information shall include the following five sets: (1) Hotspot location, (2) hotspot start and end time, (3) hotspot status, (4) rationale, (5) Hotspot severity indicators.
Category	<Operational>

Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0032.0000
Requirement	FMP shall have an access to lists of the predicted flights per sub-sets of the traffic captured in a hotspot
Title	PDT-32 prediction of flights entries / occupancies per sub-sets of traffic captured in a hotspot
Status	<Validated>
Rationale	This requirement specifically applies to cases where FMP wishes to apply a STAM flow on a subset of the traffic captured in a hotspot. FMP may define this subset either by selecting a specific flights, or by defining specific criteria that the flights shall meet, such as e.g. all flights crossing a common route segment, during a common period, that are non-regulated, that are captured in a single hotspot. The latter solution is generally regarded as the most straightforward and most convenient way for FMP to define this subset. Yet, flights lists might be more convenient to use at later stage in the STAM processing. Notably flights lists is the format to be adopted in the exchanges with external partners. FMP shall thus be able at first to use the latter solution for defining these subsets and shall be further assisted with automated editing of the list of flights corresponding to these subsets. In particular, in situations when the demand prediction at the time FMP makes this query is not fully stabilised, automated editing shall enable to refresh this list of flights as demand predictions improve. Note that the notion of “traffic subsets” differs from the notion of “monitoring TV/flow”' since traffic subsets designate groups of flights on which a STAM shall apply, and are created based on a larger number of selection criteria, such as e.g. hotspot information. This requirement shall serve as basic input for meeting REQ-07.06.05-OSED-0033.0000 and use input from the functionality defined in REQ-07.06.05-OSED-0034.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0033.0000

Requirement	FMP shall filter the lists of flights captured in a hotspot according to criteria reflecting local ATC flight handling complexity
Title	PDT-33 traffic complexity assessment per subset of traffic captured in a hotspot
Status	<Validated>
Rationale	In order to maximise the efficiency of a STAM whilst minimising impact on Airspace Users, FMP shall identify, in the list of flights captured in a hotspot, those flights that are the most ATC workload consuming. These flights typically constitute appropriate candidate for a STAM. A relevant approach to estimating the marginal ATC workload consumption for a flight is to analyse the potential sources of increased complexity for the controller to handle the flight. These sources range from the level of equipment of the aircraft, to the phase(s) in which the flight shall be at hotspot. This requirement is aimed at providing basic automated assistance to FMP in the filtering of flights that exhibit these complexity characteristics, according to what FMP identified as locally relevant sources of complexity per flight. Today network-based legacy ATFCM services do not deliver such a facility. Meeting this requirement is rendered particularly difficult since ATC complexity cannot be easily modelled, and depends on a large number of factors that are heavily dependent on local environments and conditions. Yet at local level, complexity criteria tailored to local needs are already used at several places. In the context of Step 1, introducing this filtering function is regarded as an adequate approach to assist FMP with basic ATC complexity assessment capabilities in standard DCB activities all over the network. Note that the notion of “traffic subsets” differs from the notion of “monitoring TV/flow”' since traffic subsets designate groups of flights on which a STAM shall apply, and are created based on a larger number of selection criteria, such as e.g. hotspot information.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0034.0000
Requirement	FMP shall define sub-sets of traffic applicable as basis for STAM flow elaboration.This shall be based on standard TV/flow definition criteria, as well as on considerations like, aircraft equipment, CASA regulation constraints, STAM constraints, crossing of other hotspots and any other data field contained in the set of flight details information
Title	PDT- 34 ad-hoc Creation of traffic subsets associated to a hotspot for STAM elaboration purposes
Status	<Validated>

Rationale	This requirement specifically applies to cases where FMP wishes to define in tactical the subset of the traffic captured in a hotspot on which FMP wants to apply a STAM, and in cases this sub-set does not correspond to any monitoring TV/flow already stored in FMP working environment. FMP may define this subset either by selecting a specific list of flights, or by defining specific criteria that the flights shall meet, such as e.g. all flights crossing a common route segment, during a common period, that are non-regulated, that are captured in a single hotspot. FMP shall be able to define these subsets using the latter solution, since this is generally regarded as the most straightforward and most convenient way for FMP to define this subset. In the context of the CASA service, legacy ATFCM services offer possibilities for FMP to create new TV / flows using a procedure based on official FMP requests addressed to the Network Management. Yet, this procedure is not straightforward, and may not permit to use all criteria relevant for FMP to define those STAM traffic subsets (e.g. hotspot information is not included in this list). The set of flight details information to be considered here shall be in line with REQ-07.06.05-OSED-0011.0000. This requirement shall notably support REQ-07.06.05-OSED-0032.0000. Note that the notion of “traffic subsets” differs from the notion of “monitoring TV/flow”' since traffic subsets designate groups of flights on which a STAM shall apply, and are created based on a larger number of selection criteria, such as e.g. hotspot information.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0035.0000
Requirement	FMP shall predefine before the day of operation sets of STAM measures adapted to the local conditions and local airspace structure of FMP area of responsibility and to store the resulting set in prevision of possible future use on day of operation.
Title	PDT-35 Local pre-Configured STAM library editor
Status	<Validated>

Rationale	FMP may apply different STAM measures depending on the hotspot profile. In order to simplify the task and reduce the potential workload associated with elaborating STAM on day of operation when time-pressure is high, FMP shall be able, before the day of operations, to pre-design a set of STAM that FMP judges relevant to the specific operational environment of FMP area of responsibility. FMP shall be assisted with storage capabilities as well as with facilities easing the access to the stored pre-defined STAM on day of operations. In addition, this functionality shall ease the integration at pre-tactical stage of any new information relevant to STAM future applications, resulting of the STAM post-analysis, (such as e.g. declared Airspace Users preferences attached to specific pre-defined STAM). STAM-cherry picking and STAM-flow types of measures shall be pre-defined in line with REQ-07.06.05-OSED-0040.0000, REQ-07.06.05-OSED-0041.0000 and REQ-07.06.05-OSED-0042.0000.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0036.0000
Requirement	FMP shall manually change the profile of selected flights in view of defining FMP desired end result of a STAM implementation on the flight. The change of profile may apply to segments of the flight that do not necessarily pertain to FMP area of responsibility.
Title	PDT-36 Modification of individual flights profiles for STAM elaboration purposes
Status	<Validated>
Rationale	A large number of STAM imply a modification in the profiles of the flights on which the STAM shall apply. This is the case, e.g. for STAM re-routings, or STAM Flight Level Capping. Direct description of desired modified flight profile is regarded as a very convenient, least workload and time consuming way for FMP to comprehensively define such STAM. The dDCB concept enables, through the STAM coordination process, that FMP consider flight profiles changes over larger portions of the flight than that included in FMP area of responsibility. Therefore this requirement shall not be restricted to FMP area of responsibility.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6803

6804 [REQ]

Identifier	REQ-07.06.05-OSED-0037.0000
Requirement	The FMP shall access to an automated editing facility to further specify the parameters specific to the selected type of a cherry-picking STAM measure.
Title	PDT-37 STAM cherry-picking editor
Status	<Validated>
Rationale	FMP shall be able to choose amongst a large, yet specific set of STAM-cherry picking measures, which one is best adapted to address a hotspot within FMP area of responsibility and is best adapted to the flight selected. (cf. REQ-07.06.05-OSED-0040.0000) Each type of STAM-cherry picking is characterised by a specific (standard) set of attributes, which shall be adjusted according to local conditions at hotspot and characteristics of the flight. (cf REQ-07.06.05-OSED-0042.0000) Automated editing support have already been tested at mock-up level and is considered technically feasible and operationally sound. FMP workload associated with the elaboration of a STAM shall indeed be significantly reduced with automated STAM edition assistance, as well, respect of interoperability requirements associated to STAM elaboration (cf. REQ-07.06.05-OSED-0040.0000 and REQ-07.06.05-OSED-0042.0000) shall be secured.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6805

6806 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6807

6808 [REQ]

Identifier	REQ-07.06.05-OSED-0038.0000
Requirement	The FMP shall access to an automated editing facility to further specify the parameters specific to the selected type of a cherry-picking STAM measure.
Title	PDT- 38 STAM flow editor
Status	<Validated>

Rationale	FMP shall be able to choose amongst a large, yet specific set of STAM-flow measures, which one is best adapted to address a hotspot within FMP area of responsibility and to the flow / traffic subset selected. (cf. REQ-07.06.05-OSED-0041.0000) Each type of STAM-flow is characterised by a specific (standard) set of attributes, which shall be adjusted according to local conditions at hotspot and characteristics of the flow / traffic sub-set. (cf. REQ-07.06.05-OSED-0042.0000) Automated editing support is considered technically feasible and operationally sound. FMP workload associated with the elaboration of a STAM shall indeed be significantly reduced with automated STAM edition assistance, as well, respect of interoperability requirements (cf. REQ-07.06.05-OSED-0041.0000 and REQ-07.06.05-OSED-0042.0000) shall be secured. Note that the notion of “traffic subsets” differs from the notion of “monitoring TV/flow”' since traffic subsets designate groups of flights on which a STAM shall apply, and are created based on a larger number of selection criteria, such as e.g. hotspot information.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0039.0000
Requirement	FMP shall identify in the flight list captured in a hotspot within FMP area of responsibility which flights belong to flows and /or to subsets of traffic defined by FMP as basis for STAM elaboration. Flights belonging to such flows / traffic subsets shall be highlighted using a marking based e.g. on a colour code.
Title	PDT-39 marking of flights per flow / traffic subset
Status	<Validated>
Rationale	This capability shall assist FMP in consulting the flights details of the flights belonging to a traffic subset selected for the implementation of a STAM in a straightforward manner. It shall notably help FMP in adjusting the traffic subset based on simultaneous analysis of detailed flights data. The choice of HMI prescribed here (marking via a colour code) was already tested on a mock-up and it was judged adequate, providing sufficient level of readability to FMP. This requirement shall be met using the output of the function defined in REQ-07.06.05-OSED-0032.0000 Note that the notion of “traffic subsets” differs from the notion of “monitoring TV/flow”' since traffic subsets designate groups of flights on which a STAM shall apply, and are created based on a larger number of selection criteria, such as e.g. hotspot information.
Category	<Operational>

Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0040.0000
Requirement	The FMP shall use a standard list of STAM cherry picking measures composed at least of the followings: -Local Re-routing, -Flight Level Capping, -Departure time shift
Title	PDT- 40 harmonised list of STAM cherry picking options
Status	<Validated>
Rationale	A minimum level of harmonisation of STAM activities is essential in meeting interoperability between interactive local dynamic DCB support systems. It is essential as well for ensuring common understanding between all actors in the network that shall work collaboratively towards resolution of demand/Capacity imbalances based on STAM. Harmonised definition of STAM-cherry picking options contributes to meeting this minimum interoperability requirement. This requirement shall be considered together with harmonised definition of STAM-flow options (cf. REQ-07.06.05-OSED-0041.0000), and harmonised definition of the parameters applicable per STAM option (cf. REQ-07.06.05-OSED-0042.0000)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0041.0000
Requirement	The FMP shall use a standard list of STAM flow measures composed at least of the followings: - Local Re-routing, - Flight Level Capping, - departure time shift, - Miles/minutes in Trail, - Minimum Departure Intervals
Title	PDT-41 standard list of STAM flow options
Status	<Validated>

Rationale	A minimum level of harmonisation of STAM activities is essential in meeting interoperability between interactive local dynamic DCB support systems. It is essential as well for ensuring common understanding between all actors in the network that shall work collaboratively towards resolution of demand/Capacity imbalances based on STAM. Harmonised definition of STAM-flow options contributes to meeting this minimum interoperability requirement. This requirement shall be considered together with harmonised definition of STAM-cherry picking options (cf. REQ-07.06.05-OSED-0040.0000), and harmonised definition of the parameters applicable per STAM option (cf. REQ-07.06.05-OSED-0042.0000).
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0042.0000
Requirement	The standard parameters of the STAM measure shall be defined as follows: For Local Re-routing: - adjustment parameter = [new portion of route], - adjustment limits = [maximum tolerated re-routing distance / duration] (e.g. [50 NM, 10 min]) Flight Level Capping, - adjustment parameter = [max FL, portion of route], - adjustment limits = [maximum tolerated Level Capping distance / duration] departure time shift - adjustment parameter = [departure time], - adjustment limits = [maximum tolerated delay] (e.g. 10 min) - adjustment limits = [minimum tolerated notice time] Miles/minutes in Trail - adjustment parameters = [min. In-trail separation distance / time] - adjustment limits = [minimum tolerated in-trail distance / time]; [Maximum tolerated MIT implementation duration] Minimum Departure Intervals - adjustment parameters = [min dep separation distance / time] - adjustment limits = [minimum tolerated distance / time]; [Maximum tolerated MDI implementation duration]; [minimum notice time to implementation]
Title	PDT-42 standard STAM parameters per type of measure
Status	<Validated>

Rationale	A minimum level of harmonisation of STAM activities is essential in meeting interoperability between interactive local dynamic DCB support systems. It is essential as well for ensuring common understanding between all actors in the network that shall work collaboratively towards resolution of demand/Capacity imbalances based on STAM. Harmonised definition of the parameters applicable per STAM option contributes to meeting this minimum interoperability requirement. This requirement shall be considered together with harmonised definition of STAM-cherry picking options (cf. REQ-07.06.05-OSED-0040.0000), and harmonised definition of STAM-flow options (cf. REQ-07.06.05-OSED-0041.0000). Adjustment limits may be defined as network standards, or may be locally adjustable, and may take account of Airspace Users declared preferences, and shall take account of minimum safety requirements (like e.g. as agreed with airports for MDI implementation).
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0043.0000
Requirement	The FMP shall notify his/her STAM measure decision to all actors having been identified as actors affected by this decision, through a “STAM Coordination” message.
Title	PDT-43 STAM coordination initiation
Status	<Validated>
Rationale	FMP shall be able, based on DCB information available and expert judgment, to control whether and the moment when a STAM coordination process shall be launched, for any STAM initiative aimed at addressing a hotspot within FMP area of responsibility. The STAM coordination process relies on collaborative decision-making between a number of actors whose contribution and approval is required to implement the STAM. It is therefore essential that these actors are specifically made aware, at appropriate time, of the launch of a STAM coordination process, through explicit notification (the STAM coordination message). The STAM status shall change to “PROPOSED”. Terminologies used to designate STAM statuses shall be in line with REQ-07.06.05-OSED-0112.0000 This requirement shall be in line with REQ-07.06.05-OSED-0064.000.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0043.0002
Requirement	The STAM Coordination shall support the coordination of individual measure (STAM cherry-picking) and group of measures (STAM flow measure)
Title	PDT-43b STAM coordination object
Status	<In Progress>
Rationale	The STAM Coordination shall support the coordination of individual measure (STAM cherry-picking) and group of measures (STAM flow measure)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0044.0000
Requirement	STAM coordination time-out shall alert the participants
Title	PDT-44 Alarm of imminent STAM coordination time expiration
Status	<Validated>
Rationale	The STAM coordination process shall be completed or terminated in a reasonably short timeframe in order to proceed at appropriate time to the STAM implementation process, be the coordination concluded by an agreement for STAM implementation. This STAM coordination time shall be controlled by fixing a STAM coordination time-out (cf. REQ-07.06.05-OSED-0052.0000). All participants to the STAM coordination shall be alerted of imminent coordination time expiration in order to be able to reach conclusion in due time.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0045.0000
Requirement	FMP shall determine which actors shall be involved in the STAM coordination process using an automated assitance.

Title	PDT-45 pre-Selection of actors in the STAM coordination process
Status	<Validated>
Rationale	FMP shall rapidly determine which actors shall be involved in the STAM coordination process. Automated assistance to the selection of actors shall facilitate this process and enable more rapid completion of this task. In addition, automated aid to actors selection shall be enabled using the data stored in the flight details of the list of flights on which the proposed STAM applies (including Aircraft Operator data) and data describing the portions of airspace corresponding to all FMP, Network Managers areas of responsibility FMP initiating the STAM coordination shall maintain full control over the list of actors to involve in the process.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0046.0000
Requirement	FMP shall assess the impact on FMP area of responsibility of STAM measures defined by other FMP that are being discussed, are agreed or implemented within the network.
Title	PDT-46 local decision-making support for participating FMP
Status	<Validated>
Rationale	FMP invited to participate to a STAM coordination process shall be responsible for safeguarding acceptable demand / capacity balance within own FMP area of responsibility. This implies, in particular, that FMP assess whether the execution of a STAM proposed by another FMP has no adverse effect on this balance, and that ATC within FMP area of responsibility shall normally be able to accommodate the proposed STAM. In the context of Step 1, FMP assessment of STAM impact on FMP area of responsibility is mostly based on the provision of adequate input information and expert judgement (no or very limited simulation capabilities are envisaged).
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0047.0000

Requirement	Airspace Users shall assess the impact on own operations of STAM defined by other actors (FMP), that are being discussed, are agreed or implemented within the network. Comprehensive information on 4D profiles modifications resulting of the STAM implementation for the flights operated by the
Title	PDT-47 local Assessment of proposed STAM impact on AU operations
Status	<Validated>
Rationale	Airspace Users invited to participate to a STAM coordination process shall be responsible for informing FMP of any own operating constraint that would jeopardise flight operations or seriously alter own operations efficiency, as a result of the STAM. This implies that Airspace Users carry out an analysis of STAM impact on own operations. The assessment shall be based on criteria defined "at Airspace Users discretion". Comprehensive information on 4D profiles modifications resulting of STAM implementation for the flights operated by the Airspace User shall constitute necessary and sufficient information baseline for this assessment.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6849

6850 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6851

6852 [REQ]

Identifier	REQ-07.06.05-OSED-0048.0000
Requirement	A STAM coordination process closure shall inform the participating actors by a change of STAM Status. Two possible statuses at closure shall be considered: - In case of STAM measure agreement, the status = COORDINATED - In case of no STAM Measure agreement,; the status = ABANDONED The change of status is triggered upon decision by FMP initiator.
Title	PDT-48 STAM status at coordination process closure
Status	<Validated>

Rationale	Completion or closure of a STAM coordination process shall be communicated to the network in order to give account to the community of the end result of a STAM coordination process. Actors participating to the STAM coordination are the parties primarily interested in receiving this information. Yet, other actors external to the coordination may need to be informed as well. Notification to the network shall notably serve to further brief the wider community about the progress made on the treatment of the hotspot earlier notified to them via the network view (cf. REQ-07.06.05-OSED-0020.0000). As a general rule, FMP who has initiated the STAM coordination process shall be responsible for administrating the coordination process. The notification to other actors and to the network of coordination closure is part of these administration duties. Terminologies used to designate STAM statuses shall be in line with REQ-07.06.05-OSED-0112.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0049.0000
Requirement	The FMP initiator shall be able to cancel a proposed or coordinated STAM. STAM status shall immediately turn to ABANDONED. In case the FMP initiator interrupts the hotspot, the associated STAM shall be automatically abandoned (note that the hotspot cannot be cancelled in case the STAM Measure status=IMPLEMENTED).
Title	PDT-49 cancellation of a STAM
Status	<Validated>

Rationale	During a STAM coordination process, a STAM proposed by FMP initiator can be rejected by other participants. As well, even in case a STAM is validated at coordination stage, the DCB situation may rapidly evolve in a favourable sense before the STAM is implemented, rendering the coordinated STAM implementation useless; or conversely the DCB situation may become altered, rendering the STAM implementation no longer adapted to actual conditions. In order to address these non-nominal situations, it is therefore essential for FMP initiator to be able at all times to cancel a STAM, except when progress on STAM implementation is already too advanced. In other to account for this latter case, FMP initiator shall not be able to cancel a STAM with status "implemented". As a general rule, FMP who has initiated the STAM coordination process shall be responsible for the general administration of the STAM process. In particular, even if the decision to abandon a STAM is a collaborative decision, FMP initiator shall be entitled to confirm such abandon to the network on behalf of all participants. Terminologies used to designate STAM statuses shall be in line with REQ-07.06.05-OSED-0112.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0050.0000
Requirement	All actors participating to the STAM coordination shall be informed of the abandon when a proposed or coordinated STAM is abandoned, upon FMP "responsible" (initiator) decision, The STAM status shall be modified to "ABANDONED" and the STAM status updated accordingly on the network view.
Title	PDT-50 Notification of STAM cancellation
Status	<Validated>

Rationale	Abandon of a STAM shall be communicated to all actors having participated to the STAM coordination, since this decision shall have a direct impact on their operations. Yet, other actors external to the coordination may need to be informed as well. Notification to the network shall notably serve to further brief the wider community about the progress made on the treatment of the hotspot earlier notified to them via the network view (cf REQ-07.06.05-OSED-0020.0000). As a general rule, FMP who has initiated the STAM coordination process shall be responsible for the general administration of the STAM process. In particular, even if the decision to abandon a STAM is a collaborative decision, FMP initiator shall be entitled to confirm such abandon to all participants and notify it to the network. Terminologies used to designate STAM statuses shall be in line with REQ-07.06.05-OSED-0112.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0051.0000
Requirement	During the coordination process, all participants shall be able to express their opinion on the STAM, using appropriate electronic messaging function, configured according to harmonised information structure and terminologies applicable to STAM coordination processes.
Title	PDT-51 Coordination process messaging function
Status	<In Progress>
Rationale	The STAM coordination process is based on exchange of opinions and decisions about the appropriateness of implementing a STAM, amongst a set of actors directly impacted by its implementation.A messaging function is an essential enabler of such exchanges between actors located at different places. Decisions / Actions messages shall mostly be of standard type , like “approval of the STAM measure”; or “request for approval”; whilst non-standard input shall be expressed in a free text box. The messaging function shall be configured using harmonised information structures and terminologies applicable to STAM coordination information exchanges (notably REQ-07.06.05-OSED-0057.0000, REQ-07.06.05-OSED-0058.0000). This harmonisation shall facilitate mutual understanding, and rapid retrieve by all actors of key information contained in those messages.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0052.0000
Requirement	FMP initiator shall set a time-out indicating the maximum time left available to complete the coordination process.
Title	PDT-52 STAM coordination time control
Status	<Validated>
Rationale	The STAM coordination process shall be completed or terminated in a reasonably short timeframe in order to proceed at appropriate time to the STAM implementation process, be the coordination concluded by an agreement for STAM implementation. This STAM coordination time shall be controlled by fixing a STAM coordination time-out. As a general rule, FMP who has initiated the STAM coordination process shall be responsible for administrating the coordination process. The setting of a coordination time-out is part of these administration duties. This requirement directly supports REQ-07.06.05-OSED-0044.0000.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0053.0000
Requirement	FMP who has initiated the STAM coordination (FMP initiator) shall have specific administrator duties in the STAM measure coordination process and shall have access to associated coordination process administration tools. FMP initiator shall notably: - specify among actors in the coordination process those from which opinion and specific follow-up action is required (“action”) to complete the coordination process and those from which opinion / action is not required ("information”) - manage the scheduling of the coordination process - confirm the collaborative decisions made during the process and manage the communication of those conclusions to the network
Title	PDT-53 coordination process administration
Status	<Validated>

Rationale	As a general rule, FMP who has initiated the STAM coordination process shall be responsible for administrating the coordination process. This shall apply to both the internal administration of the process and the communication on the progress of the process with the external community (the network). The complexity of the coordination process and the limited time available to complete the process, justifies that a single responsible and focal point for the coordination is designated.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0054.0000
Requirement	FMP/ Airspace Users solicited by FMP initiator to participate to a STAM coordination for action ("Action") shall reply : Accept, Reject or Stand by
Title	PDT-54 role and participation administration by actors solicited for STAM coordination
Status	<In Progress>
Rationale	The actors (FMP, AUs) sollicited by FMP initiator in the coordination process shall provide an answer related to the proposed STAM Measure. They can reply : accept (they accept the measure), reject (they reject the measure), or stand by (they will reply later)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0055.0000
Requirement	All participants to a STAM coordination process shall be able to visualize in a single summary display descriptions of the initial trajectory profile, the proposed STAM trajectory profile, the agreed STAM trajectory profile, and the implemented STAM trajectory profile for each flight eligible for a STAM in the horizontal and the vertical dimensions. All participants shall be able to clearly distinguish each trajectory profile under their different statuses (draft, proposed, coordinated, implemented, abandoned, finished).
Title	PDT-55 STAM flight profiles monitor
Status	<In Progress>

Rationale	The STAM coordination process aims at securing that all parties impacted by a STAM agree with its implementation. It is therefore essential that all parties have access to a shared comprehensive description of the STAM . A large number of STAM (except for Miles-In-trail) can be comprehensively described through a description of the flight trajectory profile modifications intended in the STAM. In order to account for the different decision-making steps reached during the collaborative processes leading to a STAM implementation, a STAM status was defined (cf. REQ-07.06.05-OSED-0112.0000). The STAM status information shall be attached to this STAM description in line with this harmonised terminology.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0056.0000
Requirement	The STAM coordination process shall mostly consist of series of standard messages exchanges between participants.
Title	PDT-56 Coordination process monitor
Status	<Validated>
Rationale	The STAM coordination process shall mostly consist of series of standard messages exchanges between participants. Such messages shall serve to convey the opinion (mostly the approval or disapproval and decision rationale) of each participant regarding the appropriateness of implementing a STAM. Under nominal conditions, the approval of all participants is required to conclude that a STAM can be implemented. It is therefore essential for all actors to get access to a complete picture of the consensus reached at all times (incl. approvals so far secured, disapprovals and associated rationale, and pending responses) . This monitoring functionality shall enable this. This monitoring functionality shall in particular use input from the contents of the messages exchanged via the STAM coordination messaging function (cf. REQ-07.06.05-OSED-0051.0000) The monitoring function shall be configured using harmonised standards applicable to STAM coordination information exchanges (notably REQ-07.06.05-OSED-0057.0000, REQ-07.06.05-OSED-0058.0000) This harmonised approach shall facilitate mutual understanding, and rapid retrieve by all actors of key information displayed in the STAM coordination process monitor.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6886 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6887

6888 [REQ]

Identifier	REQ-07.06.05-OSED-0057.0000
Requirement	The STAM coordination message shall contain at least: - the list of Flight Id impacted by the STAM - STAM Measure identification - Title summarizing the STAM Measure type - Role of actors (Action, Inform)
Title	PDT-57 STAM Coordination Messaging – Basic STAM Coordination message form
Status	<Validated>
Rationale	The STAM coordination process shall mostly consist of series of standard messages exchanges between participants. Such messages shall serve to convey the opinion (mostly the approval or disapproval and decision rationale) of each participant regarding the appropriateness of implementing a STAM. In line with REQ-07.06.05-OSED-0064.0000, the basic procedure applicable to STAM coordination processes shall be based on the following sequence of actions: ? STAM coordination initiation: FMP responsible sends a STAM coordination request message to all participants, with identical content except for actor role. the message addresses one STAM only ? STAM coordination response: all actors participating to the STAM provide their responses to FMP initiator ? STAM coordination consolidation: FMP responsible collects all replies in a standard format and in line with the information that FMP needs to gather from each participant ? STAM coordination conclusion: FMP responsible checks that all actors solicited for action have approved the STAM. if this is confirmed, the STAM is coordinated, if not, the STAM is abandoned. ? the STAM coordination process is closed. This requirement is specifically addressing the basic content of STAM coordination messages sent by FMP initiator in the context of the STAM coordination initiation (point (1) in the above sequence). The coordination message shall contain all the information necessary for all actors to rapidly and adequately provide their input to the coordination process. This message shall at least contain 1. comprehensive information about the STAM, including: ? list of Flight Id impacted by the STAM ? STAM Measure identification ? Tittle summarizing the STAM Measure feature (specifying the type of STAM) 2. clear indication of what is expected from the actor solicited: ? Role of Actor
Category	<Operational>
Validation Method	<Live Trial>

Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0058.0000
Requirement	The STAM coordination process shall mostly consist of series of standard messages exchanges between participants. "Action" for approval, actors participating to a STAM coordination shall have access to the details of the STAM using the 'STAM editor' and shall be able, in a simple click - To accept the proposed STAM Measure (e.g. by clicking on a "Accepted" button) - To reject the proposed STAM Measure (e.g. by clicking on a "Rejected" button) "Action" for implementation, to inform the actor he/she will be responsible of the the implementation of the STAM Measure.
Title	PDT-58 STAM Coordination messaging - Basic STAM Coordination Response form
Status	<Validated>
Rationale	The STAM coordination process shall mostly consist of series of standard messages exchanges between participants. Such messages shall serve to convey the opinion (mostly the approval or disapproval and decision rationale) of each participant regarding the appropriateness of implementing a STAM. In line with REQ-07.06.05-OSED-0064.0000, the basic procedure applicable to STAM coordination processes shall be based on the following sequence of actions: ? STAM coordination initiation: FMP responsible sends a STAM coordination request message to all participants, with identical content except for actor role. The message addresses one STAM only ? STAM coordination response: all actors participating to the STAM provide their responses to FMP initiator ? STAM coordination consolidation: FMP responsible collects all replies in a standard format and in line with the information that FMP needs to gather from each participant ? STAM coordination conclusion: FMP responsible checks that all actors solicited action have approved the STAM. if this is confirmed, the STAM is coordinated, if not, the STAM is abandoned. ? the STAM coordination process is closed. This requirement is specifically addressing the basic functioning of the messaging tool for participants to submit their decision on a STAM. (in the context of the STAM coordination response (point (2) in the sequence). The "STAM editor" referred herein is described in REQ-07.06.05-OSED-0037.0000, (for STAM cherry-pick) and REQ-07.06.05-OSED-0038.0000, (for STAM flow)
Category	<Operational>
Validation Method	<Live Trial>

Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0059.0000
Requirement	All actors participating to a STAM coordination shall have access to the list of incoming/outgoing coordination messages sent and received by them, sorted out by STAM Id.
Title	PDT-59 STAM coordination Messenger – sorting function by STAM Id
Status	<Validated>
Rationale	All participants to a STAM coordination shall be assisted with automated support for managing STAM coordination messages sent and received by them. This shall include at least: - time-stamped display of all incoming and outgoing messages, (such as those offered by off-the-shelf messaging tools) - a function enabling to sort messages by STAM Id (function specifically tailored to STAM coordination activities)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0060.0000
Requirement	All actors participating to a STAM coordination shall have access to the list of incoming/outgoing coordination messages sent and received by them, - grouped by STAM Id - and together with clear indication of which message(s) have been read and which have not
Title	PDT-60 STAM coordination Messenger - sorting function by read / unread message status or by STAM Id
Status	<Validated>
Rationale	All participants to a STAM coordination shall be assisted with automated support for managing STAM coordination messages sent and received by them. This shall include at least: - time-stamped display of all incoming and outgoing messages, (such as those offered by off-the-shelf messaging tools) - a function enabling to sort messages by read / unread status (such as those offered by off-the-shelf messaging tools)
Category	<Operational>
Validation Method	<Live Trial>

Verification Method	

6901

6902 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6903

6904 [REQ]

Identifier	REQ-07.06.05-OSED-0061.0000
Requirement	For a specific STAM coordination process, the full list of incoming/ outgoing coordination messages shall be displayed in a STAM messages exchanges summary, containing: - Unread : Number of unread messages associated to this message exchange - Subject : type of STAM Measure (STAM Id) and Flight Id associated - Requestor (responsible actor) : The Initiator of the coordination - Hotspot : The concerned Hotspot - Time : The time the message was sent
Title	PDT-61 STAM coordination Messenger – STAM coordination messages exchange summary
Status	<Validated>

Rationale	The STAM coordination process shall mostly consist of series of standard messages exchanges between participants. Such messages shall serve to convey the opinion (mostly the approval or disapproval and decision rationale) of each participant regarding the appropriateness of implementing a STAM. In line with REQ-07.06.05-OSED-0064.0000, the basic procedure applicable to STAM coordination processes shall be based on the following sequence of actions: ? STAM coordination initiation: FMP responsible sends a STAM coordination request message to all participants, with identical content except for actor role. the message addresses one STAM only ? STAM coordination response: all actors participating to the STAM provide their responses to FMP initiator ? STAM coordination consolidation: FMP responsible collects all replies in a standard format and in line with the information that FMP needs to gather from each participant ? STAM coordination conclusion: FMP responsible checks that all actors solicited for action have approved the STAM. if this is confirmed, the STAM is coordinated, if not, the STAM is abandoned. ? the STAM coordination process is closed. This requirement is specifically addressing the support provided by the messaging function during the STAM coordination consolidation phase (point 3 in the above sequence) and more specifically the support provided to monitor progress made in the collect of all participating actors replies. The STAM messages exchange summary shall contain all the information necessary for all actors to rapidly know where the coordination process stands in terms of information not already processed number of unread messages . together with comprehensive information about the STAM, including: ? Subject : type of STAM Measure (STAM Id) and Flight Id associated ? Requestor (responsible actor) : The Initiator of the coordination ? Hotspot : The concerned Hotspot ? Time : The time the message was sent
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0062.0000
Requirement	The Messenger shall allow to display the full text message and the associated history (previous coordination messages) when selecting a coordination message.
Title	PDT-62 Access to the message
Status	<Validated>

Rationale	Full text of the coordination message shall be easily accessible by its user from the STAM coordination messages exchanges summary (cf. REQ-07.06.05-OSED-0061.0000), as is the case with off-the-shelf electronic messaging software.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6909

6910 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6911

6912 [REQ]

Identifier	REQ-07.06.05-OSED-0063.0000
Requirement	When selecting/creating a STAM coordination message, FMP initiator (responsible) shall complete or modify the content of the message, notably in the following fields: - Responsible: The initiator and responsible of the coordination - Inform: The actors is informed about the proposed STAM (but no approval is requested) - Action for approval : The actor is required to accept or reject the proposed STAM Measure - Action for Implementation : The actor is required to acknowledge that he will be responsible to implement the STAM measure
Title	PDT-63 STAM coordination message configuration
Status	<Validated>

Rationale	The STAM coordination process shall mostly consist of series of standard messages exchanges between participants. Such messages shall serve to convey the opinion (mostly the approval or disapproval and decision rationale) of each participant regarding the appropriateness of implementing a STAM. In line with REQ-07.06.05-OSED-0064.0000 the basic procedure applicable to STAM coordination processes shall be based on the following sequence of actions: - STAM coordination initiation: FMP responsible sends a STAM coordination request message to all participants, with identical content except for actor role. the message addresses one STAM only - STAM coordination response: all actors participating to the STAM provide their responses to FMP initiator - STAM coordination consolidation: FMP responsible collects all replies in a standard format and in line with the information that FMP needs to gather from each participant - STAM coordination conclusion: FMP responsible checks that all actors solicited for action have approved the STAM. if this is confirmed, the STAM is coordinated, if not, the STAM is abandoned. - the STAM coordination process is closed. This requirement is specifically addressing the preparation of the STAM coordination request message, and more specifically the adaptation of its content to the targeted addressee. The terminology applicable to each participants role and designation shall be in line with REQ-07.06.05-OSED-0065.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0064.0000
Requirement	The coordination process shall be organised in line with a common messages exchange procedure defined as follows: - STAM coordination initiation: FMP responsible sends a STAM coordination request message to all participants, at same moment with identical content except for actor role. the message addresses one STAM only - STAM coordination response: all actors participating to the STAM provide their responses to FMP initiator - STAM coordination consolidation: FMP responsible collects all replies in a standard format and in line with the information that FMP needs to gather from each participant - STAM coordination conclusion: FMP responsible checks that all actors solicited for action have approved the STAM. if this is confirmed, the STAM is coordinated, if not, the STAM is abandoned. the STAM coordination process is closed.
Title	PDT-64 Basic STAM Coordination procedure

Status	<Validated>
Rationale	The STAM coordination process shall mostly consist of series of standard messages exchanges between participants. Such messages shall serve to convey the opinion (mostly the approval or disapproval and decision rationale) of each participant regarding the appropriateness of implementing a STAM. Under nominal conditions, the approval of all participants is required to conclude that a STAM can be implemented. The coordination process shall nominally take place at tactical stage where time pressure is high. It is therefore important to adopt a streamlined procedure that minimises the workload and risk of misunderstanding between participants during this exchange. The basic procedure prescribed here is aimed at ensuring this. this is based on the following rules: - one common coordination message is sent to all participants at same moment by FMP responsible. - the message contains one STAM only. - FMP responsible is able to collect all replies in a standard format and in line with the information FMP needs to gather from each participant This basic procedure shall be applied in line with: - for the content of STAM coordination messages REQ-07.06.05-OSED-0057.0000 - for the content of participating actors responses REQ-07.06.05-OSED-0058.0000 - for the time limit associated with participating actors responses REQ-07.06.05-OSED-0044.0000 - for the roles assigned to participating actors REQ-07.06.05-OSED-0065.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0065.0000
Requirement	The respective roles of each participant to a STAM measure coordination process shall be stated to all participants all along the process. A standard terminology shall distinguish between - participant having initiated the process : participant “RESPONSIBLE” - participant from which approval or disapproval of a STAM measure is required: participant involved “FOR APPROVAL” - participant from which a specific follow-up action is requested; participant involved “FOR IMPLEMENTATION” - participant from which no specific follow-up action, neither mandatory approval is requested: participant involved “FOR INFORMATION”
Title	PDT-65 Harmonised definition and terminology for actors designation and roles
Status	<Validated>

Rationale	As a general principle, STAM activities extensively rely on collaborative decision-making between different actors, in a time-pressured context. The STAM coordination process is the main moment when collaborative decision making takes place in STAM activities. It is essential in order to smooth the coordination process that all actors involved in the STAM coordination understand beforehand the general rules of the coordination. Harmonised definition of actors designation and roles is aimed at meeting this requirement. All services and systems assisting the STAM coordination process shall be designed in line with these harmonised participation principles.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0066.0000
Requirement	An FMP initiating a STAM coordination process for a cherry-picking STAM measure shall solicite an Airspace Users for action ("action") as a standard approach.
Title	PDT-66 standard principles of AU participation to the STAM coordination process applicable to STAM-Cherry-picking
Status	<In Progress>
Rationale	Due to the limited time that shall be made available under nominal circumstances for STAM coordination processes, actors shall as far as possible limit the number of exchanges leading to collaborative decision. This notably implies refraining as far as possible from multiplying STAM counter-proposals to the discussion. Early assessment at R&D level of scenarios introducing multiple counter-proposals with no restriction in number shows that (even with 2 counter-proposals) the process is significantly more complex and time consuming than with one proposal and potentially becomes unmanageable. At least in the context of Step 1, provided that STAM shall nominally impact several Airspace Users, it was judged reasonable to restrict Airspace Users intervention to "approval or disapproval" of the STAM under-discussion, without possibility for issuing counter-proposals. Opportunity to express viewpoint on preferred alternatives shall be left to airspace users at least at post-analysis stage. All services and systems assisting the STAM coordination process shall be designed in line with these harmonised participation principles.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0067.0000
Requirement	An FMP initiating a STAM coordination process for a flow STAM measure shall solicite an Airspace Users for information ("inform") as a standard approach.
Title	PDT-67 standard principles of AU participation to the STAM coordination applicable to STAM-Flow
Status	<In Progress>
Rationale	Due to the limited time that shall be made available under nominal circumstances for STAM coordination processes, actors shall as far as possible limit the number of exchanges leading to collaborative decision. It is anticipated that with STAM-flow measures, the time available for the coordination shall not permit, even under nominal circumstances, to organise this exchange and obtain positive feedback from all airspace users impacted in due time. Most importantly, it is anticipated that the time available would hardly permit to appropriately accommodate disapproval of even a single airspace user, since it would in most cases lead to cancel the measure in its entirety and to re-initiate the full STAM process from the onset based on a completely different approach. Therefore, at least in the context of Step 1, it was judged reasonable to restrict Airspace Users implication in STAM-flow coordination processes and involve them for information only. Opportunity to express opinion on such measures and on preferred alternatives shall be left to airspace users at post-analysis stage.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0068.0000
Requirement	The STAM status = shall be modified to IMPLEMENTED when the FMP initiator (FMP “responsible”) request to implement a coordinated STAM at a specific time.
Title	PDT-68 STAM implementation process initiation
Status	<In Progress>

Rationale	This functionality will inform actors of the promulgation of the STAM Measure. As a general rule, FMP who has initiated the STAM coordination process shall be responsible for the general administration of the entire STAM process. This shall apply to both the internal administration of the process and the communication on the progress of the process with the external community (the network). Decision to implement shall be based on FMP expert judgment of the evolution of the DCB situation and the time required to implement the measure. FMP initiator shall thus maintain full control over the time when and on whether to implement a coordinated STAM. The update of the STAM status on the network view resulting of FMP initiator decision shall be automated, and shall not be workload consuming for FMP. Terminologies used to designate STAM statuses shall be in line with REQ-07.06.05-OSED-0112.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0069.0000
Requirement	In case a coordinated STAM is not declared implemented or abandoned before the STAM measure implementation time limit, the FMP initiator and the actors having participated to the STAM coordination process shall receive an alarm alerting them of the imminent expiration of the time limit for the implementation of the STAM measure, together with the actual status of the demand / capacity imbalance at associated hotspot.
Title	PDT-69 alarm of imminent expiration of the time limit for STAM implementation
Status	<Validated>
Rationale	For all types of STAM, there is a time limit after which implementation is no longer possible (e.g. STAM implying a departure shift can no longer be implemented after a certain notice time before take-off). All actors involved in the STAM implementation process shall be fully aware of this time limit. Automated alarm of imminent expiration of this time limit for STAM implementation is aimed at further guaranteeing that this limit will not be missed. The alarm shall be accompanied with adequate information provision in order for actors to efficiently react to the alarm. Notably, the information shall include at least the STAM id and description, STAM status and DCB balance state at associated hotspot.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0070.0000
Requirement	The Airspace User shall update the flight plan in line with the required flight plan adjustment when he/she receives the "For Implementation" Message.
Title	PDT-70 Flight Plan Updates, other than departure delays, for non-ATC activated flights
Status	<In Progress>
Rationale	As a general approach, STAM implementation shall be based as far as possible on existing processes and services supporting the planning and execution of flights and ATC operations on the day of operations. This requirement is in line with this approach.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0071.0000
Requirement	The Network Manager shall update the flight plan according to the required departure time modification on behalf of the concerned Airspace User when he/she receives the "For implementation" message.
Title	PDT- 71 Flight Plan Update for departure time adjustment for non-ATC activated flights
Status	<In Progress>
Rationale	As a general approach, STAM implementation shall be based as far as possible on existing processes and services supporting the planning and execution of flights and ATC operations on the day of operations. Today, time departure shifts (delays) are already implemented for ATFCM purposes. Such service is provided by the Network Manager in the context of ATFM regulations. The service is supported by a process that enables to inform airspace users in due time of their departure shift (delay) and that secures consistent updates of Flight Plans over the network. This process is regarded as very efficient. It is therefore considered appropriate to use a similar process for the implementation of STAM involving departure time shifts. The systems and procedures supporting it shall be very similar to the existing ones, except that it shall not necessarily apply to lists of flights but to a limited set of pre-designated flights. This approach is mentioned in different sections of the OSED under the notion of "Pseudo CTOT".
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0072.0000
Requirement	When receiving the "For Implementation" message, The Air traffic control service in charge of controlling the portion of the flight where the flight plan modification applies shall update the FPL accordingly on behalf of the Airspace User and issue a ATC FPL update message specifying the CHG to the network. The Airspace user shall be made aware of the FPL modification and shall send the updated FPL to the cockpit in view of updating the aircraft Flight Management System accordingly.
Title	PDT-72 Flight Plan Update for ATC activated flights
Status	<Validated>
Rationale	As a general approach, STAM implementation shall be based as far as possible on existing processes and services supporting the planning and execution of flights and ATC operations on the day of operations. This requirement is in line with this approach.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0073.0000
Requirement	When receiving the "For Implementation" message, The Air traffic control service in charge of controlling the departures of the flights on which the measure applies shall apply the MDI according to the parameters defined in the STAM and in line with the departure management procedures locally applicable.
Title	PDT-73 Implementation of STAM-F Minimum Departure Intervals
Status	<In Progress>
Rationale	As a general approach, STAM implementation shall be based as far as possible on existing processes and services supporting the planning and execution of flights and ATC operations on the day of operations. In the case of STAM-flow of MDI type, coordination with airport ATC managing departures is required. MDI are already implemented at several airports in Europe. Yet, local practices from an airport to another may slightly differ. This requirement shall thus be considered with such differences in mind. In addition, this requirement shall be in line with new concepts developed in the context of Step 1 for airport operations (WP6), in particular new developments addressing departures sequencing.
Category	<Operational>

Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0074.0000
Requirement	When receiving the "For Implementation" message, the Air traffic control services in charge of controlling the flights shall apply the MIT according to the parameters defined in the STAM and in line with the ATC procedures locally applicable.
Title	PDT-74 Implementation of STAM-F Miles / Minutes In Trail
Status	<In Progress>
Rationale	As a general approach, STAM implementation shall be based as far as possible on existing processes and services supporting the planning and execution of flights and ATC operations on the day of operations. Until now, Miles-In-Trail (Minutes-In-trail) types of STAM have seldom been applied but at a very few locations in Europe, mostly for arrival flows pre-sequencing purposes. ATC practices enabling MIT therefore already exist and these have proven being effective in smoothing arrival flows. STAM implementation of MIT type shall thus rely on such ATC know-how. Yet, implementation of MIT over converging flows spread over different ATC sectors is no common practice. In the context of Step 1, implementation of STAM of MIT type shall thus be restricted to MIT application on single flows.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0075.0000
Requirement	The STAM status shall be updated to FINISHED as soon as FMP confirms to the system that a STAM is adequately implemented, or as soon as hotspot exit time is reached.
Title	PDT-75 STAM implementation completion
Status	<Validated>

Rationale	As a general rule, FMP who has initiated the STAM coordination process shall be responsible for the general administration of the STAM process. This shall apply to both the internal administration of the process and the communication on the progress of the process with the external community (the network). In case FMP could not communicate the change of status in due time, automated change at hotspot exit time shall ensure that no STAM is maintained in an incorrect status. FMP shall check that the conditions are met to secure STAM implementation based on expert judgment and on information available via the DCB monitoring supports.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0076.0000
Requirement	FMP who has initiated the STAM coordination process shall set a time limit before which a decision shall be made on whether a coordinated STAM measure shall be implemented or not .
Title	PDT-76 time-to-implementation management
Status	<Validated>
Rationale	As a general rule, FMP who has initiated the STAM coordination process shall be responsible for the general administration of the STAM process. This shall apply to both the internal administration of the process and the communication on the progress of the process with the external community (the network). For all types of STAM, there is a time limit after which implementation is no longer possible (e.g. STAM implying a departure shift can no longer be implemented after a certain notice time before take-off). All actors involved in the STAM implementation process shall be fully aware of this time limit. FMP initiator shall maintain full control over the time limit set for implementation decision, which shall be adjusted depending on the type of STAM, and other considerations such as local workload conditions and the estimated uncertainties of DCB predictions at hotspot (based on FMP expert judgment). This functionality shall support the functionality described in REQ-07.06.05-OSED-0069.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0077.0000
Requirement	In case a CASA regulation is in place at a hotspot within FMP area of responsibility, FMP shall exclude individual flights from the regulation in view of implementing a coordinated STAM as an alternative to the CASA slot.
Title	PDT-77 Exclusion of individual flights from a regulation.
Status	<In Progress>
Rationale	In order to address a hotspot within FMP area of responsibility, FMP shall be able to initiate a STAM process, in conjunction with a regulation requested beforehand at hotspot as a precaution in case the STAM fails. (Approach recommended by some FMP to limit the risk of facing an overload, be the STAM process unsuccessful). Under such circumstances, the possibility to directly exclude flights from the regulation would be especially useful in cases where FMP has successfully coordinated a STAM solution as a better alternative to CASA slots. (approach commonly recognised as effective). The legacy CASA service provided by the Network Management do not enable for FMP to exclude specific flights from a regulation in a straightforward manner. Whilst it is technically feasible with CASA to exclude designated flights from a regulation, the procedure prescribes that FMP issue a request for exclusion to the Network Management. The Network Management, upon receipt of the request, is entitled to implement the request. A more straightforward procedure would be preferred, with direct access for FMP to such exclusion capabilities. It is considered much better tailored to the nominally time-pressured conditions of dynamic DCB.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0078.0000
Requirement	FMP shall communicate STAM implementation instructions to ATCO internal to FMP area of responsibility using local ATCO planning supports (e.g. electronic Stripping).
Title	PDT-78 Local FMP-ATCO communication support facilitating
Status	<Validated>

Rationale	FMP, within their respective Air Traffic Control centres, shall be able to share information on STAM measures with Air Traffic Controllers working on their respective control positions in a appropriately structured and efficient manner. Notably for communicating instructions to ATCO for STAM implementation purposes, as well as, if locally needed, for ATCO consultation purposes during a STAM elaboration or coordination process. R&D tests based on a mock-up of a portable FMP-ATCO information support (tablet) showed that such a device significantly facilitates local FMP-ATCO communication. This is particularly justified by the large set of DCB / STAM information that ATCO may be interested in, and the large variety of formats applicable to structure the information; which such devices can easily accommodate. In addition, a reasonable assumption is that, in the context of Step 1, ATFCM and ATC tools will not be integrated in a single CNS architecture at least for safety / certification reasons. Therefore no direct automated transfer of instruction / information between STAM / DCB systems and ATCO systems is envisaged. FMP shall thus be able to directly transmit STAM instructions to ATCO through direct use of ATCO planning supports and / or portable devises.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6973

6974 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6975

6976 [REQ]

Identifier	REQ-07.06.05-OSED-0079.0000
Requirement	FMP shall share relevant information on STAM (s) with concerned ATC within FMP area of responsibility, at least at STAM implementation stage. Relevant STAM information shall include at least: - Detailed per flight description of STAM: Flight plans of the flights within ATCO area of responsibility with TTA and STAM assigned to them Plus, (if locally relevant): - Summary Description of STAM; - Relevant EC / OC statuses
Title	PDT-79 minimum requirements for Local FMP / ATCO information sharing
Status	<Validated>

Rationale	FMP and ATCO interaction in a STAM process shall culminate at implementation stage, where instructions to ATC shall be passed. Although It shall be sufficient for ATCO to receive flight instructions in the form of updated flight plans, it is as well important that ATCO are aware that these instructions are set in the context of a STAM. This is the reason why this requirement includes, in addition to ATC instructions on the flight, synthetic information on the STAM and the DCB situation justifying its implementation. In addition some STAM instructions (such as for miles-in-trail) shall be communicated to ATCO together with the full description of the STAM. The format adopted to present the information shall be as much as possible conform to ATC information formatting standards (cf. REQ-07.06.05-OSED-0080.0000)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0080.0000
Requirement	The format adopted to communicate STAM instructions to ATC shall be adequately integrated in and as much as possible conform to ATC information formatting standards, and adjusted to local practices as appropriate
Title	PDT-80 conformity to ATCO standard formats and terminologies
Status	<Validated>
Rationale	As a general approach, STAM implementation shall be based as far as possible on existing processes and services supporting the planning and execution of flights and ATC operations on the day of operations. Local practices adapted to the specific local conditions shall be taken as reference. This requirement is in line with this approach.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0081.0000

Requirement	The Network View service shall automatically collate and stores all STAM Notification messages associated to a hotspot and a STAM process issued throughout the network, with clear indication of which STAM and which hotspot the message is associated to, for archiving and post-analysis purposes.
Title	PDT-81 STAM / hotspot notification messages recording for archiving and post-analysis purposes
Status	<Validated>
Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. This post-ops work is mostly granted on the analysis of past decision-made, past actions implemented, and evolution of the operational situation all along the time the Dynamic DCB activity under analysis took place. Under nominal circumstances, Dynamic DCB activity post-ops analyses are performed by FMPs. This post-ops work shall thus be supported by Dynamic DCB events recording facilities, and notably facilities recording all messages associated to a hotspot and a STAM process that was issued in the network view. This source of information shall deliver all key data enabling to reconstruct the course of STAM events that were made visible, during the Dynamic DCB process, to the wider community of stakeholders.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0082.0000
Requirement	The various decision-making steps of a STAM coordination process shall be time stamped, tracked and recorded for real-time tracking, archiving and post analysis purposes.
Title	PDT-82 STAM Coordination process recording for archiving and post-analysis purposes
Status	<Validated>

Rationale	All participating actors shall be able to consult the resulting consolidated log at coordination stage, as well as at post analysis stage. For each STAM measure coordination process, a tracking and recording log associated to the coordination process shall contain at least: - messages exchanged between participants, clearly indicating content and originator of message, time of message issuance, - Content, approval of / disapproval of STAM, specifying times of issuance for each new instantiation. - list of participating actors together with their assigned role(s), including, if relevant, actors later included in the process together with time of invitation to participate The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. This post-ops work is mostly granted on the analysis of past decision-made, past actions implemented, and evolution of the operational situation all along the time the Dynamic DCB activity under analysis took place. Under nominal circumstances, Dynamic DCB activity post-ops analyses are performed by FMPs. This post-ops work shall thus be supported by Dynamic DCB events recording facilities, and notably facilities recording the STAM coordination process. This source of information shall deliver all key data enabling to reconstruct the course of Collaborative Decision Making that led to decisions implemented in the STAM process. It may as well enable to solve potential problems encountered during the coordination process that could not be addressed in dynamic, due most notably to too heavy time pressure.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0083.0000
Requirement	The DCB predictions at hotspot at key decision-making times during the dynamic DCB process shall be recorded for archiving and post analysis purposes. Key decision-making time shall include, at least and whenever applicable, hotspot notification time, STAM implementation notification time(s), hotspot cancellation time, hotspot clearance time.
Title	PDT-83 hotspot prediction statuses recording for archiving and post-analysis purposes
Status	<Validated>

Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical d-DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. This post-ops work is mostly granted on the analysis of past decision-made, past actions implemented, and evolution of the operational situation all along the time the Dynamic DCB activity under analysis took place. Under nominal circumstances, Dynamic DCB activity post-ops analyses are performed by FMPs. In order to analyse the relevance of the decisions made in dynamic, and in order as well to assess the impact of the quality of the DCB predictions on the quality of the decisions made, actual predictions statutes at the moment when a decision was made constitute highly valuable information, enabling in particular to identify situations when a decision turned out to be irrelevant but sounded appropriate at the time it was made but was based on misleading predictions.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

6993

6994 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

6995

6996 [REQ]

Identifier	REQ-07.06.05-OSED-0084.0000
Requirement	Actual implementation events of STAM instructions associated to each STAM measure cleared for implementation shall be recorded, for archiving and post analysis purposes.
Title	PDT-84 STAM implementation process recording for archiving and post-analysis purposes
Status	<Validated>

Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. This post-ops work is mostly granted on the analysis of past decision-made, past actions implemented, and evolution of the operational situation all along the time the Dynamic DCB activity under analysis took place. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. In order to analyse the effectiveness of the STAM implementation process, and in order to define preventive actions aimed notably at correcting failed implementation actions, records of actual STAM implementation actions for all flights impacted and all ATC areas impacted shall be made available as soon as the Dynamic DCB activity is completed, in view of supporting post-ops analyses carried out by different interested parties (mostly FMP).
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0085.0000
Requirement	The DCB evolution through time within the network shall be recorded, using the same DCB evolution indicators as those used in tactical, (i.e. OC/EC) for archiving and post-analysis purposes.
Title	PDT-85 STAM implementation process recording for archiving and post-analysis purposes
Status	<Validated>
Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. This post-ops work is mostly granted on the analysis of past decision-made, past actions implemented, and evolution of the operational situation all along the time the Dynamic DCB activity under analysis took place. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. In order to analyse the effectiveness of the STAM implementation process, an analysis of the actual DCB evolution at hotspot and possibly just before, just after, as well as at the vicinity of the hotspot may be required, notably in cases when correlations between different hotspots and potential resolution improvement through coordinated action are being studied.
Category	<Operational>

Validation Method	<Live Trial>
Verification Method	

7001

7002 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

7003

7004 [REQ]

Identifier	REQ-07.06.05-OSED-0086.0000
Requirement	Automated calculation of Dynamic DCB post-ops performance indicators shall be made available to Dynamic DCB post-analyses performers as soon as the tactical Dynamic DCB activity analysed is completed.
Title	PDT-86 automated calculation of Dynamic DCB post-ops performance indicators
Status	<Validated>
Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. This post-ops work is mostly granted on the analysis of past decision-made, past actions implemented, and evolution of the operational situation all along the time the Dynamic DCB activity under analysis took place. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. The quality of the outcome of the Dynamic DCB activity shall be assessed based on a robust performance assessment method, that contains elements that are harmonised at network level and elements that are mostly locally relevant. These performance indicators shall express achievements of the past Dynamic DCB activity, e.g. i.in terms of traffic load (including, if appropriate, actually perceived ATCO workload at hotspot) ii.in terms of service to users (assessment of impact on trajectories, in the form of e.g. extra miles, on-ground delay, en-route extra-time, as compared to FPLs), possibly based on feedback from airspace users iii.in terms of overall network performance; in the form of e.g. estimates of overall ground delay savings enabled by the STAM as an alternative to CASA regulations; The harmonised Dynamic DCB post-ops performance assessment method shall be in line with REQ-07.06.05-OSED-0116.0000.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7005

7006 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0087.0000
Requirement	Automated comparison of aggregated Dynamic DCB post-ops performance indicators between different selected past Dynamic DCB activities shall be made available to Dynamic DCB post-analyses performers as soon as the Dynamic DCB activities analysed are completed.
Title	PDT-87 Dynamic DCB post-ops performances comparisons
Status	<Validated>
Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. The quality of the outcome of the Dynamic DCB activity shall be assessed based on a robust performance assessment method, which may give account of improvements made from a Dynamic DCB activity to another in terms of performance, and which may, if FMP or any other post-analysis performer judges relevant, be based on comparative analysis of the quantified performance achieved between different past Dynamic DCB activities and tested STAM. Dynamic DCB performance indicators shall be in line with harmonised Dynamic DCB post-ops performance assessment method and completed with locally relevant performance indicators. The harmonised Dynamic DCB post-ops performance assessment method shall be in line with REQ-07.06.05-OSED-0116.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0088.0000
Requirement	Automated Dynamic DCB post-ops performance indicators calculation for an aggregation of a selection of past Dynamic DCB activities within a specific performance assessment period, shall be made available to Dynamic DCB post-analyses performers as soon as the tactical Dynamic DCB activities analysed are completed.
Title	PDT-88 aggregated Dynamic DCB post-ops performance assessment
Status	<Validated>

Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. The quality of the outcome of the Dynamic DCB activity shall be assessed based on a robust performance assessment method, which may give account of the accumulated performance resulting of Dynamic DCB activities on a specific performance assessment period (e.g. monthly, seasonal, yearly). This may facilitate in particular the assessment of the quality of the Dynamic DCB activity outcome against higher level monthly, seasonal or yearly performance targets. STAM performance indicators shall be in line with harmonised Dynamic DCB post-ops performance assessment method and completed with locally relevant performance indicators. The harmonised Dynamic DCB post-ops performance assessment method shall be in line with REQ-07.06.05-OSED-0116.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7013
7014 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

7015
7016 [REQ]

Identifier	REQ-07.06.05-OSED-0089.0000
Requirement	Dynamic DCB post-analyses performers shall be able to group the automated performances analysis of different past Dynamic DCB activities showing similarities in view a constituting a case study for a specific trend or pattern analysis.
Title	PDT-89 support to post-ops Dynamic DCB trend / pattern analyses
Status	<Validated>

Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. The quality of the outcome of the Dynamic DCB activity may be improved through studying similarities between different DCB situations encountered and the quality of the result obtained when different options were tested in live conditions. The elaboration of case studies based on these similar situations, identified patterns or trends, may help pre-defining adequate resolution scenarios, as well as facilitating the Dynamic DCB training process. STAM performance indicators shall be in line with harmonised Dynamic DCB post-ops performance assessment method and completed with locally relevant performance indicators. The harmonised Dynamic DCB post-ops performance assessment method shall be in line with REQ-07.06.05-OSED-0116.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0090.0000
Requirement	Dynamic DCB post-analyses performers shall be able to automatically call for and organise post-ops teleconferences with groups of stakeholders who have expressed an interest in evaluating the outcome of the Dynamic DCB activity.
Title	PDT-90 support to post-ops teleconference setting
Status	<Validated>

Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. The quality of the outcome of the Dynamic DCB activity may be assessed directly by the FMP who has initiated the process (nominal case), or may be assessed by a group of stakeholders who have expressed an interest in participating to the post-ops analysis. Such stakeholders may have sent a comment on the Dynamic DCB activity under study via e.g. a message to a users support desk, or may have directly participated to the STAM coordination process and have asked to take part of the post-ops analysis, or FMP may have judged it useful to involve them in the process. The system shall facilitate FMP tasks of dealing with the practical aspects of setting up such a post-ops teleconference (which may in turn be hold via a telephone device or any other teleconferencing tool). Dynamic DCB performance indicators shall be in line with harmonised Dynamic DCB post-ops performance assessment method and completed with locally relevant performance indicators. The harmonised Dynamic DCB post-ops performance assessment method shall be in line with REQ-07.06.05-OSED-0116.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7021

7022 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

7023

7024 [REQ]

Identifier	REQ-07.06.05-OSED-0091.0000
Requirement	Dynamic DCB post-analyses performers shall have access to the relevant template to be used for Dynamic DCB post-analysis reporting in view of carrying out their post-analysis.
Title	PDT-91 Dynamic DCB post-ops reporting
Status	<Validated>

Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. The quality of the outcome of the Dynamic DCB activity shall be assessed based on a robust performance assessment method, which shall include the use of an appropriate template, validated by relevant operations managers, notably those responsible for service performance control. The template shall be developed based on a harmonised Dynamic DCB post-ops performance assessment method, possibly adapted to locally relevant performance targets. The harmonised Dynamic DCB post-ops performance assessment method shall be in line with REQ-07.06.05-OSED-0116.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0092.0000
Requirement	Dynamic DCB post-analyses performers shall have access to any expressed Airspace Users preferences, as well as to any comment made, relevant to the Dynamic DCB activity under study.
Title	PDT-92 Dynamic DCB post-ops reporting
Status	<Validated>
Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. The quality of the outcome of the Dynamic DCB activity may be assessed directly by the FMP who has initiated the process (nominal case), taking account of the opinion of stakeholders who have expressed preferences or who have issued comments on the Dynamic DCB activity under study via e.g. a message to a users desk. The system shall facilitate FMP analysis of such input, through automated filtering and access to relevant comments and expressed preferences.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0093.0000
Requirement	Dynamic DCB post-analyses performers shall complete, validate and store Dynamic DCB post-analysis as soon as the Dynamic DCB activity under study is completed (hotspot status cleared).
Title	PDT-93 Dynamic DCB post-ops report editor
Status	<Validated>
Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. The system shall facilitate post-analysis reporting tasks (nominally carried out by FMP) through basic document edition facilities, tailored to the specific post-analysis reporting method (e.g. facilitated access to the appropriate template, easy access to automated performance indicators calculation facilities). The harmonised Dynamic DCB post-ops performance assessment method shall be in line with REQ-07.06.05-OSED-0116.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0094.0000
Requirement	Dynamic DCB post-analyses performers shall share validated STAM post-analysis reports with stakeholders who have participated to the STAM coordination process, or any other stakeholder that FMP chooses, for overall review purposes.
Title	PDT-94 Dynamic DCB post-ops report sharing
Status	<Validated>

Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. FMP may judge it appropriate, once the post-analysis report is completed and validated, to share the report with other stakeholders who might have been impacted by the STAM resulting of the Dynamic DCB activity, or directly with the stakeholders who have participated to the STAM coordination process. The harmonised Dynamic DCB post-ops performance assessment method shall be in line with REQ-07.06.05-OSED-0116.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0095.0000
Requirement	FMP initiator shall escalate the resolution of the imbalance to the Network Manager, at any moment during a tactical Dynamic DCB activity.
Title	PDT-95 Escalation Process to the Network Manager
Status	<In Progress>
Rationale	he cases identified for Network Manager escalation are: - Scenarios - Axis management - Complex coordination - Critical/special events - Crisis - Support to FMP who have no sufficient resource/expertise. In this case it concerns probably more a delegation mechanism. But we can imagine a delegation to a third-part (private company). The system shall in particular support FMP in making sure that the escalation is established according to applicable rules and procedures, and that the context, rationale, information sharing necessary are appropriately communicated to all concerned actors.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

7044 [REQ]

Identifier	REQ-07.06.05-OSED-0096.0000
Requirement	FMP and NM shall share information about an agreed escalation to the NM associated to a specific DCB issue.
Title	PDT-96 Notification of an Escalation to the Network Manager
Status	<In Progress>
Rationale	The cases identified for Network Manager escalation are: - Scenarios - Axis management - Complex coordination - Critical/special events - Crisis - Support to FMP who have no sufficient resource/expertise. In this case it concerns probably more a delegation mechanism. But we can imagine a delegation to a third-part (private company). The system shall in particular support FMP in making sure that the escalation is established according to applicable rules and procedures, and that the context, rationale, information sharing necessary are appropriately communicated to all concerned actors. Network Wide information sharing on escalations shall, in particular, support FMP in determining area whether the hotspots they are currently dealing with within their own area of responsibility may be considered together with other DCB problems addressed at Network level through the escalation process.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7045

7046 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

7047

7048 [REQ]

Identifier	REQ-07.06.05-OSED-0097.0000
Requirement	All actors involved in STAM activities (including FMP, AU, NM) shall monitor at all times and using a single summary display all the STAM measures that are being (drafted), proposed, coordinated, implemented, finished or abandoned Actors shall have access to such summaries sorted by - flights; - STAM id - STAM type - STAM status - STAM time-outs
Title	PDT- 97 STAM activities monitor / time-liner
Status	<In Progress>

Rationale	Various STAM activities may be carried out in parallel during a day of operations, possibly impacting the same FMP, AU or NM. A STAM activities monitor shall assist these actors in organising own work and ensuring interventions in the STAM processes they are concerned with. This shall be achieved by providing a synthetic view of which STAM activity shall be carried out at what time. As a minimum, this synthetic view shall enable to inform them on: - The STAMs considered on day of operation, together with their specific Type and up-to-date Status - The flights impacted for each STAM - The time-out associated to key decision milestone for each STAM (cf. REQ-07.06.05-OSED-0044.0000 and REQ-07.06.05-OSED-0069.0000) The monitoring function shall enable accessing details of the STAM impact on flights, through direct connection to the STAM flights profile monitor (cf. REQ-07.06.05-OSED-0055.0000).
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0098.0000
Requirement	FMP shall operate a dashboard facility providing an access to all STAM information / STAM commands relevant for FMP to efficiently organise his/her work associated with the various STAM activities, from hotspot detection to STAM implementation.
Title	PDT-98 STAM Dash Board display
Status	<Validated>

Rationale	The STAM Dashboard shall constitute the main tool supporting FMP in organising their tasks associated with all STAM activities. STAM activities are organised in a specific sequence of processes, implying a large number of sub-tasks that shall be completed in a coherent order and time-efficient manner. It is anticipated that FMP shall assume most of the workload associated with STAM activities, in a context of heavy time pressure. It is therefore important to provide FMP with appropriate support for organising his/her tasks in view of alleviating FMP workload and securing tasks completion in due time. The Dash Board shall thus be designed in such a way to: - highlight events / tasks processing timelines (progress on STAM Measures shall thus be displayed along a timeline). - provide adequate summary of relevant STAM information (related hotspot, STAM status, STAM Id) - provide comprehensive overview of all STAM that FMP is concerned with together with indication of when FMP shall pay particular attention to which STAM - provide flexibility to FMP to organise his/her tasks and agenda according to FMP preferences (e.g. capability to insert / modify information; set own alarm / time-out markers) - enable for FMP to command key STAM actions, like e.g. those required for the STAM coordination, directly from the dashboard interface The dash board shall be designed in such a way that - FMP accesses all relevant STAM information per hotspot in a single overview. FMP for each hotspot identified in the network shall be able to access such overview. - FMP are made fully aware of the timeline of events and actions associated with STAM activities for the day of operations - FMP manipulates such information at their convenience based on fast and intuitive Human-Machine interactions.. - FMP are able to launch specific processes, like coordination initiation, directly from manipulations of the dashboard. All the STAM Measures in progress or planned to address the hotspot shall be displayed (labelled) in the overview. The timeline for actions required for the STAM shall be indicated through the relative position of the STAM label along the time axis. FMP shall be able to insert/modify information along the timeline as alarm/time-out alarm markers for various things like coordination time-out, time for implementation.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0099.0000
Requirement	A STAM shall be automatically inserted in the STAM Dashboard and its corresponding label adequately positioned in the timeline frame as soon as FMP selects the measure for insertion in the STAM Dashboard (e.g. via the STAM Measure Editor).
Title	PDT-99 Integration of STAM Measure in the Dashboard
Status	<In Progress>
Rationale	The Dashboard shall support FMP in organising their tasks associated with STAM activities all along the successive stages required from early hotspot identification to STAM implementation and hotspot resolution. It is anticipated that FMP shall assume most of the workload associated with STAM activities, in a context of heavy time pressure. It is therefore important to provide FMP with appropriate support for organising his/her tasks in view of alleviating FMP workload and securing tasks completion in due time. In particular, FMP shall be able to integrate STAM measures in the dashboard as soon as a STAM is drafted in a straightforward and low workload consuming manner. this shall be enabled by automated transfer of STAM information from the STAM editor functionalities to the STAM dashboard, and a simple command (click) by FMP.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0100.0000
Requirement	Up-to-date STAM status shall be indicated in the STAM dashboard using a colour code applied to the STAM label.
Title	PDT-100 STAM Measure status in the Dash Board
Status	<In Progress>
Rationale	The Dashboard shall support FMP in organising their tasks associated with STAM activities all along the successive stages required from early hotspot identification to STAM implementation and hotspot resolution. It is anticipated that FMP shall assume most of the workload associated with STAM activities, in a context of heavy time pressure. It is therefore important to provide FMP with appropriate support for organising his/her tasks in view of alleviating FMP workload and securing tasks completion in due time. In particular, FMP shall be able to know at a simple glance at his/her dashboard what has been already completed on each STAM displayed, and what remains to be done. Signalling STAM status via a colour code, as prescribed in this requirement, is considered adequate to facilitate access to such information. The terminology and STAM status definition shall be in line with REQ-07.06.05-OSED-0112.0000
Category	<Operational>
Validation Method	<Live Trial>

Verification Method	

7061
7062 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

7063
7064 [REQ]

Identifier	REQ-07.06.05-OSED-0101.0000
Requirement	The ‘STAM labels displayed in the STAM dashboard shall include at least the following information - list of Flight id - Symbol of the STAM Measure (symbol to be defined)
Title	PDT-101 Dash-Board label information
Status	<In Progress>
Rationale	In line with REQ-07.06.05-OSED-0098.0000, the dashboard shall provide access to time-stamped STAM activities overviews for each hotspot identified in the network. STAM measures shall be represented by STAM “labels”. this requirement specifies the minimum information that such labels shall contain. d.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7065
7066 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

7067
7068 [REQ]

Identifier	REQ-07.06.05-OSED-0102.0000
Requirement	The timeline shall be represented by a vertical line, with the 0 reference representing the present time and a planning horizon of 4 to 6 hours with standard time graduation of 15 min.
Title	PDT-102 Timeline in the STAM Dash Board
Status	<In Progress>
Rationale	In line with REQ-07.06.05-OSED-0098.0000, the dashboard shall provide access to time-stamped STAM activities overviews for each hotspot identified in the network. Adequate representation of the timeline in the dashboard is an important feature facilitating FMP work organisation. the representation prescribed in this requirement was tested on a mock-up and judged appropriate (including the choice of a 15 minutes graduation). The horizon of planning is in line with the harmonised horizon of prediction applicable to Entry and Occupancy Count, used as baseline for hotspots predictions.
Category	<Operational>

Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0103.0000
Requirement	At expiration of specific STAM activities time-outs (as set notably for the coordination and implementation processes), the Dashboard shall deliver adequate alerts to FMP.
Title	PDT-103 Time-out in the Dash Board
Status	<Validated>
Rationale	In line with REQ-07.06.05-OSED-0098.0000, the dashboard shall provide access to time-stamped STAM activities overviews for each hotspot identified in the network. Adequate representation of the imminent expiration of the time dedicated to a specific STAM task in the dashboard is an important feature facilitating FMP work organisation. The representation prescribed in this requirement was tested on a mock-up and judged appropriate. Time-outs shall be notably in line with REQ-07.06.05-OSED-0069.0000 and REQ-07.06.05-OSED-0044.0000
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0104.0000
Requirement	FMP shall modify the different alarm times in the dashboard along the timeline.
Title	PDT-104 Changing Alarm time-out
Status	<In Progress>

Rationale	The STAM Dashboard shall support FMP in organising their tasks associated with STAM activities all along the successive stages required from early hotspot identification to STAM implementation and hotspot resolution. It is anticipated that FMP shall assume most of the workload associated with STAM activities, in a context of heavy time pressure. It is therefore important to provide FMP with appropriate support for organising his/her tasks in view of alleviating FMP workload and securing tasks completion in due time. An important aspect of FMP work organisation is the management of time-to-action. this requirement is specifically aimed at facilitating FMP in this time-management task by FMP with capabilities to set own alarm at his / her convenience. In addition, FMP shall be able to modify alert times in a straightforward and low workload consuming manner. the drag and drop approach shall enable this.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7077

7078 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

7079

7080 [REQ]

Identifier	REQ-07.06.05-OSED-0105.0000
Requirement	FMP shall insert in the STAM 'dashboard' - private memo - private alarm positioned at FMP desired time stamp in the timeline frame.
Title	PDT-105 Private information in the dash board
Status	<In Progress>
Rationale	The STAM Dashboard shall support FMP in organising their tasks associated with STAM activities all along the successive stages required from early hotspot identification to STAM implementation and hotspot resolution. It is anticipated that FMP shall assume most of the workload associated with STAM activities, in a context of heavy time pressure. It is therefore important to provide FMP with appropriate support for organising his/her tasks in view of alleviating FMP workload and securing tasks completion in due time. An important aspect of FMP work organisation is the management of time-to-action and reminders. This requirement is specifically aimed at facilitating FMP in this task by offering capabilities to record own alarm, and own memos to organise his / her work at his / her convenience.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7081

7082 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0106.0000
Requirement	FMP shall access to extended flight information directly from the dashboard.
Title	PDT-106 Extended Label Information
Status	<In Progress>
Rationale	In line with REQ-07.06.05-OSED-0098.0000, the dashboard shall provide access to time-stamped STAM activities overviews per hotspot identified in the network. For readability reasons not all information associated to a hotspot processing and associated STAM shall be displayed in the STAM dashboard overviews per hotspot. However easy and rapid access to such additional relevant information shall be secured through easy access directly from the dashboard. this is the case of the extended flight information of the list of flights concerned with STAM. The approach prescribed in this requirement to access such extended information was tested on a mock-up and judged appropriate.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0107.0000
Requirement	FMP shall manage the status of the STAM Measure by direct manipulations of the information contained in the Dash-Board.
Title	PDT-107 Management of the STAM Measure Status
Status	<Validated>

Rationale	In line with REQ-07.06.05-OSED-0098.0000, The dash board shall be designed in such a way that FMP manipulates STAM information at their convenience using fast and intuitive Human-Machine interactions. This requirement is in line with this approach. The STAM activities terminology and STAM status definition shall be in line with REQ-07.06.05-OSED-0112.0000 As well, FMP initiator shall have full and exclusive control of the administration of the STAM status for all STAM addressing hotspots detected in FMP area of responsibility. This may be enabled through drag & drops of the STAM Measure label from different positions in a STAM activities sequence diagram. The diagram shall distinguish the STAM Status - 'Draft' - 'Proposed' - 'Coordinated' - 'Implemented' - 'Abandoned' - 'Finished' Only the FMP initiator (responsible) of the STAM measure designated by the STAM Measure label shall be entitled to change the status
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0108.0000
Requirement	FMP shall initiate a STAM coordination directly from the dashboard. This may be enabled by selecting the STAM Measure from a 'Preparation' to a 'Coordination' giving to FMP the possibility to fill-in or modify information on - Role of actors (Action, Inform) - Free Text
Title	PDT-108 Moving the STAM Measure status from Preparation to Coordination
Status	<In Progress>
Rationale	In accordance with REQ-07.06.05-OSED-0098.0000, the dashboard shall be designed in such a way that FMP are able to launch specific processes, like coordination initiation, directly from manipulations of the dashboard. This requirement is in line with this approach. FMP workload shall be significantly alleviated by providing to FMP a rapid means of activating the STAM coordination messaging function (cf. REQ-07.06.05-OSED-0057.0000 for the description of the message content and REQ-07.06.05-OSED-0043.0000 for the description of the STAM coordination initiation functionality) and triggering automated pre-filing of STAM information through a simple drag and drop command.
Category	<Operational>

Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0109.0000
Requirement	When a new message has been received for a given STAM measure, an alert message shall be integrated in the dashboard.
Title	PDT-109 Coordination Message alert when receiving a new message
Status	<In Progress>
Rationale	In accordance with REQ-07.06.05-OSED-0098.0000 the dashboard shall be designed in such a way that FMP accesses all relevant STAM information per hotspot in a single overview. In particular, messages received in the context of a STAM coordination constitute essential information that shall be accessible to FMP via the dashboard. the display form suggested in this requirement was tested on a mock-up and judged adequate. The display of this input in the overview may take the form of a red bubble attached to the corresponding STAM measure label, indicating to FMP the number of unread messages addressed to him/her.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0110.0000
Requirement	The dash-board shall give access to comprehensive information of Actors participating to a STAM coordination and the up-to-date status of their decision on the STAM.
Title	PDT-110 Information about the number of actors involved in the negotiation and the agreement status
Status	<Validated>

Rationale	In accordance with REQ-07.06.05-OSED-0098.0000 The dash board shall be designed in such a way that FMP accesses all relevant STAM information per hotspot in a single overview. In particular, the number of actors participating to a STAM coordination and the up-to-date status of their decision in the context of a STAM coordination constitute essential information that shall be accessible to FMP via the dashboard. the display form suggested in this requirement was tested on a mock-up and judged adequate. The terminology applicable for the designation of participating actors roles shall in accordance with REQ-07.06.05-OSED-0065.0000 The status of decision shall be in line with REQ-07.06.05-OSED-0058.0000. In case no response has been received, the decision status is “pending”. In case no response has been received at STAM coordination time-out, the decision status is “expired”.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7101

7102 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

7103

7104 [REQ]

Identifier	REQ-07.06.05-OSED-0111.0000
Requirement	The STAM Dashboard shall propose different views - FMP view (main view): All the hotspot and STAM Measures contained in the FMP area of responsibility - TFV view: All the hotspot and STAM Measures contained in the TFV area - Hotspot view: All the STAM Measures contained in the hotspot area
Title	PDT-111 STAM Dash-Board Views
Status	<In Progress>
Rationale	The Dashboard shall support FMP in organising their tasks associated with STAM activities on day of operations. Therefore as a minimum requirement, the dashboard shall provide adequate overview of all tasks associated with STAM activities on day of operations. Of direct concern for FMP, are all STAM activities associated to hotspots within FMP area of responsibility. However, FMP may want to narrow-down their analysis of their work plan to STAM activities associated with a specific hotspot or a specific Traffic Volume (including outside of FMP area of responsibility, especially when FMP is solicited for participation to a collaborative STAM coordination / implementation effort). The dashboard shall thus be designed in accordance with these needs and the latter requirement shall not be restricted to hotspots / TFV within FMP area of responsibility.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7105

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0112.0000
Requirement	Actual progress on a STAM activity shall be recorded, reported and communicated using a standard STAM status indicator. The Status shall be expressed using a standard terminology. The Standard STAM status terminology shall be defined as follows: - DRAFT: local STAM elaboration stage - PROPOSED : An STAM Measure is proposed for coordination - COORDINATED : The STAM Measure has been coordinated and agreed - IMPLEMENTED : The decision is taken to implement the coordinated/agreed STAM Measure - ABANDONED : The STAM measure is abandoned - FINISHED : The STAM measure has been successfully implemented and considered finished at the hotspot exit time
Title	PDT-112 Harmonised terminology for STAM Status
Status	<Validated>
Rationale	Actual progress achieved on STAM coordination and implementation is key information supporting STAM activities, and is of interest to many parties, starting with all actors involved in STAM coordination processes. In order to ensure mutual understanding about STAM activities progress, a harmonised terminology shall be applied to clearly distinguish the different stages reaches towards STAM implementation. The harmonised terminology prescribed herein was defined, based on the key milestones identified in the STAM process.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0113.0000
Requirement	Hotspots, STAM coordination messages and STAM measures published at Network level and / or shared between different actors shall be identified using a single Identifier common to all parties within the network.
Title	PDT-113 common STAM Identifiers
Status	<Validated>

Rationale	A large number of STAM activities, STAM measures and hotspots may simultaneously be considered over the network; as well as circulate over the network of information support systems. It is therefore important, in order to avoid confusion, to implement a service that secures unique identification of STAM, STAM coordination messages and hotspots at network level.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0114.0000
Requirement	FMP, Airspace Users and Network Management having monitoring and decision-making responsibilities in STAM activities shall be appropriately trained on dynamic DCB / STAM activities based on training packages harmonised at network level.
Title	PDT-114 basic ops training
Status	<In Progress>
Rationale	Dynamic DCB activities are characterised by collaborative work between FMP, Airspace Users and Network Managers under heavy time pressure (tactical stage). As well, a number of d-DCB / STAM activities imply the use of harmonised terminologies, rules and principles, which all actors involved shall be fully aware of beforehand. In addition, d-DCB activities extensively rely on NM, AU and especially FMP capacity to deliver expert judgment and adequate interpretation of DCB and STAM information. Harmonised level of expertise over the network is therefore a key enabler of dynamic DCB / STAM activities. Today, the level of expertise significantly varies. Notably some FMP are already very familiar with using Occupancy Counts as primary DCB indicators, whilst others are not. Alignment of FMP training in particular, is therefore regarded as key for maximising the benefit of implementing dynamic DCB over the network.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0115.0000

Requirement	Escalations to the Network Manager triggered by FMP initiator shall be executed according to a harmonised procedure, specifying the cases when escalations can take place, and for each case, which course of action shall be followed by the various actors involved.
Title	PDT-115 Harmonised procedure for the Escalation to the Network Manager
Status	<In Progress>
Rationale	In order to ensure that effective resolution of critical DCB situations involving an escalation to Network Manager can be achieved in due time and without excess complexity, a clear harmonised escalation procedure shall be specified and appropriately documented in the system. The cases so far identified for Network Manager escalation and that shall be addressed through the procedure, include: ? Scenarios ? Axis management ? Complex coordination ? Critical/special events ? Crisis ? Support to FMP who have no sufficient resource/expertise. In this case it concerns probably more a delegation mechanism. But we can imagine a delegation to a third-part (private company). including whenever applicable, relevant lists of action plans associated to each case.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0116.0000
Requirement	Dynamic DCB activities post-analyses shall be carried out in line with a network-wide harmonised post-ops Dynamic DCB performance assessment method, based on relevant, harmonised performance indicators, possibly completed with and adapted to local performance targets.
Title	PDT-116 harmonised post-ops Dynamic DCB activity performance assessment method
Status	<In Progress>

Rationale	The Dynamic DCB concept includes post-operational activities, taking place after the tactical Dynamic DCB process is completed, and which are essentially aimed at assessing the quality of the outcome of the activity, learning lessons from such experience, and identifying ways of improving both the responses and the processes (including the Collaborative Decision Making processes) supporting it. This post-ops work is mostly granted on the analysis of past decision-made, past actions implemented, and evolution of the operational situation all along the time the Dynamic DCB activity under analysis took place. Under nominal circumstances, Dynamic DCB post-ops analyses are performed by FMPs. In order to facilitate co-joined analysis of the quality of the outcome obtained, and Collaborative Decision Making, and in order to inscribe the Dynamic DCB activity in the wider ATM service performance improvement mechanism, a harmonised basis for the Dynamic DCB post-ops analysis is prescribed here. This harmonised approach shall be completed with and further adapted to local performances considerations. In order to achieve this, a harmonised baseline post-ops analysis method, associated with harmonised baseline template for the reporting, is prescribed here.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0200.0000
Requirement	In case, the Airspace User (AOC, CFPSP or flight plan filer) use the ICAO FPL, the EET information of the route shall be included in the F18 EET information for all significant points indicated in their ICAO FPL (F15) as described in project P762, early step1. The Airspace User (AOC, CFPSP or flight plan filer) shall include aircraft performance information in their ICAO FPL (F18).
Title	TTA-200
Status	<In Progress>
Rationale	The EET is a temporary solution to mitigate the absence of the ISBT
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0201.0000
Requirement	The Airspace User shall fulfil the 4D profile when using the iSBT (AOC, CFPSP or flight plan filer)
Title	TTA-201
Status	<In Progress>
Rationale	The ISBT needs to be fulfiled.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0202.0000
Requirement	Flights 4D profile shall be elaborated taken into account the ICAO FPL field 18 (EETs and aircraft performance)
Title	TTA-202
Status	<In Progress>
Rationale	The ETFMS needs to exploit the EET to calculate 4D profile including ETA and ETO information.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0203.0000
Requirement	In case of DCB time-based constraint, the NIMS shall determine the TTO/TTA value for each regulated flight from the received ICAO FPL 4D profile for the concerned point of the F15 or from the received ISBT 4D profile.
Title	TTA-203
Status	<Validated>

Rationale	The ETFMS needs to exploit the filed 4D profile to calculate CTOT and TTA/TTO
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0204.0000
Requirement	SAM and SRM messages containing available CTOT+TTA/TTO information shall be distributed to concerned actors
Title	TTA-204
Status	<In Progress>
Rationale	The CTOT and TTA/TTO needs to be transmitted to relevant actors when required (Aiport, ACC/ATSU, Airspace Users, Regional/Sub-Regional/Local Network)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0205.0000
Requirement	TTA/TTO information shall be accessible to the concerned actors
Title	TTA-205
Status	<Validated>
Rationale	The TTA/TTO information needs to be displayed on Support Tools
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0206.0000
Requirement	The Airspace User shall receive the TTA/TTO information
Title	TTA-206
Status	<In Progress>
Rationale	The AOC or Airspace User needs to receive the TTA/TTO
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0207.0000
Requirement	The Airspace User shall handle the TTA/TTO information
Title	TTA-207
Status	<Validated>
Rationale	The AOC or Airspace User needs to handle the TTA/TTO
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0208.0000
Requirement	The Airport shall receive the TTA/TTO information
Title	TTA-208
Status	<Validated>
Rationale	The Airport needs to handle the TTA/TTO
Category	<Operational>
Validation Method	<Live Trial>

Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0209.0000
Requirement	The Airport shall handle the TTA/TTO information
Title	TTA-209
Status	<In Progress>
Rationale	The Airport needs to handle the TTA/TTO
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0210.0000
Requirement	The flight crew shall receive the TTA/TTO information
Title	TTA-210
Status	<In Progress>
Rationale	The flight crew needs to receive the TTA/TTO
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0211.0000
Requirement	The flight crew shall handle the TTA/TTO information

Title	TTA-211
Status	<Validated>
Rationale	The flight crew needs to receive the TTA/TTO
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0212.0000
Requirement	The ACC/ATSU concerned by the ICAO FPL or the ISBT shall receive the TTA/TTO information from NMF
Title	TTA-212
Status	<In Progress>
Rationale	The ACC/ATSU need to be able to display this information or part of it either directly on their working interface (i.e. ATCO's Controller Working Position) or on a dedicated interface (NOP portal, CHMI, tablet similar to iPad .....)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0213.0000
Requirement	The ACC/ATSU shall handle the TTA/TTO information
Title	TTA-213
Status	<Validated>
Rationale	The ACC/ATSU need to be able to display this information or part of it either directly on their working interface (i.e. ATCO's screen) or on a dedicated interface (NOP portal, CHMI, tablet similar to iPad .....)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0214.0000
Requirement	The Airport shall assign a TTOT as close as possible to the CTOT, preferably TTOT= CTOT± 5’
Title	TTA-214
Status	<In Progress>
Rationale	The Airport needs to manage the TTOT in order to adhere as best as possible to the CTOT
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0215.0000
Requirement	The Flight Crew shall enter the TTA/TTO as an RTA into the FMS
Title	TTA-215
Status	<In Progress>
Rationale	The FMS needs to fly flight plan in order to achieve the TTA/TTO Target
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0216.0000
Requirement	The Flight Crew shall disregard TTA information following the receipt of a CTA clearance from ATC.

Title	TTA-216
Status	<In Progress>
Rationale	The Crew/Pilot needs to replace the TTA with a received CTA from ATC. Once a CTA is issued the TTA makes no further contribution to the flight execution phase.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0217.0000
Requirement	The ACC/ATSU TMA shall manage flight with TTA constraint.
Title	TTA-217
Status	<In Progress>
Rationale	The CTA constraint for flight arriving with TTA need to be managed by the ACC/ATSU TMA The trajectory prediction takes into account the estimated time over the COP (Coordination Point) and the AMAN tool places the aircraft in the initial arrival sequence. In the event that there is a need to manage the sequence the arrival management tool will calculate a CTA with reference to the IAF for the aircraft.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0218.0000
Requirement	The Regional/Sub-Regional/Local Network shall avoid any change in the planning of TTA/TTO-constrained flights
Title	TTA-218
Status	<Validated>
Rationale	The Regional/Sub-Regional/Local Network shall try not to interfere with TTA/TTO-constrained flight

Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0219.0000
Requirement	The ACC/ATSU shall consider the impact on TTA adherence before altering the trajectory in order to allow the flight to comply with its TTA. Where safety and separation permit, the ACC/ATSU shall support the flight plan adherence of an ATFCM regulation indicated flight
Title	TTA-219
Status	<In Progress>
Rationale	Where safety and separation permit, the ACC/ATSU shall support the flight plan adherence of flight indicating that it is subject to an ATFCM measure.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0220.0000
Requirement	The procedure shall be allow the Airspace User to update the EET (only to a greater value)
Title	TTA-221
Status	<In Progress>
Rationale	It needs to provide to the Airspace User flexibility in order to update its EET.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0221.0000
Requirement	In case the Airspace User wants to depart on time or before the allocated CTOT but still wants to maintain its TTA/TTO, he/she shall update its EET.
Title	TTA-222
Status	<In Progress>
Rationale	It needs to provide to the Airspace User flexibility in order to update the EOBT to a later time while keeping the TTA/TTO.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0300.0000
Requirement	The DCB actors and Airspace Users shall use an electronic CDM support to exchange the airport impact assessment information
Title	AIMA-300
Status	<Validated>
Rationale	It needs to provide an electronic communication support to exchange AIMA information
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0301.0000
Requirement	The updates of the Airport Impact Assessment information shall contain batched AOP assessments for all flights whose TTA has been processed by the AOP (for the reference arrival regulation).
Title	AIMA-301
Status	<Validated>

Rationale	It needs to provide the history of all the AIMA updates whose TTA has been processed by the AOP
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0302.0000
Requirement	The Airport Impact Assessment information updates shall be human readable and intuitive.
Title	AIMA-302
Status	<Validated>
Rationale	It needs to provide a friendly-user AIMA information
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0303.0000
Requirement	The DCB actors shall use the Airport Impact Assessment updates to order flights by TTA time.
Title	AIMA-303
Status	<Validated>
Rationale	It needs to provide the AIMA updates sorted by TTA time
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0304.0000
Requirement	An Airport Impact Assessment update shall contain a version number to assist with synchronisation.
Title	AIMA-304
Status	<Validated>
Rationale	The AIMA message must be numbered
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0305.0000
Requirement	NMOC actors shall manually process the latest received Airport Impact Assessment information update every twenty minutes from time of activation until termination or cancellation of the regulation.
Title	AIMA-305
Status	<Validated>
Rationale	The processing by NMOC of AIMA update will occur every twenty minutes from time of activation until termination or cancellation of the regulation.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0306.0000
Requirement	NMOC actors shall manually assess the Airport Impact Assessment information update by comparing the TTA values with those contained within NMF.
Title	AIMA-306
Status	<Validated>
Rationale	It needs to check if a TTA difference (AIMA and ETFMS TTA values)occurred during the AIMA update.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0307.0000
Requirement	NMOC actors shall determine if a TTA difference (between the Airport Impact Assessment Information and the NMF) is noted during the update, then no action shall be performed on that flight.
Title	AIMA-307
Status	<Validated>
Rationale	It needs to check if a TTA difference occurred during the AIMA update. In such a case no action will be performed on that flight.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0308.0000
Requirement	The Airport Impact Assessment Information updates shall contain Flight ARCID, Severity, TTA and TTA time margins (minimum, maximum).
Title	AIMA-308
Status	<Validated>
Rationale	The AIMA message shall contain (Flight ARCID, Severity 0,1,2,3, TTA value HH.MM, TTA Time margins - min, +min)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0309.0000

Requirement	TTA time margins (minimum, maximum) shall contain positive or negative times in minutes that reflect the acceptable time margins relative to the TTA for the flight to meet its airport turnaround commitments.
Title	AIMA-309
Status	<Validated>
Rationale	The TTA time magrins can be expressed in [+x min] and [-x min]
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0310.0000
Requirement	Subject flights shall be prioritised for processing based upon the Airport Impact Assessment severity (3 highest and 1 lowest priority) then by TTA time (earliest is highest priority);
Title	AIMA-310
Status	<Validated>
Rationale	It needs to prioritise the flight depending of severity and TTA time
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0400.0000
Requirement	A modified Most Penalizing regulation rule shall be apply for CASA and STAM solutions
Title	MPR-400
Status	<In Progress>

Rationale	A modified Most Penalizing regulation rule shall be apply for CASA and STAM solutions The flag “Flight-under-constraint S” will be created at the first flight ‘STAMed’ or the flag “Flight-under-constraint R” will be created for flight affected by a regulation. ? Flight with a status “flight-under-constraint S” or “flight-under-constraint R” cannot be eligible for an other STAM Measures. ? Flight with a status “flight-under-constraint S” can be eligible for an other regulation and the on-going STAM Measure will be cancelled. ? Flight with a status “flight-under-constraint R” can be eligible for an other regulation and the MPR principle will be apply as today. In case a CASA regulation will be apply on flight “flight-under-constraint S” with a STAM status not yet implemented, an automated STAM Measure cancellation will be performed.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0401.0000
Requirement	The CASA regulation shall over-rule the STAM Measure in case of multiple constraint affecting a flight
Title	MPR-401
Status	<Validated>
Rationale	In case a CASA regulation will be apply on flight “flight-under-constraint S” with a STAM status not yet implemented, an automated STAM Measure cancellation will be performed.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0401.0001
Requirement	Force Target Time to cherry-picked STAM flight shall be available in the execution phase

Title	Force Target Time in the execution phase
Status	<Validated>
Rationale	The Force Target Time to cherry-picked STAM flight shall be available in the execution phase
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0402.0000
Requirement	The Hotspot Resolution Area shall be calculated based on the initial hotspot area capture and the recovery period as a consequence of the smoothing effect
Title	Hotspot Resolution Area
Status	<In Progress>
Rationale	In case of DCB time-based constraints assigned to flights, the hotspot resolution area shall take into account the recovery period due to the smoothing effect
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0404.0000
Requirement	The Target Time information assignment status shall be : creation, update, cancellation
Title	Target Time information status
Status	<Validated>
Rationale	The Target Time information status are: - creation : to create and assign a TT value - update : to update the TT value - cancel : to cancel the TT measure
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0405.0000
Requirement	In the pre-departure phase, the Target Time 'creation' shall be notified to NMF, ATC, AOC and pilots
Title	Target-Time creation in the Pre-departure phase
Status	<Validated>
Rationale	In the pre-departure phase, the NMF, ATC, AOC, pilots actors shall receive the TT assignment
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0406.0000
Requirement	In the pre-departure phase, the Target Time 'update' shall be notified to NMF, ATC, AOC and pilots
Title	Target-Time update in the Pre-departure phase
Status	<Validated>
Rationale	In the pre-departure phase, the NMF, ATC, AOC, pilots actors shall receive the TT update
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0407.0000
Requirement	In the pre-departure phase, the Target Time 'cancellation' shall be notified to NMF, ATC, AOC and pilots
Title	Target-Time cancellation in the Pre-departure phase

Status	<Validated>
Rationale	In the pre-departure phase, the NMF, ATC, AOC, pilots actors shall receive the TT cancellation
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0408.0001
Requirement	In the execution phase, a Target Time shall be created, coordinated, implemented and disseminated using the STAM process (DCB measures catalogue)
Title	Target-Time creation in the execution phase
Status	<Validated>
Rationale	In the execution phase, a Target Time shall be created, coordinated, implemented and disseminated using the STAM process
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0409.0000
Requirement	In the execution phase, the Target Time shall be updated and disseminated using the STAM process
Title	Target-Time update in the execution phase
Status	<In Progress>
Rationale	In the execution phase, the Target Time shall be updated and disseminated using the STAM process
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0411.0000
Requirement	In the execution phase, the Target Time shall be cancelled and disseminated using the STAM process
Title	Target-Time cancellation in execution phase
Status	<In Progress>
Rationale	In the execution phase, the Target Time shall be cancelled and disseminated using the STAM process
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0415.0000
Requirement	When the Local DCB proposes a Target Time Measure, The Target Time measure information shall be provided to the AOP-NOP
Title	Target Time information & AOP-NOP
Status	<Validated>
Rationale	The Target-Time assignment shall be notified to the Airport and Network View
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0416.0000
Requirement	The Target Time information shall be disseminated to the NMF functions through the B2B Services
Title	Target Time dissemination to NMf
Status	<Validated>
Rationale	The Target-Time assignment shall be disseminated to the NMF functions
Category	<Operational>

Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0417.0000
Requirement	The Target Time information shall be disseminated to the ATC functions through the messaging capabilities
Title	Target Time dissemination to ATC
Status	<In Progress>
Rationale	The Target-Time assignment shall be disseminated to the ATC systems
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0418.0000
Requirement	The Target Time information shall be disseminated to pilot functions through the AOC ACARS or others messaging support for flight in the pre-departure phase
Title	Target Time dissemination to pilots in the pre-departure phase
Status	<In Progress>
Rationale	The Target Time information shall be disseminated to pilot functions through the AOC ACARS messaging for flight in the pre-departure phase
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0420.0000

Requirement	The Target Time information shall contain the following information - Flight ID - Target Time (TT) - TT_Fix - Status STAM (proposed, coordinated, implemented, abandonned, finished) - Status TT: (creation, update, cancellation) - MPR (Most Penalizing Regulation) - ATC Advisory to be sent to the pilot - Static Target Window
Title	Target Time information content
Status	<In Progress>
Rationale	The Target Time information shall contain the following information - Flight ID : Flight Identifier - Target Time (TT) : HH:MM - TT_Fix : Reference Point to calculate and manage the Target Time - Status STAM (proposed, coordinated, implemented, abandonned, finished) Status TT = (creation, update, cancellation) - MPR = (yes, No) - ATC Advisory to be sent to the pilot - Static Target Window
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0421.0000
Requirement	The Calculation of the Target Time Deviation Indicator shall be based on - TDI : Target Deviation Indicator = TT - ATT - ATT : Achievement of Target Time
Title	Calculation of Target Time Deviation Indicator (TDI)
Status	<Validated>
Rationale	The Target Time Deviation Indicator information shall contain the following information - Flight ID : Flight Identifier - TDI : Target Deviation Indicator = TT - ATT (processed from messages (APR./EPP, CPR, FSA)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0422.0000
Requirement	The Target-Time Deviation shall be notified to the AOP-NOP
Title	Target Time Deviation & AOP-NOP
Status	<In Progress>
Rationale	The Target-Time assignment shall be notified to the Airport and Network View
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0423.0000
Requirement	The B2B Services or messaging shall disseminate the Target Time Deviation information
Title	Target Time Deviation Indicator dissemination
Status	<In Progress>
Rationale	The Target-Time assignment shall be disseminated to the NMF functions
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0424.0000
Requirement	A static Target Window (TW) shall be associated to the Target Time
Title	Static Target Window (TW)
Status	<Validated>
Rationale	This Target Window corresponds to the uncertainties and marge of manœuvre of the flight to achieve the target Time

Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0425.0000
Requirement	The value of the Target Window (TW) shall be defined depending of the flight status (pre-departure, departure, execution phases)
Title	Value of the Static Target Window (TW)
Status	<Validated>
Rationale	The value of the target Window (TW) shall be defined depending of the flight status (pre-departure, departure, execution phases)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0427.0000
Requirement	An automatic detection of Hotspot Resolution Deviation shall alert the FMP
Title	Automatic Hotspot Resolution Detection
Status	<Validated>
Rationale	An automated system shall detect that the Hotspot Resolution is deviating comparing to the DCB plan
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0428.0000

Requirement	The automatic detection of the Hotspot Resolution shall be calculated taken into account - static Target Window - TDI
Title	Monitoring of the Hotspot Resolution & Target Time Deviation
Status	<In Progress>
Rationale	The automated deviation detection of the hotspot resolution shall be based on TW and TDI information
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0431.0000
Requirement	The DCB Revision Process shall be activated by the FMP whenever - A deviation of the hotspot resolution is detected by the system indicating that the hotspot is no longer resolved - A deviation of the hotspot resolution indicating the hotspot is cleared - A Target Time Update/Cancellation Proposal has been received
Title	DCB Revision Process
Status	<Validated>
Rationale	The DCB revision process is activated by the FMP in case - a deviation is detected at the Hotspot Resolution level - a deviation is detected at the trajectory Level (Target Time deviation)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0433.0000
Requirement	The Target Time Update Proposal shall be notified by NMF when : TDI not included in [-TW, +TW] and ATT inside the hotspot area
Title	Target Time Update Proposal

Status	<In Progress>
Rationale	The detected deviation do not allow the flight to recover to the Target.The Target-Time should be updated in order to reflect its ETO.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0434.0000
Requirement	The Target Time Cancellation Proposal shall be notified by NMF when : TDI ? [-TW, +TW] and ATT outside the hotspot area or if the hotspot has been abandonned
Title	Target Time Cancellation Proposal
Status	<In Progress>
Rationale	The TT should be cancelled for cases : 1) The detected deviation does not allow the flight to recover to the Target. In addition, the ATT indicates that the flight is outside of the hotspot area 2) the hotspot has been abandonned
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0435.0000
Requirement	The B2B Services or messaging shall disseminate the Target Time Update Proposal
Title	Target Time Update Proposal
Status	<In Progress>
Rationale	The Target-Time Update Proposal shall be disseminated to the NMF functions
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0436.0000
Requirement	The B2B Services or messaging shall disseminate the Target Time Cancellation Proposal
Title	Target Time Update Proposal
Status	<In Progress>
Rationale	The Target-Time Cancellation Proposal shall be disseminated to the NMF functions
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0028	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0437.0000
Requirement	An editor shall support the preparation and the monitoring of the Target-Time measures
Title	Target-Time Editor
Status	<In Progress>
Rationale	An editor shall support the preparation and the monitoring of the Target-Time measures.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0439.0000
Requirement	The Target-Time information shall be displayed on the Network Working Position (NWP)
Title	Target Time displayed on NWP
Status	<Validated>
Rationale	HMI NWP shall display the TT information
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0440.0000
Requirement	The Target-Time Deviation information shall be displayed on the NWP
Title	Target Time Deviation displayed on NWP
Status	<Validated>
Rationale	HMI NWP shall display the TT deviation information
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0441.0000
Requirement	The Target-Time Editor shall support the Target-Time assignment
Title	Target Time Editor on NWP
Status	<Validated>
Rationale	HMI NWP shall manage the TT edition
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0442.0000
Requirement	The Hotspot Management display shall provide different views to compare the DCB plan and execution
Title	Hotspot Management Display for Monitoring
Status	<In Progress>

Rationale	The Hotspot Management will provide the following views - View 1 : the planned hotspot resolution - View 2 : the current hotspot resolution taking into account the TDI
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0444.0000
Requirement	The FMP shall manage the assignment of STAM Target-Time Measures in order to ensure a proper and efficient resolution of the hotspot
Title	Hotspot-Centric Management
Status	<Validated>
Rationale	The FMP is responsible to assign the necessary STAM measures in order to support a proper and efficient hotspot resolution, in particular when assigning STAM target-time.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0500.0000
Requirement	The NMOC actor shall access to the Supervision tool proposing the following displays - DCB Monitor - DCB Monitor MAP - TimeLine - Occupancy Count - Flight List - Messenger Trajectory Horizontal/Vertical View
Title	SPV-500
Status	<In Progress>
Rationale	The NMOC actor have to build the Network Situation Awarness concerning the imbalance, hotspot, CASA and STAM Measures.

Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7397

7398 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

7399

7400 [REQ]

Identifier	REQ-07.06.05-OSED-0501.0000
Requirement	The NMOC actor NMOC shall access to the DCB Monitor providing an HMI TFV List versus time to display the imbalance alert.
Title	SPV-501
Status	<In Progress>
Rationale	The imbalance alert will be displayed - start time - end time - imbalance severity o Green Line : below the sustain threshold o Orange Line : between the sustain threshold and the peak threshold and a duration < 20 min o Red Line : between the sustain threshold and the peak threshold and a duration > 20 min OR over the peak threshold The DCB Monitor will display the Hotspot zone for the concerned TFV - start time - end time - Type of proposed measures o R : Regulation measure o S : STAM measure o C : Capacity measure (Military) - Hotspot severity o Green Zone : below the sustain threshold o Orange Zone : between the sustain threshold and the peak threshold and a duration < 20 min o Red Zone : between the sustain threshold and the peak threshold and a duration > 20 min OR over the peak thresold - Potentially resolved : Yes/No Detailed Hotspot information will be displayed with mouse over the TFV period concern. Detailed Imbalance information will provide - Reference delay - New Delay
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7401

7402 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

7403

7404 [REQ]

Identifier	REQ-07.06.05-OSED-0502.0000
Requirement	The NMOC actor shall access to the DCB Monitor/MAP providing an HMI representing an horizontal view of the TFV.
Title	SPV-502
Status	<In Progress>
Rationale	The DCB Monitor MAP will provide information regards to the time selected in the DCB Monitor Time. The MAP will display for TFV - Imbalance severity o Green : below the sustain threshold o Orange : between the sustain threshold and the peak threshold and a duration < 20 min o Red : between the sustain threshold and the peak threshold and a duration > 20 min OR over the peak threshold The MAP will display for TFV - Hotspot severity o Green Hatched: below the sustain threshold o Orange Hatched : between the sustain threshold and the peak threshold and a duration < 20 min o Red Hatched : between the sustain threshold and the peak threshold and a duration > 20 min OR over the peak threshold Detailed Hotspot information will be displayed with mouse over the TFV period concern. Detailed Imbalance information will provide - Reference delay - New Delay - Potentially resolved : Yes/No - Type of proposed measures o R : Regulation measure o S : STAM measure o C : Capacity measure (Military) - Potentially resolved: Yes/No
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

7405

7406 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0503.0000
Requirement	The NMOC actor shall access to the timeline
Title	SPV-503
Status	<In Progress>
Rationale	The Timeline HMI shall display - STAM Measures - Regulation Measures - Capacity Measures (Military) The NMOC will have mainly Regulation Measures in the Left Hand Side: For action (i.e. to activate a regulation)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0504.0000
Requirement	The NMOC actor shall access to the Trajectory Horizontal/Vertical View
Title	SPV-504
Status	<In Progress>
Rationale	The HMI will display the initial SBT and the initial SBT + planned constraints in order to visualize the temporal and geographical trajectory changes.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0505.0000
Requirement	NMOC actor shall access to the Flight List
Title	SPV-505
Status	<In Progress>

Rationale	The Flight List shall contain additional information - Type of Measures o Regulation o STAM ? Type of Measure (LC, TONB, MDI…) ? Measure details
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0601.0000
Requirement	The tool shall display the list of alternate airport preferences for each aircraft candidate for diversion
Title	MassDiv-601
Status	<In Progress>
Rationale	The requirement shall ease the selection by the Airspace User of the prefered alternate aerodrome
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0602.0000
Requirement	The tool shall distinguish between constraints and preferences. The constraints exclude candidate diversions from the list, while preferences allow ranking the candidates
Title	MassDiv-602
Status	<In Progress>
Rationale	The requirement shall ease the selection by the Airspace User of the prefered alternate aerodrome, while preventing it to select an aerodrome which is anyway not available or in conflict with ATC constraints
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0603.0000
Requirement	Preferences shall be captured by the Airspace Users during preparation, pre-diversion and diversion phases. By default, the most recently introduced preferences have priority on the olders
Title	MassDiv-603
Status	<In Progress>
Rationale	In the preparation phase, diversion plans are elaborated to identify which aerodromes should be involved in the MassDiv process. AU preferences are already usefull at this stage to determine if it would be usefull or not to contact additional aerodromes to be added in the diversion plan. During the execution of the MassDiv process, when coming closer to the booking of alternate slote, or even the actual decision to divert, AU preference might evolved depending on the evolution of the operational context and the business needs. It is therefore essential to allow the AU to adapt their preferences accordingly.
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0604.0000
Requirement	The aerodrome mentionned in the Alternate Aerodrome field of the FPL shall be captured by the tool and considered as a pre-diversion preference
Title	MassDiv-604
Status	<In Progress>
Rationale	The Alternate Aerodrome field of the FPL provide an possible solution for a requested diversion. On the other hand, the operational context might involve that no parking slot is available anymore in this alternate aerodrome hence the need to allow the AU to adapt the list of preferences accordingly.
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0605.0000
Requirement	The Airspace User shall have the possibility to change the diversion preference order
Title	MassDiv-605
Status	<In Progress>

Rationale	AU preference might evolved depending on the evolution of the operational context and the business needs. It is therefore essential to allow the AU to adapt their diversion preferences accordingly.
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0606.0000
Requirement	Diversions preferences in conflict with constraints shall be indicated as non-compliante in the preference list
Title	MassDiv-606
Status	<In Progress>
Rationale	Constraints mentionned here refer to the Diversion Strategy defined by the ANSP responsible for the area associated to the major airport for which the öqssDiv process is executed. Some of these ANSPs (e.g. DSNA) apply diversion strategies easying the management of the traffic to be diverted (e.g. the Quadrant Approach for Paris CDG, preventing flights crossing in the center of Paris ACC). On the other hand, some alternate might still be requested by AU/Flight Crew, despite a possible conflict with the diversion strategy. The information about the conflict is made available to the ATCO and the Flight Crew. The latter will take the diversion decision after coordination with the ATCO.
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0607.0000
Requirement	For each flight, available diversion aerodromes shall be listed by order of preference
Title	MassDiv-607
Status	<In Progress>
Rationale	The requirement allows the Flight Crew, in coordination with the ATCO, to decide on the diversion with due information about AU preferences
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0608.0000
Requirement	A warning shall be triggered/displayed in case of conflict between AU and ANSP preferences for a given flight
Title	MassDiv-608
Status	<In Progress>
Rationale	See MassDiv-606
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0609.0000
Requirement	A warning shall be triggered/displayed in case there is no available parking slot among the AU preferences for a given flight
Title	MassDiv-609
Status	<In Progress>
Rationale	The warning might be used, either by the AU to modify the order of diversion preferences, or by the Diversion Information Manager (DIM) , in coordination with the Alternate Aerodrome, to provide additional parking stands
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0610.0000
Requirement	For each diversion plan, the tool shall capture and indicate the name and coorinates of the Diversion Information Managers (arrival and en-route)
Title	MassDiv-610
Status	<In Progress>
Rationale	Key information for the CDM process
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0611.0000
Requirement	For each flight, the tool shall indicate the Aircraft Operator, or the Operating AO if mentionned in FPL
Title	MassDiv-611
Status	<In Progress>
Rationale	Key information for the CDM process
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0612.0000
Requirement	For each Aircraft Operator referred to in a diversion list, the tool shall allow the capture and shall indicate the contact address
Title	MassDiv-612
Status	<In Progress>
Rationale	Key information for the CDM process
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0613.0000
Requirement	For each flight, the tool shall display the number of persons on board (POB field from the FPL if available, otherwise the max POB for the aircraft type will be used. This info can be updated following coordination with the pilot or the AOC).
Title	MassDiv-613
Status	<In Progress>
Rationale	The information allow the Alternate Aerodromes to assess the number of passengers they would have to deal with, in case decision is taken to leave the aircraft.
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0614.0000

Requirement	For each aerodrome of diversion, the tool shall display the number of persons arriving due to diversion (i.e. the sum of POB of all flights having selected the aerodrome)
Title	MassDiv-614
Status	<In Progress>
Rationale	See MassDiv-614
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0615.0000
Requirement	In preparation for the Recovery Phase, the tool shall display the list of diverted aircraft, with their original destination, and their diversion aerodrome
Title	MassDiv-615
Status	<In Progress>
Rationale	An objective of MassDiv is the support the Recovery Phase by providing key information to the actors of this phase, namely the Major Aerodromes, the associated ANSP, the Airspace Users and the Network Manager.
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0616.0000
Requirement	For each flight in the recovery list, the tool shall allow the Airspace Users to capture the recovery duration (in the form of: Take-Off not before and/or Take-Off not later)
Title	MassDiv-616
Status	<In Progress>
Rationale	Key information as input of the Recovery Phase
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0617.0000

Requirement	In case of change in the diversion period (e.g. the start of diversion is delayed), the status and the diversion booking of the flight list shall be updated to take the new diversion period into account
Title	MassDiv-617
Status	<In Progress>
Rationale	The actual period of the diversion is not necessarily known at the beginning of the diversion period and might be updated extended or shortened) during the diversion phase
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0618.0000
Requirement	The following Flight Diversion States shall recognize: TO_PROCESS - the flight arrives at the MassDiv airport during the diversion period, and requires processing by the actors of the diversion process. By default, the application will consider such flights as requiring diversion (and will be counted in the 'traffic demand' for parking spaces) EXCLUDED - the flight arrives at MassDiv airport during diversion period, but for any reason has been excluded from the diversion process by the MassDiv DIM. (e.g. the flight has been authorized to land at the MassDiv airport). RESERVED - Diversion has been discussed between En-Route or MassDiv DIM and the flight crew (possibly in coordination with FOC), and the latter booked a parking slot for diversion DIVERTED - Decision to diverted is taken by the flight crew (possibly in coordination with FOC), and an AFP is sent
Title	MassDiv-618
Status	<In Progress>
Rationale	The flight status allows to filter out flights selected by the diversion period in order to identify rapidly which need to be associated with an alternate aerodrome. Furthermore, once the decion is taken, either to book a slot or to actually divert, it is important to consider these decision in the assessment of the available slots remaining.
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0619.0000
Requirement	The « Airport Parking Data » table shall display the list of diversion aerodromes. For each diversion aerodrome, the table displays the number of needed/available/taken parking slot per aircraft category

Title	MassDiv-619
Status	<In Progress>
Rationale	Table to be used by the Diversion Information Manager (DIM) and the Alternate Aerodromes to identify where are the request for parking slots
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0620.0000
Requirement	Available parking slot shall be the initial number of available slots published by the diversion aerodrome minus the number of flights having decided to divert (DIVERTED) or booked a parking slot (RESERVED) in the aerodrome
Title	MassDiv-620
Status	<In Progress>
Rationale	See MassDiv-619
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0621.0000
Requirement	The tool shall display diversion aerodromes on the map, with color code indicating the level of availabilities
Title	MassDiv-621
Status	<In Progress>
Rationale	The display of the flight on the maps, together with alternate aerodromes, is a very usefull tool to identify possibility of diversions, in case the initial request by the AU cannot be fulfilled
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0622.0000

Requirement	Diversions are only proposed for flights already airborne. The MassDiv tool shall clearly distinguish between pre- and post-departure flights, and will only support diversion actions for airborne flights (no modification of Flight Diversion States for aircraft on the ground)
Title	MassDiv-622
Status	<In Progress>
Rationale	Once the DIM declares the start of the MassDiv process, this is coordinated with the Network Manager in order to ensure that all FPL aiming at arriving at the major airport subject to MassDiv during the MassDiv period are either rerouted or suspended, preventing that the size of the traffic to be diverted would not increase.
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0623.0000
Requirement	In the processing of the diversion opportunities for the colour codes, the MassDiv tool shall adopt the “pessimistic view”, i.e. unless specified otherwise (i.e. EXCLUDED), any flight arriving at the MassDiv airport during the diversion period will be considered as requiring diversion (i.e. TO_PROCESS)
Title	MassDiv-623
Status	<In Progress>
Rationale	This approach has been choosen to ease the interpretation of the color code. It is based on the assumption that the number of alternate slots might be sufficiently larger than the number of aircraft to be diverted.
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0624.0000
Requirement	At the start of the Recovery Phase, all flights in the status TO_PROCESS are assigned the status EXCLUDED in the MassDiv tool
Title	MassDiv-624
Status	<In Progress>
Rationale	As the airport subject to MassDiv is again able to receive flights, there is no need to apply any diversion anymore for the non-nominal situation, the the flights might be excluded from the MassDiv process
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0625.0000
Requirement	At the start of the Recovery Phase, the MassDiv tool shall allow the display of all filghts affected by the MassDiv process, with the following information: Flight status: airborne, landed Initial destination (initial FPL) Actual destination (AFP) Flight Diversion States (EXCLUDED, RESERVED, DIVERTED) Recovery duration (in the form of: Take-Off not before and/or Take-Off not later)
Title	MassDiv-625
Status	<In Progress>
Rationale	Key information as input of the Recovery Phase
Category	<Operational>
Validation Method	<Gaming Technique (Agent Based Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A

[REQ]

Identifier	REQ-07.06.05-OSED-0701.0000
Requirement	The FMP shall be able to create predefined scenarios based on criterias (hotspot, type of STAM Measure, ADEP, ADED, TFV, actors involved, time-out, …) from post-ops analysis.
Title	Predefined Scenarios-1
Status	<In Progress>
Rationale	The FMP shall be able to create predefined scenarios based on criterias (hotspot, type of STAM Measure, ADEP, ADED, TFV, actors involved, time-out, …) from post-ops analysis.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0702.0000
Requirement	The FMP shall be able to create predefined scenarios with mixed STAM Measures (Rerouting, Level cap, TTO/TTA, ….)

Title	Predefined Scenarios-2
Status	<In Progress>
Rationale	The FMP shall be able to create predefined scenarios with mixed STAM Measures (Rerouting, Level cap, TTO/TTA, ….)
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0703.0000
Requirement	The Predefined Scenarios shall be applied to select floights and to create/edit automatically STAM Measures.
Title	Predefined Scenarios-3
Status	<In Progress>
Rationale	The Predefined Scenarios shall be applied to select floights and to create/edit automatically STAM Measures.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0704.0000
Requirement	The FMP shall be able to create a V-STAM for an airborne flight without declaring an hotspot.
Title	V-STAM-1
Status	<In Progress>
Rationale	The FMP shall be able to create a V-STAM for an airborne flight without declaring an hotspot.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0704.0001
Requirement	The system shall create automatically an hotspot in case a V-STAM Measure is created. The system shall identifyautomatically the hotspot characteristics corresponding to the V-STAM measures.
Title	V-STAM-2
Status	<In Progress>
Rationale	The system shall create automatically an hotspot in case a V-STAM Measure is created. The system shall identifyautomatically the hotspot characteristics corresponding to the V-STAM measures.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0705.0000
Requirement	An automatic system hotspot creation shall not be notified to the actors but shall be stored in the NOP for post-ops analysis and DCB activity traceability.
Title	V-STAM-3
Status	<In Progress>
Rationale	An automatic system hotspot creation shall not be notified to the actors but shall be stored in the NOP for post-ops analysis and DCB activity traceability.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0706.0000
Requirement	The FMP tool shall support the capability to send private messages (MP) to specific addressees independently of any STAM measures.
Title	Private Message
Status	<In Progress>

Rationale	The FMP tool shall support the capability to send private messages (MP) to specific addressees independently of any STAM measures.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0707.0000
Requirement	An hotspot alert shall inform the FMP in regards to the hotspot resolution status indicating if it is still resolved or not.
Title	Hotspot monitoring-1
Status	<In Progress>
Rationale	An hotspot alert shall inform the FMP in regards to the hotspot resolution status indicating if it is still resolved or not.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0708.0000
Requirement	The hotspot alert shall be triggered in case of drifts concerning the hotspot duration/timeframe/magnitude.
Title	Hotspot Monitoring-2
Status	<In Progress>
Rationale	The hotspot alert shall be triggered in case of drifts concerning the hotspot duration/timeframe/magnitude.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

[REQ]

Identifier	REQ-07.06.05-OSED-0709.0000
Requirement	A basic what-if shall be provided : the Predicted Workload (Entry Count, Occupancy Count) will display figures based on three options - Traffic situation based on the current flight plan - Traffic situation based on the STAM “proposed+for coordination+coordinated+for implementation” status - Traffic situation based on the STAM “draft” status
Title	Basic What-if
Status	<In Progress>
Rationale	The proposed DCB plan (STAM Measures) will be assessed with a basic what-if based on the current and simulated traffic situation, i.e. the Predicted Workload (Entry Count, Occupancy Count) will display figures based on three options - Traffic situation based on the current flight plan - Traffic situation based on the STAM “proposed+for coordination+coordinated+for implementation” status - Traffic situation based on the STAM “draft” status
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.04	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0007	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>

6.2 Information Exchange Requirements

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0010	Get_Traffic_Volume_Description_Request	AU; NMF	NIMS	Traffic Volume ID	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0020	Get_Traffic_Volume_Description_Reply	NIMS	AU; NMF	Traffic Volume ID Reference Location ID Reference Location Type List of {Flow description}	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0030	Get_List_of_Traffic_Volumes_Request	AU; NMF	NIMS	Traffic Volume Set ID Traffic Volume ID	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0040	Get_List_of_Traffic_Volumes_Reply	NIMS	AU; NMF	List of {Traffic Volume ID}	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0050	Get_List_of_Traffic_Volume_Sets_Request	AU; NMF	NIMS	N/A	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0060	Get_List_of_Traffic_Volume_Sets_Reply	NIMS	AU; NMF	List of {Traffic Volume Set ID}	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0070	Get_Flight_List_by_Topic_Request	AU; NMF	NIMS	Date WEF UNT Flight Capture Type Topic Type Topic Identification Traffic Type Flight Plan Data Selection Traffic Category Max Flight Level Min Flight Level	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0080	Get_Flight_List_by_Topic_Reply	NIMS	AU; NMF	List of {identification of the resqested flight}	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0090	Get_Traffic_Count_by_Topic_Request	AU; NMF	NIMS	Date WEF UNT Topic Type Topic Identification Traffic Type Flight plan data selection Traffic Category Max Flight Level Max Flight Level	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0006<Partial>; REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0100	Get_Traffic_Count_by_Topic_Reply	NIMS	AU; NMF	List of { count per period }	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0006<Partial>; REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0110	Get_Capacities_by_Topic_Request	AU; NMF	NIMS	Date WEF UNT Topic Type Topic Identification Capacity Type Traffic Category	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0120	Get_Capacities_by_Topic_Reply	NIMS	AU; NMF	List of { Hourly Capacity per period} (for Capacity Type = “Hourly Capacity”) List of { (Peak OTMV, Sustained OTMV) per period} (for Capacity Type = “OTMV”)	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0130	Create_Hotspot_Request	AU; NMF	NIMS	Traffic Volume ID WEF UNT Severity Status Diary	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0140	Create_Hotspot_Reply	NIMS	AU; NMF	Hotspot ID	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0150	Modify_Hotspot_Request	AU; NMF	NIMS	Hotspot ID Traffic Volume ID New WEF New UNT Severity Status Diary	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0160	Modify_Hotspot_Reply	NIMS	AU; NMF	New Hotspot ID	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0170	Merge_Hotspot_Request	AU; NMF	NIMS	HS1 Hotspot ID HS2 Hotspot ID New WEF New UNT	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0180	Merge_Hotspot_Reply	NIMS	AU; NMF	New Hotspot ID	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0190	Delete_Hotspot_Request	AU; NMF	NIMS	Hotspot ID	UC1: Detection of Demand and Capacity Imbalance	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0200	Delete_Hotspot_Reply	NIMS	AU; NMF	Status (=cancelled)	UC1: Detection of Demand and Capacity Imbalance UC14 :	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
					STAM Supervision					
IER-13.02.03-OSED-DCB1.0210	Clear_Hotspot_Request	AU; NMF	NIMS	Hotspot ID	UC1: Detection of Demand and Capacity Imbalance UC14 : STAM Supervision	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0220	Clear_Hotspot_Reply	NIMS	AU; NMF	Status (=cleared)	UC1: Detection of Demand and Capacity Imbalance UC14 : STAM Supervision	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0230	Get_Hotspot_Description_Request	AU; NMF	NIMS	Hotspot ID	UC1: Detection of Demand and Capacity Imbalance UC14 : STAM Supervision	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement
IER-13.02.03-OSED-DCB1.0240	Get_Hotspot_Description_Reply	NIMS	AU; NMF	Traffic volume ID WEF UNT Severity Status	UC1: Detection of Demand and Capacity Imbalance UC14 : STAM Supervision	One-Way	<Validated>	Hotspot Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0250	Flight_Retrieval_Request	AU; NMF	NIMS	Flight ID Flight Status (norma/proposal) Traffic Type Requested Flight Dataset Requested Flight Fields Flight Retrieval Reply	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures UC14 : STAM Supervision	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0260	Flight_Retrieval_Reply	NIMS	AU; NMF	Flight Retrieval Reply	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures UC14 : STAM Supervision	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>	HotspotManagement

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0270	Measure_Definition_Request	AU; NMF	NIMS	ATFCM Measure type Measure identifier STAM qualifier STAM kind Measure activity status Flight selection kind Regulation reason Measure period Measure description M-CDM required Linked Measure set	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0280	Measure_Definition_Reply	NIMS	AU; NMF	M-CDM state	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures
IER-13.02.03-OSED-DCB1.0290	Assign_Measure_Constraints_Request	AU; NMF	NIMS	Traffic Volume Traffic Volume description Traffic Volume Set ANM remark Regulation Note Protected location Sub-periods definition Avoid Location Via Location	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0300	Assign_Measure_Constraints_Reply	NIMS	AU; NMF	Status	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures
IER-13.02.03-OSED-DCB1.0310	Add_Flight_to_Measure_Request	AU; NMF	NIMS	Cherry Picked measure identifier List of {Flights associated to the measure}	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0320	Add_Flight_to_Measure_Reply	NIMS	AU; NMF	Status	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures
IER-13.02.03-OSED-DCB1.0330	Remove_Flight_to_Measure_Request	AU; NMF	NIMS	Cherry Picked measure identifier List of {Flights associated to the measure}	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0340	Remove_Flight_to_Measure_Reply	NIMS	AU; NMF	Status	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0350	Measure_Impact_per_Flight_Request	AU; NMF	NIMS	Measure ID Flight ID	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures UC6 : Post-Ops Analysis	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0360	Measure_Impact_per_Flight_Reply	NIMS	AU; NMF	Measure OPLOG results	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures UC6 : Post-Ops Analysis	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0370	Force_CTOT_Request	AU; NMF	NIMS	Delay measure ID Flight ID Flight plan data selection (normal/proposal) New CTOT time New CTO time	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0380	Force_CTOT_Reply	NIMS	AU; NMF	Status	UC2.a : Analysis and Preparation of the STAM solution for Cherry-Picking Measures UC2.b : Analysis and Preparation of the STAM solution for Flow Measures UC12 : Implement dDCB measures using TTO/TTA to resolve resurgence or residual significant measures	One-Way	<Validated>	DCB Measure Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	STAMMeasures

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0390	MCDM_List_per_Actor_Request	AU; NMF	NIMS	Date Actor (ANU Id) Actor's role Measure ID Measure Type Outgoing Traffic Volume	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0400	MCDM_List_per_Actor_Reply	NIMS	AU; NMF	List of Hotspots For each Hotspot, List of Measures For each Measure, List of Flights Additional info per Hotspot, Measure, Flight	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0410	MCDM_List_per_Flight_Request	AU; NMF	NIMS	Date Flight ID	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0420	MCDM_List_per_Flight_Reply	NIMS	AU; NMF	List of {Hotspot ID} For each Hotspot, List of {Measure ID}	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0430	MCDM_Topic_Request	AU; NMF	NIMS	Topic ID	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0440	MCDM_Topic_Reply	NIMS	AU; NMF	Vote MDCM state Communication history Roles	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0450	Cast_of_Vote_Request	AU; NMF	NIMS	Topic ID Actor (ANU Id) Approval state Comment Rejection reason	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0460	Cast_of_Vote_Reply	NIMS	AU; NMF	Topic ID Actor (ANU Id) Approval state	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0470	Update_MCDM_StateRequest	AU; NMF	NIMS	Topic ID Actor (ANU Id) MCDM state	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0480	Update_MCDM_StateReply	NIMS	AU; NMF	Status	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0490	Get_MCDM_Topic_Actor_Roles_Request	AU; NMF	NIMS	Topic ID	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0500	Get_MCDM_Topic_Actor_Roles_Reply	NIMS	AU; NMF	List of actors and corresponding roles	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0510	Edit_MCDM_Topic_Actor_Roles_Request	AU; NMF	NIMS	Topic ID Actor (ANU ID) List of Actors and Corresponing roles	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0520	Edit_MCDM_Topic_Actor_Roles_Reply	NIMS	AU; NMF	Status	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0530	Add_Comments_Request	AU; NMF	NIMS	Topic ID Actor (ANU ID) Comment	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0540	Add_Comments_Reply	NIMS	AU; NMF	Status	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0017<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0550	Get_Remaining_Tasks_Request	AU; NMF	NIMS	Actor ID (ANU ID)	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>	M-CDMMeasure

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0560	Get_Remaining_Tasks_Reply	NIMS	AU; NMF	List of tasks including, for each task: { Time remaining to perform the task: in minutes, Due time to perform the task, topic ID, Task description, Incoming / Outgoing indicator}	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0570	Edit_Measure_Deadlines_Request	AU; NMF	NIMS	Measure ID Actor (ANU ID) Time to Coordinate By Time to start implemention by Time to implement by	UC3: Coordination of the STAM Meaures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	M-CDMMeasure

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0580	Edit_Measure_Deadlines_Reply	NIMS	AU; NMF	Status	UC3: Coordination of the STAM Meaures UC4 : Implement STAM Measures	One-Way	<Validated>	MCDM Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	M-CDMMeasure
IER-13.02.03-OSED-DCB1.0590	Edit_Target_Time_Request	AU; NMF	NIMS	Flight Id Target Time (TT) TT_fix Status (proposed, coordinated, implemented, abandonned, finished) MPR = (Yes, No)	UC7, UC8, UC9, UC10, UC11, UC12, UC13	One-Way	<Validated>	Target-Time Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	
IER-13.02.03-OSED-DCB1.0600	Edit_Target_Time_Reply	NIMS	AU; NMF	Status	UC7, UC8, UC9, UC10, UC11, UC12, UC13	One-Way	<Validated>	Target-Time Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-13.02.03-OSED-DCB1.0610	Get_target_Time_Deviation_Request	AU; NMF	NIMS	Flight_Id	UC7, UC8, UC9, UC10, UC11, UC12, UC13	One-Way	<In Progress>	Target-Time Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	
IER-13.02.03-OSED-DCB1.0620	Get_target_Time_Deviation_Reply	NIMS	AU; NMF	TDI	UC7, UC8, UC9, UC10, UC11, UC12, UC13	One-Way	<In Progress>	Target-Time Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	
IER-13.02.03-OSED-DCB1.0630	Get_Target_Time_Request	AU; NMF	NIMS	Flight_Id	UC7, UC8, UC9, UC10, UC11, UC12, UC13	One-Way	<Validated>	Target-Time Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	
IER-13.02.03-OSED-DCB1.0640	Get_Target_Time_Reply	NIMS	AU; NMF	Target Time (TT) TT_fix Status (proposed, coordinated, implemented, abandonned, finished) MPR = (Yes, No)	UC7, UC8, UC9, UC10, UC11, UC12, UC13	One-Way	<Validated>	Target-Time Management	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>	

Table 20 : IER layout

7 References

7.1 Applicable Documents

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

[1] SESAR Template Toolbox 04.00.00, 22/03/2014

[2] Requirements and V&V Guidelines 03.01.00, 05/02/2014

[3] SESAR Toolbox User Manual 03.01.01, 28/02/2014

[4] EUROCONTROL ATM Lexicon https://extranet.eurocontrol.int/http://atmlexicon.eurocontrol.int/en/index.php/SESAR

7.2 Reference Documents

The following documents were used to provide input/guidance/further information/other:

[5] 07.02-D29 Network Operations for Step 1 Detailed Operational Description (DOD), Ed. 00.04.00, 2016

[6] 13.02.03-D323 Step1 DCB SPR , 2016, edition 1.0

[7] WPB.01 Integrated Roadmap Dataset DS13

[8] 13.02.03-D383 Step 1 dDCB Validation Report, 2016, edition1.0

[9] 08.03.10-D64 ISRM Service Portfolio 00.07.01, 03/02/2016

[10] **SESAR** 04.07.02-D37 Free Route OSED_2, Edition 00.02.01, January 2016 https://extranet.sesarju.eu/releasehome/OFA03.01.03/Working%20Library/OFA%2003.01.03%20Deliverables/OFA%20OSED%20Iteration%202/04.07.02-D37%20Free%20Route%20OSED_2_v00.02.01a_clean.docx

[11] **EUROCONTROL** Challenges of Growth – Task 4: European Air Traffic in 2035, June 2013. http://www.eurocontrol.int/sites/default/files/article//content/documents/official-documents/reports/201306-challenges-of-growth-2013-task-4.pdf

Appendix A Justifications

N/A

Appendix B New Information Elements

N/A

-END OF DOCUMENT-