Collaborative NOP OSED Step 1

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Abstract

The final objective of the Collaborative Network Operations Plan (NOP) (Solution 20) is to monitor and manage the application of the regulatory framework in operations, providing a European Common view of network performance and facilitating its enhancement.
This document describes the evolutions of the Collaborative Network Operations Plan (NOP), its Operational services and associated environment to support the Network Management concept, achieved in the step 1 of SESAR.
These evolutions concern 4 domains :
- Weather (MET) integration at planning phase,
- Performance driven operations,
- AOP-NOP integration,
- Collaboration improvement (B2B services for data integration into local tools, user driven prioritisation process for increased awareness, 4D profiles and real time airspace reservation).

Concepts described into the DOD have been refined in term of NOP Services and information exchange. Operational implementation of these concepts have been described into scenarios and use cases allowing their validation during validation exercises.

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Rational for rejection
None.

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8 Document History

Edition	Date	Status	Author	Justification
00.00.01 (D01)	31/12/10	Initial	[redacted]	Status, Operational Concept Description. Background
00.01.02 (D01)	27/09/13	Interim		Update (all chapters) based on SJU Review
00.02.00 (D39)	27/01/14	Final		Update of Chapter 1 considering the Step 1 DOD update, expansion of section 3.2, improvement of Chapter 4, Chapter 6 and Appendix A. Insertion of a new Appendix for the Network Performance Framework.
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00.03.00 (D45)	29/09/15	Final		Version for hand-over.
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00.03.02 (D46)	28/07/16	Revised Draft		Update of old and new operating methods + associated summary and abstract, latest requirements extract from DOORS, ER alignment, AOP/NOP update.
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00.04.02 (D46)	21/10/16	Final		Update of requirements

9 Intellectual Property Rights (foreground)

10 This deliverable consists of SJU foreground.

Table of Contents

List of tables

List of figures

Executive summary

The final purpose of the Collaborative Network Operations Plan (NOP) (Solution 20) is to provide:

- A consolidated Regional Network view of the coordinated Sub-Regional and Local operational plans from Pre-Tactical through execution phases of daily operations.
- Continuous integrated data exchange to provide an accurate representation of planned and real-time operations in the European Network.
- Ability to monitor and manage the European ATM Network in support of the ATM Performance Scheme.
- What if capability to enable the impacts of changing real time operations to be evaluated in advance and ensure collaborative and coordinated decision making.

The main actors for achieving the Collaborative (NOP) are the Regional (European) NM, the Sub-regional NM, the Local ATM providers, the Airspace Users and others providers (for example, providers of regulatory framework, Providers of additional information in support of Network Operations like MET and providers of additional information and support as required in unusual circumstances e.g. contingency and crisis).

Within the Network Management concept, the Collaborative NOP role is:

- to provide a European Common view of up to date Network performance
  ⇨ to deliver Shared Awareness, Effective CDM processes, Co-ordinated & accurate rolling plan.
- to enable Monitoring and Management of the performance regulatory framework in daily operations
  ⇨ “Monitoring by providing targets reference, KPIs and performance metrics, to continuously access the performance achievement.
  ⇨ “Management”: to support proactive management at local/sub-regional and regional levels, and reduce unplanned tactical intervention at local level.
- to facilitate European performance enhancement
  ⇨ by Lesson learning via agreed Post-Ops activities, and enabling experience to be incorporated into future planning activity.

This OSED (Operational Service and Environment Definition) describes the evolutions within SESAR step 1 for the Collaborative NOP (Network Operations Plan) to support the Network Management concept.

The goal is to provide the reader with a clear understanding of the focus of the Collaborative NOP main developments in SESAR Step 1.

These developments results from the analysis of all the DOD concepts. They come from two sources: developments directly listed as part of the "Network Operation Planning" and other developments contributing to the Collaborative NOP by means of the collaboration and network performance driven NOP principles (Business and Mission Trajectory, Free routing, Airspace Management and AFUA, Dynamic Sectorisation and Constraint Management, Enhanced ATFCM Processes, UDPP, AIM).

The main resulting evolutions covered in this OSED (included in the new operating method described) are:

1. The initial integration of weather information in the network to support the elaboration of the network plan. This integration provides support to improved NM supervision and monitoring role in scenarios where measures are created and significant weather forecast impact is detected.
2. The increased visibility of network performance to support moving to Performance driven operations. This evolution is achieved with the operational use of a set of global performance indicators (delays, adherence, predictability…) to assist the network monitoring in multiple phases (pre-tactical, tactical and post-ops).
3. An advance integration of Airport and Network, especially during the tactical phase , exchanging any relevant data supporting airport and network operations with a rolling (very dynamic) data exchange.
4. An improved Collaboration via an extended set of B2B services that allowed wider integration with different NOP actors. This includes but it is not limited to: the new local tools supporting the STAM process and M-CDM, the AU driven prioritisation process for its flights, the use of the 4D profiles and the real time airspace reservation.

362 The operations have been detailed via scenario and associated use cases (either created and
363 detailed into this OSED or already existing and listed into the DOD), which allow the concept
364 validation to be performed (in validation exercise).

365 This OSED and the operational concept have been updated accordingly with the outcome from
366 validation exercises (see list in B.1).

1 Introduction

1.1 Purpose of the document

The Operational Service and Environment Definition (OSED) describes the operational concept defined in the Detailed Operational Description (DOD) in the scope of its Operational Focus Area (OFA).

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. 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 OPS P07.02 project. It also contains additional information that have been consolidated back into the higher-level SESAR concepts using a “bottom up” approach.

The figure 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. The different phases are driven by the OI Steps addressed by the project in the Integrated Roadmap document [24].

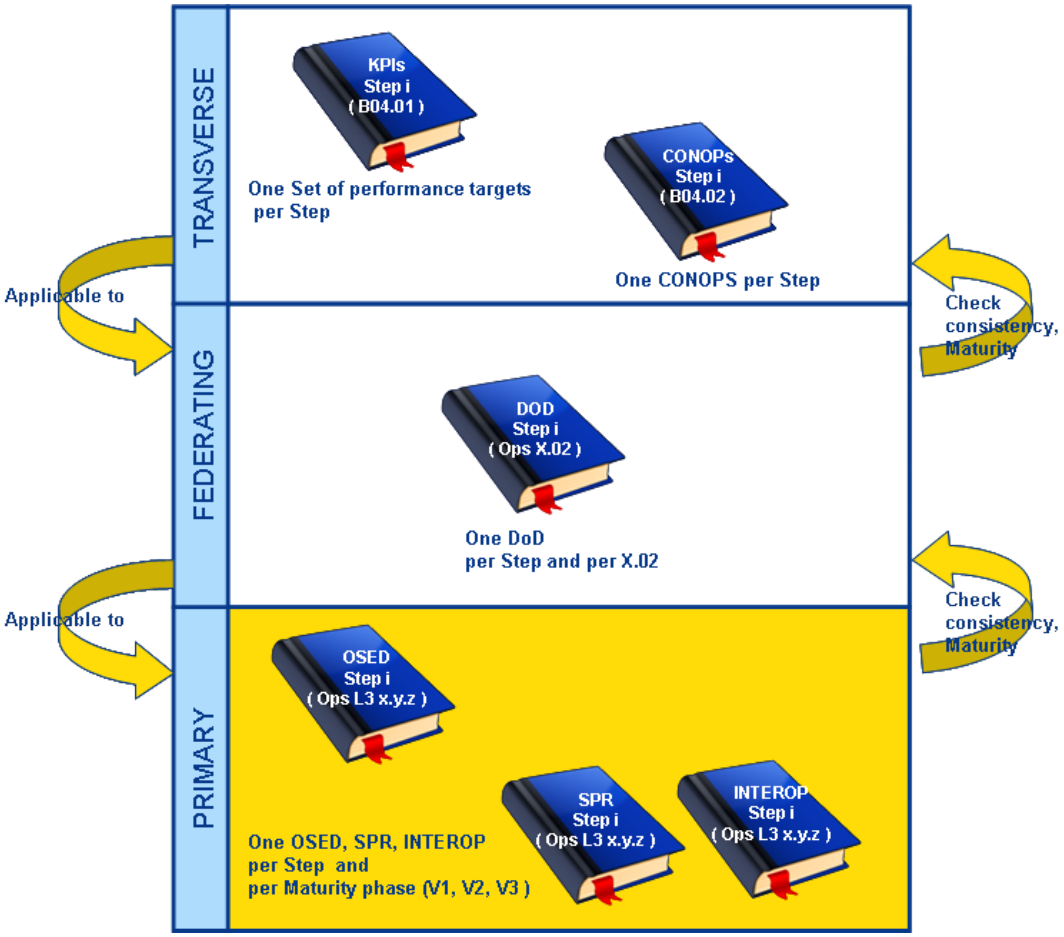

Figure 1: OSED document with regards to other SESAR deliverables

1.2 Scope

This OSED details the operational concept for the Operational Focus Area (OFA) 05.03.07 Network Operations Planning.

The NOP OSED provides a common conceptual framework describing how the NOP is elaborated, used and monitored throughout the ATM phases, by whom and for what purpose. It provides a consolidated description of the NOP content and related operational / interoperability requirements.

The OFA05.03.07 is a transversal OFA, which supports all OFAs, involved in collaborative network planning. The validation of the Step 1 NOP mainly relies on the exercises prepared by the customer OFAs (or by the relevant combination of them in case of cross-OFAs integrated validations).

The OFAs, which have potential dependencies with OFA05.03.07, are:

- OFA03.01.03 Free Routing;
- OFA03.01.04 Business and Mission Trajectory;
- OFA04.01.02 Enhanced Arrival and Departure Management;
- OFA05.01.01 Airport Operations Management;
- OFA05.03.01 Airspace Management and FUA;
- OFA05.03.03 Dynamic Airspace Configuration[1];
- OFA05.03.04 Enhanced ATFCM processes;
- OFA05.03.06 UDPP;
- ENB02.01.02 AIM/MET.

In addition to these OFA, this OSED covers the additional domains part of the NOP and not already covered by previously referenced OFAs (METEO, Network Performance management, AOP/NOP integration, support to NM function and Non-functional aspects).

1.3 Intended readership

The NOP OSED is primarily intended to:

- The OFAs which have a dependency with OFA05.03.07 as explained above (i.e. OFA03.01.03, OFA03.01.04, OFA04.01.02, OFA05.01.01, OFA05.03.01, OFA05.03.03, OFA05.03.04, OFA05.03.06, ENB02.01.02 AIM/MET): they shall review the OSED to ensure that the Step 1 NOP concept and related requirements are fit for purpose;
- P08.01.x Information Architects: they shall support the P07.06.01 team in the consolidation of NOP data descriptions and ensure that they are input into the AIRM update process;
- P08.03.x Service Architects: they shall support P07.06.01 in the identification of related services;
- Airspace Users: they shall review the concept and related requirements;
- SJU.

Secondly, this document is of interest to SWP07.02, for the consolidation of Network Operations concept definition and validation.

Thirdly, the document is aimed at the SESAR community in general.

Finally, in addition to the operational representative listed above, the technical leaders of the primary projects have to be part of the review process and are using this OSED as a major input to their work.

[1] There is no OSED foreseen in Step 1 by this OFA

1.4 Structure of the document

The document is split in seven chapters and 2 appendix:

- Chapter 1 gives a general description of the document structure and scope;
- Chapter 2 gives a summary of the concept as described in SWP07.02 DOD Step 1;
- Chapter 3 gives a description of the detailed operating method;
- Chapter 4 gives a description of the operational environment;
- Chapter 5 gives a description of operational/processes and use cases;
- Chapter 6 provides the resulting requirements;
- Chapter 7 provides the applicable and reference documentation.

Appendix A provides additional details/justification justifying the concept.

Appendix B provides the New Information Elements to be modelled in the AIRM, addressing those that are not documented in the OSED Appendix B of customer OFAs or other documentation.

1.5 Background

Due to the transversal scope of the collaborative NOP concept, a quite large number of projects and initiatives provide input to the project. The reference operational concept documents (OSED level) available at the time of writing the present document are listed in the table below.

OFA	Step 1	Ref.
OFA03.01.03 Free Routing	P07.05.03-D02 Step 1 OSED P04.07.02-D36 Step 1 FR OSED	[11]
OFA03.01.04 Business and Mission Trajectory	P07.06.02-D01 Step 1 OSED (Business Trajectory) P07.06.02-D01 Step 1 OSED (Mission Trajectory) P11.01.02-D11.1.2-1 FOC operational and performance requirements for Step 1 (Quick Wins) P11.01.02-D11.1.2-3m WOC operational and performance requirements for Step 1, Step 2 and Step 3	[12] [13] [14] [15]
OFA04.01.02 Enhanced Arrival and Departure Management	P05.04.02-D01 Preliminary OSED Step 1 (Cooperative planning in TMA) P05.06.04-D32 consolidated OSED Step 1 (Tactical TMA and En-Route Queue Management)	[21] [22]
OFA05.01.01 Airport Operations Management	P06.05.04-D08 Step 1 OSED (Airport Operations Centre Definition)	[20]
OFA05.03.01 Airspace Management and FUA	P07.05.04, D45 V3 step 1 OSED (Advanced Flexible Use of Airspace)	[19]

OFA	Step 1	Ref.
OFA05.03.03 Dynamic Airspace Configuration	*There is no OSED for Step 1*[2]	
OFA05.03.04 Enhanced ATFCM processes	P13.02.03-D303 Enhanced DCB OSED Step ,1 (Enhanced DCB)	[16]
	P04.07.01-D68 OSED Step 1 (Complexity Management in En route)	[17]
OFA05.03.06 UDPP	P07.06.02-D366 OSED Step 1 (User Driven Prioritisation process)	[18]
ENB02.01.02 AIM/MET	P13.02.02-D01 Step 1 OSED (Digital NOTAM and Digital Integrated Briefing)	[23]
	P11.02.01 MET OSED	[36]
	P11.02.01 MET SPR	[37]
	P11.02.01 MET INTEROP	[38]

Table 1: List of primary projects contributing to the P07.06.01 OSED

In addition, the following high level / transversal conceptual material is of relevance to the Step 1 NOP concept definition:

- Step 1 Network Operations Detailed Operational Description (DOD) [6];
- Airport Detailed Operational Description Step 1 [7];
- Definition of trajectory requirements for Step 1, including gap analysis, support to standardization report from Airspace Users perspective (DOD) [8];
- MET Detailed Operational description (MET-DOD) [9].

1.6 Glossary of terms

This glossary provides definitions for some important notions used in this document;

Term	Definition	Source
Airport Operations Plan	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 real-time. Through its 'rolling' nature, the AOP ensure that mitigation actions taken by each stakeholder based on accurate information with the result of their actions being reflected directly back into the AOP.	SESAR Lexicon
Airspace Configuration	A pre-defined and coordinated organisation of ATS routes of the ARN and /or terminal routes and their associated airspace	Step 1 7.2 DOD

[2] Although there is no Step 1 OSED for OFA05.03.03, part of the content allocated to this OFA is delivered in SESAR 1 as part of P04.07.07 activities on CM-0102-A.

Term	Definition	Source
	structures, including airspace reservations/restrictions (ARES), if appropriate, and ATC sectorisation.	
Network Management Function	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. which encapsulates: • Collaborative layered planning and execution processes, including the facilitation of business/mission trajectories. • Airspace organisation and management processes. • Demand and Capacity Balancing processes through all planning and execution phases to ensure the most efficient use of airspace resources, to anticipate and solve workload/complexity issues and to minimize the effects of ATM constraints. • The enabling of the UDPP process. • The provision and maintenance of Operation Plans covering the range of activity, i.e. Network to Local. • The provision of relevant complexity resolution advice to ATC operations. Based on CDM, the Network Management Function is executed at all levels (Regional, Sub-regional, and Local), throughout all planning and execution phases, involving, as appropriate, the adequate actors (NM, FM, LTM …).	Step 1 7.2. DOD
Initial Shared Business/Mission Trajectory (iSBT/SMT)	In Step 1, the SBT/SMT is not fully implemented yet and only incorporates flight intentions (in the medium-term planning) which are progressively refined with incoming information from the Airspace users to become an extended flight plan in the short term period including trajectory data (UP4DT/ReqMT).	Step 1 7.2. DOD
Initial Reference Business/Mission Trajectory (iRBT/RMT)	The result of the collaborative planning process that revises the iSBT/SMT and is published as the initial Reference Business/Mission Trajectory (iRBT/RMT), at the moment when due to the proximity of the Execution Phase, the Aircraft Operator cannot accept any more changes on the iSBT/SMT. The iRBT/RMT contains all data included in the (last) agreed iSBT/SMT, in particular the TTO/TTA.	Step 1 7.2. DOD
Network Operations Plan	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. The NOP has a dynamic and rolling lifecycle starting in the long-term planning phase and progressively updated up to and including the execution and post-operations phases. It supports and reflects the result of the collaborative ATM planning process: at each phase, stakeholders collaborate at developing a common view of the planned network situation, allowing each of them to take informed decisions considering the network effect and the Network Manager to ensure the overall coordination of individual decisions needed to support network performance.	SESAR Lexicon

453 **Table 2: Glossary of terms**

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1.7 Acronyms and Terminology

Term	Definition
A/C	Aircraft
AAST	Airport Arrival Slot Time
ACC	Area Control Centre
A-CDM	Airport-Collaborative Decision Making
ACT	Activation message (Message d'activation) OLDI
ADEP	Aerodrome of Departure
ADES	Aerodrome of Destination
ADIV	Airport of Diversion (ICAO)
ADP	ATFCM Daily Plan
A-DPI	Airport-Departure Planning Information
ADST	Airport Departure Slot Time
AENA	Aeropuertos Españoles y Navegación Aérea
AFP	ATC Flight Plan proposal
AFTN	Aeronautical Fixed Telecommunication Network
AFUA	Advanced Flexible Use of Airspace
AIAT	Actual Initial Approach Fix Time
AIBT	Actual In-Block Time
AIM	Air Traffic Flow and Capacity Management Information Message
AIP	Aeronautical Information Publication
AIR	Airborne (flight status)
AIRAC	Aeronautical Information, Regulation and Control
AIRM	ATM Information Reference Model
AIXM	Aeronautical Information eXchange Model
ALDT	Actual LanDing Time
AM	Airspace Manager
AMAN	Arrival Manager
AMC	Airspace Management Cell
ANM	Air Traffic Flow Management Notification Message
ANS	Air Navigation Service
ANSP	Air Navigation Service Provider
AO	Airport Operator
AOP	Airport Operations Plan
AP	Arrival Procedure (see STAR)
APB	Airspace Policy Body
API	Application Programming Interface
APL	ATC Flight Plan
APOC	Airport Operations Centre
APP	Approach Control (Office/Service)
APT	Airport
ARCCOD	Aircraft Code (IATA Aircraft Type)
ARCID	Aircraft Identification
ARES	Airspace reservation
ARN	ATS Trunk Route Network
ARR	Arrival Message
AS	Airspace
ASAT	Actual Start-Up Approval Time
ASM	Airspace Management
A-SMGCS	Advanced Surface Movement Ground Control System
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATFCM	Air Traffic Flow and Capacity Management
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management

Term	Definition
ATOT	Actual Take-Off Time
ATS	Air Traffic Services
ATSU	Air Traffic Services Unit
ATV	Aircraft Transit View
ATYP	Aircraft Type (ICAO Aircraft type)
AU	Airspace User
AUO	Airspace User Operations
AUP	Airspace Use Plan
AXIT	Actual Taxi In Time
AXOT	Actual Taxi Out Time
B2B	Business-to-Business
BAA	British Airports Authority
BIC	Best-in-Class
BMT	Business Mission Trajectory
BRD	Boarding (flight status)
BT	Business Trajectory
CAA	Civil Aviation Authority
CACD	Central Airspace and Capacity Database
CAM	Conflict Alert Message (MADAP)
CAT	Clear Air Turbulence
CB	Cumulonimbus
CBA	Cost Benefit Analysis
CCTV	Closed Circuit Television
CDA	Client Defined Area
CDM	Collaborative Decision Making
C-DPI	Cancel-Departure Planning Information
CDR	Conditional Route
CFI	Call For Interest
CHG	Change message
CHMI	CFMU Human Machine Interface
CIFLO	CFMU Interface for Flow management position
CMAC	Civil-Military ATM Coordination
CMMI	Capability Maturity Model Integration
CNX	Cancelled (flight status)
CO2	Carbon Dioxide
CODA	Central Office for Delay Analysis
COMAO	Composite Military Air Operations
CRIDA	Reference Centre for Research, Development and Innovation in ATM
CSBT	Coordinated Shared Business Trajectory
CTA	Controlled Time of Arrival
CTOT	Calculated Take-Off Time
CV	Curriculum vitae
DCB	Demand and Capacity Balancing
DCT	Direct Route
dDCB	Dynamic Demand and Capacity Balancing
DDR	Demand Data Repository
DEI	De-Icing
DEP	Departure or Departure message
DEST	Destination
DGAC	Direction Générale de l'Aviation Civile
DIV	Diversion
DLA	Delay or Delay Message
DMAN	Departure Manager
DNM	Directorate Network Management
DO	Direction des Opérations

Term	Definition
DOD	Detailed Operational Description
DOF	Date of Flight
DOORS	Dynamic Object Oriented Requirements Management System or Solution
DPI	Departure Planning Information
EACCC	European Aviation Crisis Coordination Cell
EASA	European Aviation Safety Agency
EATMA	European ATM Architecture
eAUP	Electronic version of EAUP
EAUP	European Airspace Use Plan
EC	European Commission
ECAC	European Civil Aviation Conference
E-DPI	Early-Departure Planning Information
EET	Estimated Elapsed Time
EFPL	Extended Flight Plan
EIAT	Estimated initial Approach Fix Time
EIBT	Estimated In Blocks Time
EIOBT	Estimated In Off Block Time
ELDT	Estimated Landing Time
EOBT	Estimated Off Block Time
ETFMS	Enhanced Tactical Flow Management System
ETO	Estimated Time Over
ETOT	Estimated Take Off Time
EU	European Union
EUROCONTROL	European Organization for the Safety of Air Navigation
eUUP	Electronic version of the EUUP
EUUP	European Updated Airspace Use Plan
EXIT	Estimated Taxi In Time
EXOT	Estimated Taxi Out Time
FAB	Functional Airspace Block
FAF	Final Approach Fix point
FAP	Future ATM Profile
FIR	Flight Information Region
FIXM	Flight Information Exchange Model
FL	Flight Level
FLID	Flight ID
FMP	Flow Management Position
FNL	On Final Approach (flight status)
FOC	Flight Operations Centre
FP	Flight Planning
FPL	Flight Plan
FR	Flight Route
FRA	Free Route Airspace
FUA	Flexible Use of Airspace
GAT	General Air Traffic (civil) (Circulation aérienne générale (CAG))
GDP	Gross Domestic Product
GEN	General
GMC	Ground Movement Controller
GOA	Go-around (flight status)
GUFI	Global Unique Flight Identifier
HL	High Level
HLAPB	High Level Airspace Policy Body
HMI	Human Machine Interface
HTTPS	Secure HTTP
IATA	International Air Transport Association
IBK	In-Block (flight status)

Term	Definition
ICAO	International Civil Aviation Organisation
ID	Identifier
IDH	Indefinite Holding (flight status)
IE	Included / Exempted
IER	Information Exchange Requirements
IFPLID	Individual Flight Plan Identity code
IFPS	Integrated Initial Flight Plan Processing System
IFR	Instrument Flight Rules
iOAT	Initial Operational Air Traffic
INAP	Integrated Network Management and extended ATC Planning
IR	Implementing Rules
iRBT	Initial Reference Business Trajectory
iRMT	Initial Reference Mission Trajectory
ISMS	IT Security Management System
ISP	Information Security Policies
iSBT	Initial Shared Business Trajectory
iSMT	Initial Shared Mission Trajectory
ISRM	Information Service Reference Model
IT	Information Technology
ITIL	IT Infrastructure Library
KPA	Key Performance Area
KPI	Key Performance Indicator
kt	Knot
LCM	Local Capacity Manager
LTM	Local Traffic Manager
MAM	Military Airspace Manager
MASDIV	Massive Diversion
MET	Meteorology
METAR	METeorological Aerodrome or Aeronautical Report
MIL	Military
MILO	Military Liaison Officer
MSSC	Minimum Set of Security Controls
MT	Medium Term
N/A	Not Applicable or Not Available or Not Assigned
NAT	North Atlantic Region
NATO	North Atlantic Treaty Organisation
NATS	National Air Traffic Services (UK)
NFR	Non Functional Requirement
NM	Network Manager
NMF	Network Management Function
NMOC	Network Manager Operation Centre
NOP	Network Operations Plan
NOT	No Transfer
NOTAM	Notice to Airmen
NSA	National State Authority
NSP	Network Strategy Plan
OAT	Operational Air Traffic
OC	Operation Centre
OFA	Operational Focus Area
OI	Operational Improvement
OPS	Operations
OSED	Operational Service and Environment Description
OTMV	Occupancy Traffic Monitor Values
P&S	Processes and Services
PC	Provisional Council

Term	Definition
PDI	Performance Drivers Indicators
PERF	Performance
PM	Project Management
PREDICT	Variant of TACT used for Pre-Tactical Work
PRF	Performance
PSP	Physical Security Plan
PTR	Profile Tuning Restriction
RAD	Route Availability Document
RAIS	Route Availability Information Sheet
RBT	Reference Business Trajectory
RDI	Ready for de-icing (flight status)
RDY	Ready message (old name for REA)
REG	Aircraft Registration
REQ	Requirement
RET	Returning (flight status)
RMT	Reference Mission Trajectory
RNDSG	Route Network Development Sub-Group
RPL	Repetitive Flight Plan
RR	Routeing Scheme Route
RTN	Returning (flight status)
RTSA	Real Time Airspace Status
RWY	Runway
RWYARR	Runway Identifier of the assigned arrival runway
RWYDEP	Runway identifier of the assigned departure runway
SAM	Slot Allocation Message
SBT	Shared Business Trajectory
SBY	Standby (flight status)
SCH	Scheduled (flight status)
SCN	Scenario
SES	Single European Sky
SESAR	Single European Sky ATM Research
SIBT	Scheduled In-Block Time
SID	Standard Instrument Departure Route
SITA	Société Internationale de Télécommunications Aéronautiques
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SLA	Service Level Agreement
SLDT	Scheduled Landing Time
SMGCS	Surface Movement Guidance and Control System
SMT	Shared Mission Trajectory
SNOWTAM	NoTAM on SNOW Conditions (Message containing snow fall information)
SOBT	Scheduled Off Block Time
SRM	Slot Revision Message
ST	Short Term
STA	Scheduled Time of Arrival
STAM	Short-Term ATFCM Measures
STAR	Standard Instrument Terminal Arrival Route
STATFOR	Statistics & Forecasts Service
SUP	Supplement
SWC	Significant Weather Chart
SWIM	System Wide Information Management
TAF	Terminal Area (Aerodrome) Forecast
TBD	To Be Defined, Determined or Discussed
TFV	Traffic Volume
TIAT	Target Initial Approach Fix Time
TLDT	Target Landing Time

Term	Definition
TLP	Tactical Leadership Programme
TMA	Terminal Manoeuvring Area
TOBT	Target Off Block Time
TRA	Temporary Reserved Area
TSA	Temporary Segregated Area
TSAT	Target Start-Up Approval Time
TTA	Target Time of Arrival
TTD	Target Time of Departure
TTO	Target Time Over
TTOT	Target Take Off Time
TV	Traffic Volumes
TWR	Air Traffic Control Tower
TXI	Landed / Taxi-in (flight status)
UC	Use Case
UDPP	User Driven Prioritisation Process
UEFA	Union of European Football Associations
UIR	Upper Flight Information Region
UK	The United Kingdom
UP4DT	User Preferred 4D trajectory
UPR	User Preferred Routing
USA	United States of America
UTC	Coordinated Universal Time
UUP	Updated Airspace Use Plan
VFR	Visual Flight Rules
VPA	Variable Profile Area
WIP	Work In Progress
WOC	Wing Operations Centre
WP	Work Package
WTC	Wake Turbulence Category

455 **Table 3: Acronyms and Terminology**

2 Summary of Operational Concept from DOD

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.

Table 4 lists the Operational Improvement steps related to the NOP. The table is based on the latest version (DS13) of the Integrated Roadmap (see [24]).

Relevant OI Steps ref. (from Integrated Roadmap[24])	Operational Focus Area name / identifier	Story Board Step	Master or Contributing (M or C)	Contribution to the OIs short description
DCB-0103-A	Network Operations Planning / OFA05.03.07	1	M (OI allocated to this single OSED)	Consolidation of NOP information requirements; identification of Collaborative NOP services and procedures based on shared NOP information during planning, execution and post-flight
AO-0801-A	Airport Operations Management / OFA05.01.01	1	C	Integration of information between AOP and NOP to optimise the Airport and Network operations through time.
MET-0101	AIM/MET / ENB02.01.02	1	C	Integration of weather (Enhanced MET observations, nowcasts and forecasts) in the network to support the elaboration of the network plan.

Table 4: List of relevant OIs within the OFA

The following table identifies the link with the applicable scenarios and use cases of the DOD.

Scenario identification	Use Case Identification	Reference to DOD [7] section where it is described
Long term Planning	UC-NL-03 Provide large National or Multinational Exercises Plans	4.2.1.2
	UC-NL-04 Elaborate Airspace Demand Forecast	
Medium and Short term Planning	UC-NP-02 Update iSBT/SMT	4.2.2.2
	UC-NP-07 Submission of Airspace Reservation requests	
	UC-NP-10 Enrich Historical Demand Forecast with incoming Flight intentions	
	UC-NP-11 Assess Predictability and Uncertainty of Demand Forecast	
	UC-NP-12 Publish / Share Demand Forecast	
	UC-NP-13 Assess Complexity and Sector Workload	
	UC-NP-14 Define / Update Sector / Airport Capacities	
	UC-NP-15 Capture and Maintain Capacity Data	
	UC-NP-17 Monitor Declared Capacity Values	
	UC-NP-18 Capture and Analyse Airspace Organisation Data	
	UC-NP-19 Identify the Optimum Airspace Configuration	
	UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase	
	UC-NP-21 Collaboratively Agree and Implement Airspace Configuration	
	UC-NP-22 Analyse and Prepare DCB/dDCB Measures	
	UC-NP-23 Prepare and Coordinate DCB Measures using TTA	
	UC-NP-25 Publish and Update Airspace Configuration	
	UC-NP-30 Provide Special Event Information and Impact	
	UC-NP-31 Provide Network Weather Information and Impact	
	UC-NP-32 Exchange Updated Airport Capacity Plan with no demand capacity	

Scenario identification	Use Case Identification	Reference to DOD [7] section where it is described
	imbalances detected	
	UC-NP-33 Managing unplanned reduction in Airport Capacity	
	UC-NP-34 Manage unplanned increase in traffic demand (Business aviation)	
	UC-NP-35 Airport capacity recovery from a disrupted situation	
	UC-NP-36 Exchange Updated Runway Configuration Plan at D-1	
Short-term Planning/Execution	UC-NE-04 Monitor deviation between Agreed and Actual Flight Profile	4.2.2.2, 4.2.3.2
	UC-NE-07 Detection of Demand Capacity Imbalances (Hot Spots)	
	UC-NE-10 Coordination of the STAM solution	
	UC-NE-11 Implement STAM solution	
	UC-NE-13 Dynamically Updating the *NOP*	
	UC-NE-15 Update Airspace Status in Real Time	
	UC-NE-16 Communicate TTA/TTO Information	
	UC-NE-18 Provide Critical Event Information and impact	
	UC-NE-19 Assess Military KPIs Adherence	
	UC-NE-20 Assess KPIs Adherence	
	UC-NE-21 Manage unplanned increase in traffic demand (diverting flights)	
	UC-NE-22 Demand increase (additional unplanned flights)	
	UC-NE-23 Exchange Updated Runway Configuration Plan at Day of Operation (D)	
	UC-NE-24 Exchange of API and DPI	
	UC-NE-25 Turn around delay, delayed outbound flight	
	UC-NE-26 Reduction in airport (runway) capacity	
	UC-NE-27 Airport traffic distribution adjustment	
	UC-NE-28 Dissemination of Flight Progress information – Flight suspension from AOP DPI process	
	UC-NE-29 Dissemination of Flight Progress information – Flight diverted from AOP API process	
	UC-NE-30 Post-OPS Analysis of Network adherence to Operational Performance KPIs	
	UC-NE-31 Network Impact Assessment of dDCB Measures proposed by LTM	
	UC-NE-32 Network Impact Assessment of Airports AOP Changes	
Post-Flight	UC-NP-24 Monitor the Network Effect	
	UC-NE-01 Monitor the Application of DCB/dDCB measures	
Medium and Short term Planning	UC-NP-39 Airport Traffic Demand Exchange	4.2.2.2
Short-term Planning/Execution	UC-NE-02 Notify TTA in addition to CTOT	4.2.2.2, 4.2.3.2

464 Table 5: List of relevant DOD Scenarios and Use Cases

465 Note:

466 The Step 1 DOD [7] provides a few UCs (UC-NL-08 to UC-NL-15) addressing the Network Long term planning
467 (strategic) Plan. These are not mentioned here as the elaboration and maintenance of the Network Strategy Plan
468 is not a NOP process. It must be noted however that NOP data (e.g. large events) may be available during the
469 long-term planning phase as part of NOP processes.

470

471 The following *Table 6* identifies the link with the applicable environments of the DOD.

Operational Environment	Class of environment	Reference to DOD section where it is described
Airspace classification/management	Initially based on ICAO ATS airspace classifications, regulations and applicable rules, including Visual Flight Rules (VFR) and Instrument Flight Rules (IFR). However, it	§ 3.1.1

Operational Environment	Class of environment	Reference to DOD section where it is described
	may be necessary to consider different ways of designating/classifying the airspace so that it becomes more responsive to the airspace users' needs. A particular factor is the necessity of ensuring that classifications and rules are common to all States, and that they are applied uniformly across the entire region.	
Route configuration	ARN Version-7	§ 3.1.2

472 Table 6: List of relevant DOD Environments

473
474 The following *Table 7* identifies the link with the applicable Operational Processes and Services
475 defined in the DOD.

DOD Process / Service Title	Process/ Service identification	Process/ Service short description	Reference to DOD[7] section where it is described
Determine Network Demand	N/A	This corresponds to the activities to determine the demand to cover the forecasted traffic flows. Historical data, especially for General Aviation flights and for military operations, are taken into account. The traffic demand is a core element of the NOP	5.3.3.4
Plan Network Resources and Capabilities	N/A	The output from this process is a clear description of the capacity at both the Network and sector level for a given time period that is available for further planning. The Network Resources and Capabilities are core elements of the NOP.	5.3.3.4
Plan Network Airspace Architecture	N/A	Airspace requirements are incorporated into a proposed airspace design. Temporary or conditional routings through reserved airspace are identified along with the times that they can be used. Airspace organization / sectors' configurations are core elements of the NOP.	5.3.3.2
Balance Demand with Resources & Capabilities	N/A	This process is to establish a balance between the assessed Network Demand and the Resources and Capabilities of the Network. The output of DCB process is a core element of the NOP	5.3.3.4
Dynamically Balance Network Capacity with Demand	N/A	Demand capacity balancing information (imbalances) and solutions detected/elaborated	5.3.3.4

DOD Process / Service Title	Process/ Service identification	Process/ Service short description	Reference to DOD[7] section where it is described
		during execution are part of NOP updates.	
Dynamic Airspace management	N/A	Changes to airspace reservations / sector configurations are part of NOP updates.	5.3.3.2
Monitor/Analyse Network Management Performance	N/A	A series of performance indicators are identified according to the main objectives of the network management, monitored and analysed. Network performance data is a core element of the NOP.	N/A

476 Table 7: List of the relevant DOD Processes and Services

477

478 The following *Table 8* summarizes the Requirements including Performance (KPA related)
479 requirements relevant of the OSED. This table supports defining the performance objectives in the
480 scope of the addressed OFA. The DOD performance requirements are structured to respond to Key
481 Performance Indicators (PI) targets / decomposed PIs, so this table supports traceability to the
482 performance framework.

DOD [7] Requirement Identification	DOD requirement title	Reference to DOD[7] section where it is described
REQ-07.02-DOD-0001.0000	Sharing Trajectory Information	§6.1
REQ-07.02-DOD-0001.0001	Commonly agree and facilitate on a reference trajectory	§6.1
REQ-07.02-DOD-0001.0002	Enabling Free Route inside a FAB	§6.1
REQ-07.02-DOD-0001.0004	Complexity and Workload assessment tools supporting Free Route	§6.1
REQ-07.02-DOD-0001.0005	Flexibly adapt airspace structures designed for the military activities	§6.1
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-0001.0009	Airspace Users participate to Prioritization Process	§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-0001.0012	Enhanced real-time Civil Military Coordination and air situation awareness	§6.1
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-0001.0013	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-0001.0020	Capacity: Increase in TMA capacity for Step 1	§6.2.4
REQ-07.02-DOD-0001.0016	Predictability: Improvement in predictability for Step 1	§6.2.7

DOD [7] Requirement Identification	DOD requirement title	Reference to DOD[7] section where it is described
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-BMTP.1000	Capacity: En-Route capacity improvement using BMT in Step 1	§6.2.4
REQ-07.02-DOD-BMTP.1010	Capacity: TMA capacity improvement using BMT in Step 1	§6.2.4
REQ-07.02-DOD-BMTP.1020	Predictability: Improvement of predictability using BMT in Step 1	§6.2.7
REQ-07.02-DOD-BMTP.1030	Fuel Efficiency: Increase of efficiency using BMT for Step 1	§6.2.5
REQ-07.02-DOD-BMTP.1040	Cost Effectiveness: Increase of productivity due to improvement of demand profile information	§6.2.3
REQ-07.02-DOD-AMAP.1000	Capacity: Increase in En-Route capacity using VPA in Step 1	§6.2.4
REQ-07.02-DOD-AMAP.1010	Capacity: Increase in TMA capacity using VPA in Step 1	§6.2.4
REQ-07.02-DOD-AMAP.1020	Fuel Efficiency: Reducing emissions and fuel consumption with better use of airspace and more direct profiles in Step 1.	§6.2.5
REQ-07.02-DOD-DACP.1000	Safety: Improvement due to the enhanced alignment of demand & sectorisation in Step 1	§6.2.1
REQ-07.02-DOD-DACP.1010	Capacity: Increase in En-Route capacity using FUA in Step 1	§6.2.4
REQ-07.02-DOD-DACP.1020	Capacity: Increase in TMA capacity using FUA in Step 1	§6.2.4
REQ-07.02-DOD-DACP.1030	Fuel Efficiency: improvement of efficiency with dynamic sectorisation in Step 1	§6.2.5
REQ-07.02-DOD-DACP.1040	Cost Effectiveness: improvement of productivity using dynamic sectorisation in Step 1	§6.2.3
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 management in Step 1	§6.2.3

Table 8: List of the relevant DOD Requirements

2.2 Operational Concept Description

2.2.1 Overall concept

The European ATM Collaborative Network Operations Plan (Collaborative NOP) is a set of consolidated integrated information and actions derived and reached collaboratively both relevant to, and serving as a reference for, the management of the Pan-European ATM network in different timeframes, which includes, but is not limited to, targets, objectives, how to achieve them, anticipated impact.

The Collaborative NOP (NOP) represents a view, at any moment in time, of the expected demand on the ATM Network on a particular day and the resources available across the network, together with a set of agreed actions to accommodate this demand, to mitigate known constraints and to optimize ATM Network performance.

The NOP has a dynamic and rolling lifecycle starting in the long-term planning phase and progressively updated up to and including the execution and post-flight phases. It supports and reflects the results of the collaborative ATM planning process: at each phase, stakeholders

collaborate in developing a common view of the planned network situation. The NOP facilitates and supports all ATM stakeholders to take informed decisions considering the network effect and supports the Network Manager, responsible for the overall coordination of individual decisions and actions needed to accommodate the demand and optimize network performance.

The NOP provides Common Situation Awareness to all ATM stakeholders. Thanks to the multiple services allowing to access to the NOP unique source of data, it ensures that the same information is available to all ATM Stakeholders. The NOP is the common view of the Network situation knowing that the information the ATM Stakeholder has access to, depends on its role and associated access rights, adapted to its operational needs (different security levels).

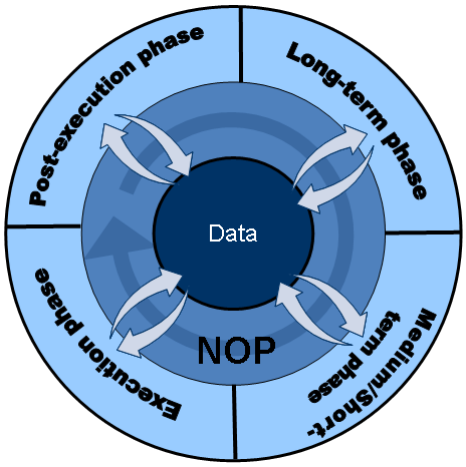


Figure 2: NOP as a rolling process

2.2.2 Scope of the NOP

In SESAR, four main phases are identified: Long-term Planning, Medium and Short Term planning, Execution, and Post-flight (incl. post-operations analysis resulting, for example, in lessons learned that are fed back into subsequent planning phases).

The NOP is a rolling plan with a lifecycle that follows the ATM phases. The information contained in the NOP and the responsibility of actors may differ depending on the phase. The NOP starts when an ATM actor uses and/or shares information with another ATM actor to build a local picture, take a decision (long term planning or operational), coordinate information, or collaborate to reach a decision.

Once ATM information is of interest to ATM stakeholders, it could be considered to form part of the Collaborative NOP. The NOP also baselines information (plans) throughout its rolling lifecycle i.e. different NOP instantiations, which form reference points. The following NOP instantiations are foreseen:

- A Yearly NOP (baselined end-November). The yearly NOP is associated to long term planning yearly network performance targets and objectives.
- Seasonal NOPs (baselined mid-April for a season that starts in May and mid-October for a season starting at the beginning of November). Seasonal plans are related to long term planning seasonal network performance targets and objectives where relevant;
- A weekly plan associated to weekly targets and objectives where relevant (e.g. axis management);
- D-1 NOP baselined for the following day.
- D NOP, starting at 00:00 UTC (Universal Time Clock) and ending at 23:59 UTC. This rolling plan continues to be executed and updated with all the last minute changes.

The D-1 NOP and D NOP are related to network performance targets and objectives fixed for that particular D-day.

- Executed NOP, starting at D+1 at 00:00 UTC (Universal Time Clock) is used to compare what happened with what was planned to happen and how well different mitigation measures worked.

The Executed NOP is used to evaluate to which extent the network daily targets and objectives have been met, and extend also to the analysis of previous days/weeks/months 'performance.

The NOP instances in relation to the ATM phases are detailed in the table below:

ATM Phase	Description	NOP instance	Baselined
Long Term Planning	The long-term issues of the activities concerned to the Development of the Business/Mission trajectories (e.g. business plans of all stakeholders, resources, budget planning, historical data, performance targets, demand forecasts, trends, options, facilities).	3-5 Years NOP – Long term planning NOP	Annually
		Yearly NOP	End of November
Medium-Short Term Planning	All activities concerned to the planning of Shared Business/Mission trajectories (e.g. resource allocations, airspace organizations adoption and mode of operations, network operations plan, adjustments or refinements of assets and budgets).	Seasonal NOP	mid-April and mid-October
		Weekly NOP[3]	Friday before week start on Saturday
		D-1 NOP	Specific time before D
		D NOP (*)	Starts at D 00:01
Trajectory Execution	All activities concerned to the agreement and execution of the Reference Business/Mission Trajectories. It includes the monitoring of events applying service refinements or adjustments needed in order to maintain the stability of Network Operations Plan.		
Post Flight Processes	The period after the end of the flight (on block), e.g. performance Analysis.		
		Executed NOP	Starts 0:00 D+1

Table 9: NOP ATM flight phases

(*) D NOP time line overlaps between short-term planning, execution, and post-fight phases.

2.2.3 Benefits

As the contribution of the NOP to the safety is indirect, it shall be noted that all the direct impacts in term of requirements, needs and associated processes are addressed into the Primary Projects (see Table 1). In this OSED, the safety is not addressed separately (and indirectly addressed in each requirement, process and service).

The Collaborative NOP provides direct contribution in the following areas of performance:

KPA/Focus Area	Collaborative NOP contribution
Predictability([4])	The NOP provides the planned network situation considering all known

[3] A Weekly Planning applies to specific activities in Network Operations e.g. Axis Management.
[4] **Predictability** addresses the ability of the ATM System to ensure a reliable and consistent level of 4D performance. In other words: across many flights, the ability to control the variability of the deviation between the actually flown 4D trajectories of aircraft in relationship to the Reference Business Trajectory (SESAR Definition Phase – D2).

KPA/Focus Area	Collaborative NOP contribution
	constraints. The NOP contains the latest, most accurate information relating to the ATM environment and its operation, thus enabling airspace users to take informed flight planning decisions. NOP contributes to extend the time horizon for decision-making (network view). This NOP contributes to block-to-block and arrival performance. It also helps preventing and mitigating service disruption, contribute to reduce recovery times and help stakeholders to restore the plan.
Capacity	NOP enhancing of traffic demand assessment in the Medium and short Time phases, supported by dynamic AOP/NOP information exchange facilitates better usage of existing Network capacity by allocating resources to accurate demand The achieved improvement in predictability and the support it provides to Network performance monitoring and management by the NOP, contributes to reducing capacity buffers and bringing up latent capacities
Flexibility([5])	The NOP gives the common awareness to all stakeholders (incl. non-scheduled flights). The NOP provides updates resulting from late changes to demand, capacities and influencers. The NOP facilitates the accommodation of airspace user requests for late changes during planning. The NOP provides access to opportunities in case of sudden changes in capacity or demand.
Participation	The NOP should enable stakeholders' collaborations earlier in the planning phase and facilitate commitment to network performance optimum by making stakeholders' intentions and actions more transparent. The collaborative NOP is realized in a Network CDM platform enabling collaborations between operational staff for all network-related matters addressed during planning, execution and post-analysis.

548 Table 10: KPAs with direct contributions

549 Increased predictability has a positive impact on other KPAs. The Collaborative NOP provides indirect
550 contributions in the following performance areas:

KPA	Collaborative NOP contribution
Safety	Improved planning should decrease congestion and reduce workload and should have eventually a positive effect on the safety of the ATM system
Flight[6] / Fuel Efficiency /Environment	The NOP facilitates more direct routing made possible by providing a better knowledge of the actual Network capability and so have an indirect impact on fuel efficiency.
Punctuality	The NOP lead to a better use of available capacity, leading to a reduction of departure and arrival delays, and so have an indirect impact on Punctuality.
Resilience	The increase in Predictability and increase in Situational Awareness achieved by continuous performance monitoring during execution enhance pro-active management and the ability to withstand and recover from planned and unplanned events and conditions which cause a loss of nominal capacity

[5] **Flexibility** addresses the ability of the ATM system and airports to respond to 'sudden' changes in demand and capacity: rapid changes in traffic patterns, sudden airport capacity changes, weather, crises, etc. (SESAR definition Phase – D2).

[6] **Fuel Efficiency**: Performance scheme targets are set on the basis of flight efficiency ,measured in terms of both planned and actual En-Route horizontal excess distance, as this is a major contributor to fuel efficiency that is most practically measured and more directly controllable by ANS providers than **fuel efficiency**

KPA	Collaborative NOP contribution
Cost Effectiveness/Direct cost of ANSPs	The NOP helps to optimize the allocation of ANSPs' resources leading to significant cost efficiencies and facilitating the SESAR performance target relating to the reduction of ATM attributable cost per flight. The NOP has an indirect impact on this KPA through its direct positive impact on Predictability.
Interoperability/ application of global standards and uniform principles	The Network CDM Platform facilitates access to the ATM network situation and the NOP (Network Operations Plan). It enables all exchanges between stakeholders (ANSPs, airports, airspace users) in relation to the plan. Interoperability should have a positive impact on the efficiency of trajectories.
Environment[7]	The NOP contributes to the Environment by supporting ANSP in facilitating more direct routing. The NOP provides better knowledge of the actual Network capability and so have an indirect impact on fuel efficiency

551 Table 11: KPAs with indirect contributions

552 2.3 Processes and Services (P&S)

553 Concerning the processes and service, the P07.06.01 took advantage of the EATMA (MEGA) central
554 repository to fulfil the role of the P07.06.01 project, which is to ensure the coherence between
555 federating and primary projects at WP7/13 level (operational activities and information exchanges).

556 The outcome of this work can be found directly in the EATMA.

557 Nevertheless, in the Appendix A of this document, a summary extract of the WP7/13 operational
558 processes (operational activities and information exchanges) in the scope of the NOP could be found
559 for information.

[7] **Environment**. ATM strategic targets and SESAR validation targets are based on fuel efficiency, incorporating efficiency in aerodrome operations (on the airport surface) as well as both horizontal and vertical flight profile efficiency because the strategic goal is to improve overall fuel efficiency

3 Detailed Operating Method

3.1 Previous Operating Method

The NOP processes are described for each ATM planning phase considered by NM.

To enable the comparison with the new operating method, the description is structured according to the following high-level invariant network planning activities:

- Network Performance Management;
- Airspace Structure Planning;
- Airspace Management (Civil and Military);
- Significant Event Planning
- Demand Capacity Balancing (DCB).

3.1.1 Long term planning Phase (From 5 years up to 6 months)

The high-level goal of network operations planning in this period is to translate the ATM Network Strategy Plan into a European Network Operations Plan (as per SES Network Manager IR n°677/2011) for the Network and refine this European Network Operations Plan on a yearly basis.

Currently, Long Term Planning activities at the airspace level are ACC-oriented with a time horizon of five years ahead.

The planning process relies on traffic forecast based on economic, environmental and political considerations.

The objective is to design the infrastructure both at airspace and airports levels to optimise the use of resources, taking into account Airspace Users' needs and preferences and the local, sub-regional and regional Performance Targets.

3.1.1.1 Network Performance Management

3.1.1.1.1 Network Performance Review

This is an activity that reviews the performance of the Network over the preceding year, identifying bottlenecks, delays, flows, measures taken and results.

The activity is performed annually and the main output the annual EUROCONTROL Network Operations Report. There is no collaborative process with externals. The report is published in the European Network Operations Plan document and reported to stakeholder groups.

Inputs are:

- Target provided by Provisional Council (PC)
- Network targets for capacity and flight efficiency
- Local delay breakdown of the capacity target
- Traffic forecast
- Expected traffic distribution over the route network
- Cost of air navigation service provision
- Network Statistics Performance Review

Outputs are:

- The annual Network Operations Report

The main players are the ANSPs and the Network Manager.

3.1.1.1.2 Airspace Demand and Traffic Forecast

An accurate demand forecast is the key to effective performance planning. This is an ongoing activity, undertaken by STATFOR, producing traffic forecasts based on historical data and known information.

The demand is then distributed over the airspace structure on the shortest routes available on the network, producing a demand forecast at local (ACC/Sector Group) level. An accurate demand forecast is essential to the construction of a coherent European Network Operations Plan at every level and is accessible via the NOP Portal long term planning (strategic) pages.

Inputs are:

- Economic forecast (GDP)
- Airline schedules
- Airport plans
- States' Transport Policies
- Baseline traffic forecasts produced at State level, together with alternative forecasts for low growth and high growth scenarios
- Seasonal weather forecasts

Outputs are:

- Demand Traffic Forecasts at State level (Low, Baseline and High Growth) which are summarised in the European Network Operations Plan document and accessible through the NOP Portal long term planning (strategic) pages

The main players are the Network Manager and ANSPs and to a lesser extent Airports and Airlines.

3.1.1.1.3 ACC Capacity Planning

In an iterative process, the Network Manager supports the ANSPs in the production and delivery of 5-year capacity plans. These are collected annually from the ANSPs in a fully collaborative process and updated throughout the year as needed. The demand forecast is distributed over the future ATS Route Network over the shortest available routeings, constrained only by the planned Airport Capacities. The capacity plans and the resulting changes to capacity – increase/decrease and applicable date/time - at regional, sub-regional and local (ACC and sector level) are delivered to the NM NOP Team and are accessible via the NOP Portal.

Inputs are:

- ACC Capacity Plans from ANSPs
- Demand Forecast
- Seasonal weather forecasts
- Capacity enhancement initiatives, including:
  - ATM system improvement
  - Airspace structure development
  - Planned sectorisation/opening schemes
  - Sector/traffic volume capacities/monitoring values
  - Staff planning
  - Identification of remaining bottlenecks
- ACC capacity baseline
- ACC capacity requirement profiles
- ACC local delay target

Outputs are:

- Capacity Plans are included in 'Summer NOP' and ATM Network Operations Performance Plan for the coming 4 years

The main players involved are the State NSA, the ANSP, and the Network Manager.

3.1.1.1.4 Airport Capacity Planning

Today, the Airport Operators perform their own long term planning determination of airport demand by reviewing capabilities and balancing the forecast demand with capabilities, developing their own airport operations Plan.

Inputs are:

- Local performance targets
- Airport capacity
- Capacity enhancement plans
- Operational improvements
- capabilities and mode of operation
- Resources plan
- Temporary modifications
- Catalogue of scenarios and modes of operation
- Implementation plan
- Stand allocation plan
- Surface movement plan
- Potential risks

No formal Airport Operator resources plan is shared with NM at any stage, but some elements of it are shared (see the list below). EUROCONTROL gathers and consolidates Airports' planning. A database and a Web Interface are used to collect and store airport information and plans. Data captured includes:

- Airport runway capacity (different runway configurations, adverse weather conditions)
- Forecast capacity
- Forecast % traffic increase / decrease
- Ongoing and planned Activities / Events
- Projects planned
- Weather Management
- Airport CDM status
- CDA
- Traffic Mix
- Infrastructure Services
- Airline schedules
- Early plan for network traffic flows
- Initial forecast of traffic data
- Awareness of special events that could impact the expected demand flows (large military events, sport and social events, air shows, etc.)
- Information on ATC capacity of the surrounding areas (TMA, ACCs)
- Infrastructure Services

Data is extracted from the database and re-directed to EUROCONTROL Capacity Planning. Today this collection is not automated. It is published in the European Network Operations Plan Document (the forecast traffic evolution, declared capacity (airport capacity and known variations for specific weather circumstances), ongoing and planned activities (events)). It is available to all stakeholders via the EUROCONTROL Airport Corner, with restricted access via the NOP Portal.

The main players are the Airports, the Network Manager and the Airspace Users.

Outputs are:

- EUROCONTROL Capacity Planning
- European Network Operations Plan Document

3.1.1.1.5 Airspace Users' planning

The long term planning by the Airspace User takes place outside of network operations planning. Today all NM stakeholders receive as a result of the airline planning process, the intentions (i.e. DDR advanced demand to FPLs).

3.1.1.2 Airspace Structures Design

The scope of airspace structures comprise ATS Routes, DCTs, Free Route Airspace, ATC sectorisation and sector opening schemes.

The objective of the Airspace Design activity is to organise and carry out the necessary development and coordination of planning and implementation activities for the optimisation of the ATS Route Network and supporting Air Traffic Control (ATC) Sectorisation in the European Civil Aviation Conference (ECAC) area, for both En-Route and terminal airspace. Airspace Design is a fully collaborative process, leading to the establishment of improvements to the airspace structure (e.g. ATS routes, DCTs, Free Route Airspace, temporary airspace structures including TRA/TSA/CDR etc.). This process promotes the design of operational airspace structures, regardless of national boundaries, to meet the requirements of both civil and military users at local, sub-regional and regional ATM Network level.

Inputs are:

- Governance Bodies/SESII performance targets
- Agreed performance targets for capacity and flight efficiency at network and where relevant local level (ECAC, FAB, ACC)
- Network Manager: Existing Airspace Structure (CACD)
- Airspace Availability / Conditions of Use extracted from the AIP and the RAD
- Default Airspace Availability
- Identified capacity bottlenecks
- Coordination of Airspace design plans (local / sub-regional)
- ANSP: Plans for local or FAB development
- Identified capacity bottlenecks
- Performance plans (FAB and ACC)
- Current airspace structure and utilisation (AIP/RAD)
- Airspace Users: Requests via RNDSG
- Airspace Improvement proposals via RNDSG
- Yearly reviews of the RAD
- Routing Preference (historical data) and Priorities
- Military: Military Airspace Requirements

Outputs are:

- Updated Airspace Structure development plan
- Amended / Updated / New Route Network and/or sectorisation. Full details of all proposals available for consultation and/or amendment – restricted access through the One Sky on-line RNDSG web application

Today, the output is not fully integrated into today's European Network Operations Plan document. The main players involved are High Level Airspace Policy Body (HLAPB), Governance Bodies; the Network Manager (NM), ANSPs/FABs and the Airspace Users.

3.1.1.3 Airspace Management (Civil and Military)

The Flexible Use of Airspace (FUA) Concept allows the optimal use of airspace through enhanced civil/military co-ordination. The application of the FUA Concept ensures that any airspace reservation, segregation or restriction is temporary and based on real use for a specified time period. Airspace Management contributes to the design of flexible airspace structures taking account of the civil and military airspace requirements – (See Section 3.1.2.2 (Current and future Airspace Structure)).

The long-term planning phase is mostly concerned with the definition of the national airspace policy and the establishment of pre-determined airspace structures.

Inputs are:

- HLAPB: Periodical review of the use made of the airspace using traffic statistics and forecasts

- Military and Civil ANSPs: Planned events that could require airspace reorganisation or could have an effect on the Operations Plan

Outputs are:

- Flexible airspace structures (Not in today's European Network Operations Plan document but used in Airspace Design)
- Planned Events (In today's Network Operations Plan document published in Event Planning)

3.1.1.4 Significant Event Planning

Significant Events are events such as major projects (ATM system or infrastructure upgrade or major airspace reorganisation), military exercises, sporting events, major social events, etc. that are expected to affect the demand and have a significant impact on Operations. The objective of Significant Event Planning is to obtain and consolidate the information necessary to provide a detailed and global description of all the European events planned, including specific ATFCM measures foreseen to mitigate negative impacts on the Network.

With few exceptions (Major ACC System and Infrastructure Upgrades, Major Airport Works and some special events) significant event-planning takes places mainly in the mid and short term planning phase (seasonal planning) and the processes for all are the same. The table below provides a summary of the type of information ('**what**' + '**description**') is available in the European Network Operations Plan document and/or the NOP portal, and the timeframe ('**when**').

WHEN	WHAT	DESCRIPTION
Mid and short term (generally). Occasionally long term	**Initial notification and assessment**	This includes Calendar, description, constraints (airspace closure, capacity reduction, runway out of service, etc.), responsibilities, etc. Simulation and other impact assessments published.
Mid and short term	**Initial event plan**	CDM process, meetings etc. that results in draft events plan more detailed than above and containing proposed mitigation measures (restrictions, re-routing, demand reductions, etc.)
Short-term	**Final Event Plan**	on NOP including the operational procedure publication
Execution	**Publication of significant deviations from plan**	NOP headline news in NOP Portal

Table 12: Significant events information available in the NOP portal

With the exception of Contingency & Crisis, the processes involved to manage significant events are identical, therefore, full descriptions are provided in mid and short term phase.

Contingency & Crisis

There are a set of procedures for the management of crises. These are developed on an annual basis, i.e. initial definition and annual review.

In this phase, there is simply a procedures document and a set of roles and responsibilities.

Inputs are:

- Previous experience

Outputs are:

- Procedures document for management of crisis

3.1.1.5 DCB (long term planning)

This process takes place in the Long term Planning Phase if and when the known capacity does not meet the known demand. The objective is to identify and perform the necessary actions in order to

enable capacity to meet demand-taking account of the level of information accuracy possible at this time frame.

Inputs are:

- ANSPs, FABs and ACCs provide their delay/capacity targets and forecasts
- Airports provide their operational performance plan
- The Network environment/flight efficiency performance target and forecast
- Special events
- An analysis of the operational performance targets and forecast
- Identified Operational bottleneck areas

Outputs are:

- Demand and Capacity balanced
- Mitigation solutions / actions e.g. route restrictions (the RAD), re-routing scenarios, and definition of variable sector capacities depending on operational conditions

The main players involved in this process are the Network Manager (CMAC. MILO and OPS), States, Airports, ANSPs and Airspace Users, Special Military Events Directors

The outputs of this activity are an input and are reflected in today's European Network Operations Plan document.

3.1.2 Seasonal Planning Phase (From 6 months until one week)

The objective of is to refine the Network Operations Long Term Plan adding more granularity and more accurate and recent/updated data through the production of Seasonal Plans, Axis Plans for summer and Daily Plans in collaboration with all stakeholders.

The Concept Elements identified for the Long term planning Phase have been mapped to show their evolution and granularity in time.

3.1.2.1 Network Performance Management

3.1.2.1.1 Network Performance Review (Seasonal Debrief)

Seasonal debriefing is the statistical analysis of the previous season and qualitative post operations feedback from ANSPs, NM and Airspace Users. Seasonal and monthly operations performance reviews take place where bottlenecks and other network hotspots requiring particular attention are identified.

Inputs are:

- statistical analysis of previous season
- qualitative post operations feedback from ANSP, NM and airspace users

Outputs are:

- Identified bottlenecks and other network hotspots requiring particular attention

3.1.2.1.2 Airspace Demand and Traffic Forecast (Network, ANSP, FAB, ACC, Airport, MIL)

Repetitive Flight Plans are plans related to a series of frequently recurring, regularly operated individual flights with identical basic features, submitted by an operator for retention and repetitive use by ATS units. It is an ICAO procedure. The objective of the Repetitive Flight Planning process is to support airspace users' flight planning activities by minimising resources and effort involved i.e. avoiding filing individual flight plans, which are not expected to change during the IATA season (clock change to clock change). The RPLs provide the ANSPs with anticipated information on the demand.

Inputs are:

- Initial RPLs
- Validated or corrected RPLs

Outputs are:

- RPLs

The main players involved are the Network Manager and the Airspace Users (using this process).

Today's network operations' planning is not using this information during this phase. (See section 3.1.3 (Execution Planning Phase).

3.1.2.1.3 ACC Capacity Planning

The objective is to produce and share a Network Operations Plan for summer and for winter incorporating all known existing information on traffic demand and capacity plans for the seasons. This information, in addition to past experience and network post-ops analysis, allows the Network Manager to identify bottlenecks and propose ATFCM and ASM measures to counterbalance them.

The Seasonal Plans which are developed for the Summer and for the Winter compile outputs of the various planning activities foreseen by ANSPs, Network Manager, Airports, Military and other stakeholders

The winter version of the plan is more limited than the plan prepared for each summer and does not contain overall network traffic forecasts and delay / flight efficiency performance plans, etc. The table below indicates the main elements to be found in each seasonal plan.

Inputs are:

	Summer	Winter
Review of previous winter / summer season	Available on-line via portal	
Seasonal traffic and capacity forecasts	Yes	No
Airspace and route utilisation changes	Available on-line via portal	
Description of main network flows (axis)	Yes	Yes
Special events	Yes	Yes
Military events	Yes	Yes
Summary of major ACC and ATM system upgrades	Yes	Yes
Detailed planning information and targets per ACC including monthly updates on Daily Average traffic, Observed traffic increase (in %), Observed average ATFM delay (in min.) and Observed average ATFM delay (in min.) excluding weather & industrial action.	Yes	No
Detailed information per airport including monthly updates on Average Daily Movements, Traffic evolution (%),% of days regulated, % of delayed arrival traffic and Daily average ARR delay	Yes	Yes
Catalogue of ATFM measures pre-agreed for different events and modes of operation	Available on-line via portal	

Table 13: Main information available in seasonal plans today

Outputs are:

- This seasonal Network Operations Plan, bi-annually (summer and winter) is available for all ATM Stakeholders via the NOP Portal.

The main players involved are the Network Manager, ANSPs, Airports and the Airspace Users.

3.1.2.1.4 Airport Planning

The Airport Operators continue the planning commenced in the long-term planning phase; reviewing capabilities and balancing the forecast demand with capabilities, updating their own airport operations plan). These Seasonal Airport Capacity plans include planned works, dates and times and positive/negative impact on capacity short and long term. These plans are not shared with the Network at this stage today.

3.1.2.1.5 Airspace Users' Planning (Seasonal Programmes)

Commercial Flight plan: The commercial Flight plan contains generally: Origin, Destination, Schedule and preferential Aircraft type for the leg. With a non-negligible workload, airlines could be able to deliver preferred routes and, based on statistical values, usage of these routes inclusive profile for European and some long haul flights.

Inputs are defined for a season and adapted after first official acceptance in case-by-case.

Winter season (start end of October / 5 months):

- First usable commercial flight plan (without airport slot confirmation) available in middle August. About 80% of the legs are valid
- Last commercial flight plan (with airport slot confirmation) available beginning of October. About 95% of the legs are valid
- Change during the season. About 5% of the legs
- Summer season (start end of March / 7 months)
- First usable commercial flight plan (without airport slot confirmation) available in middle January. About 80% of the legs are valid
- Last commercial flight plan (with airport slot confirmation) available middle of February. About 90% of the legs are valid

Change during the season. About 10% of the legs (Season is longer and more charters adaptations)

Outputs are: Schedules – Seasonal Planning (In DDR, AU have the possibility to update their seasonal schedule once a week).

3.1.2.2 Airspace Structures Design

3.1.2.2.1 Airspace design (Specific events)

Details of confirmed airspace structure changes are published two AIRAC cycles in advance, through the RAIS (route availability information system) and formally published through the NOP Portal allowing access to all ATM partners. The Network Manager provides details to the NM environment and IFPS, who simulate and test in advance of implementation of the revised airspace structure.

Outputs are:

- Revised airspace structure available via the NOP Portal

3.1.2.2.2 Airspace structure Organisation (Temporary Airspace Structures)

For particular military operations, the airspace can be reorganised for a limited period of time. This entails coordination, assessment, and re-designing of day-to-day operational airspace to meet the needs of AUs and States.

Outputs are:

- Temporary airspace reorganisation is published in an AIP Supplement (AIP SUP) or NOTAM and available on the NOP Portal

The main players are the Military, the States, and the Network Manager.

3.1.2.2.3 The RAD

On top of, and in addition to, the route network, additional flow constraints are necessary.

E.g. particular route segments are only available under certain conditions. These constraints are captured in a route availability document updated and reviewed at AIRAC cycle. The RAD could be considered as a first ATFCM measure. The RAD is an ATFCM tool that integrates both structural and ATFCM requirements, geographically and vertically.

The objective of the RAD is to facilitate flight planning, in order to improve ATFCM, while allowing airspace Users flight planning flexibility.

Inputs are:

- ANSPs modifications / updates
- Validated modifications (accuracy, network consistency)
- ANSP route restrictions in their airspace of responsibility in agreed timeframes
- Revised AU demand

Outputs are:

- RAD available for consultation via the NOP Portal

The main players involved are the Network Manager, the ANSPs and the Airspace Users.

3.1.2.3 Airspace Management (Civil and Military)

During this phase, the process of continuous reassessment of national airspace and establishment of new flexible airspace structures takes place. Depending on requirements, temporal flexible airspace structures could be introduced. (See Section 3.1.2.2 ‘Current and future airspace structure’).

Inputs are:

- civil/military airspace requirements

Outputs are:

- AIP SUP or NOTAM

The Military continue updating the planned events – adding specifics with regard to the involved flexible structures, time periods etc. (See 3.1.2.4.1.4 ‘Military Events’)

3.1.2.4 Significant Event Planning (Seasonal)

A specific separated description is provided in case of significant event.

Inputs are:

- Information on Major ACC System and Infrastructure Upgrades
- Information on Major airspace reorganisation
- Information on Major Airport Works
- Information on Military Events
- Information on Special Events
- Information on Axis Planning
- Information on Contingency and Crisis

Outputs are:

- Updated Events Planning available via the NOP Portal
- Agreed Initial measures

3.1.2.4.1.1 Major ACC System and Infrastructure Upgrades

ACC upgrades are ATM system changes planned in an ACC that may temporarily impact capacity. The objective of the NM Major ACC upgrades planning services is to consult, advise coordinate and agree measures to be put in place in the Network to accommodate a temporary shortfall in capacity in a given area and to inform all the stakeholders that this is going to happen.

Inputs are:

- Details of the ACC infrastructure upgrades
- Proposed initial measures

- Assessment of impact including dates, potential impact, affected airspace and potential measures

Outputs are:

- Agreed Initial measures (Scenarios are published in the NOP, or RAD is updated if deemed mandatory)
- The event is input on the NOP Portal calendar and an entity (entry) corresponding to the event is created under ATFM Events

The main players involved are Network Manager, ANSPs and Airspace Users

3.1.2.4.1.2 Major Airspace reorganisation

When a major ACC airspace reorganisation is foreseen, the concerned State informs the Network Manager.

Inputs are:

- Information/details of the ACC airspace reorganisation
- Proposed initial mitigation measures
- Analysis of the impact for the Network of potential temporary reductions in capacity including dates, potential impact, affected airspace and potential measures

Outputs are:

- Agreed Flow measures (Scenarios are published in the NOP, or RAD is updated if deemed mandatory)
- The event is input in the NOP Portal calendar and an entity (entry) corresponding to the event is created under ATFM Events

The main players involved are Network Manager, ANSPs and to a small extent major impacted Airspace Users.

3.1.2.4.1.3 Major Airport Works

Major airport works are works planned that may temporarily impact capacity. The objective of this activity is to consult, advise coordinate and agree measures to be put in place in the Network to accommodate a temporary shortfall in capacity in a given area and to inform all the stakeholders that this is going to happen.

Inputs are:

- Information on the planned works from the ANSP/Airport
- Assessment of impact including dates, potential impact, affected airspace and potential measures
- Proposed initial mitigation measures

Outputs are:

- Once agreement has been reached on the initial measures to be put in place - notification of the event and measures is published in the NOP Portal calendar and an entity (entry) corresponding to the event is created in the NOP Portal.

The main players involved are Network Manager, ANSPs/Airports and Airspace Users.

3.1.2.4.1.4 Military Events

Military events are military exercises, which have a high priority and can be national or international events. They can be both repetitive and ad-hoc exercises – small and large. To share the planning of these events with ATM actors a catalogue of events (e.g. identified planned large national, international and multinational (NATO) military exercises) is produced and made available for consultation on the NOP Portal in the ATFCM Measures Section.

Inputs are:

- Data on Military Events - Requests received from military for all exercises that are not day-to-day training, special exercises; and special events (e.g. Protection of Olympic Games or Head of State summits).
- Military Yearly Plan

Outputs are:

- Catalogue of events and foreseen impact that is available for consultation on the NOP Portal in ATFCM Measures.

The main players involved are the Military, the Network Manager (CMAC and network operations long-term planning ATFCM team and MILO), States, Airports, ANSPs and Airspace Users, Special Military Events Directors.

3.1.2.4.1.5 Special Events

For special events (excluding military), the Network Manager is either already aware of the event or collects events provided by the ANSPs. The NM produces a yearly planning / special events catalogue and updates the calendar and ATFCM events in the NOP Portal up to several years in advance depending on the impact. Typically activities concerning special events (Champions League, Grand Prix, etc.) take place in the mid and short term planning phase, exceptions being large world-scale or European sporting events which are known about years in advance (for example Olympics, EURO 2012).

Inputs are:

- Special event information (new, cancelled etc.) including name, dates potential impact, affected airspace
- Analysis of impact for the Network
- Proposed mitigation measures

Outputs are:

- Measures
- An official publication (AIP SUP, also true for military)
- Constraint(s)
- Yearly catalogue of events identifying and summarizing all special events planned - The event is input on the NOP Portal calendar and an entity (entry) corresponding to the event is created in the NOP Portal under ATFM Events

The main players involved are the Network Manager, ANSPs, Airports and to a lesser extent the AUs.

3.1.2.4.1.6 Axis Management

Major traffic flows across the European airspace and their direction have been identified. These flows are based on traffic movements, are temporal and result from airspace users' demand e.g. holiday destinations. The four main axis flows are South-West, Northeast, Southeast, and Ski. The objective of Axis Planning is to agree on a way of operating when this demand arises and to produce and share a Network Operations Plan for the relevant time period.

Inputs are:

- Review of previous axis flow performance
- Future plans
- Local mitigation measures proposed by ANSPs
- Proposals for mitigation measures
- Process activities
- Description of main network flows (axis)
- Further refinements to local information
- Traffic forecasts and revised demand
- Capacity plans
- Meeting minutes and comments thereon

- Templates
- Scenarios

Outputs are:

- A catalogue of measures is elaborated and activities for the complete season are agreed including expected actions from the different stakeholders.
- Minutes of meeting with a set of agreed actions – requirements – implement or remove restrictions

The main players involved are the Network Manager, relevant ANSPs, and the Airspace Users.

The European Network Operations Plan document is updated with the Axis Scenarios and Process Information and is published on the NOP Portal.

3.1.2.4.1.7 Contingency & Crisis

There are a set of procedures for the management of crisis. These are developed on an annual basis, i.e. initial definition and annual review.

Inputs are:

- Existing procedures
- Any recent Crisis and Contingency occurrence

Outputs are:

- Procedures document for management of crisis.
- Schedule
- General capacity and configuration plans,
- Draft routing and level capping scenarios.

For the purpose of this document, all the processes for significant event planning are grouped as they are identical:

WHEN	WHAT	DESCRIPTION
Mid and short term (generally)	**Initial notification and assessment**	This includes Calendar, description, constraints (airspace closure, capacity reduction, runway out of service, etc.), responsibilities, etc. Simulation and other impact assessments published.
Mid and short term	**Initial event plan** **Seasonal event plan**	CDM process, meetings etc. that results in draft events plan more detailed than above and containing proposed mitigation measures (restrictions, re-routing, demand reductions, etc.) Content - Schedule, General capacity and configuration plans, draft routing and level capping scenarios
Short-term	**Final Event Plan**	on NOP including the operational procedure publication
Execution	**Publication of significant deviations from plan**	NOP headline news in NOP Portal

Table 14: Main information on events in the NOP portal today

3.1.2.5 DCB

Demand and Capacity balancing take place on an ad-hoc basis where and when necessary with the appropriate ATM Actors facilitated by the Network Manager and Scenario modelling support with a CDM approach. Agreed seasonal and axis plans are available via the NOP Portal.

Inputs are:

- Forecasted demand
- Planned capacity

Outputs are:

- Seasonal Plans
- Axis Plans
- Potentially scenarios for special events

3.1.3 Short-term Planning Phase

The objective of the Short-term Planning phase is to prepare daily plans and to prepare weekly Axis Plans in collaboration with all stakeholders.

The Concept Elements previously identified have been mapped across this phase – showing their evolution and granularity in time.

3.1.3.1 Network Performance Management

3.1.3.1.1.1 Network Performance Planning and Review

Not applicable in this phase

3.1.3.1.1.2 Airspace Demand and Traffic Forecast

Demand / Traffic Forecast is a process which covers receiving the latest demand from Airspace Users (and to a lesser extent from ANSPs and FABs) and/or estimating (forecasting) the demand based on historical data. The Network Manager always uses historical data as a basis for the forecast. The Airspace Users' (including Military) internal planning and demand is not integrated into the Network Management forecast until the filing of the flight plans. The ANSPs / FABs contribute to this process via their capacity planning and DCB activities. At this stage, the demand forecast is not accurate.

Inputs are:

- Historical data
- Outputs from Simulation tools

Outputs are:

- Network forecast input to the Daily Plan

The main player is The Network Manager.

3.1.3.1.1.3 ACC Capacity Planning

The objective of the ACC Capacity Planning process in the short-term Phase is to have the latest, refined and complete plans of the ACCs and FABs in order to build the Daily Plan. (7 days is the start of the demand tuning, 2 days is the start of the capacity and configuration tuning).

Inputs are:

- Latest Capacity Plans from ANSPs
- Resource Planning
- Detailed Scenarios
- Configurations
- Proposed regulations
- Traffic samples (historic data)
- Updated traffic demand

Outputs are:

- The Daily Plan (Latest capacity situation to be reflected in the Daily Plan)

Once agreed the final capacity plans are consolidated, reflected in the Network Daily Plan and made available on the NOP Portal. The Daily Plan only contain details of changes to the Network Plan

and/or details of foreseen difficulties and mitigations. The implementation of the Daily Plan is monitored continuously up to and including the Post-Ops phase.

The main players involved are the ANSPs and FABs and the Network Manager.

3.1.3.1.1.4 Airport Planning (Capacity Check)

During this phase, Airport Operators continue the slot coordination procedure until at a fixed time prior to the operation (typically 72 hours). A demand/capacity monitoring is performed at this stage. In case the demand surpasses the capacity, airports through their ATC/TWR via FMP request a traffic regulation in order to counterbalance the demand/capacity deviation. No formal interchange with the ANSP/ Network or consistency check is done at this stage. Non-coordinated airports receive flight requests directly from the Airspace User, which is accepted by the Airport Authority.

Airport schedules are not shared with the ANSP and or the Network.

The main players involved are the Airports.

3.1.3.1.1.5 Airspace Users' planning

The operational flight plan is derived from the commercial flight plan and delivered to the flight operations department about 72 hours before the effective flight (from 1 week to 24 hours).

3.1.3.2 Airspace Structures Design (fine-tuning)

The RAD is planning tool (mid and short term) and is described in the Seasonal section. It consists in fine-tuning the airspace Structure in the short-term phase as part of the Short-term ATFCM measures.

3.1.3.3 Airspace Management (Civil and Military)

Short-term - ASM Level 2 consists of the day-to-day management and temporary allocation of airspace through national or sub-regional AMCs and in coordination with the NM. AMCs collect, analyse and de-conflict, if required, users' airspace requests. After coordination with the adjacent AMCs and the NM aiming at optimisation of the airspace allocation, the AMCs promulgate the airspace allocation as an Airspace Use Plan (AUP) and updates thereto in UUPs. The objective is to promulgate a consolidated eAUP and all updates thereto in eUUPs.

Inputs are:

- National draft and consolidated AUPs/UUPs
- Analyses/scenarios results

Outputs are:

- eAUPs/eUUPs. The Network Manager promulgates eAUP/eUUP via the NOP Portal.

The main players involved are the Network Manager, AMCs and military AUs.

3.1.3.4 Significant Event Planning

Significant Event Planning activities commenced during the Medium-Term (Seasonal) phase continues for Major ACC system and infrastructure upgrades, Major airspace reorganisation, Airport Works, Military Events, Military Daily training and Special Events i.e. actively collecting, analysing and sharing the revised details and potential impact of the event as more elements and more certainty is added and looking at alternative (what if) options. Axis Planning is continued on a weekly basis.

Inputs are:

- Updated latest information from the ANSPs/FABs on major ACC upgrades, Military Events and Significant Events.
- Proposed initial mitigation measures
- Scenarios / simulations – results

Outputs are:

- An updated Daily Plan

The main players involved are Network Manager, ANSPs, Military, and Airports.

3.1.3.5 DCB and producing the Daily Plan

3.1.3.5.1 Short-term DCB

Short-term Network Demand and Capacity Balancing (DCB) considers and addresses Network Performance Needs for the target day of operation.

Inputs are:

- Demand issues identified (imbalances, demand over capacity locally or temporarily) and the potential mitigations
- Network Impact Assessment
- Scenarios for the credible constraints and imbalances
- DCB for Significant Events
- Potential measures to counterbalance the imbalances foreseen.
- Weather
- NAT Tracks
- Appropriate historical demand data - scenarios / simulation results

Outputs are:

- The solutions/mitigations are reflected in the Daily Plan

The main players involved are the Network Manager, ANSPs / FABs / ACCs and Military.

Modelling of airport demand is performed at airport level just to check airport resources capability. No airspace capability check is carried out and no information is shared with the Network.

Airport capacity assessments, due to changes in any airport capacity element, are performed in order to detect DCB unbalances. In case of severe restrictions, communication to the local ANSP or FMP is done. No formal communication procedure is established with the Network.

No Airport information at this stage is communicated to or reflected in the network operations planning.

3.1.3.5.2 Production of a Daily Plan

The ATFCM Daily Plan is a set of Execution ATFCM measures (e.g. activation of Routing Scenarios, regulations, etc.) prepared by the Network Manager in collaboration with other ATM partners (FAB, FMP and AMC). Published every day around 1600UTC, it is accessible via the NOP Portal and also promulgated via AFTN by means of the ANM and Network News messages.

The ATFCM Daily Plan may be updated at any time according to the needs.

Inputs are:

- Latest situation
- Traffic Forecast
- ANSPs / FABs capacity plans (and Airport plans under the ANSP area of responsibility)
- Weather
- Suggested measures
- Expected Significant Events
- Simulation of the Network Situation
- Historical data
- Daily conference

Outputs are:

- Once agreed, the output is the Daily Plan, which is published on the NOP Portal

The main player involved in this process is the Network Manager – other players are the ANSPs / FABs and AUs.

Airports: During this phase the data provided by the slot coordination process is downloaded into the Airport Operations Platform to create the daily Airport Aircraft-Passenger Schedule (Typically 48 hours ahead of operations).

The daily Airport plan therefore contains detailed information of aircraft-stand relationships, with complete information of airports of origin and destination and associated aircraft-passenger required resources.

Every airport resource is re-usable, so the schedule sequence of arrivals and departures, and the planned aircraft occupancy times are important elements to be taken into account when developing the Resource-Allocation and Resource- Occupancy Times Plan.

Recorded Arrival, Turnaround and Departure Predictability figures (standard deviation) are the main inputs to determine the size of protection buffers in the airport resource allocation planning.

Short-term formally ends with the publication of the Daily Plan at 16h00 UTC. After that, operations are considered to be in Execution phase. That is a system and formal procedures perspective. This process is gradually evolving to an execution rolling plan process that continue the planning process right into the day of operation.

The end-state for the short-term phase is to have an agreed and consolidated picture of the capacity situation in Europe as an input to the Daily Plan.

3.1.4 Execution Phase (Day of operations)

The objective of network operations planning on the Day of operations is to continuously support the ATM partners (including the Network Manager) execute demand and capacity balancing to achieve the best possible performance, taking into account the actual situation and the Airspace Users' needs.

3.1.4.1 Network Performance Management

3.1.4.1.1 Network Performance Monitoring

In the Execution Phase, there is a continuous monitoring of how the Network is performing in terms of delay. The Network Manager is the main player here, but some or sometimes ANSPs also perform this monitoring at a more local level.

Inputs are:

- ETFMS data
- CIFLO data
- NOP Portal data
- The Daily Plan
- Simulations to identify impact of proposed measures

Outputs are:

- Updated Daily Plan

3.1.4.1.2 Airspace Demand and Traffic Forecast (Managing Demand)

The Airspace Users officially declare demand by filing flight plans. Where more than one routing is possible, AUs use NM tools to be aware of the Network Traffic Situation and reroute accordingly. The objective is to provide a continuously up-to-date traffic situation.

Inputs are:

- Flight Plans – filed and updated
- IFPS data
- ETFMS data
- CHMI data

Outputs are:

- Airspace Demand

- Traffic forecast

The main player is the Airspace Users and the Network Manager

3.1.4.1.3 ACC Capacity Monitoring

This is a process that is carried out locally by the ANSPs. The NOP portal provides a view of the European demand and specifically of the demand that affects the concerned ANSP. The objective is to provide the latest up-to-date information to allow ANSPs to react in the best possible way.

The main players are the ANSPs and the Network Manager.

3.1.4.2 Airspace Structures Management

N/A

3.1.4.3 Airspace Management (Civil&Military) - Airspace Situation Monitoring (Military)

During this phase, the FUA Execution (Tactical) Level 3 – real-time use of airspace allowing safe Operational Air Traffic & General Air Traffic (OAT & GAT) operations – applies. The Military provide updates when there is latest relevant information e.g. EAUP, UUP, CDR routes availability. Mitigations are discussed in DCB.

Inputs are:

- Updated latest information from the Military on airspace use and availability
- Scenarios / simulations
- Analysis impact

Outputs are:

- Updated Daily Plan

The main players involved are Network Manager, Military and Airspace Users.

3.1.4.4 Significant Events Monitoring

Significant Event activities monitoring and management continue, updating when there is latest relevant information e.g. early start, late finish, cancellation, late fine-tuning of measures. Mitigations are discussed in DCB.

Inputs are:

- Latest information on major ACC upgrades, Military Events and Significant Events
- Analysing the impact for the Network
- Scenarios / simulations

Outputs are:

- Updated Daily Plan

The main players involved are Network Manager, ANSPs, Military and Airspace Users.

3.1.4.5 Execution (tactical) DCB and updating the Daily Plan

3.1.4.5.1.1 Execution (tactical) DCB

The Network Manager continuously analyses the latest demand, capacity, Significant Events progress, actual weather. This information identifies bottlenecks, imbalances, problem areas, shortfalls in capacity etc. Solutions / mitigations are proposed to the ATM Stakeholders (ANSPs, FABs and ACCs. Military) quickly discussed and a solution put in place. The solutions/mitigations update the Daily Plan.

Activities are:

- Monitoring demand

- Real-time mitigations
- Conducting a network Impact Assessment according to actual demand and capacity
- Developing scenarios for the credible constraints and imbalances that are happening in real time
- Managing DCB for Significant Events
- Sharing proposed measures to counterbalance the imbalances foreseen

At Airport level, during the Execution phase, when runway/taxiway, apron or TWR ATC demand surpasses the actual capacity of an airport, a regulation is submitted by ATC to the Network Manager in order to balance airport demand and capacity

The main players involved in this process are the NM, FAB, ANSP, ACC, Airport, Military, and AUs.

3.1.4.5.1.2 Updating the Daily Plan

The ATFCM Daily Plan must be continuously updated during the day of operations to reflect the latest actual situation of the Network. It is used as a reference by all ATM Partners.

The results of the previously described activities in this Phase are updated on a continual basis in the Daily Plan. The NOP portal is updated with the Daily Plan.

Inputs are:

- Outputs from Monitoring Network Performance, Monitoring Capacity, Monitoring Significant Events, Monitoring Demand, Monitoring Airspace Availability – Military, Execution (tactical) DCB and Collaborating

Outputs are:

- Updated Daily Plan

The main player involved in this process is the Network Manager.

No real coordination is performed between different stakeholders, push flight plan information is received at airports via IFPS and pull ATFM (regulations), aircraft situation information at the arrival and CTOT information, at the departure can be consulted by the AU using CHMI terminal.

3.1.5 Post-ops Phase (D+1)

The objective of Post-Operations is to conclude what went well and what could have gone better on the day of operation itself and also throughout the entire planning phase.

The performance of the Network and the different processes involved in Network Management is analysed. The different processes and information flows are analysed. Discrepancies between the planning and execution, the expected compared with the actual performance at each phase and the impact on the day of operation and the reasons for it is made available to all ATM partners

The following areas (sub-processes) are analysed:

- Calculation and extraction of historical trends:
- Monitoring and Evaluation of historical trends:
- Collection and sharing of regional and local trends:
- Collection and sharing of comments and experience on performance and events:
- Reporting and sharing of historical trends:
- Extrapolation of events, measures and of historical trends for future usage:
- Performance reporting and provision

Inputs are:

- ANSPs (including FABs) providing completed Airspace Execution with changes compare to the plan and rationale for it,
- MILITARY providing completed Military Airspace Execution with changes compare to the plan and rationale for it,
- Airports providing changes to the plan and rationale for it.
- Airspace Users providing inputs on ‘what did/did not work’ and report on information missing.

- Network Manager support
- Seasonal follow-up of airport operations:
  - average daily movements
  - traffic evolution (%)
  - daily average delayed traffic
  - daily average airport delay
  - % of delayed arrival traffic
  - % of days regulated
  - % of delay due to weather conditions
- Seasonal follow-up of ANSPs operations:
  - average daily movements
  - traffic evolution (%)
  - daily average delayed traffic
  - daily average delay
  - % of delayed traffic
  - % of days regulated
  - % of delay due to weather conditions.
  - most penalised regulations
  - actions undertaken
- What worked
- What did not work
- Report on information missing
- Analysis and lessons learnt

Outputs are:

- Post Ops. Analysis

Post-Ops analysis Airports view

Airports record their operational data to assess two main Key Performance Indicators:

- Punctuality index: Percentage of flights falling within a timeframe scope, both for arrivals and departures (Time Efficiency KPI)
- Traffic Delay: Scheduled time deviations including Average Departure Delay, Maximum Delay, Average Delay of Delayed Flights, Causes of Delay (Time Efficiency KPI)

The official publication of traffic delays is based on ATFM data, which is widely inconsistent with Airport delay statistics.

3.1.6 Summary Table

See next page.

Today's Operations	From 3 to 5 years up to6 months	Seasonal (up to one week)	Short-term One week – D-1	Execution Day	Post OPS After D
1. Network Performance					
a) Network Performance Planning (and Review)	<u>Network Performance targets</u> Incorporation of lessons learned from post ops analysis – solutions fed back into appropriate area (airspace design/ ASM, ATFCM etc.)	Creation of long term planning 'scenarios' designed to off-load bottleneck sectors/airspace and/or manage special events	Simulation and assessment of re-routeing proposals to avoid/relieve congested or closed airspace What if? assessments in support of alternative options offered	Monitoring Network Performance	<u>Annual & seasonal operations performance review</u> Post ops review of the previous day/week/month (not sure they do this today, probably only for previous day)
b) (Expected) Airspace Demand and Traffic Forecast (Network, ANSP, FAB, ACC, Airport, MIL)	Historical data Traffic Forecast (STATFOR)	Historical data Demand forecast enriched with Consolidated Flight Intention data from various sources Airspace Requests	PREDICT demand forecast Historical data RPLs -> FPLs Demand forecast enriched with Consolidated Flight Intention data	FPL + change messages	
c) ACC Capacity Planning	5 year performance plans 5 year ACC capacity requirement profiles (targets) Network & local (PC -> SES) Performance targets Seasonal ACC capacity baseline (calculated by Eurocontrol) Airport Capacities (provided by Airports) used as a constraint on network growth	ACC sector/ Traffic Volume default monitoring values Airport Capacities RAD	Detailed sector configuration plans including max configuration availability and opening times to cover – or not – peak hour demand Identification of bottleneck sectors Sector/traffic volume variable monitoring values Activation of long term plans to mitigate known bottlenecks	Monitoring of Capacity and flight efficiency indicators at network and -if relevant- local level (yearly, seasonal, monthly, weekly, daily) Full sharing of information on capacity availability or limitations Mitigation actions for planned and unplanned bottlenecks	
d) Airport Planning	Future planned Airport capacities	Seasonal APT Cap Planned works –	Identification of Airport constraints	Mitigation actions for planned and unplanned	

Today's Operations	From 3 to 5 years up to6 months	Seasonal (up to one week)	Short-term One week – D-1	Execution Day	Post OPS After D
	Works planned long term	dates/times and positive/negative impact on capacity short and long term	Airport Plans including contingency plans to mitigate disruption to operations, including severe weather	bottlenecks Full sharing of information on capacity availability or limitations	
e) Airspace user planning – all users		Schedule - Seasonal Planning	RPL/FPL	FPL Change messages Re-routing	
2. Current and future Airspace Structure(*including ATS Routes, DCTs, Free Route Airspace, ATC Sectorisation and sector opening schemes)*	Future Airspace Structure, including proposed ATS route network, DCTs, Free Route Airspace and ATC sectorisation ARN v. x	Collaborative identification of DCB scenarios to mitigate expected constraints and bottlenecks Confirmed airspace structure (2 AIRAC cycles in advance) AIP SUP RNDSG/RAIS Sector configuration planning		ATC sectorisation – number of sectors and sector/traffic volume capacities Sector configuration optimisation ATC resource management	
3. Airspace Management (Civil and Military)	ASM/FUA Handbook	AIP SUP Planned military exercises Collaborative identification of DCB scenarios to mitigate expected constraints and bottlenecks	Planned availability of temporary airspace structures (normally Military) *(Daily Plan)* AUP/UUP	Dynamic Management of temporary airspace structures to ensure no sterile airspace	
4. Significant Event Planning :	Early notification by State concerned Coordination of events by NM	Collaborative identification of DCB scenarios to mitigate expected constraints and bottlenecks	Re-routeing proposals to avoid/relieve congested or closed airspace	Fair attr bution of Delay Monitoring Significant Events (weather, and unexpected)	Fair attribution of Delay
a) Major ACC System and Infrastructure Upgrades	Agreed process for notification and management of unplanned disruptions (e.g., closure of airspace	Assessment of demand through DDR Simulation NM/FAB/ACC/Airport long	What if? assessments in support of alternative options offered	N/a	
b) Major airspace reorganisation				N/a	
c) Major Airport Works				N/a	

Today's Operations	From 3 to 5 years up to6 months	Seasonal (up to one week)	Short-term One week – D-1	Execution Day	Post OPS After D
d) Military Events	due str ke or weather)	term plans to manage event, planned or unplanned		Monitoring Military Events	
e) Special Events				Monitoring Special Events	
f) Axis management		Seasonal Axis Planning	Weekly Axis Planning	Monitoring Axis Flows	
g) **Contingency and Crisis**	Contingency Plans Agreed process for notification and management of unplanned disruptions (e.g., closure of airspace due str ke or weather)	"Plannable" Crisis plans		Crisis Management	
5. **DCB**	Long term DCB	Collaborative identification of DCB scenarios to mitigate expected constraints and bottlenecks Seasonal DCB, including RAD	Short-term DCB dDCB Daily Plan	Execution (tactical) DCB dDCB	
Historical data Traffic Forecast (STATFOR)	Annual/ Seasonal performance - monitoring against Network/FAB/local targets	seasonal/ monthly/weekly/ daily performance - monitoring against Network/FAB/local targets Seasonal and monthly operations performance review reports at Network and local level	annual/seasonal/ performance - monitoring against Network/FAB/local targets Also proposed to monitor monthly/weekly/ daily targets		Operations Review – comparison of STATFOR and DDR demand forecast with actual demand on the day. Comparison of plan with performance on the day. Identification of Lessons Learned.
Consolidation	**European ATM Network Medium Term OPS Performance Plan**	**Seasonal Plan**	**Daily Plan**	**LIVE Execution**	**Analysis & Reporting**

1355 Table 15: Previous network operations planning method

3.2 New SESAR Operating Method

The NOP processes follow the SESAR ATM Phases (Long-term, Medium and Short term Phase, Execution Phase, and Post-operations Phase) depicted in Figure 3.

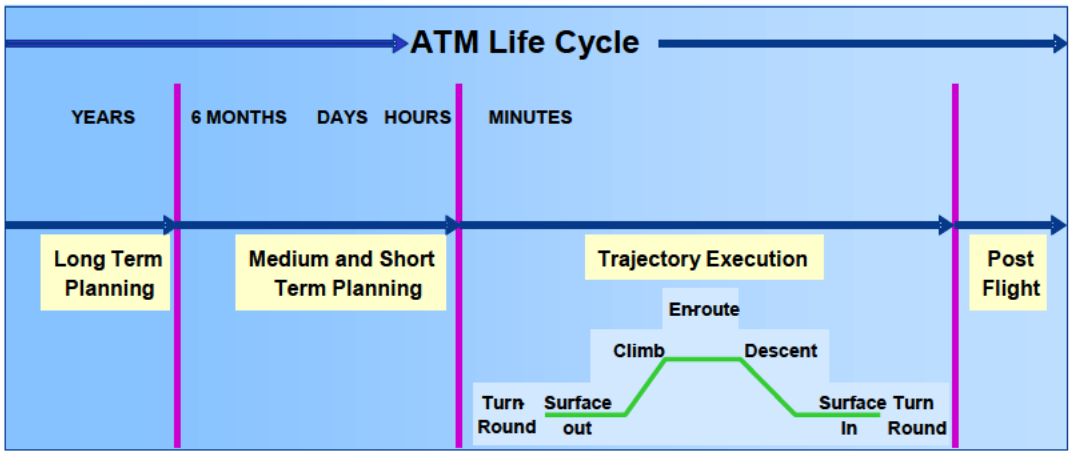


Figure 3: ATM Phases

Long-Term Planning Phase

Long-Term Planning spans a period from 3-5 years before the day of operation up to the start of the Medium and Short term Planning time frame i.e. 6 months before the day of operation.

Medium and Short term Planning Phase

Medium and Short term Planning covers the period from 6 months before the day of operation up to hours before flight departure.

Execution Phase

This phase covers the day of operation (more precisely, the period from hours before the flight takes off (pre-departure) to in-block).

Post Ops Phase

This phases starts once operation has ended.

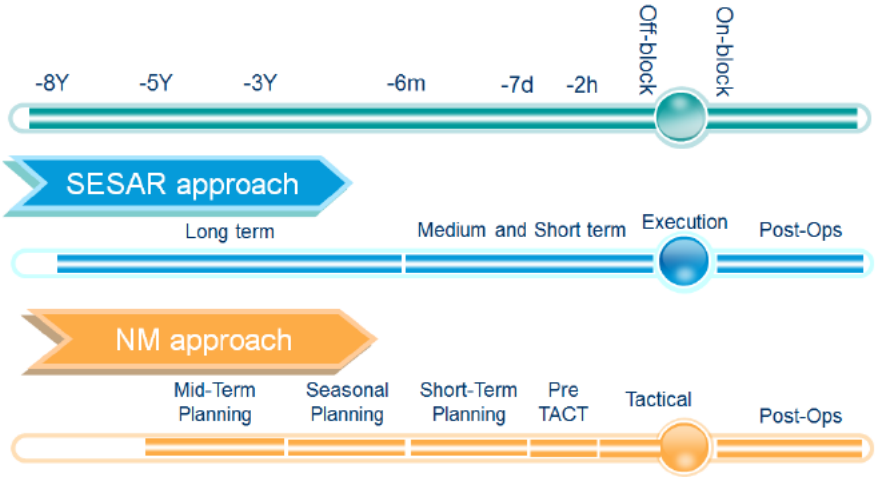


Figure 4: SESAR ATM phases versus NM (previous method) ATM phases

According to the SESAR time line, the elaboration of the Network Operations Plan continues during Execution until the moment when trajectories start to be executed (i.e. from off-block to in-block). The Network Operations Plan can also be revised during trajectory execution.

Collaborative Network Planning is based on the following principles:

- Network planning is a collaborative process, which involves sharing decisions and actions, and recognises that the action of one stakeholder may have an effect on others.
- Network planning is to prepare and secure the necessary airspace and airport resources and capabilities, so that service providers are in the best position, on the day of operations, to facilitate airspace users' trajectories as planned.
- Network planning is driven by individual stakeholders' objectives and network performance targets as per SES II. There are trade-offs, however. The overall optimum may lead sometimes to break individual stakeholders' KPIs. Stakeholders' own contribution to overall network performance are measured and recognised. The NOP provides the data needed in post-operations to analyse the performance of the network vs. performance targets (on a daily/weekly/seasonal/yearly basis) and to determine stakeholders' contribution to network performance.
- Collaborative network planning relies on transparency and trust in the decision making process; sharing more information, as well as more consistent information during planning, helping stakeholders take more informed decisions, save time and money.
- The product of network planning is a digital rolling Network Operations Plan (NOP) available to all ATM stakeholders and updated throughout all ATM phases. The NOP contains all information that stakeholders need to share to make their planning as effective as possible. It has different granularity levels and accuracy depending on the time horizon. It is built from a reference yearly plan reflecting the long-term network targets and high-level stakeholders' courses of action. It is refined progressively in a rolling process until the execution of Daily Plans. It provides the ATM network situation, i.e. a snapshot of the plan at any given moment in time.
- Every airport has an AOP for performing integrated network operations, and a part of its data is shared / synchronised with the NOP. The AOP (Airport Operations Plan) is the principal source of airport-related information. Small Airport are able to join an APOC grouping multiple small airports.
- There are security levels for sharing information in the NOP where it is deemed sensitive, e.g. security, commercial etc.
- The NOP interfaces allow stakeholders to use a pre-defined online access (NM portal) or to connect their own applications using system-to-system data exchanges (e.g. B2B web-technology based services).

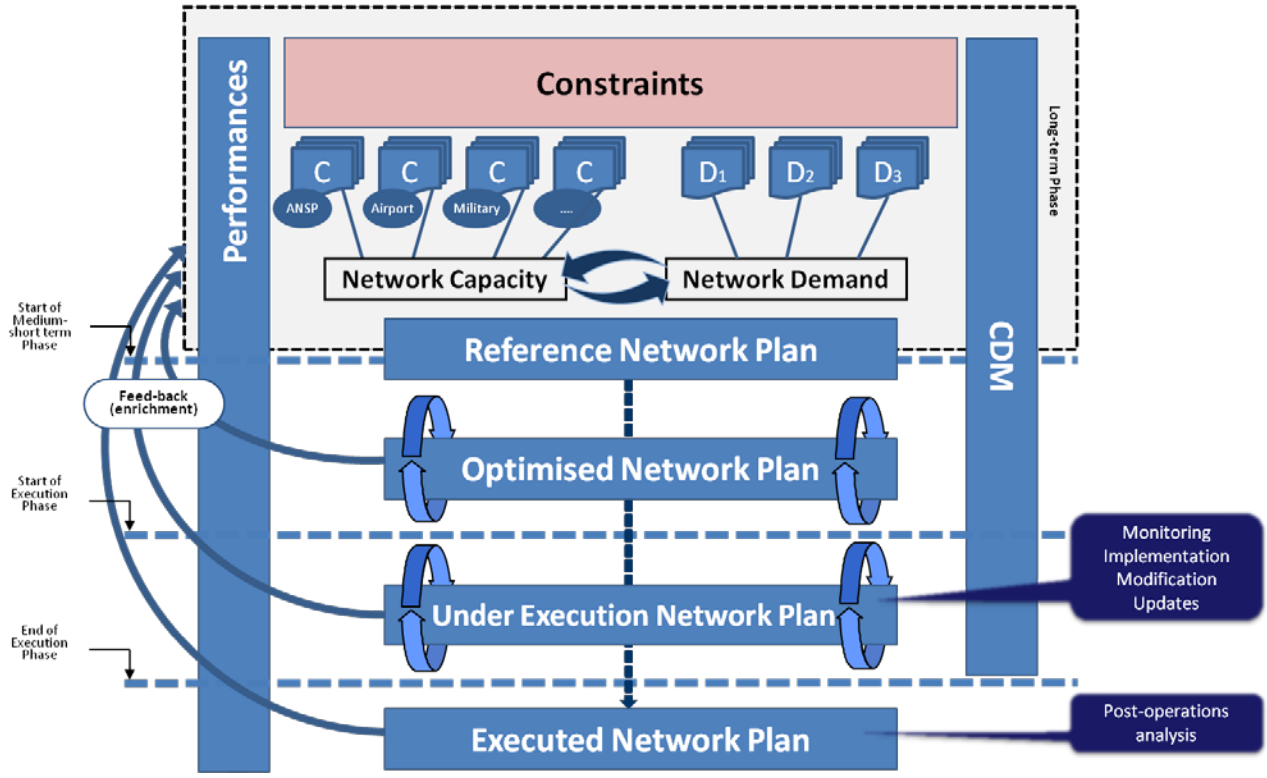


Figure 5: New SESAR Operating Method for Network Operations Planning

A seamless progressive picture of European ATM Network is provided from long-term planning to post-ops. This common situation awareness is ensured both at local and Network level, in nominal (normal) and adverse conditions, through the digital rolling NOP (continuously updating their content by sharing information between all stakeholders into a single rolling plan widely accessible) which is central to the Network Management Function.

As explained before, the phases are not aligned with the previous operating method. However, to facilitate the comparison, the description is structured according to the following high-level invariant network planning activities:

- Network Performance Management;
- Airspace Structure Planning;
- Airspace Management (Civil and Military);
- Significant Event Planning;
- Demand Capacity Balancing (DCB).

3.2.1 Network Performance Monitoring and Management

One of the main differences in the new SESAR operating method for Step 1 is the initial calculation and sharing of Network Performance Indicators at the different ATM phases as a first step towards a European Network ATM based on Performance.

The assessment of the Network Performance must be performed through all the phases.

A series of performance indicators are identified, according to the main objectives of the Network Management, monitored and analysed in order to optimize the Network Performance.

Deviations from performance targets and the Network Operational Plan should be detected allowing corrective actions to be implemented.

3.2.1.1 Network Performance Monitoring System

3.2.1.1.1 Network Performance Background

The way Performance Monitoring has previously been addressed is analysed in this section together with the identification of Network Performance Monitoring gaps in order to propose an alternative Network Performance Framework, capable of supporting the management paradigm shift of moving from the current reactive system to a more pro-active management system and its supporting procedures.

Current Network Performance Monitoring characterises by the following main principles:

- Not accurate enough Planning System is used, as the allocation of resources cannot be efficiently performed due to the low quality of demand assessment, both in terms of timeliness and accuracy
- Performance Monitoring mainly relays on Post-Operational analysis. Although enabling process reengineering, it gives less importance to the review process during real time monitoring in the execution phase
- Focus is put on Output Performance and very little on Performance Drivers: *Performance cause elements.*

In Step 1 these three monitoring areas are widely addressed by:

1. Improving Demand Assessment specially in the Short & Medium Flight Phases and during Execution
2. Significantly increasing Real Time Monitoring during the Execution Phase
3. Giving special importance to the allocation of “Performance Driver KPIs”, during execution to enhance pro-active management

3.2.1.1.1 Network KPA Selection

Two main considerations justify the selection of Step1 Network KPAs and their associated Key Performance Indicators:

1. B 04.01 Statement in its last edition (see ref [40]):

   "*B.4.1 is not defining new KPAs, but just proposing a different organization of elements already present within the existing ICAO KPAs"*.

2. The new approach to Network Performance Monitoring stresses the importance of concentrating in the Management Review Process during the execution phase, which implies:

   a. Increasing the focus on monitoring activities during execution, to early detect deviations from planning and enable mitigation actions to recover from disruptions.

   b. Selection of monitoring based on Performance Drivers; that is; those Influencing factors associated to KPA Focus and Sub-Focus Areas that have a direct impact on output performance.

NOP has no performance targets associated. Its performance-monitoring role is to serve as enabler to be used by Primary Projects in the achievement of their performance objectives. This is another reason for NOP to concentrate in monitoring the influencing factors rather than in the expected outputs

Regarding the first consideration, NOP follows B04.01 recommendations, trying to adapt them to current operational feasibility, extended to cover those “cause indicators” contained in the performance Focus Areas and Sub- focus Areas

Regarding Monitoring Activities in the execution phase, the focus is made on Performance Drivers**:**

See Appendix C for more information on Performance Drivers, Areas and Indicators.

3.2.1.2 Network Performance Monitoring Support Tools

Network Performance Monitoring is supported by the inclusion of new NOP performance Monitoring tools.

A new set of KPIs is defined to assist the NMOC during the short-term planning and execution phase in the on-line network performance monitoring. The new set may also include some KPIs that need to be derived after post-OPS analysis

The graphical representation of these KPIs is such that the user NMOC identifies or retrieve easily and little effort e.g. minimum number of clicks or fields to fill in the required information. Top-level KPIs are represented as trends, gauges or similar representations that clearly visualise the status and the evolution of the indicator.

NOP stakeholders have access to these KPIs, except in cases when is considered sensitive information.

The following domains are targeted for the new KPI set:

- Airports
- Regulation and STAM
- Occupancy vs. entry counts

In terms of delays, adherence and predictability

The new set includes the following KPI

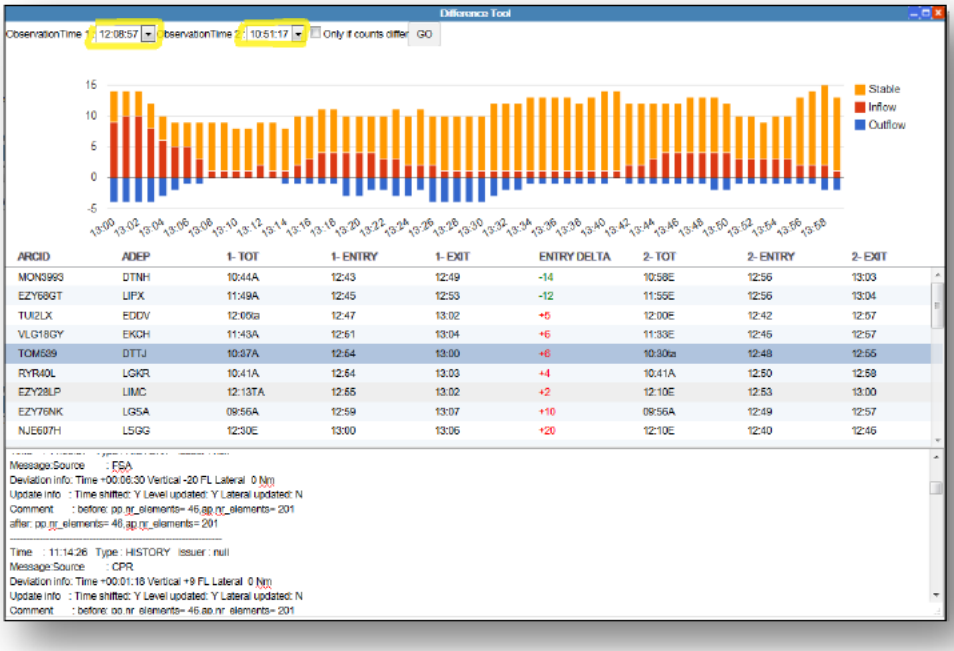
KPI	Category	Short Description	Rationale
Arrival Variability	Static - Adherence	For one or multiple aerodrome ids (separated by a space or a comma), the presented KPIs compare take off variability (ATOT - CTOT or ATOT-ETOT) versus arrival variability (ATA - CTA or ATA - ETA).	The variability helps the FMP to determine how likely the traffic is expected to take-off and arrive as planned, also indicating the trend of flights to take longer or shorter in terms of elapsed time.
Comparative Load Occupancy Status Evolution	Trend Analysis - Historical Comparison	For a given traffic volume give the status of the traffic (normal, loaded, overloaded) for the complete day aggregated over a representative set of observations in the past. Indicate on top of this graph the current traffic count (occupancy or entry)	The comparison with the archived data allows the FMP to quickly decide whether the current and short time future of the count is in line with the past and whether there is a trend building up towards an overload.
Departure Tolerance	Static - Adherence	To determine the tolerance on the TOT in function of DPI; Regulation, Normal variance - DPI-s Tolerance TTOT-ATOT - Regulation Tolerance CTOT-ATOT - Normal Tolerance ETOT-ATOT	To analyse the reliability of the occupancy counts with influx from nearby airports allows the FMP to determine what is the best solution to choose in terms of STAM when a hotspot occurs. This can help to understand whether a hotspot is likely or not likely to occur depending on the flows originating from the observed aerodromes.
Occupancy	Trend Analysis - Probability	Indicate the margin of uncertainty of the occupancy based on the mix of regulated traffic.	Regulated traffic has a smaller Tolerance Window and is expected to be more likely to be on time. The smaller the margin of uncertainty, the more likely the counts are representative of the true traffic density

Occupancy Count Composition	Trend Analysis - Composition	Indicate the proportion of the traffic within the monitored traffic volume which is on time, within a given tolerance and outside a certain tolerance, both earlier or later, to enter the traffic volume at the time of observation. The values are represented as a bubble chart.	The variation in composition of the traffic timeliness at the reference location of the traffic volume allows the FMP to take a better decision about the effect of a measure to resolve a hotspot, should he implement it.
Occupancy Count Variability	Trend Analysis - Variability	Indicate the highest and lowest value of the occupancy for a given time within a period in the future, for each interval as requested (configurable), and for a given occupancy duration. The minimum and maximum values are refreshed at each refresh and the current value is indicated as a line.	The spread in value between minimum and maximum and the variation over the monitored period allows the FMP to take a decision on whether a hotspot needs to be declared and requires action
Occupancy Flux	Static - Composition	To determine the proportion of flights that are inflow, outflow and stable in the occupancy count - Inflow are A/C that were not predicted to be in the sector but are in based on flight planning and actual profiles - Outflow are A/C that were predicted to be in the sector but are no longer based on flight planning and actual profiles - Stable are A/C that were predicted to be in the sector and are in based on flight planning and actual profiles The counts are compared with a reference baseline count which could be a fixed point in time or a rolling window comparing with interval of x minutes before the actual	To analyse the reliability of the occupancy counts in function of participating A/C so that the FMP can determine the effect of a measure based on the stability of the traffic within the traffic volume.
Occupancy FMP Monitor	Static - Aggregate	Collect the OTMV status of a traffic volume indicating in different colours the below peak, below sustain, accumulative values for the monitored traffic volumes, aggregated per FMP	Allow a high-level view on potential hotspots. Allows the FMP to drill down from the overall traffic situation at the level of the FMP to the specific Traffic Volumes involved.
Occupancy Status Variability	Trend Analysis - Variability	Monitor the occupancy of a traffic volume in function of time indicating the periods during which the sustain and peak OTMV values are exceeded. The evolution is captured every interval and represented such that the evolution over time can be	Occupancy traffic counts are variable in function of time and the evolution allows the FMP to take a decision on whether or not a hotspot exists and requires action

		monitored.	
Occupancy vs. Entry Time comparison	Static - Comparative	for a given airspace or traffic volume show: · Entry counts (by default Hourly counts every 20 minutes) · Min/Max/Average occupancy counts for each entry count bar.	The minimum and maximum occupancy versus the entry counts helps FMP to determine how likely a certain STAM lead to a resolution of the hotspot, should it be implemented.
Traffic Volume Entry Adherence	Static - Adherence	Snapshot of the adherence of flights in terms of entry flight level and entry time into the monitored traffic volume, represented as a scatter graph. Regulated flights can be filtered and are indicated as a different colour.	The deviation in flight level or time allows the FMP to determine the effect of a measure, should he decide to implement it, based on the traffic actually taking place as planned.

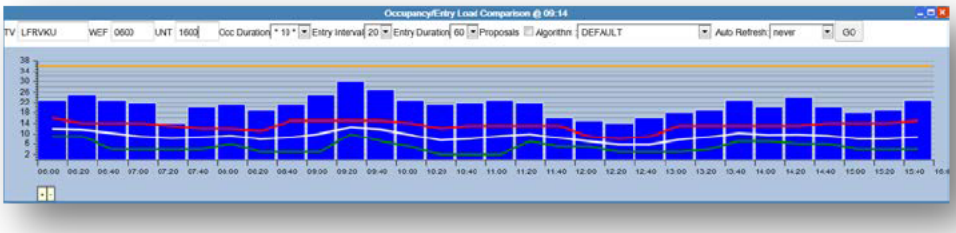
Some examples of graphical representation are proposed below for the above-mentioned KPIs:

Occupancy Flux



Departure Tolerance

Occupancy vs. Entry Time comparison



3.2.2 Long term Planning Phase

The long term planning include iterative activities such as planning and reviewing Network Long term Performance targets and objectives, producing an accurate demand and traffic forecast, ACC Capacity Planning and Airport Planning.

3.2.2.1 Airspace Structures Design

Iteratively (and in consultation and coordination with the aforementioned planning activities) the current and future Airspace Structure, including both the route structure design (including the FRA characteristics) and the changes into the ACC sectorisation are designed.

Actions necessary for consultation, coordination and decision-making are provided by and conducted through the network planning processes using the rolling NOP.

3.2.2.2 Airspace Demand and Traffic Forecast

The expected network traffic demand is key information of the long term rolling NOP.

In Step 1, a consolidated traffic demand forecast data covering the whole European airspace is generated by the Network Manager and updated in a rolling process as long as more accurate information on flight intentions is known. The process starts in the long-term planning phase based on statistical data and is refined through the period since flight intentions may be available 6 months to 9 months before the day of operation.

Authorized stakeholders (e.g. capacity planners) have the ability to access/query the Network Managers' traffic forecasts they want using the NOP interfaces (e.g. web-based NM portal, B2B services).

The updating of airspace demand becomes a rolling process as well. When the long term intentions to carry out either a mission or training exercise are matured enough to be shared, the military stakeholder concerned has the ability to input the information into the NOP and to progressively update the information as alterations or more complete data become available.

3.2.2.3 Airspace (En-Route) Capacity Planning

One of the key elements for an efficient ATM organisation is the ability to provide for the effective allocation of resources in order to meet the actual traffic demand.

For this purpose, ACCs follow their local capacity process and in coordination with the European Network Manager elaborates their own local capacity plans.

At the end of Step 1, Airspace (En-Route) Capacity planning is carried out in a collaborative decision making environment, taking into consideration stakeholders' plans and it is based on common understanding and an equal acceptance of all stakeholders.

There is a better knowledge of which action has been taken by which actor and the effect it has on network performance; these actions are recorded and this information is used to support Post Ops Analyses and other planning phases.

This data is essential as it enables the identification of areas where processes and initiatives have been planned in the past and to what extent they were successfully applied. For example, after having collected information as "most common sector opening" through statistics, ANSPs are able to develop sector openings with better anticipation and optimum airspace development.

It also serves as the basis for building knowledge of Network behaviour following certain events and actions.

The updating of capacity is a rolling process. ANSPs have the ability to input their sector capacity data into the NOP using the NOP interfaces. The Network Manager has the ability to produce an up-to-date consolidated view of sector capacity data covering the whole European airspace. Authorized stakeholders (e.g. capacity planners) are able to access/query the capacity information they are concerned with, at any moment in time.

3.2.2.4 Airport Planning

In a similar way to the ACCs local capacity process, airports also follow their own process and elaborate their own local capacity plans.

At the end of Step 1, Airport Capacity planning is also carried out in a collaborative decision making environment, taking into consideration stakeholders' plans.

All airport stakeholders develop a mutually agreed performance standard (i.e., goals, targets, rules, thresholds, trade-off criteria and priorities) that is included in the Airport Plan (the AOP).

AOP exchanges the Airport Capacity Plan and Event Plan Information in an automated way. In an initial exchange, the AOP provides the seasonal declared capacity for both inbound and outbound flows.

As soon as AOP identifies an event impacting the Capacity Plan i.e. significant reduction of capacity (actual/forecasted capacity <declared capacity) like major maintenance of runway or taxiway, it updates and exchanges with NOP. The updated Airport Capacity Plan and Event Plan Information contains elements like the event kind, probability, reason, for each capacity reduction, area or process of airport impacted, expected recovery scenario and possible aircraft type restrictions.

3.2.2.5 Airspace Management

In the same long term planning timeframe, and via the Advanced Flexible Use of Airspace concept, the Military participate in the definition of the national airspace policy and the establishment of pre-determined airspace structures for military activity. These is made available in the NOP to authorized users.

3.2.2.6 Significant Event Planning

Both military and civil stakeholders are planning and able to input initial information on planned events in the NOP according to the workflow agreed with the European Network Manager.

The Network Manager obtains and consolidate the information necessary to provide a detailed and global description of all the planned European events that significantly affect capacity and/or demand. This is available to authorized NOP users.

As part of the significant event planning, contingency Plans and/or, crisis management procedures and agreed processes for notification and management of disruptions that may happened in an unplannable manner (for example, industrial action or significant weather) are also prepared during the long term planning and housed and shared in the NOP.

3.2.2.7 Airspace Users' Planning

At the end of Step 1, airspace users are able to get from the NOP more detailed and up-to-date information on network En-Route and airport level restrictions throughout the whole planning horizon. They should be able, thanks to improved FOC system automation, to quickly evaluate the impact of the changes caused by the external factors (like political or security events) and react or be prepared to react to them.

Information on the planned status of the European ATM system (that includes other airspace users' plans) provide an opportunity to implement the Robust Scheduling approach. As predictability of the air traffic operations increases, schedules prepared at the long and medium planning stages should be better suited for scenarios that might occur in reality.

The iSBT/iSMT of military Airspace Users (OAT trajectories- iOAT "FPL) are submitted by Military Airspace Users to the Network Manager in the form of individual flight plans a few hours before the mission flights. At this long-term planning phase it is expected to have an indication of some of the planned military traffic at least for large military scale exercises.

3.2.2.8 DCB

Once the Long term Demand and the Long Term Capacity Plans are available as well as the other plans that may shape demand, capacity or both, Long term Demand and Capacity Balancing is performed taking account of the level of accuracy possible in this time-frame.

The output of this process is included in the Reference long term NOP that reflects the agreement of ATM participants in terms of actions and measures necessary to achieve the network long term performance targets for the year to come.

Progressively, planning may be refined and up to six months before the day of operation, the long term NOP provides the expected European Network Performance figures based on a view of demand as well as various information in relation to ATM infrastructure capacity and improvements foreseen.

The NOP provides a clear view of where capacity may not meet the demand, the efficiency or other performance goals and why, as well as mitigation solutions agreed with all ATM partners.

3.2.2.9 Network Performance Planning, Monitoring and Management

As per SES II, all stakeholders have individual and overall (network) performance targets that act as drivers for network performance management at all levels and timeframes. Expected performance indicators are improved according to the information available every time in the digital rolling NOP, thus providing an estimation of the performance values expected to be achieved with current planning available data.

This continuous estimation of performance indicators drives a network planning reviewing and updating process affecting all stakeholders in order to meet the network performance targets, supporting also local performance target achievement. Actions are triggered when deviation occurs higher than predefined thresholds for the selected performance indicators.

In long-term planning phase these thresholds may have a bigger difference respect to the target values than in consecutive planning stages (the closer to the execution phase, the less margin available to take actions and thereby tolerance respect to target decreases).

These actions are performed through collaborative processes and it may well happen that the optimum solution in terms of the network could mean a deviation or non-accomplishment of local stakeholder targets; all these actions taken by each stakeholder in order to improve performance are recorded in order to guarantee transparency and equity for all actors of the process and to support CDM. What-if simulation of different solutions and their assessment through multiple KPIs is required within the NOP.

As a result of the collaborative process, the Network Manager establishes a yearly baseline against which stakeholders' performance are compared in the next planning phases.

The following table shows data input requirements to monitor Network Performance during the Long Term Planning Phase. Not all data is currently available and/or are available for STEP1.

KPA	Main Focus Area	Lower Level Focus Area	Description	Metrics / Indicators
Capacity	Network Capacity	Yearly Traffic Demand	- Consolidated traffic demand forecast data covering the whole European Airspace - Updates on Traffic demand - Planned Mission / Training exercises - Planned European events that significantly affect capacity and/or demand - Yearly Traffic Demand baseline to be used as reference Demand including corrections based on: o changing demand patterns o short notice events o late airspace requirements and o statistically known capacity-impacting weather phenomena	- Aircraft Demand per ACC and/or sector expressed in terms of: o Entry Counts o Occupancy Counts o Extra requested demand per mission /exercise o Extra requested demand per Extra Event o Type of demand (scheduled, etc.). o Expected variation (%) in demand in relation to the previous year
		Airspace Capacity	- Network up-to-date consolidated view of sector capacity data covering the whole European airspace. - Network up-to-date Airport Declared Capacities covering the whole European Network - ARES Required Airspace Capacity for annual Military Training	- Capacity values per Sector per ACC based on entry counts.: per time period - OTMV capacity values per Sector per ACC based on Occupancy counts per time period - Airport capacity values for arrivals Number of arriving A/C per time period that an airport can absorb.
		Airspace DCB	- Potential Airspace Demand / Capacity unbalanced situations - Mitigation Actions to solve unbalances	- Number of Forecasted imbalances per sector per ACC Cause of imbalances per sector per ACC - % Demand/Capacity ratio at ATS unit > (90%) + Time period of expected imbalance
		Airport DCB	- Airport Demand / Capacity Imbalances	- Number of Forecasted imbalances per airport - Cause of Airport DCB imbalances - % Demand/Capacity ratio at Key Airports > (90%) + Time period of Capacity shortfall

Table 16: Network KPAs / KPIs at Long Term Planning

3.2.3 Medium and Short-term Planning Phases

The rolling NOP is refined in the medium-term and short-term planning phases by adding more granularity as well as more accurate and recent (updated) data: integration of Seasonal Plans, Axis Plans for summer and winter and Daily Plans in coordination and collaboration with all stakeholders.

Network Performance planning are addressed by seasonal and monthly operations performance reviews which identify network bottlenecks.

One of the outputs of this phase is the publication of the Daily Plan in the NOP.

3.2.3.1 Airspace Structures Design (Fine-tuning)

During the medium and short-term planning phase, takes place the local process of continuous reassessment of national airspace, coupled with the identification of cross border issues that call for a CDM identification of mitigation demand and capacity balancing (DCB) scenarios leading to the establishment of new flexible airspace structures.

The European Network Manager simulates and test revised airspace structures in advance of implementation. Details of short-term airspace improvements (RAIS) are notified to the all the users well in advance. The new confirmed and tested route structure is made available to stakeholders in the rolling NOP, facilitating sector configuration and other planning activities.

Monitoring the impact of variable sectoring and other airspace related features is conducted through the NOP and new services and processes concerning alerts automatically supports the planning and sharing of mitigation plans.

3.2.3.2 Airspace Demand and Traffic Forecast

The NOP contains more up-to-date traffic forecasts, taking into account-consolidated flight intentions data from Airspace Users, approved schedules from Airports, advance bulk flight plans and already filed individual flight plans (FPL). This may take into account the enrichment of FPL data by operational FPLs (Extended flight plan - EFPL).

The integration of better demand information (progressively being refined with the incorporation of flight intentions / iSBT, iRBT) and pro-active management of events enable more accurate forecasts and better prediction of airspace utilisation with anticipated workload levels.

Stakeholders are able to get from the NOP a seamless view of the traffic demand throughout the Medium and Short-term planning phases (up to D-1 day), including access to the trajectories that would compose the demand.

Historic city pair flight information or route generation algorithms are used to generate the most likely 4D trajectory to connect departure and arrival.

3.2.3.3 Airspace (En-Route) Capacity Planning

ACCs/FABs provide the NOP their detailed sector configuration plans including maximum configuration availability and opening times that cover (or not) peak hour demand.

This information is available in the NOP to allow stakeholders further improving the identification of bottleneck sectors.

Flow planning and Airspace Management (Civil and Military) activities & processes further complement ACC Capacity Planning and AU planning activities. Specific flows planning activities (for example Axis planning) may happen as virtual regular meetings using remote collaboration technology and the outcome is available in the NOP.

3.2.3.4 Airport Planning

The creation of the AOP starts at the beginning of the mid-term planning phase. At this point, the results of the IATA Slot Conference is available. This permits an initial airport demand profile to be entered into the AOP and allow airport operators to ensure that local decisions achieve the optimum performance from aircraft operations at and around airports.

The seasonal schedule for the specific airport is produced and published by the Airport Operator and made available to airport actors and to the Network Manager for inclusion in the NOP[8].

The schedule information contains departure and arrival flight information both in IATA (flight) and ICAO. The NOP creates *Consolidated Flight Intentions* to logically connect this departure and arrival schedule information.

The NOP identifies inconsistencies and ambiguities in the Airport Schedule Information. e.g., when an arrival cannot be connected to a departure (or vice versa), and informs the relevant AOP(s) of these identified inconsistencies.

The increase of the frequency of update from daily batched updates in current operations to continuous updates of airport schedule information is expected for next SESAR phase. This overcome the current non-use of available information in the periods between the batch updates.

During all this phase and particularly at the end of it, AOP continues to update in a timely manner the Airport Capacity Plan and Event Plan Information (see 3.2.2.4). This information allow NMOC to establish the network impacts of a sudden or planned capacity changes or reductions due to the event. NOP shares the airport event planning, the constraints and the network impact. Airspace Users would be able to anticipate any changing conditions as early as possible they could adjust flight plans, transfer passengers re-routed or additional fuel taken to allow for a longer period of holding, as required.

AOP automatically exchanges the Runway Configuration Plan (RCP) with NOP when this data becomes available. RCP contains the planned runway configurations and timestamps on which configuration changes are expected, but also STARs/SIDs assignment to specific arrival/departure runways.

The runway configuration information permits the Network to select the applicable SID and STAR according to the airport runway configuration provided to build the 4D profile models. Changes to pre-planned Runway configuration (e.g. change from inbound to outbound, priority mode or to runway availability – maintenance/inspection, noise abatement etc.) are exchanged in a timely manner with NOP and trigger the recalculation of the 4D flight profile models.

From D-1 and design to start earlier in next SESAR phase, the AOP also exchanges specific departure and arrival planning information per flight, named API and DPI respectively .

The API includes time estimates and actual values at specific milestones of the flight: like landing, taxing, in-block ... as well as in-bound flight statues like entered-TMA, holding, FNL, in block, etc. and other information like the SID/runway, target time of arrival or at IAF, arrival terminal and minimum turnaround time.

Similarly the DPI includes time estimates and actual values at specific milestones of the flight: off-block, taxing, take-off... as well as out-bound flight statutes like BRD,RDY, TXO, DEP… and other information like the STAR/runway, de-icing and departure terminal.

The 4D flight profile models in NM is enhanced/re-calculated upon receipt of the flight specific API and DPI. SID, STAR and/or RWY information as well as times like TTOT, out taxi, and estimated landing time (when received from local arrival TMA) are key data in DPI and API used to update the flight profile. The ELDT resulting from the flight profile calculation is of particular interest for AOP. The AOP uses this ELDT to monitor its planned operations, re-assess the use of airport resources (DCB assessment of runway/taxiway/stand capacity) and update the relevant departure planning information (outbound trajectory of the Airport Transit View – ATV) where appropriate, i.e. when the

[8] Although the seasonal schedule is formally part of the Medium Term Plan there may be local initiatives which permit a proportion of these actions to be undertaken earlier.

ELDT estimates a significant delay that prevents the aircraft to perform its rotation before the outbound flight planned departure time. See [**UC-NE-25 Turn around delay, delayed outbound flight**]

Other data received in API and DPI like terminal, minimum turnaround time (time spent on the ground by an aircraft between arrival and next departure) and inbound or outbound flight status improves NOP situational awareness. In addition, the latter is also an important indicator of the quality of the data received in the DPI and API, e.g. the time estimates for an outbound flight are of better quality when the status is boarding (BRD) than at early reception of the flight plan (INI).

API and new DPI enhances current operations as there is no API exchanged nowadays and the new DPI extends the current DPI. In addition, a very important change is that the exchange of API and DPI is done in timely manner or rolling, meaning as soon as meaningful update is identified by AOP, unlike current operations when the DPI messages follow a strict time driven approach e.g. a DPI cannot be sent before 3h before EOBT and so on. The other very important change is the extended horizon (up to -24h before EOBT) of API and DPI exchange compared to the current exchange of DPI that starts -3h before EOBT for CDM airports.

The rolling exchange of RCP, API, DPI (from AOP to NOP) and flight progress -ELDT (from NOP to AOP) results in more accurate NOP profiles and increase of predictability as it improves the traffic demand accuracy and DCB process. By NOP providing access to the most up-to-date departure and arrival flight data (for NOP actors common situational awareness) and to the resulting improved flight profiles, NOP is supporting a better planning of airport ATV (airport transit view) and airspace users operations.

The rolling exchange of API, DPI and ELDT in an extended horizon also makes possible the Multi airport integration planning. The extended horizon is key for this concept. The early and more accurate knowledge of the landing times (ELDT) provided by NOP for the inbound legs, permits the AOP to provide earlier and more accurately departure times (TTOTs) for the outbound legs. This effect cascades down to all AOPs receiving the aircraft later throughout the day (up to the next 24h). See figure below. Multi-airport Integration significantly increases predictability for the airport and for the network.

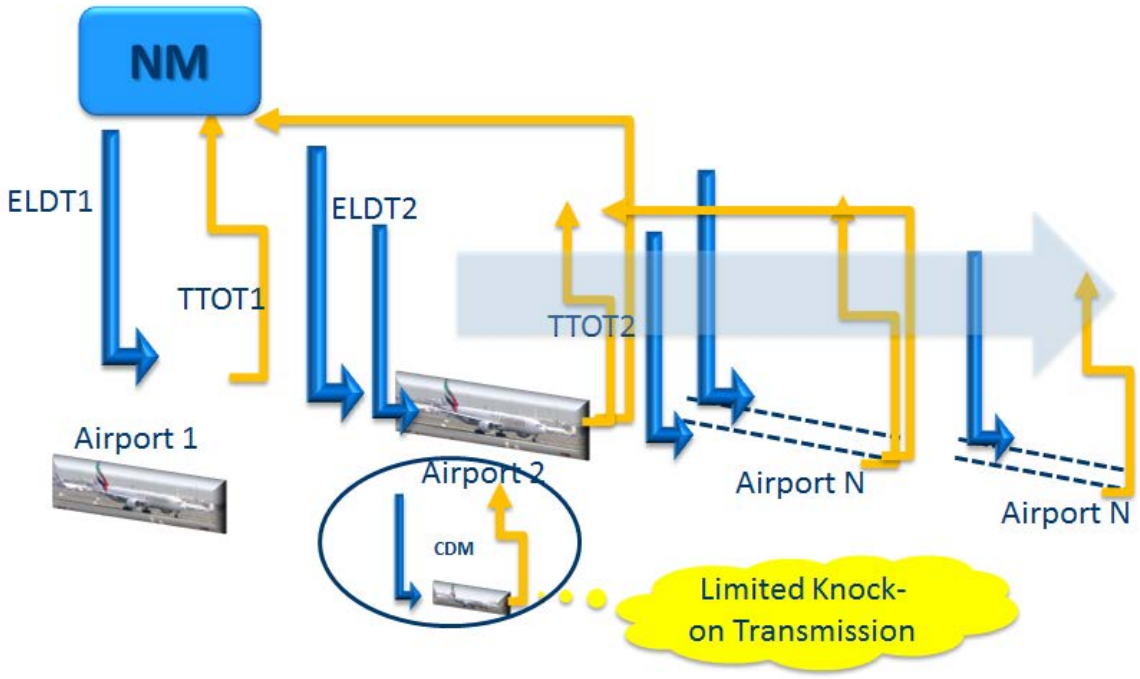


Figure 6 Multi Airport Integration

As a whole, the AOP-NOP Integration concept elaborated in SESAR is about a comprehensive integration of airports and network resulting in more data – but relevant data - exchange and in a timely and automated manner, named rolling data exchange. The concept support a better Network

and Airport planning, as means of better predictability, cost reduction as means of better planning and carbon footprint reduction, as means of better planning and less air-holding.

As the concept is very extensive and ambitious, SESAR step 1 has mainly focused on the departure and arrival planning exchange of AOP-NOP data from pre-tactical to execution, as explained in this section.

3.2.3.5 Airspace Users' Planning / Trajectory Management

All foreseeable ATM restrictions / constraints are easily available to airspace users through the NOP interfaces (NM portal, B2B services). Airspace users has also timely access to the airspace structure (FRA or pre-define route network).

Airspace Users submits initial Shared Business/Mission Trajectories (iSBT/SMT) to the Network manager, which consists of flight intentions progressively refined as time moves closer to departure time (UP4DT). Progressively the user preferred 4D Trajectories are generated by the FOC systems and included in the iSBT/SMT as soon as becomes ready for publishing.

As an initial step towards the Shared/Reference Mission Trajectory, a common and improved OAT and enhanced flight plan is defined at European level as well as its network level integration in the short-term planning phase. At a later stage both the iSBT/SMT and the UP4DT is used by the Network Manager to improve the forecast of traffic and they are made available in the NOP to all relevant ATM actors as constituents of the traffic demand. In Step 1, the SBT/SMT is not fully implemented yet and only incorporates flight intentions (in the medium-term planning) which are progressively refined with incoming information from the Airspace users to become an extended flight plan in the short term period including trajectory data (UP4DT). This extended flight plan then evolves into the initial SBT/SMT (iSBT/iSMT).

The iSBT/SMT is subject to an iterative revision process, as time moves within this medium short-term planning phase towards the execution phase and latest information affecting the flight becomes available. The iSBT might include the following: flight's city pair, user preferred 3D route, flight plan, and when possible known long-term ATM constraints. In the evolution to a UP4DT, the trajectory is enriched with more detailed information - aircraft performance, forecast upper air weather, all known ATM constraints and TTO/TTA. The iSBT/iSMT is published as the initial RBT/RMT at the moment when, due to the proximity of the execution phase, iSBT/iRMT is sufficiently reliable to become the trajectory the AU agrees to fly and the Airspace Service Providers agree to facilitate. The NOP shall make available the iOAT FPLs whilst respecting the confidentiality requirements as dictated by the originator.

The UDPP Enhanced Slot Swapping is used by the Airspace Users to reflect their priorities by swapping important flights to the detriment of less important flights, in short-term phase hours before the flight operation. The enhanced slot swapping Identification Tool aims to propose valid candidate flights for swapping that can be sent as slot swap requests to NM.

The NOP supports the data exchange between the different UDPP stakeholders (Network Manager and Airspace Users) by providing tools and services enhancing the collaboration and coordinated decision process and keeping record of its results.

Concerning Departure-Flexibility at Airports, reordering requests are addressed in the context of the A-CDM environment at the Airport, and results in updated TSAT for the flights. At the level of the NOP, no additional information than the A-CDM information is exchanged.

3.2.3.6 Airspace Management and AFUA

Closer to the day of operation, by participating to the ASM process (in the AMC structure), the Military provide their intentions which are reflected into the NOP with the latest (more accurate) information regarding the planned availability of temporary airspace structures).

This information is available to the Network Manager in daily airspace use plans, which can be updated dynamically.

The planned airspace reservations, once consolidated at network level, is published by the Network Manager in the rolling European AUP/UUP (part of the NOP reference information).

3.2.3.7 Sectorisation and Constraint

The NOP is updated with sector configuration data and with potential and planned configurations.

Under AFUA procedures, solutions are proposed to provide the necessary volume of reserved airspace to the military to conduct their operations safely and to improve the Network efficiency and the capacity at the same time.

The implementation of modular areas increases flexibility:

- For the military and potential ARES user to have the necessary volume of airspace to fulfil their individual demands and
- To have an increased volume of airspace available for those flights affected by the activation of ARES in order to potentially increase the efficiency of the airspace configurations.

VPA (Variable Profile Area) modules (instead of the commonly used airspace configuration of TRAs or TSAs) are designed to facilitate multiple airspace allocation solutions suitable for various mission profiles as well as to fit the overall network with regard to the ARES VPA grid size and shape.

VPA is a new airspace design principle based on flexible allocation and management of small fixed predefined modules of airspace. These modules are designed to fulfil airspace users' needs individually or as a combination of modules as an ARES, dependant on individual mission profile.

Connecting the ASM tool with the ATFCM system provides static airspace data and dynamic AUP / UUP update to ATFCM system, facilitating as an initial step the collaborative decision making process, involving all pertinent partners to ASM in order to achieve a structured and goal oriented approach.

Additionally the continuous sharing, potentially in real time, of airspace planning and status provides a shared situation awareness and contribute to a more efficient DCB process.

3.2.3.8 Significant Event Planning (incl. Weather Events)

As for long term planning, the sources that have the best knowledge about a significant event (and its local/sub-regional impact) are able to directly input the information in the NOP.

Procedures are in place to ensure that information on the impact of an event (on traffic demand or capacities) can be shared in the NOP in a timely manner. Stakeholders have more time to collaborate on mitigation strategies/ DCB scenarios.

Transition plans are developed collaboratively using data available in the NOP (including up-to-date information on traffic forecasts and available ANSPs/airports capabilities) for significant events (as ATM system enhancements) where a temporary reduction in capacity is expected.

These is elaborated with a view to minimise the negative impact on network performance targets/objectives whilst taking into account local/sub-regional optimisations and airspace users' preferences. What-if assessment tools is used enabling all stakeholders in any trajectory update to look at the same contextual information and to have visibility on the impact on KPIs before a decision is activated (the set of KPIs to be addressed is specified in the Step 1 Operational Network Performance Framework). Contingency plans and diversions plans for plannable critical events (for example industrial actions, significant changes in airspace availability, significant weather), are also developed more collaboratively using the data made available in the rolling NOP (including up-to-date information on traffic forecasts and on available ANSPs/ airports capabilities).

Local weather assessments is used to assess the potential impact of weather on operations. The process, which is much more dynamic than in the previous operating method, starts at the earliest possible based on the 4DWxCube information and other information available from MET Services Providers (incl. temperature and wind at defined FL, CBs, thunderstorms / convective activity, Clear Air Turbulence, Pressure systems/frontal activity, icing). More MET information become available when getting closer to the day of operation and are enriched by the estimation of impact in capacity provided by the local units.

The local/sub-regional units input their weather assessments into the NOP. Weather assessments are integrated in the CDM processes to enhance this functionality on both the local as well as the network level.

3.2.3.9 DCB

The Network Manager support continuously look in a collaborative process with local units at the network performance. It tries to off-load identified bottlenecks through DCB measures (for example creation of cross-border rerouting alternatives) designed to optimize network efficiency.

It is possible to use simulations and assessments of rerouting proposals to avoid or relieve imbalances (in congested or closed airspace), as well as 'what-if' assessments in support of alternative options offered.

The NOP further supports the CDM actions necessary (e.g. access to historical data, alternate routes modelling) to discuss and agree the Plans as well as to improve consistence between local units, airport and ATFCM planning.

During Medium term planning phase a subset of data (expected to have an impact on network capacity) available in the AOP (Airport Operational Plans) e.g. Seasonal Airport Plans in terms of airport capacities, planned works and identified constraints are shared with the NOP. This is a significant change in operating methods where today airports do not share this data with the network at this stage.

The NOP houses the latest available information on agreed DCB pre-defined actions/strategies including Target Times. Target times can be monitored from the NOP, deviations are signalled and various measurements and KPIs are able to determine the degree of adherence of a flight to its target.

During the short time planning phase at D-1 the Network Management Function captures, maintains, and makes accessible on a need-to-know basis, the sector capacities using the NOP and publishes the Daily Plan for the next day.

Prior to execution on D day, the Network Manager monitoring function monitors the declared capacity values available from the NOP against the actual traffic flow and complexity values in search of imbalanced situations.

Once imbalance situations are detected and declared as hotspots by the Local Traffic Manager, a coordination process with the Network Management Function, implying what-if procedures are initiated performing an analysis of different parameters to determine the nature of the hotspots and to identify and prepare STAM solutions for Flow Measures. During this process, the NMOC cascades down to the LTM the Network Performance impact resulting from the What-If procedures and /or expert judgment for final coordination of DCB measures.

Taking account of occupancy and complexity as key measures of workload in the Short-Term Planning phase, DCB has a more accurate understanding of the demand capacity imbalance and can offer solutions directly at the point of overload, including the distribution of target times to airspace users and ANSP to ensure adherence to the plan (such as CTOT to TTA/TTO), which reduces the overall cost of the DCB solution.

3.2.3.9.1 Weather Status Monitoring (MET)

The NOP receives significant weather information and dynamic updates of by the MET Service Provider (4DWXCube). This information is then used for example to estimate the existence of significant weather areas that may call for the application of STAM measures in D-day. These significant weather phenomena is modelled as "MET objects" in the NOP.

Local impact (potential capacity reduction within a certain time) is assessed and shared with all ATM actors through the NOP. Significant weather data should cover airport and en route and include phenomena like convection, turbulences, icing, fog, strong wind or precipitations.

During execution on D-day, the Network Management Function support and/or LTM identifies areas where eventual tactical measures (e.g. STAM measure) may be necessary and are or will be affected by significant weather and highlight them for monitoring (evolution of hotspot and Significant weather).

Local impact (potential capacity reduction within a certain time) is continuously reassessed and shared with all ATM actors through the NOP. At any moment, the implementation of a STAM can be triggered through the usual coordination process.

In brief, the demand and capacity balance assessment, and in its turn the elaboration of the network plan and its monitoring performed by the Network Manager benefits with the integration in the NOP of significant weather data.

3.2.3.10 Network Performance Planning, Monitoring and Management

Considered as a continuous process, the network performance planning, monitoring and review at medium and short-term planning phases uses available more accurate data the closer it gets to the execution phase.

Keeping the same principle of acting when a deviation from an established performance target is detected, the thresholds requiring collaborative action from stakeholders are reduced compared to the long-term planning phase, thus allowing a major adherence to predefined targets. Actions taken by any actor are recorded in order to guarantee transparency and equity between all stakeholders.

It is possible to refine the performance monitoring by apportioning yearly network operational targets and objectives to smaller geographical areas and time periods (season, week and days) thanks to the better knowledge of traffic demand and network capabilities. The data available in the NOP makes it possible to provide prognosis of network performance (for coming season, week and day).

The following table shows data that can be used to monitor Network Performance during the Medium and Short-term Planning Phase. Some of the mentioned data may only be available in the short-term planning phase, very close to execution.

1921

Main Focus Area (FA)	Lower Level FA	Description	Metrics/Indicators
Network Capacity	Network Throughput	Network Throughput at Peak day / Peak hour Airport / Airspace Planning Inconsistencies	MAXIMUM Nº of planned IFR flights at Peak day / Peak hour 99% percentile of number of planned IFR flights per 20-min rolling hours during the time interval (seasonal or yearly) Days of maximum number of IFR flights That can be - TOTAL in the Network - Per FIR/ACC/Sector/Airport.
	Airport DCB	Airport Demand / Capacity Imbalances	Airport imbalances identified, per airport and day - Total number of imbalances and duration - Cause of Airport DCB imbalance - % Demand/Capacity ratio at Key Airports >P% (e.g. 90%) + Time period of Capacity reduction: o Per time period o Per key airport
	Airspace DCB	Airspace Demand / Capacity Predicted Imbalances	Airspace imbalances (demand > capacity) identified, per ACC per sector and day - Total Number of Imbalances and duration - Number of Imbalances per day - Cause of Airspace imbalances - % Demand/Capacity ratio per ACC unit >P % (e.g. 90%) + Time period of Capacity reduction

Main Focus Area (FA)	Lower Level FA	Description	Metrics/Indicators
		Airspace / Airports Demand / Capacity severe predicted imbalances	Airspace severe (% Demand/Capacity ratio >P % (e.g.110%) imbalances identified, per ACC per sector and day - Total Number of severe Imbalances and duration - Number of severe imbalances per time period - Cause of severe imbalances - Ratio of severe imbalances and Hotspots /Imbalances Airports severe (% Demand/Capacity ratio >P % (e.g.110%) imbalances identified, per airport and day - Total Number of Airports where flow measures could be expected - Cause of severe airport imbalance
	En-route Weather Phenomena	4DWX phenomena that may impact Capacity: • Turbulence • Convection • Icing	- 4DWx phenomena (impacting capacity) and predicted start time - Relation of 4DWx based, phenomena probability versus WX risk assessment using current prediction systems - Number of WXAoI created per sector - Number of post-in created within each AOI - Number of WXAoI removed due to end of weather risk - Number of 4DWx prediction updates Number of OTMV traffic volume Capacity updates based on 4DWx observations
Network Punctuality	Network Delays	Number of potentially delayed scheduled flights greater than a parameter (e.g. 15 min.)	- Number of severe imbalances where delay is greater that a parameter - Airspace / Airport originating the imbalance - Number of Flights per ACC whose planned AOBT-SOBT> (T)
		Average delay of potentially delayed scheduled flights (expected to depart not as planned) beyond a predetermined threshold.	- Σ (planned AOBT-SOBT> (T)) /Nº delayed Flights per Airspace or Airport. This indicator may be linked to a what-if analysis performed by the NMF of a reduction in Capacity during a specific period of time due to a planned event.

1922 Table 17: Network KPIs / PIs Medium and Short-term Planning

3.2.4 Execution Phase

3.2.4.1 Airspace Traffic Demand

The filed Extended Flight Plan (EFPL) that is used to update NOP in real-time.

The expected airspace utilisation and anticipated workload levels would be highly accurate.

Stakeholders are able to get from the NOP a view of the traffic demand including access to the trajectories that would compose the demand and are updated in real time.

3.2.4.2 Airspace (En-Route) Capacity Monitoring and further planning

The NOP continues to be updated in real-time with the actual sector capacities and optimised sector configurations. This information allow stakeholders to further improve the identification of bottleneck sectors including the flights.

The update on the Airspace Usage (Civil and Military coordinated) further complements ACC Capacity management and AU operations.

The update of the actual local weather assessments is used to assess the actual capacity available. The nowcasts is provided by the 4DWxCube information and other information available from MET Services Providers. The MET information is enriched by the impact in capacity provided by the local units.

The local/sub-regional units' weather assessments is considered in the CDM processes to maximize capacity at the network level.

3.2.4.3 Airport Monitoring and further planning

The rolling exchange of information between AOP and NOP continues throughout this phase. The NOP is updated in real-time with the actual airports' status and resources and latest information on planned operations shared with the network through the AOPs (including reduced rates in case of weather issue or any other type of issue). The NOP is alerted of deviations from AOPs, which require an intervention of the network. NOP continues to exchange flight progress information that includes flight status as calculated by NM systems and profile estimates (especially ELDT) updated as the flight evolves in time - especially but not exclusively covering the airborne phase.

3.2.4.4 Airspace Users' Planning / Trajectory Management

Airspace users have timely access to the NOP data relevant to their operations, including the AOP data shared by airports and DCB/dDCB constraints. Airspace users also have timely access to the actual airspace structure (FRA or pre-define route network) and airspace utilization with a clear indication of opportunities/limitations following the actual airspace usage status.

The NOP is also updated with relevant data from UDPP activity through the NOP interface.

At the day of operations, the Airspace users communicate to externals its flight prioritization (thanks to UDPP tooling). At a first stage, this prioritization information concerns only constrained situations (regulated flights, departure airport congestion) enhancing the slot swapping, both at Network and airport levels. The NOP supports the data exchange between the different UDPP stakeholders (Network Manager, Airspace Users and Airports) by providing tools and services enhancing the collaboration and coordinated decision process (flight lists, priority allocation as well as associated performance indicators).

3.2.4.5 Airspace Management and AFUA

In the day of operations, the flight Execution phase, the NOP is updated with the real-time airspace activation status and any change (deactivation or modification of the airspace allocated in the planning phase) eventually including TT over the concerned airspaces.

Changes to the Network Operations Plan are coordinated amongst the relevant network actors. Such short notice requests for route activation and updates of military requests as significant weather phenomena, unexpected ground or space infrastructure opportunities/limitations, critical events, etc. are coordinated through integrated and user-friendly systems permitting a shared situational awareness and a pertinent decision making process, ; thus, exploiting the airspace in a dynamic manner (but still within the ASM planning process), minimising the impact of any disruptions and taking benefit of any opportunity.

Any airspace changes would be shared through UUPs promulgation and the NOP is updated with any change related to the AUP and UUP exchange, ARES (for FRA and DCT) and CDRs concerned.

The airspace users are alerted of changes in airspace CDR status, which require an intervention on the filed FPL.

3.2.4.6 Sectorisation and Constraint

The NOP is updated with actual sector configuration data, sector configurations and related capacities.

Allocation of airspace reservation (ARES) happens through more dynamic airspace management enabling dynamic responses to short notice military airspace requirements (up to 3 hours before operations) or very short term changes (e.g. bad weather). This relies in particular on increased collaboration between ASM/ATFCM partners and scenarios providing flexibility with regard to daily airspace and route requirements, and adequate highly reactive system support.

3.2.4.7 Significant Event Monitoring

Military events, special events and any other unexpected event are monitored by stakeholders using the NOP.

The NOP is also updated with network crisis relevant information, facilitating the information sharing, and the processes that would support the Network Crisis Management.

3.2.4.8 dDCB (Dynamic DCB)

The dDCB actions are shared in the NOP to improve situational awareness at network level and enable post-ops analysis.

The implementation and promulgation of STAM measures by Local Traffic Managers are published in the NOP, which is dynamically updated by inputs of all concerned actors.

The Network Manager Function supervises Network Performance evolution during the day, monitoring the declared capacity values available from the NOP against the actual traffic flow and complexity values and keeps track of the application of dDCB measures with relevant statistical metrics and performance indicators to assess their efficiency.

Agreed procedures ensure a fair attribution of delay, and delay sharing processes help in optimizing performance.

The System keeps all actors informed about the Network Operations Plan updates.

3.2.4.8.1 Weather Status Monitoring (MET)

During execution phase, at D-Day, the evolution of 4DWX phenomena that have been assessed to influence Capacity i.e. monitored continuously. These significant weather phenomena is modelled as “MET objects” and is continuously updated in the NOP. This information is then used for example to confirm the existence of significant weather areas (or to evaluate new ones) that may call for the application of STAM measures.

During execution on D-day, the regional or local Network Management Function support identifies areas where tactical measures (e.g. STAM measure) may be necessary due to significant weather (in addition to other issues) and highlight them for action (evolution of hotspot and significant weather).

Local impact assessment and actions are shared with all ATM actors through the NOP. At any moment, the implementation of a STAM can be triggered through the usual coordination process.

When received updates on forecasted Turbulence, Convection, or Icing, their capacity impact on the affected sectors is always assessed.

The full integration in the NOP is not completed during Step1, where a standalone prototype is still used. The integration is finalised in Step 2.

3.2.4.9 Network Performance Monitoring and Management

During execution, the performance of the Network in relation to daily targets is monitored and some KPIs are provided by the system. Agreed threshold level deviations - where practicable for some KPIs - automatically trigger NOP alerts to the concerned and relevant stakeholders. Key for achieving an efficient management is the capability to anticipate distortions to the plan before they actually happen, that is the ability to identified cause and effect relationships elements to help determining optimum locations for performance sensors, based on their Network influence, easiness of implementation and data source quality. In summary, during execution the ability to identify and monitor Performance Drivers (cause elements) rather than outcome performance (effect elements) is paramount.

The following tables show data input requirements to monitor Network Performance during the Execution Phase for different Key Performance Areas.

2028

Network Capacity Focus Area

Lower Level Focus Area	Description	KPI Algorithm	Sample Context / Cause of miss-performance
Network Throughput	Network Throughput at Peak hour with number of active ATFM regulation and ATFM average delay ** *Peak hour is used to assess Network throughput capability; i.e. maximum number of flights within an acceptable level of delay (to be agreed).*	- Nº of planned IFR flights at peak hour - Nº of active regulations at Peak hour - Expected ATFM average delay at this hour - Number of peak hours per period of time interval taken from those reaching 99% percentile of number of planned IFR flight per 20-min rolling hour reference	Traffic volume showing the maximum throughput within the peak hour. Cause of demand capacity imbalance activating regulations.
Airspace DCB Changes	Capacity Reductions at key Network ATS units affecting Network Performance	- % Demand/Capacity ratio at Hotspot> (e.g. 90%) - Time period of Capacity reduction including duration. - Number of DCB and dDCB measures - Number of flights affected by measures.	Per network and/or given unit : – Entry counts; occupancy counts – Number of Airspace imbalances detected – Number of imbalances declared as hotspots – #OTMV (Traffic Volume Capacity values) – #Tactical Capacity declared in traffic volume – # Updates of Airport Runway Configuration – Cause of hotspot
Airport DCB Changes	Capacity Reductions at key Airports affecting Network Performance Departure Demand Shifts Impacting the Network	– % Demand/Capacity ratio at Key Airports > (e.g. 90%) – + Time period of Capacity reduction – Number of flights affected airport DCB changes	Per relevant airport (and/or grouping airports by ACC/FIR): – Plot Initial / updated Departure Demand graphic – Cause of DCB change
Weather Phenomena Monitoring	D-Day Updates on 4DWX phenomena (impacting Capacity), based on NOP/MET Integration	– Weather Phenomena updates – Capacity Updates caused by weather phenomena	- 4DWx phenomena Start Time Update - Number of 4DWx prediction updates - Relation of 4DWx based, phenomena probability versus WX risk using current prediction systems

Lower Level Focus Area	Description	KPI Algorithm	Sample Context / Cause of miss-performance
			- Number of WXAoI converted into Hot Spots - Number of WXAoI removed due to end of weather risk - Number of OTMV traffic volume Capacity updates based on 4DWx observations
On-line Airport Trend Monitoring	Helps to monitor the traffic demand by understanding the breakdown by flight status and the breakdown of delay by delay category.	Categorization of Traffic Demand *The accuracy in traffic count prediction depends on the status of aircraft at the time there position data is obtained: Ground status; Off-block or Airborne*	- Flight State : o Suspended, o Filed, Departed o (Airborne or Terminated) - CDM state: o Targeted (T-DPI_t) o Sequenced (T-DPI_s) o Pushed back (A-DPI) - Regulated or not
		Departure Demand Delayed (*Demand shifts due to delayed flights)*	- CLASSICAL ATFCM DELAYS: delay due to the (pre-)allocation of CTOTs - AIRPORT" DELAYS(A-CDM): delay due to differences between ATC issued TTOTs and the original demand ETOT/regulated-demand CTOT. - TAKE-OFF DELAYS: differences between the planned ATC take-off time and the actual take-off time
On-Line Occupancy / Entry Load Comparison	Compares entry load with occupancy. Gives an idea of the variation of the occupancy counts. The closer the three occupancy values are, the more stable the value is. It can help to decide, in case of overload, on the type of measure STAM/reg. to	Comparison of Entry Load with Occupancy for a given Traffic Volume and Time period	- Number of entry counts on traffic volume - Number of occupancy counts in traffic volume - Average value for each hourly period - Maximum occupancy count within each period - Minimum occupancy count within each period - Reference load factor evolution from similar archived period of time

Lower Level Focus Area	Description	KPI Algorithm	Sample Context / Cause of miss-performance
	apply.		

Table 18: Network Execution KPIs / Capacity Indicators during execution

Fuel Efficiency Focus Area

Based on B04.01 recommendations, Fuel Efficiency (extra Fuel burn) are measured using Flight Efficiency, measured in terms of both planned and actual en-route horizontal excess distance, as this is a major contributor to fuel efficiency that is most practically measured and more directly controllable by ANS providers than fuel efficiency).

Lower Level Focus Area	Description	KPI Algorithm
Aircraft Trajectory Changes	Number of Flights affected on their initially planned trajectory (horizontal profile, vertical profile) by ATM DCB measures.	– Number of Flights affected by DCB measures – Cause of ATM trajectory change: Holdings Trajectory Changes (RR/FL capping) in predefined planned scenarios or STAM measures Significant Weather phenomena
Airspace Flight Time Extensions (Block2Block)	Number of flights with block to block time greater than planned, (for example, the number of flight with a certain value of the ratio of the Extended EET and the Initial EET (FPL)) ****EET from the FPL is used, although it is normally greater than the calculated, due to the buffer introduced by the airline to compensate from the lack of block2block predictability (true for Schedule (as in the next column) and RPL, but not for FPL where the only "buffer" could be to put the taxi out and the longest SID and STAR.)*	– Relation of flights that have suffered flight extension with cause of flight extension per each flight – Number of FIR Flights if: ((SIBT - SOBT)- (AIBT-AOBT)) / (SIBT - SOBT) <% (Scheduled Blk2Blk-Actual BLK2Blk)/ (SIBT - SOBT) <%
	Average block-to-block time extension of the flights with time longer than planned, as the sum (Extended EETs- Initial EETs) divided by the number of Extended EETs.	– Cause (s) of flight extension and flight affected – Average of ((SIBT - SOBT)- (EIBT-EOBT)) if: ((SIBT - SOBT)- (EIBT-EOBT))/ (SIBT - SOBT) > %
	Detection of significant number of IFR flights exceeding their planned EETs in a specific traffic flow, as the % of extra time flown over a pre-determined period of time.	– Average of ((SIBT - SOBT)- (EIBT-EOBT)) if: ((SIBT - SOBT)- (EIBT-EOBT)) > T; in a specific traffic flow

Table 19: Network Execution KPIs / Fuel Efficiency Indicators during execution

2036

Punctuality Focus Area

Lower Level Focus Area	Description	KPI Algorithm
Network Delays	Number of delayed scheduled flights greater than a given parameter (e.g. 15 minutes, 30 minutes) Average delay of delayed scheduled flights (departing not as planned) beyond a predetermined threshold. Percentage of departure delayed flight greater than a time parameter over total number of departures Delay per delayed departure. Average departure delay of delayed flights En-Route Delays	– Number of FIR Flights AOBT-SOBT> (T) – Σ (AOBT-SOBT> (T)) /Nº delayed FIR Flights – Cause of Delay – Flights delayed per cause of Delay. – % of Departures ((AOBT-EOBT) ≥ T) / Total departures o Per ACC / FIR / Major Airport – if (AOBT-EOBT) ≥ T min); Σ (AOBT-EOBT) (min) / delayed departures o Per ACC / FIR / Major Airport – Flight profile deviations impacting flight efficiency (extra fuel burn) – Flight profile deviation impacting Punctuality (delays) Other Causes of delays - Regulations - Special Event - ATC Routeings - ATC Staffing - ATC Equipment - Weather
ATFM Delays due to ATFM Regulations	Total number of ATFM regulations in the day Total Flights affected by regulations during the day Ratio of Number of delayed flights due to each ATFM Regulations / Number of flights affected by the regulation	– Number of ATFM regulations published by the NMOC – Total flights affected by Regulations along the day: o Percentage of flights with ZERO, 5 minutes,10 minutes and over 10 minutes of ATFM delay – Number FIR Flights CTOT - ETOT > (T))/ Number FIR Flights affected by the regulation (with an ATFM slot)
	Average Network ATFM Delay decomposed by ACC/FIR due to Airspace Regulations %delay Contribution of each ACC to Total Network delay Average Network ATFM Delay of regulated delayed flights due to Airspace	– Minutes of ATFM delay due to regulations, Σ (CTOT - ETOT) (min) / all regulated flights within each ACC/FIR – %Σ (CTOT - ETOT) (min) (ACC/FIR)/ Σ (CTOT - ETOT) (min) (all flights) – Σ (CTOT - ETOT)>T (0;5;10: over 10 min)/ Number FIR Flights whose ATFM delay >T
	Average Network ATFM Delay due to Airport Regulations per Major Airport (Hub) / per hour (shown in a 20 minutes rolling hour)	– Hourly Minutes of ATFM delay due to Airport arrival regulations, Σ (CTOT - ETOT) (min) /Major Airport in a rolling 20 minutes hour – Σ (CTOT - ETOT) (min) from all Major (HUB) Airports

Lower Level Focus Area	Description	KPI Algorithm
	Total ATFM delay due to Major (HUB) Airports %delay Contribution of Each Major Airport to Total Network delay	– %Σ (CTOT - ETOT) (min) from all Major (HUB) Airports / Σ (CTOT - ETOT)
ATFM Delays due to STAM Measures	Average Network ATFM Delay due to STAM Measures Average Delay of Selected aircraft for STAM	– Percentage of DCB imbalance declared as Hot Spot – Causes of Hot Spots – # Hot Spot solved by Flow Measures – # Hot Spot solved by Cherry Picking Measures – Entry counts to Hotspot – Occupancy counts at Hotspot – Minutes of ATFM delay per flight due to STAM Σ (CTOT - ETOT) (min) / all flights – Minutes of ATFM delay per flight due to STAM Σ (CTOT - ETOT) (min) / Selected flights
Arrival Delays	Arrival delays greater than a time parameter per Major (HUB) Airport in a 20 minutes rolling hour Average arrival delay per delayed arrivals per Major (HUB) Airport	– Σ (AIBT-EIBT) ≥ T / 20 min. rolling hour – if (AIBT-EIBT) ≥ T min); Σ (AIBT-EIOBT) (min) / delayed arrivals – Number of airports and list of airports with a certain arrival delay
Specific Airports On line Delay Monitoring	Provides a set of KPIs on Delay and Accuracy (Arrival/Departure and DPI) for a given airport	For A-CDM Airports: – ATFM DLY (Past) For departed regulated flights, determine the average delay value (CTOT-ETOT) – ATFM DLY (Future) For future departing regulated flights, determine the average delay value (CTOT-ETOT) – APT DLY(Past) For departed non-regulated flights, determine the average (T-DPI_s TTOT – ETOT) – APT DLY(Future) For future departing non-regulated flights, determine the average (T-DPI_s TTOT – ETOT) For non A-CDM Airports – ATFM DLY (Past), ATFM DLY (Future), ATOT – ETOT, ATOT – CTOT:
Arrival Punctuality	% Arrivals delayed less than a time parameter per Major (HUB) Airport using SIBT reference % Arrivals delayed less than a time parameter per Major (HUB) Airport using EIBT reference (calculated from arrival	– Arrival Punctuality Index= (%) (AIBT-SIBT)<T (3; 5; 10 minutes) – Arrival Punctuality Index= (%) (AIBT-EIBT)<T (3; 5; 10 minutes) – Number of airports and list of airports with a certain arrival punctuality index.

Lower Level Focus Area	Description	KPI Algorithm
	FPL)	
Departure Punctuality	% flights departing" In Time". % of flights departing within a TOBT window (e.g. +5 min.). Departure delay greater than a time parameter per Major (HUB) Airport in a 20 minutes rolling hour Delay per delayed departure. Average departure delay per delayed flight per Major (HUB) Airport	– Categorization of Airport Delays – Flights Delayed by more than 30Min – Delay by Accident/ Incident. – Delay by ATC Capacity. – Delay by De-icing. – Delay by Aerodrome Capacity – Weather Departure Punctuality Index= (%) (AOBT-TOBT) <T (e.g. +5 min.). – Departures ((AOBT-EOBT) ≥ T) / 20 min. rolling hour if (AOBT-EOBT) ≥ T min); Σ (AOBT-EOBT) (min) / delayed departure – Number of airports and list of airports with a certain departure punctuality index s
Weather Delays	Average Network Weather Delays Per ACC/ FIR /Major Airport	– Weather phenomena causing traffic delays: – Σ ATOT - ETOT (min) (Weather reasons) / all flights

2037 Table 20: Network Execution KPIs / Punctuality Indicators during execution

2038

2039 ## Predictability

Lower Level Focus Area	Description	KPI Algorithm
On-Time Arrival Variability	Standard Deviation of arrivals from their SIBT per Major airport (SIBT adherence) Standard Deviations of arrivals from their EIBT per Major Airport (EIBT (from FPL) adherence) Early arrivals. % of arrival delayed (AIBT-EIBT) <T per Major Airport	– Arrival Variability using Scheduled Times as reference – Arrival Variability using EPL Time estimates as reference – Arrivals ((AIBT-EIBT) ≤ -T (e.g. 5min)/ Total arrivals – Number of airports and list of airports with early arrivals
On-Time Departure Variability	Standard Deviation of arrivals from their SOBT per Major airport Standard Deviations of arrivals from their EOBT per Major airport	– Variability using Scheduled Times as reference – Variability using EPL Time estimates as reference – List and Number of Airports with Standard departure deviation greater than T min.
Knock-on Effect	Average Reactionary Delay at Major Airports	Σ departure delays with IATA reactionary delay codes (91-96) / all outbound flights Number of airports and list of airports with reactionary delays.
Specific Airports On line Variability Monitoring	Provides KPIs on arrival time accuracy (estimated and calculated)	In all airports (A-CDM or not) the following arrival KPIs are shown – – ATA – ETA For arrived non-regulated flights, determine the average arrival 'inaccuracy' – ATA - CTA For arrived regulated flights, determine the average arrival ''inaccuracy''
Airport Departure Predictability from nearby airports	Reliability of the occupancy counts with influx from nearby airports	– DPI variability (TTOT-ATOT) – ATFM variability (CTOT-ATOT) – FPL variability (ETOT-ATOT)
Traffic Volume On-line Occupancy Count Predictability	Occupancy counts Monitoring Display: For a given traffic volume, over time occupancy count variation viewing the occupancy counts for some future time period (e.g. 90 minutes in the future) and integrating observations made at 1 minute intervals	Bubble graph displaying categorization of flights: – On time – arriving within a [-5, +5] margin of the original expectation. – Late – arriving [+5, +15] minutes later than originally expected – Very late – arrive [15, …] minutes later than originally expected – Early – arriving [-15, -5] minutes earlier than originally expected – Very early – arrive […, -15] minutes earlier than originally expected

Lower Level Focus Area	Description	KPI Algorithm
	TV entry time variance for different categories of flights	– Average entry time variance observed per airborne flight (in minutes) – Total entry time variance observed for all airborne flights (in minutes)
	Location Time Predictability	– Traffic Load Occupancy bar indicating percentage of On-Time, Late and Early entries combined with a pie presentation of aircraft data source
	Occupancy Count Predictability, depending on A/C origin.	The accuracy in traffic count prediction depends on the status of aircraft at the time there position data is obtained; greater when aircraft are airborne and lower when at ground – Ground status – Off-block – Airborne
	Occupancy Count Predictability, depending on traffic Flux:	– Inflow are A/C that were not predicted to be in the sector but are in, based on flight planning and actual profiles – Outflow are A/C that were predicted to be in the sector but are no longer, based on flight planning and actual profiles – Stable are A/C that were predicted to be in the sector and are in. based on flight planning and actual profiles Total O/C = Inflow –Outflow + Stable
On-Line Monitoring of Traffic Volume Entry Time Adherence	Monitor the actual versus planned differences with respect to flights entering a Traffic Volume, in a given time period (defaulting to [-2h, 1h]).	– ATO – ETO (Past) For entered non-regulated flights, determine the average entry 'inaccuracy' – ATO – CTO (Past) For entered regulated flights, determine the average entry 'inaccuracy'' – ATO – ETO (Future) For later entering non-regulated flights, determine the average entry 'inaccuracy' – ATO – CTO (Future) For later entering regulated flights, determine the average entry 'inaccuracy'

Table 21: Network Execution KPIs Predictability Indicators

Examples of performance monitoring representations

In Step 1, some representations of the previous KPIs are available in different forms (graphics) showing the KPIs changes dynamically.

Airport KPIs in terms of Delay and Accuracy (Arrival/Departure and DPI)

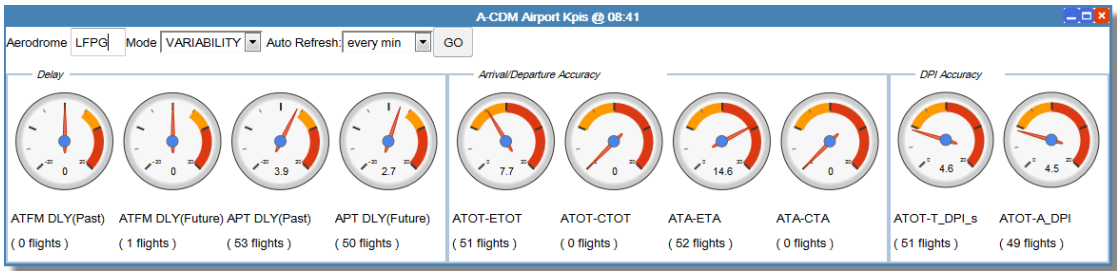


Figure 7 Airport KPIs

Airport Trends KPIs to monitor the traffic demand by understanding the breakdown by flight status (left) and the breakdown of delay by delay category (right)

Figure 8 Airport Trends

Occupancy Variability Monitor to monitor how occupancy counts vary over time, showing how the “hotness” of the TV evolves over time

Figure 9 Occupancy Variability Monitor

The figure above represents several KPIs: Occupancy Count Predictability, depending on A/C origin, Occupancy Count Predictability depending on traffic Flux and Location Time Predictability.

Occupancy / Entry Load Comparison, where occupancy values present Average value for each hourly period, Maximum occupancy count within each period and Minimum occupancy count within each period.

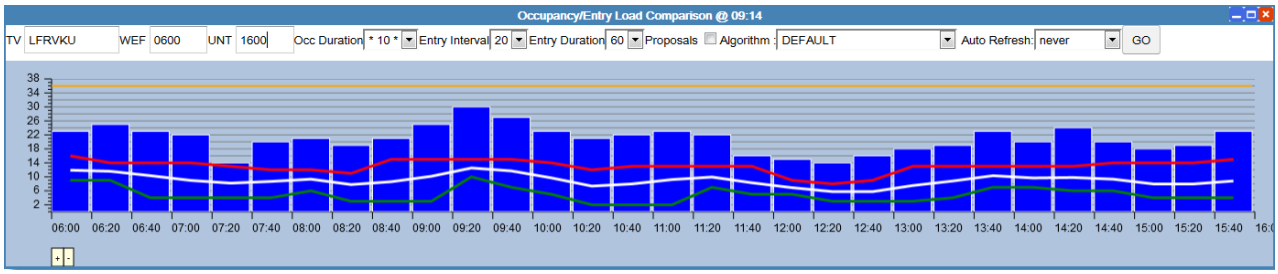


Figure 10 Occupancy / Entry Load Comparison

Traffic Volume Entry KPI Monitor to display average (DELAY or VARIABILITY) and the flight by flight entry 'inaccuracy', both in terms of FL and time.

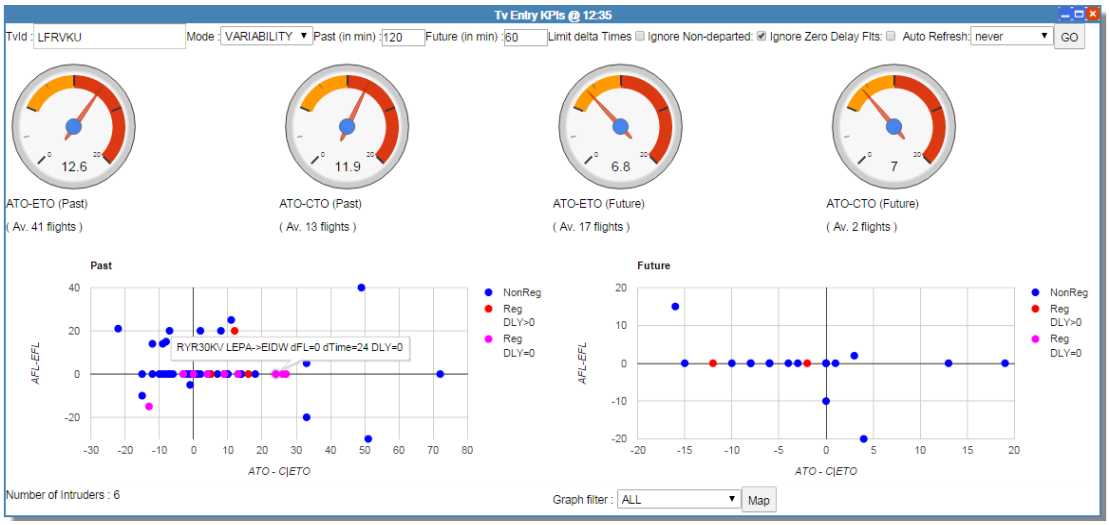


Figure 11 Traffic Volume Entry KPI Monitor

3.2.5 Post-flight Phase

3.2.5.1 Network Performance Review and Management

Base-lining of the Network Operations Plan has taken place all along the planning and execution lifecycle and these planned baselines (or NOP/Plan instances) are stored in the NOP Post-Operations process, together with actual performance, DCB actions performed, scenarios and mitigations and their relative success. This information complement historical data and be available to the relevant ATM Actors for future reference and information.

During NOP Post Operations phase, the performance of the Network in relation to targets is reviewed. Agreed threshold level deviations are highlighted and reported to the concerned and relevant stakeholders.

Key for achieving an optimum European ATM Network Performance is the capability to review and continuously learn from the impact of ATM occurrences building knowledge to anticipate the future similar occurrences facilitating the ability to identify the cause and effect relationships.

The following tables show data input requirements to review Network Performance during the NOP Post Operations Phase for different Key Performance Areas.

Network Capacity Focus Area

Lower Level Focus Area	Description	KPI Algorithm
Serviced Demand	Annual IFR Throughput	Number of flights executed / year - Per ACC /FIR / Airports
	Daily IFR Throughput per ACC /FIR / Airports	Number of flights executed / day - Daily average number of IFR flights per month - Daily average number of flights in the peak month of the year
Quality of Planning	Development of the NOP: Updating procedure Actors Involved in Developing / Updating the NOP	Annually; Seasonally; Monthly; Weekly; Daily; Real Time. AUs; ATCs; Airports; Slot Coordinators; NMOC: - Per Updating period
	Quality of Content: Assessment of Difference between planned and executed :	Changes in Service Demand: Per ACC /FIR / Airports - Monthly; Weekly; Daily - Number of Planned IFR flights Daily Changes in Available Capacity: - Per ACC /FIR / Airports + - Time Shifts in the Demand - Causes of Capacity Reduction and / or Time shifts of demand
	Predicting Capability	Prediction of Weather Phenomena - Duration of forecasted Weather phenomena versus actual duration - Relation of 4DWx based, phenomena probability versus WX risk assessment using current prediction systems Performance Decreased Foreseen in any Air Traffic Service Unit or Airport Overcapacity Planned: (%P) Flight Capacity headroom
Cancellations	Number of Flights Cancelled due to Demand / Capacity imbalances	– Cause of the imbalances producing cancellations – Number of Cancellations per ACC /FIR /Major Airport – Number of planned IFR flights cancelled due to capacity shortfalls

Table 22: Network Post-Operations KPIs / Capacity Indicators

Fuel Efficiency Focus Area

Lower Level Focus Area	Description	KPI Algorithm
Aircraft Trajectory Changes	Number of Flights affected on their initially planned trajectory due to DCB measures (horizontal profile, vertical profile)	Number of Flights affected by DCB measures Cause of ATM trajectory change: Holdings Trajectory Changes (RR/FL capping) in predefined planned scenarios or STAM measures Significant Weather phenomena
Airspace Flight Time Extensions (Bock2 Block)	Number of flights with block to block time greater than planned, (for example, the number of flight with a certain value of the ratio of the Extended EET and the Initial EET (FPL) ****EET from the FPL is used, although it is normally greater than the calculated, due to the buffer introduced by the airline to compensate from the lack of block2block predictability (true for Schedule (as in the next column) and RPL, but not for FPL where the only "buffer" could be to put the taxi out and the longest SID and STAR.)*	– Cause of flight extension per each flight that has suffered flight extension – Number of FIR Flights if: – ((SIBT - SOBT)- (AIBT-AOBT)) / (SIBT - SOBT) <% (Scheduled Blk2Blk-Actual BLK2Blk)/ (SIBT - SOBT) <%
	Average block to block time extension of the flights with time longer than planned, as the sum (Extended EETs- Initial EETs) divided by the number of Extended EETs	– Cause (s) of flight extension and flight affected – Average of ((SIBT - SOBT)- (EIBT-EOBT)) if: ((SIBT - SOBT)- (EIBT-EOBT))/ (SIBT - SOBT) > %

Table 23: Network Post-Operations KPIs / Fuel Efficiency Indicators

2091

Punctuality Focus Area

Lower Level Focus Area	Description	KPI Algorithm
Network Delays	Number of delayed scheduled flights greater than a given parameter (e.g. 15 minutes, 30 minutes) Average delay of delayed scheduled flights (departing not as planned) beyond a predetermined threshold. Percentage of departure delayed flight greater than a time parameter over total number of departures Delay per delayed departure. Average departure delay of delayed flights - En-Route Delays	– Number of FIR Flights AOBT-SOBT> (T) – Σ (AOBT-SOBT> (T)) /Nº delayed FIR Flights – Cause of Delay – Flights delayed per cause of Delay. – % of Departures ((AOBT-EOBT) ≥ T) / Total departures o Per ACC / FIR / Major Airport – if (AOBT-EOBT) ≥ T min); Σ (AOBT-EOBT) (min) / delayed departures o Per ACC / FIR / Major Airport – Flight profile deviations impacting flight efficiency (extra fuel burn) – Flight profile deviation impacting Punctuality (delays) Other Causes of delays - Regulations - Special Event - ATC Routeings - ATC Staffing - ATC Equipment Weather
ATFM Delays due to ATFM Regulations	Total number of ATFM regulations in the day Total Flights affected by regulations during the day Ratio of Number of delayed flights due to each ATFM Regulations / Number of flights affected by the regulation	– Number of ATFM regulations published by the NMOC – Total flights affected by Regulations along the day: o Percentage of flights with ZERO, 5 minutes,10 minutes and over 10 minutes of ATFM delay – Number FIR Flights CTOT - ETOT > (T))/ Number FIR Flights affected by the regulation (with an ATFM slot)
	Average Network ATFM Delay decomposed by ACC/FIR due to Airspace Regulations %delay Contribution of each ACC to Total Network delay Average Network ATFM Delay of regulated delayed flights due to Airspace	– Minutes of ATFM delay due to regulations, Σ (CTOT - ETOT) (min) / all regulated flights within each ACC/FIR – %Σ (CTOT - ETOT) (min) (ACC/FIR)/ Σ (CTOT - ETOT) (min) (all flights) – Σ (CTOT - ETOT)>T (0;5;10: over 10 min)/ Number FIR Flights whose ATFM delay >T

Lower Level Focus Area	Description	KPI Algorithm
	Average Network ATFM Delay due to Airport Regulations per Major Airport (Hub) / per hour (shown in a 20 minutes rolling hour) Total ATFM delay due to Major (HUB) Airports %delay Contribution of Each Major Airport to Total Network delay	– Hourly Minutes of ATFM delay due to Airport arrival regulations, Σ (CTOT - ETOT) (min) /Major Airport in a rolling 20 minutes hour – Σ (CTOT - ETOT) (min) from all Major (HUB) Airports – %Σ (CTOT - ETOT) (min) from all Major (HUB) Airports / Σ (CTOT - ETOT)
ATFM Delays due to STAM Measures	Average Network ATFM Delay due to STAM Measures Average Delay of Selected aircraft for STAM	- Percentage of DCB imbalance declared as Hot Spot - Causes of Hot Spots - Nb of Hot Spot solved by Flow Measures - Nb of Hot Spot solved by Cherry Picking Measures – Entry counts to Hotspot – Occupancy counts at Hotspot – Minutes of ATFM delay per flight due to STAM Σ (CTOT - ETOT) (min) / all flights – Minutes of ATFM delay per flight due to STAM Σ (CTOT - ETOT) (min) / Selected flights
ATC Delays	Average Holding Delays at Key Approach Sectors	– Σ Holding minutes / number of flights / Approach sector to Major Airport
	ATC pre-departure delay n Major Airports	– Number FIR Flights with TSAT - TOBT > (T) Σ TSAT-TOBT / Number of affected flights / Major Airport
Arrival Delays	Arrival delays greater than a time parameter per Major (HUB) Airport in a 20 minutes rolling hour Average arrival delay per delayed arrivals per Major (HUB) Airport	Σ (AIBT-EIBT) ≥ T / 20 min. rolling hour if (AIBT-EIBT) ≥ T min); Σ (AIBT-EIOBT) (min) / delayed arrivals Number of airports and list of airports with a certain arrival delay
Arrival Punctuality	% Arrivals delayed less than a time parameter per Major (HUB) Airport using SIBT reference % Arrivals delayed less than a time parameter per Major (HUB) Airport using EIBT reference (calculated from arrival FPL)	Arrival Punctuality Index= (%) (AIBT-SIBT)<T (3; 5; 10 minutes) Arrival Punctuality Index= (%) (AIBT-EIBT)<T (3; 5; 10 minutes) Number of airports and list of airports with a certain arrival punctuality index.
Departure Punctuality	% flights departing" In Time". % of flights departing within a TOBT window (e.g. +5 min.). Departure delay greater than a time parameter per Major (HUB) Airport in a 20 minutes rolling hour Delay per delayed departure. Average departure delay per delayed flight per Major (HUB) Airport	Categorization of Airport Delays – Flights Delayed by more than 30Min – Delay by Accident/ Incident. – Delay by ATC Capacity. – Delay by De-icing. – Delay by Aerodrome Capacity

Lower Level Focus Area	Description	KPI Algorithm
		Weather Departure Punctuality Index= (%) (AOBT-TOBT) <T (e.g. +5 min.). Departures ((AOBT-EOBT) ≥ T) / 20 min. rolling hour if (AOBT-EOBT) ≥ T min); Σ (AOBT-EOBT) (min) / delayed departure Number of airports and list of airports with a certain departure punctuality index s
Weather Delays	Average Network Weather Delays	Cause of weather delay: Σ ATOT - ETOT (min) (Weather reasons) / all flights
Impact of ARES dimension and shape	Provide an indication of how closely the allocated ARES conforms the optimum airspace dimensions for training	Optimum ARES dimensions vs. allocated ARES dimensions (OvsA)
Impact of ARES location	Provide an indication of whether military are using ARES within an acceptable distance of their base, considering also that activities may actually be conducted during the transit to/from ARES, leading by nature to non-optimal flight/mission profiles.	Total segregated training vs. total airborne time Average synthetic transit time to/from airbase associated ARES Training time in non-segregated vs. any airspace
Segregated Airspace Utilisation	Capacity allocated - Provide an indication of the segregated airspace allocated for training in relation to the amount of airspace requested. Capacity used - provide an indication of actual utilisation of segregated airspace in relation to the amount of airspace allocated	Total Allocated Segregated Volume x Time Allocated (min) / Total Requested Segregated Volume x Time Requested (min) Total Used Segregated Volume x Time Used (min) /Total Allocated Segregated Volume x Time Allocated (min)
Booking Efficiency	Provide an indication of the actual airspace usage, compared with that booked by operators and a measure of the degree of over - or under-booking of airspace by planners	Time Used (min) / Time Requested (min)
FIR/ UIR capacity	Provides an indication of the actual utilisation of FIR/UIR airspace for military training	FIR/UIR lateral airspace volume capacity' KPIs (pFUs) FIR/UIR vertical airspace volume capacity' KPIs (PFUa)

2092 Table 24: Network Post-Operations KPIs / Temporal Efficiency Indicators

2093 # Predictability Focus Area

Lower Level Focus Area	Description	KPI Algorithm
On-Time Arrival Variability	Standard Deviation of arrivals from their SIBT per Major airport (SIBT adherence) Standard Deviations of arrivals from their EIBT per Major Airport (EIBT (from FPL) adherence) Early arrivals. % of arrival delayed (AIBT-EIBT) <T per Major Airport	– Arrival Variability using Scheduled Times as reference – Arrival Variability using EPL Time estimates as reference – Arrivals ((AIBT-EIBT) ≤ -T (e.g. 5min) / Total arrivals – Number of airports and list of airports with early arrivals
On-Time Departure Variability	Standard Deviation of arrivals from their SOBT per Major airport Standard Deviations of arrivals from their EOBT per Major airport	– Variability using Scheduled Times as reference – Variability using EPL Time estimates as reference – List and Number of Airports with Standard departure deviation greater than T min.
Knock-on Effect	Average Reactionary Delay at Major Airports	– Σ departure delays with IATA reactionary delay codes (91-96) / all outbound flights – Number of airports and list of airports with reactionary delays.
On-Line Arrival Variability Monitoring	Graphic Display focused on comparing real arrival times versus planned arrival times from selected Airports (one or multiple)	Take off variability versus arrival variability – For Regulated flights: o (ATOT-CTOT)versus (ATA-CTA) – For Non Regulated flights: – (ATOT-ETOT) versus (ATA-ETA)
Traffic Volume Demand Predictability	For a selected Traffic Volume • Traffic Volume demand predictability • Traffic Volume crossing time predictability	– Traffic Volume Planned Entry / Occupancy counts versus actual recorded Entry / Occupancy counts – Traffic Volume Planned Crossing Time versus actual recorded Crossing Time

2094 Table 25: Network Post-Operations KPIs / Predictability Indicators

2095 ## Flexibility Focus Area

Selected Main Focus Area	Lower Level Focus Area	Description	KPI Algorithm
Business Trajectory Flexibility	Airspace Flexibility	Number of AU Change Requests accepted / IFR flights requesting a trajectory change	% of accepted requests
	Airport Flexibility	Number of scheduled flights with departure time as requested (after change request) Average delay of delayed scheduled flights (after change request)	– Nª accepted CRs per Major Airport – Σ (AOBT- EOBT)/ Nº CRs per Major Airport – Number of airports and list of airports where CR were accepted

2096 Table 26: Network Post-Operations KPIs / Flexibility Indicators

2097

2098 ## Environmental Sustainability Focus Area

Selected Main Focus Area	Lower Level Focus Area	Description	KPI Algorithm
Atmospheric Impacts	N/A	Total block to block time extension of the flights with time longer than planned translated into fuel consumption and CO2 emission.	Σ (Extended EETs- Initial EETs) per ACC / FIR

2099 Table 27: Network Post-Operations KPIs / Environmental Sustainability Indicators

3.3 Differences between new and previous Operating Methods

The main differences are summarised in the table below.

Area of improvement	Previous Operating Methods	New Operating Methods
Coordinated performance management	No clear shared information on the Network performance targets and their potential implications for the ATM actors. No clear shared information of the overall network performance and the main factors influencing it. No clear common understanding of the impact of individual stakeholders' actions on network performance. Coordination between stakeholders is carried out on a procedural basis and there are no tools that support for example the identification of airspaces/ACCs with available capacity to help off-load overloaded airspaces/ACCs and minimise the overall impact of an ATFCM measure.	In SESAR Step 1, the NOP provides increased visibility of network performance to support moving to Performance driven operations by: • sharing live and post OPS figures for an initial set of key performance indicators (delays, adherence, predictability…). • assisting the network monitoring in multiple phases (pre-tactical, tactical and post-ops). • allowing an initial performance analysis at short-term planning timeframe for understanding a decision making process based on performance. When achieving completely the new concept: • The NOP provides the Performance Targets, which is the reference point for the Network and all ATM Actors. • The NOP further provides projections of the expected performance taking account of the expected operational context and potential and agreed solutions. • The NOP allows the complete performance analysis of the planning process, through the delivery of key performance indicators after the execution of what-if and simulation activities, showing the potential trade-offs needed to execute a decision making process based on network performance • The NOP may be used for measuring the contribution of Network Management Activities to the performance of the Network (e.g. reconciling and improving individual targets). The ATM actors may also report on their own factors in order to allow the Network Manager Function to identify how the Network Management activities impact on local performance.

Area of improvement	Previous Operating Methods	New Operating Methods
Integrated planning	A great amount of information is captured in an isolated way and incorporated into a consolidated planning process. This is made available to ATM stakeholders in a European Network Operations Plan document. There is little follow-up of the correlation between the different stakeholders' plans (long term and short term) and the published European Network Operations Plan document. ANSPs, military, airports have individual plans that may not be consistent.	In the long term, the Network Operations Plan resulting from Network planning is central to European Regional Network Monitoring Management function. European Regional Network planning is carried out in a collaborative decision making environment, taking into consideration Sub-Regional and Local operational stakeholders' plans and it is based on common understanding and an equal acceptance of all stakeholders. In SESAR Step 1, the Collaborative NOP provides an initial integration of weather information in the network to support the elaboration of the network plan. This integration provides support to improved NM supervision and monitoring role in scenarios where measures are created and significant weather forecast impact is detected. Weather information and its likely impact is progressively considered and integrated into a single shared rolling plan widely accessible. . Another example in step 1 supporting the integrated planning is the new B2B services created for local tools to integrate with network supporting the STAM process including the CDM between local actors and Network. When achieving completely the new concept, Sub-Regional and Local operational stakeholders' plans are integrated into a single collaborative rolling plan widely accessible.

Area of improvement	Previous Operating Methods	New Operating Methods
Airports in the network	There is very few Airport Operator resources planning information shared in the NOP. What is available is shared with insufficient harmonisation of the data and processes involved. There is a gap between the resources plan shared and the actual timely evolution of the plan with insufficient update of the Airport Operator resources plan and the potential implications for the Network. Limitations in the airports are not consistently shared and therefore not known in advance with enough accuracy, thus making necessary to apply ATFCM measures on very short notice. An additional specific problem is the recovery from unexpected situations at airports. A need for recovery in one can result in an uncoordinated bunch of traffic in another affecting enroute and network performance.	The AOP-NOP Integration in SESAR step 1 mainly focuses on the departure and arrival planning exchange of data from pre-tactical to execution. This represents a significant step in the integration of Airport and Network. In particular, runway configuration plans, extended DPI, API and airport Capacity Plan are timely shared. The rolling exchange of API, DPI and ELDT in an extended horizon also makes possible the Multi airport integration planning. The early and more accurate knowledge of the landing times (ELDT) provided by NOP for the inbound legs, permits the AOP to provide earlier and more accurately departure times (TTOTs) for the outbound legs. Multi-airport Integration significantly increases predictability for the airport and for the network. Event information and its impact in airport resources are not yet exchanged in a full timely manner. Similarly slot and airport schedules are shared but updates are not shared in a timely manner as a comprehensive integration of AOP-NOP is not fully achieved in step 1. NOP and various AOPs are progressively integrated in Step 1. Integration of more AOPs as well as improvements in terms of data exchanges, as just explained, are expected to continue in next SESAR phase taking the concept to its full potential.

Area of improvement	Previous Operating Methods	New Operating Methods
ATM network situation awareness	There is incomplete shared situational awareness of what is expected to happen in European ATM both at local and network levels.	A seamless progressive picture of European ATM Network is provided from long term planning to post ops. Enrich common situation awareness is ensured both at local and Network level, in nominal (normal) and adverse conditions, through the extension of B2B services. In SESAR Step 1, new data is exchanged allowing an enhanced situation awareness, for example, by getting the airspace user preferences via UDPP, accessing AOP data via AOP-NOP Integration, using shared target times for operations, allowing real time airspace reservations, including MET data in CDM processes. There is an extended set of B2B services for data integration into local tools, a user driven prioritisation process for increased awareness, use of the 4D profiles and real time airspace reservation The final goal that starts being present in SESAR Step 1 is to move from a passive network situation monitoring to more targeted situation awareness by the delivery of early notifications and alerts in the event of network situation deviations from expected performance to achieve an anticipated and proactive network situation management.
Traceability / follow-up (Post-flight)	There is little communication between actors about the individual actions they have taken following the publication of the European Network Operations Plan document. There is incomplete recording of the actions taken by ATM stakeholders and their impact on network performance. There is an incomplete recording and sharing of the Network situation and performance after the day of operation, and no clear indication of causes. Due to the lack of information, it is impossible to replay a past situation for continuous improvement by assessing potential different actions.	In SESAR Step 1, there is an increase recording of data to support the calculation of performance indicators at post-flight and post-OPS level. The goal is to have a better knowledge of which action has been taken by which actor and the effect it has on network performance. Actions and consequences are recorded and available after operations for continuous improvement. This information is used to support Post OPS Analyses. Post OPS Analyses data is essential as it enables the identification of areas where processes and initiatives have been applied in the past and to what extent they were successful. Post OPS analysis data also serves as the basis for building knowledge on the Network behaviour following certain events and actions and to ultimately support the development of intelligence that could anticipate to provide the best possible solutions for operations and network performance.

Area of improvement	Previous Operating Methods	New Operating Methods
Rolling NOP	There is very limited correlation between the Network Operations Plan (long term), the short term plans and the execution of the plan. There is very little automation and/or system support for this correlation. The execution and most up-to-date demand data (i.e. taking into account DPIs 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 demand figures change with every minute. In addition, the originally planned capacity may shift for various reasons, e.g. due to adverse weather conditions or short-term operational anomalies having an impact on capacity. However, the NOP is not recalculated or updated accordingly.	Step 1 shows an initial move to a dynamic rolling picture drawing on the latest available information shared in the system including weather and airport information. All ATM actors, via the appropriate data exchange and applications (including local tools), have an enhanced picture and visibility of the forecasted demand and capacity and also of the actual demand and capacity situations, the agreements reached and measures implemented. All ATM actors, via the appropriate data exchanges and applications, also have a more accurate picture and improved visibility of the potential events (e.g. significant weather, or punctual shape changes in demand or capacity), They share the actions agreed closer to the aircraft getting airborne. The goal is to have all relevant ATM actors participating in the CDM decisions needed to agree upon the NOP and its updates via the appropriate initial applications for achieving the best possible network performance.
Shared impact assessments	As there is poor common situation awareness at a local level of the Network demand (and more generally, the network situation), the solution of one problem at local level can create further problems up- or downstream). For example, a level capping or rerouting of flights may cause them to enter into another downstream ACC than originally planned, causing an overload; a reduction of a landing rate at an airport may result in an overload up-stream ACC through queuing up. Furthermore, in case of multiple measures for one flight, these measures can be inconsistent, e.g. a flight is first delayed and then accelerated.	Local impact assessments are an element shared through the initial system supported NOP (digital NOP), and thus are reflected in the ATM network situation also available for the whole ATM actors. Step 1 shows some improvements in the tools to evaluate and share both the network situation and the network impact of ATFCM measures and local actions. For example, extra services for local tools are provided allowing what if simulations for STAM, which help to analyse the impact on the network for potential STAM measures.
Crisis handling	No up-to-date information widely available on weather phenomena of significant network impact or other critical events. There is fragmented and incomplete shared situational awareness of what happens in a crisis situation in the European ATM. There is incomplete set of tools to minimise the network impact of a crisis and to expedite network resilience.	Despite no operational evolutions in Step 1, the measuring and the monitoring of the operational performance is enhanced (real time and post-ops).

Area of improvement	Previous Operating Methods	New Operating Methods
Accessibility	There is a poor set of tools to ensure the accessibility of the NOP by ATM stakeholders and its subsequent consideration in the local and individual processes and decisions.	Step 1 shows some improvements in the tools and data exchange to make NOP more accessible and to facilitate its visibility by ATM stakeholders.
Trust in the plan	Due to the incomplete data, there is a limited trust in forecasted planning information. There is a limited situational awareness on events and their potential impact on the network. There is an incomplete set of planning decisions. It is not possible to trace back the plan to the actual events and the actual reliability of the plan cannot be measured.	In SESAR Step 1, there is an integration of better demand information with Extended Flight Plan (EFPL) where the airspace user provides a detailed trajectory fully adapted to the aircraft characteristic (i.e. aircraft type and performance). However the following trends do not support the increase of the predictability and situation awareness expected from the collaborative NOP: – SBT concept is not embraced in Step 1 by airspace users as they don't believe in a significant benefit of earlier exchange of trajectories and prefer option of using historical data until RBT is exchanged. – RBT published rather late, in the last few hours.

2102 Table 28: Differences between previous and new operating methods

4 Detailed Operational Environment

4.1 Operational Characteristics

The section includes only the aspects relevant for the Collaborative NOP. More detailed information related to operational characteristics can be consulted in the Network Operations DOD Step 1 [6].

The availability of information through time, considering Step 1 improvements, has been summarised in the simplified picture presented in the next page, where the main operational nodes relevant for the Collaborative NOP are represented.

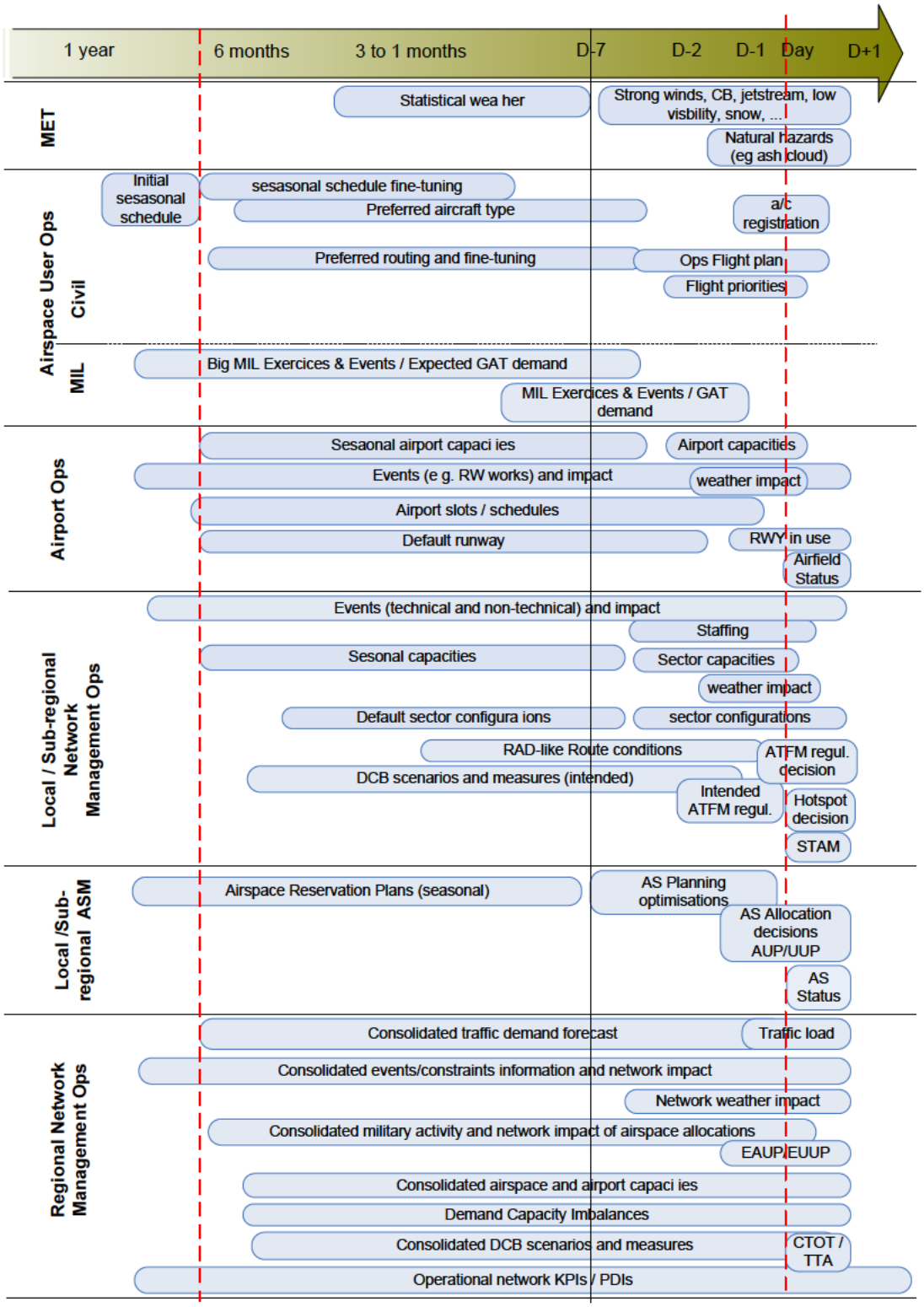


Figure 12: Network Operations Planning Time Line

Note: For Airspace User civil: Except for RPL the OFP/FPL is always calculated with an aircraft registration. OFP is calculated before FPL, and sometimes first FPL is not sent by AU waiting for more up to date weather information, avoiding the management of FPL messages. Same thing with the aircraft type, even if can be changed.

Note: For Airspace User military: real time management of ARES is based on OAT flight plan.

4.2 Roles and Responsibilities

The following descriptions focus on the aspects of the roles which are related to the elaboration, maintenance and monitoring of the NOP.

Role	Summary of responsibility	
Network Management Function-related roles		
Network Manager	General view	Acts as catalyst and facilitator for an efficient overall network management integrating and balancing all ATM stakeholders' needs. 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.
	Steer Network Performance	In coordination with the operational stakeholders, NM develops, maintains and implements the Network Strategy Plan, which covers the area of responsibility of the Network Manager, defines the long term objectives and includes the Network Manager Performance Plan. 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.
	Assess ATM Network Situation	Works towards identifying and mitigating significant DCB issues, which affect the network at a regional level; Monitors the evolution of network performance and provides appropriate alerts and warnings; Monitors alignment / synchronisation between NOP and AOPs; Ensures that any DCB measure is decided considering the global optimum of the network; Provides support for Network crisis management, reacting to unexpected events, which impact on overall network performance.
	Support Collaborative Decision Making	Closely coordinates with all the involved HLAPBs in order to ensure coherency of the European Network operations; Coordinates and provides most optimum solutions at Network level (optimized Airspace Configurations and other DCB solutions if required). Consolidates local DCB solution at regional level and participates to iRBT/RMT revisions Acts as an arbitrator in case mutual agreed decision affecting the network cannot be made in time.

Role	Summary of responsibility	
	Maintain NOP	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 changes to agreed airspace design, organisation and management (and other capabilities) possibly impacting ATM operations is accurately reflected in the NOP as appropriate. Ensures every actor has proper access to the Network view.
	Perform Post-operations analysis	Run post-operations analysis integrating ATM stakeholders' views and provides regular reports on the overall performance of the network and the relation to the expected pan-European operational performance targets.
High Level National / Sub-regional Airspace Policy Body (HL APB)	General view	Has a leading role within the Long term planning Level 1 Cycle activities at national level and at the sub-regional (FAB) level. It is responsible for assuring prerequisites for the most optimum operational Airspace Configuration for the volume (s) of airspace within its responsibility; Closely coordinates with the Network Manager to ensure that national/sub-regional airspace design projects are compatible and consistent with all the plans, in particular with the overall Network Strategy Plan and its implementation through the Network Operations Plan. Assesses the performance of the past season based on the outputs of the regular daily post-ops analysis performed by local ACCs, FAB Centres and Network Manager.
CDM Group for European Network Airspace Organisation and Management	General view	Establishes the different plans described in SES II Regulations package at long-term and operational levels, while applying the airspace design principles. This process starts in the long-term planning phase and continues to be updated at regular intervals, and as soon as an acceptable maturity is reached, the resulting outline of the Airspace Configuration is detailed and published in the NOP. Provides national or sub-regional plan to the Network Manager in order to ensure a coherent integration of agreed airspace design projects in the Network Strategy Plan (NSP) and the Network Operations Plan (NOP).
Airspace Designer	General view	The role is performed at local, sub-regional and regional levels. Establishes airspace structures in order to accommodate the different types of air activity, volume of traffic and differing levels of service in accordance with the airspace policy defined by the HLAPB
Local Capacity Manager	General view	Is based at an operational ATSU focusing on either an ACC or Airfields operation. The LCM is a planning role, which contributes to the long-term capacity planning (for Airspace Organisation and Management and DCB activities). Provides the local information and knowledge base, on which to build the optimised sub-regional capacity plan.
Flow Manager	General view	The role is performed at sub-regional level and contributes to the Network Management function. Generic FAB responsibility for planning activity within the Medium and Short term planning and execution phases.

Role	Summary of responsibility	
	Assess ATM Network Situation	Based on known and forecast Civil/Military demand, attempts to match the capacity of the FAB to that of the demand pattern, and then informs the NM of the intended plan for visibility and Network consistency. Where a purely FAB contained solution is unavailable, Network options are considered in conjunction with the NM Dependent upon the AM's ASM solution, FM Planning may well have to initiate further ATFCM measures to resolve any remaining forecast DCB imbalances. The resulting plan is then coordinated with the Network Manager (NM) for both visibility and, where necessary, to take appropriate actions.
	Support Collaborative Decision Making	Coordinates with appropriate Local Capacity Managers (LCM) during planning phases, ensuring that all opportunities to optimise capacity are fully explored, and limitations within the relevant timeframes are known. Takes part in the execution process in case of unexpected events, which impact the FAB area, such as unusual meteorological conditions or loss of significant assets (e.g. runways, airports).
	Maintain NOP	Updates the NOP information with the ASM/ATFCM plan for the FAB zone, and fine-tunes the information until execution.
	Perform Post-operations analysis	Fulfils post ops analysis process in order to review and assess efficiency of the decisions made in medium-short planning phase and provide input for the next planning cycle. Provides feedback analysis on network performance.
Airspace Manager	General view	The role is part of the Sub-regional function, and may be fulfilled by two actors: the Civil Airspace Manager (CAM) and the Military Airspace Manager (MAM). These actors would then have clear defined roles and areas of authority. The AM function as well as the FM function can only exist at National/Local levels within the FAB.
	Assess ATM Network Situation	Consults the evolution of network performance and receives appropriate alerts and warnings. Manages Airspace Configurations (together with the FM) in CDM mode with NM and Local Traffic Management as appropriate (medium-short term planning).
	Support Collaborative Decision Making	Collates and analyses all airspace requests coming from Trajectories demand (SB/MT) and from "airspace constraint" demand (airspace volumes linked to ground activity as firing, specific protection…etc…) Resolves conflicts through negotiation and coordination, as part of the Network Management Function
	Maintain NOP	Updates the NOP information with decision on Planned Airspace Configuration for the next period (e.g. week, day) and fine-tunes the information until execution.
	Perform Post-operations analysis	Fulfils post ops analysis process in order to review and assess efficiency of the decisions made in medium-short planning phases and provide input for the next planning cycle. Provides feedback analysis on network performance.
Approved Agency	General View	Approved Agencies are units that are authorized by States to deal with Airspace Managers for airspace allocation and utilisation matters. Their responsibilities include the submission of their needs for airspace to the AM and of any update on their request.

Role	Summary of responsibility	
Local Traffic Manager	General view	The Local Traffic Manager (LTM) is role exercised at local level that contributes to the Network management function. The role lies in between the Flow Manager and the extended ATC planning role, taking a view over a group of multi sector areas and/or sectors. Has the leading role in the DCB/dDCB processes in execution phase (and appropriately in the short term planning phase close to execution).
	Assess ATM Network Situation	Monitors the situation at local level and anticipates hotspots and workload issues. .
	Support Collaborative Decision Making	In case of an imbalance, is responsible for declaring the hotspot, identifying the adequate solutions, coordinating and refining with concerned partners using CDM process or UDPP activities if time permits it.
	Maintain NOP	The output of this DCB/dDCB process is a decision on the ATM Network Management, which is integrated into the rolling NOP.
INAP roles	General View	Address the overlapping period between NMF and extended ATC planning. Implement and monitor the execution of agreed dDCB measures taken within its area of responsibility (incl. airspace re-configurations). Perform early conflict detection and resolution (the implementation of the resolution might be shared with the control sector). These are EAP responsibilities (ATCO).
ATC-related roles		
Extended ATC Planner	General View	Have planning responsibilities for a Sector Family. Monitors complexity and workload for the next 15 to 40 minutes approximately.
ATC Planner	General View	Primarily concerned with entry and exit coordination; Boundary problems are resolved by re-coordinating. Planning horizon is about 10 to 15 minutes.
ATC Executive Controller	General View	Is responsible for the safe and expeditious flow of all flights operating within his area of responsibility. His principal tasks are to separate and sequence known flights operating within his area of responsibility and to issue instructions to Flight Crews for conflict resolution and segregated airspace circumnavigation. Additionally, he monitors the trajectory (4D and 3D) of aircraft according to the clearance they have received.
Tower Ground Controller	General View	Is responsible for providing an Air Traffic Service at controlled aerodromes. His main task is the provision of ATS to aircraft and vehicles on the manoeuvring area. He must also ensure that airport maintenance vehicles carrying out necessary improvements on an active manoeuvring area do not interfere with the movement of aircraft. He is assisted by an advanced surface movement guidance and control system (A-SMGCS).
Airspace User-related roles		
Airline Operations Centre (or Flight Operation Centre)	General View	Is an organisational unit of an airline hosting the roles of Flight Dispatcher, Slot Manager, Long term planning and A-CDM Manager thereby managing the operations of the Airline and implementing the flight programme.
Wing Operation Centre	General View	Is a generic designation of a military entity in charge of dispatching and prioritising the flights, developing and planning Mission Trajectories, and managing Flight Data and environmental issue

Role	Summary of responsibility	
Flight Crew	General View	Remains ultimately responsible for the safe and orderly operation of the flight in compliance with the ICAO Rules of the Air, other relevant ICAO and CAA/EASA provisions, and within airline standard operating procedures. It ensures that the aircraft operates in accordance with ATC clearances and with the agreed Trajectory. For military, some additional rules not covered by ICAO may be implemented by the States for State Aircraft.
Airport-related roles		
Airport Operator	General view	The Airport Operator is responsible for the physical conditions on the manoeuvring area, apron and in the environs of the aerodrome. Updates the AOP information regarding possible airport configurations, unforeseen / temporary aerodrome constraints, restrictions regarding aerodrome resources, airport usage and any restriction rule, operational capacity of airport resources, airport resources availability and allocation plan, etc.
Airport Operations Centre (APOC)	General view	An operational management structure that permits relevant airport stakeholders to have a common operational overview and to communicate, coordinate and collaboratively decide on the progress of present and near term airport operations. Ensures liaison between airport operations and Network. The APOC hosts the roles of APOC Supervisor and Airport CDM Project Manager. The APOC supervisor (short term and execution phases) liaises with all APOC participants for the purpose of coordination and arbitration between actors in the management of the Airport Operations Plan (AOP).
APOC Supervisor	General view	The APOC supervisor (short term and execution phases) liaises with all APOC participants for the purpose of coordination and arbitration between actors in the management of the Airport Operations Plan (AOP). He acts as a final decision maker in case of issues for which no consensus has been reached. The following roles and responsibilities are identified: Updates the AOP with information within the AOP sphere of responsibility.
Airport Slot Coordinator	General view	Prepares the allocation of airport slots to Aircraft Operators wanting to operate from/to a fully coordinated airport on a seasonal basis (long-term Planning phase), facilitate the operations of Aircraft Operators at schedule facilitated airports, and monitor the use of airport slots and adherence of Aircraft Operators to allocated schedules.
Others		
MET Service Provider	General View	An organization designated to provide MET services supporting international air navigation As far as network management operations are concerned, provides updated weather observations and forecasts (incl. now cast) information as required for the Network View.

4.3 Constraints

- An initial SWIM Technical Infrastructure is required to support the collaborative workflows (incl. NM, airspace users, ANSPs, airport operators, AMCs) and underlying NOP services where needed.

- The NOP data shall have agreed common / harmonised description (logical part in the AIRM, physical part in exchange models such as AIXM, FIXM, WXXM, etc.).
- The Step 1 Airspace Data, Demand Data and Flight Data are needed to support NOP activities and are not expanded in SESAR Step 1.
- NOP interfaces (e.g. NM portal, B2B services) shall be made available to all stakeholders involved in network planning.

4.3.1 Security

The DOD is mentioning 3 different requirements concerning the security aspects of the Network Operations, all of them based on the Security policy defined by 16.6.02:

- Security - collaborative support: Network Operations shall enable collaborative support.
- Security - resilience and self-protection: Network Operations shall ensure resilience of the Network Operations performance targets.
- Security - transition to implementation: Network Operations shall ensure that the transition to deployment and operational use is secure.

The 16.2.5 project is addressing the security aspects and provides guidance material via the Minimum Set of Security Controls (MSSC), mentioned as being mandatory for every SESAR OFA and projects (see ref [25]).

The following sub-chapters are describing the controls (from the MSSC) that are implemented in the P07.06.01 Project.

The overall security goals and objectives for the P07.06.01 are that all the NOP data and services shall be accessed, exchanges securely, modification of the data being logged, using efficient tools.

As an example, see below the general requirements related to security for network functions specified in Commission Regulation no 677/2011, Annex VI, paragraph 3 that applied to NM:

(1) The Network Manager shall have a security management system that covers the entire network functions it performs according to the following principles:

a) *ensure the security of its facilities and personnel so as to prevent an unlawful interference that could impact the safety of the network functions it manages*

b) *ensure the security of operational data it receives or produces or otherwise employs, so that access to it is restricted only to those authorised*

c) *define the procedures relating to security risk assessment and mitigation, security monitoring and improvement, security reviews and lesson dissemination*

d) *define the means designed to detect security breaches and to alert personnel with appropriate security warnings*

e) *define the means of containing the effects of security breaches and to identify recovery action and mitigation procedures to prevent reoccurrence*

4.3.1.1 Organization of Information Security

Security of the NOP is addressed in P07.06.01 via the definition of non-functional requirement and the definition of the roles and responsibility for NOP data and services all along their life cycle.

For each NOP data, the responsibility is documented in EATMA when updating the related data exchanges, and illustrated via scenario and use cases, for each service, the security is based on the effective implementation of the recommendations covered via the non-functional requirements.

The organisation of security in NM is used as an example to illustrate how could be addressed the different aspect of security concerning the NOP data and services.

The NOP activities being under the responsibility of the Network Manager are covered, for the security aspect, by 2 main elements: practices and procedures describes into the "*Security Management Manual*" (see [28]) and a NM security officer. His role includes:

- the support of the implementation of the Information Security Policies (ISP) necessary to ensure the security of Operations, IT and information network functions regarding availability, integrity and confidentiality
- to coordinate, organize and support the definition, deployment, operation and evolutions of the Security Management System (ISMS, which includes all aspects of IT, information and physical security) of the Network Manager Directorate and ensure its continuous compliance with the applicable EC regulatory requirements and international Standards, to maintain compliance to Security standards by fostering continuous improvement

4.3.1.2 Asset Management

The MSSC requires that *"All assets shall be clearly identified and an inventory of all important assets drawn up and maintained"*

Concerning the NOP, the different assets are described and named where they are used/defined, into the project's OFA/OSED documents (being primary project in (see Table 1) or in the P07.06.01 project). The P07.06.01 is helping in using a common naming all over the different projects, thanks to its transversal view and associated cross document review.

Each service and data ownership is described as explained above at the beginning of chapter 4.3.1.1 (for NOP data, responsibility documented in Appendix A and Appendix B, illustrated via scenario and use cases. For service, security based on implementation of non-functional requirements).

The rules for the acceptable use of assets shall be identified, documented, and implemented.

For example, NM is documenting and classifying the intangible functions, services, processes and information in term of criticality, sensitivity (requiring specific rights or not), resource impact (heavy or light). The legal aspect is also addressed at the beginning of the development life cycle (see the CBA template ref [30]).

Concerning the supporting assets (tangible entities such as equipment, software data, policies, procedure, staff or management systems), their value, legal requirements, sensitivity and criticality have also been documented all along the development life cycle. The management of equipment and software configuration process is fulfilling the CMMI and ITIL requirements (documented into the iMS, see [29]), including policies and procedures. This integrated Management System is ISO9001 certified.

⇨ Related requirement: REQ-07.06.01-OSED-NFR1.0010
Requirement title: Security - NOP Assets identification, inventory and classification.

4.3.1.3 Human Resources Security

For all the people dealing with the NOP data and/or services, procedures and process shall be put in place in order to ensure personnel Security. It includes for the concerned people:

- Having passed a pre-employment screening,
- Be properly briefed with awareness training and regular updates of the organisational security policies and procedures relevant for their job function,
- To adhere to the established security policies.

Pre-employment screening is the foundation of good personnel security. It seeks to verify the credentials of those you are seeking to grant access to NOP information, and to check that they meet preconditions of employment. Example of area that could be covered:

- involvement in illegal activities

- unspent criminal convictions relevant to the role, particularly if not volunteered by the applicant and only revealed by other checks
- false or unsubstantiated claims on the CV or application form
- unsubstantiated qualifications
- unexplained gaps in employment history
- adverse references
- questionable documentation e.g. lack of supporting paperwork or concern that documents are not genuine
- evasiveness or unwillingness to provide information on the part of the candidate

As an example, the NM recruitment process (based on EUROCONTROL corporate service and describes in the "*Network Manager Directorate – Security Management Manual*", see ref [28], chapter "*Assuring Personnel Security*") includes measures allowing to assess the loyalty, trustworthiness, and reliability of individual and for granting access to systems which contain NOP information and services where inappropriate user actions may result in a security impact.

Background verification checks on staff shall be performed:

- In accordance with relevant laws, regulation, and ethics
- be proportional to the roles and responsibilities, in particular in respect to the business requirements (e.g. safety-critical function, developments), the classification of information to be accessed, and the perceived risks
- take into account privacy, protection of personal data and/or employment based legislation

The level of verification checks (and re-screening) should be based on the role and responsibility of the staff and could, for instance, require a full background investigation in the case of an individual working with sensitive information.

⇨ Related requirement: REQ-07.06.01-OSED-NFR1.0020
Requirement title: Security – Ensure NOP human resource security

4.3.1.4 Physical and Environmental Security

In order to ensure the physical security of the systems and installations implied in delivering NOP data and services, standards have to be set so that any unauthorized access are prevented or, if not prevented, are promptly detected and notified, and that all the authorized accesses are correctly tracked (log). Security perimeters shall be built in order to limit the chance of damage, interference and unauthorized access.

The NOP (physical) systems shall be covered by a Security perimeter to protect the NOP sensitive areas and processing facilities. The associated areas (building, premises…) shall be securely protected by appropriate entry controls which allow access only to authorized personnel and which detect unauthorized access.

In the case of NM, measures are described (see chapter 4 of "*Security Management Manual*", ref [28]) to ensure adequate supervision of the environment under the managerial responsibility of the NM in order to ensure that any threat is quickly identified and managed in a suitable manner and to limit access to areas in which these functions are performed only to those authorised. It relies on the EUROCONTROL Agency operation of a Physical Security Plan (PSP). This includes:

- Day-to-day security provided under contract by an external company,
- Set out the responsibilities of staff and actions to be taken in specific circumstances in various documents and office notes,
- The application of the 'Defence in Depth' principle, which ensures that assets assessed as critical to the business received additional access restrictions by physical and electronic means,
- Buildings access controlled by a chip-based digital access badge which also prevents unauthorised access to specific areas,
- Intrusion detection within the building (CCTV camera surveillance of access areas) and outside the building,

- access controlled by a manned security gate at the main entrance to the site,
- procedures for securing facilities in the event of fire and/or evacuation of the building,
- Regular comprehensive reports of physical security activities and events
- Contingency arrangements for certain network functions on a different site.

⇨ Related requirement: REQ-07.06.01-OSED-NFR1.0030
Requirement title: Security – Physical and Environmental Security

4.3.1.5 Communications and Operations Management

The NOP data and services are accessed and transferred over wide area networks (Internet and others like AFTN, SITA). They are encrypted at transport layer level (based on HTTPS for B2B services) end to end; client credentials shall only be sent via an encrypted session.

⇨ Related requirement: REQ-07.06.01-OSED-NFR1.0040
Requirement title: Security – Transfer over data network

NOP operational systems and application software should be subject to strict change management control (Acceptance criteria to be established, suitable security tests carried out during development and acceptance, changes to the information system and service are analysed for potential security impacts prior to implementation).

⇨ Related requirement: REQ-07.06.01-OSED-NFR1.0045
Requirement title: Security – Change management control

The NM development processes covers already all this needs. See iMS, ref [29] and associated ISO9001 certification. It includes proper Back-up and restore capabilities,

Detection, prevention, and recovery controls shall be in place to protect NOP software against malicious code and appropriate user awareness procedures shall be implemented (malicious code detection and repair software, security awareness, appropriate system access and change management controls and integrity verification tools to detect unauthorized changes to NOP software).

⇨ Related requirement: REQ-07.06.01-OSED-NFR1.0050
Requirement title: Security – Protection against malicious code

The NOP services shall be protected against or limit the effects of denial of service attacks.

⇨ Covered in requirement: REQ-07.06.01-OSED-NFR1.0004
Requirement title: NOP Data access - Service level and availability

Traceability (authentication of the origin) of NOP data shall be ensured for critical information.

⇨ Related requirement: REQ-07.06.01-OSED-NFR1.0055
Requirement title: Security – NOP critical data traceability

The management of the NOP related documentation shall be done securely to avoid unauthorized access.

Formal exchange agreements shall be established for the exchange of NOP services, information and software. In NM, the signature of such service agreement or letter of agreement (customer profile dependent), is required before granting access to any user.

⇨ Related requirement: REQ-07.06.01-OSED-GEN1.0060
Requirement title: NOP User eligibility and service agreement

Procedures for monitoring the access to NOP Services and their usage (system load per service, usage per user) shall be put in place and the results of the monitoring activities reviewed regularly (a reporting facility shall be provided).

⇨ Related requirement: REQ-07.06.01-OSED-NFR1.0055
Requirement title: Security – NOP critical data traceability

NOP logging facilities and log information shall be protected against tampering and unauthorized access.

⇨ Covered in requirement: REQ-07.06.01-OSED-GEN1.0060
Requirement title: NOP User eligibility and service agreement

Faults shall be logged, analysed, and appropriate action taken:

- Faults reported by users or by system programs related to problems with NOP information processing or NOP communications systems should be logged.
- Clear rules shall be put in place for handling reported faults including a review of fault logs to ensure that faults have been satisfactorily resolved.

⇨ Related requirement: REQ-07.06.01-OSED-GEN1.0070
Requirement title: Security – NOP faults treatment

4.3.1.6 Access Control

The access to the NOP services, information, information processing facilities, and business processes is controlled. Security controls are implemented before granting access to the data and services.

As an example, the NM operating method before granting access to a customer is based on:

- a specific processing of customer requesting access to NOP data and/or services (see The NM Service catalogue [27] for details), which represents the implementation of the access control policy
- the signature of a service agreement or letter of agreement (customer profile dependent), before granting access. An example of such service agreement could be found in the NM Service catalogue (see [27])
- The delivery of a secured access material (being a token or a certificate)
- The services usage monitoring and log to detect misuse and to be able to investigate any infringement of agreement or security aspect

The NM Service catalogue (see [27]) states, for NOP service, what accesses are permitted by each customer profile.

The access to sensitive data is restricted to a set of authenticated identified users. The authentication relies on a secure mechanism, i.e. use of a unique digital client certificate issued by a recognised certification authority. In this way, the probability of an unauthorized user access that compromises information confidentiality or integrity is minimized, and if it happens, it could be investigated (thanks to the logs).

The access control relies on a central notion of user profile. Each user (or user class in the case of non-authenticated users) is given a profile that defines:

a) Which roles he can play on which domains.
b) What information he can see with a given role in a given domain.
c) What actions he can perform with a given role in a given domain.

⇨ Related requirement: REQ-07.06.01-OSED-GEN1.0075
Requirement title: Security – Access control and Secure access to sensitive data

For more details and an example of implementation into NM systems, please see chapter 8 in the document ref [27].

4.3.1.7 Information Systems Acquisition, Development and Maintenance

All NOP system enhancement proposals shall include security requirements validated by a security risk assessment of the enhanced system. In NM, the CBA (see CBA template ref [30]) includes this mandatory checking for each new or evolving service.

⇨ Covered in requirement: REQ-07.06.01-OSED-NFR1.0045
Requirement title: Security – Change management control

4.3.1.8 Information Security aspects of Business Continuity Management

Measures shall be implemented to prevent single client monopolizing all available server resources and creating deny of service to other clients.

Each user shall have the same priority in term of resources availabilities for the NOP data and services.

⇨ Covered in requirement: REQ-07.06.01-OSED-NFR1.0004
Requirement title: Security – Change management control

4.3.1.9 Compliance

All the NOP systems and applications shall comply with SESAR policies and standards, with law and regulatory requirements concerning the security. Such compliance shall be regularly verified.

Personal information should be protected and handled in accordance with locally applicable laws and regulations.

⇨ Related requirement: REQ-07.06.01-OSED-GEN1.0075
Requirement title: Security – Access control and Secure access to sensitive data

5 Use Cases

This chapter is in two parts:

1) Section 5.1 lists the 7.2. Step 1 DOD Use Cases from

Medium and Short term Planning	UC-NP-39 Airport Traffic Demand Exchange	4.2.2.2
Short-term Planning/Execution	UC-NE-02 Notify TTA in addition to CTOT	4.2.2.2, 4.2.3.2

2) Table 5 where the NOP shall be used. Table 29 is to help customer OFAs to refine their use cases up to the point where actions on the NOP are explicitly addressed in their requirements.

3) Section 5.1.1 provides these UCs into a concrete operational context in order to illustrate the use of the NOP in various situations. Again, the objective is to support the other OFA/projects in the development of NOP end-to-end validation scenarios.

5.1 NOP-related Use Cases

The table outlines, for each Step 1 DOD Use Case, the involved NOP procedures. The UCs shown in bold are those referred to in the NOP scenarios described in section 5.1.1.

Use Case	OFA	NOP procedure
UC-NL-03 Provide large National or Multinational Exercises Plans	OFA05.03.01 Airspace Management and AFUA	The Military authorities involve in the process query the relevant information from the NOP. At the end of this process, they publish the large multinational Plans and subsequent updates in the NOP. The plans (and updates) are available to the relevant NOP users
UC-NL-04 Elaborate Airspace Demand Forecast	OFA05.03.01 Airspace Management and AFUA	The Network Manager queries information from the NOP to analyse the long-term airspace demand (e.g. military airspace requirements or cross-border areas). At the end of the process, the Network Manager publishes the related Airspace Demand Forecast in the NOP.
UC-NP-02 Update iSBT/SMT	OFA03.01.04 Business and Mission trajectory	Airspace users publish in the NOP the subsequent updates to their flight intentions (GAT), with additional details increasing accuracy of planned trajectory.
UC-NP-07 Submission of Airspace Reservation requests	OFA05.03.01 Airspace Management and AFUA	Military airspace users publish the exercise schedules in the NOP.
UC-NP-10 Enrich Historical Demand Forecast with incoming Flight intentions	OFA05.03.04 Enhanced ATFCM processes	The Network Manager consults information from the NOP (incl. past traffic Demand information, flight intentions) to enhance its forecast of the traffic demand throughout the Medium and Short term planning phases.
UC-NP-11 Assess Predictability and Uncertainty of Demand Forecast	OFA05.03.04 Enhanced ATFCM processes	Throughout the demand forecasting process, an assessment of its predictability is performed by the Network Manager. At the end of the process, the assessment is published in the NOP as a value attached to

Use Case	OFA	NOP procedure
		the demand forecast.
UC-NP-12 Publish / Share Demand Forecast	OFA05.03.04 Enhanced ATFCM processes	The Network Manager publishes the traffic forecast updates in the NOP.
UC-NP-13 Assess Complexity and Sector Workload	OFA05.03.04 Enhanced ATFCM processes	The local capacity managers publish in the NOP their assessment of complexity and sector workload (complexity indicators).
UC-NP-14 Define / Update Sector / Airport Capacities	OFA05.03.04 Enhanced ATFCM processes & OFA05.01.01 Airport Operations Management	The Local Capacity Managers (ANSPs and Airports) publish sector and airport capacities in the NOP during the medium term planning, providing clear description of the up-to-date available capacities for a given time period. This information is supporting stakeholders in the development of medium-term plans, in particular Demand Capacity Balancing.
UC-NP-15 Capture and Maintain Capacity Data	OFA05.03.04 Enhanced ATFCM processes	The Network Manager captures, maintains, and makes accessible on a need-to-know basis, the sector capacities using the NOP.
UC-NP-17 Monitor Declared Capacity Values	OFA05.03.04 Enhanced ATFCM processes	The NM monitoring function monitor the declared capacity values available from the NOP against the actual traffic flow and complexity values.
UC-NP-18 Capture and Analyse Airspace Organisation Data	OFA05.03.01 Airspace Management and AFUA	The Network Manager develops Airspace Configurations (former ASM/ATFCM/ATS scenarios) for anticipated imbalances in cooperation with local and sub-regional joint civil-military function (Sub-Regional Network Managers, Local Traffic Managers, Airspace Managers, Multi-sector Planners) and Airspace Users. Agreed Airspace Configurations are published in the NOP.
UC-NP-19 Identify the Optimum Airspace Configuration		
UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase	OFA05.03.04 Enhanced ATFCM processes	
UC-NP-21 Collaboratively Agree and Implement Airspace Configuration	OFA05.03.01 Airspace Management and AFUA	Bottlenecks detected by the system are recorded in the NOP.
UC-NP-22 Analyse and Prepare DCB/dDCB Measures	OFA05.03.04 Enhanced ATFCM processes	The measures prepared in advance by Local Traffic Managers, Flow Managers, APOCs (facilitated by the Network Manager as needed) are published in the NOP.
UC-NP-23 Prepare and Coordinate DCB Measures using TTA		DCB measures using TTA are collaboratively prepared by stakeholders together with arrival airport using DCB information available from the NOP.
UC-NP-24 Monitor the Network Effect		Flow Manager and Network Manager analyses during Post-flight phase the effectiveness of STAM measures using dDCB information available in the NOP, and integrate lessons learnt into the NOP.
UC-NP-25 Publish and Update Airspace Configuration	OFA05.03.01 Airspace Management and AFUA	CDM partners publish agreed airspace configurations in the NOP, as well as subsequent updates as a result of CDM process.
UC-NP-30 Provide Special Event	OFA05.03.07 Network Operations Planning	The use case describes the AOP to NOP exchange of information related to

Use Case	OFA	NOP procedure
Information and Impact		special events affecting significantly demand and/or capacity with the NOP.
UC-NP-31 Provide Network Weather Information and Impact	OFA05.03.07 Network Operations Planning	The use case describes exchange of information related to significant weather and its potential impact and management actions with the NOP.
UC-NP-32 Exchange Updated Airport Capacity Plan with no demand capacity imbalances detected	OFA05.03.07 Network Operations Planning	The use case describes the exchange of update information related to the Airport Capacity and Event Plan as contained in the AOP.
UC-NP-33 Managing unplanned reduction in Airport Capacity	OFA05.03.07 Network Operations Planning	The use case describes the process for managing an unplanned reduction in airport capacity that manifests on the day of operation where the resulting AOP and NOP assessment has determined a significant forecasted demand/capacity imbalance (large impact and high probability).
UC-NP-34 Manage unplanned increase in traffic demand (Business aviation)	OFA05.03.07 Network Operations Planning	The use case describes the process for managing an unplanned increase in traffic demand that manifests on the day of operation when business aviation unexpectedly file flight plans to service their on-demand air transportation services.
UC-NP-35 Airport capacity recovery from a disrupted situation	OFA05.03.07 Network Operations Planning	The use case describes the timely and accurate update of the Airport Capacity and Event Plan and automatic exchange of that information between the AOP and the NOP to assist in a fast and efficient recovery of operations following a period of capacity disruption.
UC-NP-36 Exchange Updated Runway Configuration Plan at D-1	OFA05.03.07 Network Operations Planning	The use case describes the exchange of updated information related to the Runway Configuration Plan as contained in the AOP until D-1, 1500 UTC.
UC-NP-39 Airport Traffic Demand Exchange	OFA05.03.07 Network Operations Planning	This UC deals with the exchange of slots and schedule and later its updates between AOP-NOP. NOP to identify inconsistencies and ambiguities in traffic demand and flows between the AOP's and reported back to the relevant AOP's NOP updates and improves the quality of the Network traffic demand data with this exchange.
UC-NE-01 Monitor the Application of DCB/dDCB measures	OFA05.03.04 Enhanced ATFCM processes / OFA05.03.07 Network Operations Planning	DCB information published in the NOP is used by all actors during Post-Ops phase to analyse the application of DCB/dDCB measures through relevant statistics and performance indicators.
UC-NE-02 Notify TTA in addition to CTOT	OFA05.03.04 Enhanced ATFCM processes	The Network Manager publishes in the NOP the TTA (pre-departure) determined for relevant regulated flights (terminal area). Relevant AU, Flow Managers, Local Traffic Manager and Airport Operations Centres are notified accordingly.

Use Case	OFA	NOP procedure
UC-NE-03 Notify TTO in addition to CTOT		The Network Manager publishes in the NOP the TTO (pre-departure) determined for relevant regulated flights (En-Route airspace). Relevant AU, Flow Managers, Local Traffic Manager and Airport Operations Centres are notified accordingly.
UC-NE-04 Monitor deviation between Agreed and Actual Flight Profile	OFA05.03.07 Network Operations Planning	The NM monitoring function monitors the adherence of trajectories to agreed profiles using information from the NOP.
UC-NE-07 Detection of Demand Capacity Imbalances (Hot Spots)	OFA05.03.04 Enhanced ATFCM processes	Hotspot information is published in the NOP (starting 4 hour before entry).
UC-NE-09Analysis and Preparation of the STAM Solution for Flow Measures	OFA05.03.07 Network Operations Planning	The Local Traffic Manager performs an analysis to determine the nature of the hot spot and identify/prepare a STAM solution for Flow Measures
UC-NE-10 Coordination of the STAM solution	OFA05.03.04 Enhanced ATFCM processes	STAM coordination information is published in the NOP.
UC-NE-11 Implement STAM solution		LTM publishes the STAM solution in the NOP.
UC-NE-12Escalation to Network Manager	OFA05.03.07 Network Operations Planning	The use case describes how and when a DCB measure is escalated to the Network Manager for coordination and arbitration at regional level.
UC-NE-13 Dynamically Updating the NOP	OFA05.03.07 Network Operations Planning	This use case is embedded in all DOD UCs involving updating the NOP.
UC-NE-15 Update Airspace Status in Real Time	OFA05.03.01 Airspace Management and AFUA	The Military may need to change their airspace status e.g. modification of the time of an exercise, opening/closing an area. They use the NOP to assess the impact of their intended change. The update is published in the NOP. All actors concerned are notified of the update.
UC-NE-16 Communicate TTA/TTO Information	OFA05.03.04 Enhanced ATFCM processes	The TTA information is communicated to relevant airspace user, flow managers, local traffic managers and APOCs via the NOP.
UC-NE-18 Provide Critical Event Information and impact		The use case describes how the NOP is used to share information on critical events based on workflow agreed by all concerned actors.
UC-NE-19 Assess Military KPIs Adherence		The use case describes how the NOP is used by Military and NMF during Post-flight phase to review the effectiveness of Civil-Military coordination based on AFUA information, indicators etc. recorded in the NOP.
UC-NE-20 Assess KPIs Adherence	OFA05.03.07 Network Operations Planning	The use case describes the follow-up and monitoring of agreed KPIs at a certain time.
UC-NE-21 Manage unplanned increase in traffic demand (diverting flights)		The use case describes concerns the process of managing an unexpected and unplanned increase in traffic demand that manifests on the day of operation when a

Use Case	OFA	NOP procedure
		nearby aerodrome suffers an unexpected loss of capacity (e.g., Runway closure) for a short period that launches the MASDIV process to identify the impacted airborne flights and available alternate aerodromes.
UC-NE-22 Demand increase (additional unplanned flights)	OFA05.03.07 Network Operations Planning	The use case describes the process for managing an unplanned increase in airport traffic demand that manifests on the day of operation.
UC-NE-23 Exchange Updated Runway Configuration Plan at Day of Operation (D)	OFA05.03.07 Network Operations Planning	The use case describes the exchange of update information related to the Runway Configuration Plan as contained in the AOP on the day of operation. The Runway Configuration Plan is updated due to changing operating conditions at the airport (weather related, availability of airport infrastructure, unexpected shift in traffic demand, etc.
UC-NE-24 Exchange of API and DPI	OFA05.03.07 Network Operations Planning	The use case describes the exchange of flight specific information as contained in the AOP on the day of operation.
UC-NE-25 Turn around delay, delayed outbound flight	OFA05.03.07 Network Operations Planning	The use case describes the exchange of information between the AOP, .FOC/ Airspace User and the NOP following the assessment of the impact of updated ELDTs and ETOTs on the airport resource availability and on the turn-around process.
UC-NE-26 Reduction in airport (runway) capacity	OFA05.03.07 Network Operations Planning	The use case describes the process for managing an unplanned reduction in airport capacity that manifests on the day of operation following unplanned Airport Capacity reductions caused by e.g., taxi way blockage (or runway blockage, failing infrastructure or specific meteorological events).
UC-NE-27 Airport traffic distribution adjustment	OFA05.03.07 Network Operations Planning	The use case describes the process for managing an unplanned reduction in airport capacity that manifests on the day of operation and results on a significant forecasted demand/capacity imbalance (large impact and high probability) calling for DCB measures in coordination with the relevant stakeholders (Airspace Users, airport, local ANSP) to reduce the impact on the network (Network-CDM) by adjusting the airport traffic distribution in time.
UC-NE-28 Dissemination of Flight Progress information – Flight suspension from AOP DPI process	OFA05.03.07 Network Operations Planning	The use case describes the process of disseminating flight progress information when the NOP accepts an unscheduled FPL.
UC-NE-29 Dissemination of Flight Progress information – Flight diverted from AOP API process	OFA05.03.07 Network Operations Planning	The use case describes the process of disseminating flight progress information for a flight departing USA and expected to arrive in Europe that diverts to another airport before entering European airspace.

Use Case	OFA	NOP procedure
UC-NE-30 Post-OPS Analysis of Network adherence to Operational Performance KPIs	OFA05.03.07 Network Operations Planning	The use case describes how the Network Manager performs in Post Flight phase an analysis on the way trajectory deviations from the agreed profile and recorded in the NOP, impact on the Operational Performance Indicators and assesses their deviation from the established Key Performance Targets.
UC-NE-31 Network Impact Assessment of dDCB Measures proposed by LTM		The use case describes how the Network Manager analyses during the execution phase, using What-If procedures and expert judgment, the performance impact of trajectory deviations proposed by the LTM on downstream sectors.
UC-NE-32 Network Impact Assessment of Airports AOP Changes		The use case describes how Network Manager analyses during short term and execution phase, using What-If procedures and or expert judgement, the performance impact on DCB due to changes provided by AOP such as capacity, runways configurations and departure and arrival flight specific data.

Table 29: NOP procedures as per DOD UCs

5.1.1 Airport Capacity and Event Plan Information

5.1.1.1 UC-NP-30 Provide Special Event Information and Impact

5.1.1.1.1 Purpose

This use-case concerns the exchange of update information related to the Airport Capacity and Event Plan as contained in the AOP. In this use case a special event is planned that affects the airport demand and/ or resources e.g. replacement of ground handling equipment. The event is communicated to NOP in the medium planning phase or even long term planning with its impact on the airport capacity. The update to the default (declared) Airport Capacity and Event Plan is updated in the NOP.

5.1.1.1.2 Actors

The following actors are responsible for an immediate change of the Airport Capacity and Event Plan when necessary and inclusion of these updates in the AOP.

- APOC supervisor,
- APOC participants
  - TWR supervisor,
  - TMA supervisor,
  - Airport Operations manager.
- NM (NMOC) is responsible for acting on the exchanged updated Airport Capacity and Event Plan.

5.1.1.1.3 Preconditions

- NM AIRAC (Environment) data contains the Airport declared (default) capacity information.
- Availability of SWIM infrastructure.
- The scenario starts some two months before the event takes place

5.1.1.1.4 Post conditions

Success End State

- The updated Airport Capacity and Event Plan has been timely determined and exchanged with the NOP.
- The NOP has made visible for all stakeholders the Airport Capacity and Event plan and the total Network situation.

Failure End State

- The updated Airport Capacity and Event Plan in the AOP are inaccessible for the NOP.

5.1.1.1.5 Notes

None

5.1.1.1.6 Triggers

An alert/warning from the Airport Performance Monitor service can be a trigger to update the Airport Capacity and Event Plan.

Any change in a previously exchanged Airport Capacity Event Plan is a trigger to exchange a new/updated Airport Capacity Event Plan to the NOP.

5.1.1.1.7 Flows

1. The Airport Capacity and Event Plan contained in the AOP are updated with the most accurate information.
2. The AOP exchanges the updated Airport Capacity and Event Plan with the NOP via SWIM.
3. The Capacity section in the NOP is updated with the Airport Capacity Plan.
4. NOP publishes the AOP Airport Capacity and Event Plan updates.
5. NMOC assesses and the network demand (based on flight intentions) versus the updated airport capacity received in the Airport Capacity Plan and identifies any imbalances that start to analyse to initiate measures for mitigation.

5.1.1.2 UC-NP-32 Exchange Updated Airport Capacity Plan and UC-NE-18 Critical Event Information and impact

5.1.1.2.1 Purpose

This use-case concerns the exchange of update information related to the Airport Capacity and Event Plan as contained in the AOP. This Use Case starts when the default (declared) Airport Capacity and Event Plan is changed/updated due to changing conditions at the airport e.g. maintenance of airport infrastructure or specific forecasted weather phenomena or a critical unplanned event like an airplane bursts a tyre on landing thus closing the arrival runway. It is similar to [**UC-NP-30 Provide Special Event Information and Impact]** but UC-NP-32 applies in short term or execution.

5.1.1.2.2 Actors

The following actors are responsible for an immediate change of the Airport Capacity and Event Plan when necessary and inclusion of these updates in the AOP.

- APOC supervisor,
- APOC participants
  - TWR supervisor,
  - TMA supervisor,
  - Airport Operations manager.
- NM (NMOC) is responsible for acting on the exchanged updated Airport Capacity and Event Plan.

5.1.1.2.3 Preconditions

- NM AIRAC (Environment) data contains the Airport declared (default) capacity information.
- Availability of SWIM infrastructure.
- The scenario starts at D -1 10:00 UTC

5.1.1.2.4 Post conditions

Success End State

- The updated Airport Capacity and Event Plan has been timely determined and exchanged with the NOP.
- The NOP has made visible for all stakeholders the Airport Capacity and Event plan and the total Network situation.

Failure End State

- The updated Airport Capacity and Event Plan in the AOP are inaccessible for the NOP.

5.1.1.2.5 Notes

None

5.1.1.2.6 Triggers

An alert/warning from the Airport Performance Monitor service can be a trigger to update the Airport Capacity and Event Plan.

Any change in a previously exchanged Airport Capacity Event Plan is a trigger to exchange a new/updated Airport Capacity Event Plan to the NOP.

5.1.1.2.7 Flows

5. The Airport Capacity and Event Plan contained in the AOP are updated from D-6 with the most accurate information.
6. The AOP exchanges the updated Airport Capacity and Event Plan with the NOP via SWIM.
7. The Capacity section in the NOP is updated with the Airport Capacity Plan.
8. NOP publishes the AOP Airport Capacity and Event Plan updates.
9. The NM assesses the network demand versus the network capacity (including the updated Airport Capacity Plan).

5.1.1.3 UC-NP-33 Managing unplanned reduction in airport capacity

5.1.1.3.1 Purpose

This use-case concerns the process for managing an unplanned reduction in airport capacity that manifests on the day of operation. Like in [**UC-NP-32 Exchange Updated Airport Capacity Plan and UC-NE-18 Critical Event Information and impact**] the default (declared) Airport Capacity and Event Plan is updated due to Unplanned Airport Capacity reductions. Unplanned Airport Capacity reduction can be caused by e.g., taxiway or runway blockage, failing infrastructure or airport response to specific meteorological weather events.

In this use case, the resulting AOP and NOP assessment has determined a significant forecasted demand/capacity imbalance (large impact and high probability).

In the knowledge of the extent of the airport traffic flow adjustment requirement, the NM employs DCB measures in coordination with the local APOC (where the relevant stakeholders - Airspace Users, airport, local ANSP – participate in) to reduce the impact on the network (Network-CDM).

5.1.1.3.2 Actors

The following actors are responsible for managing a significant forecasted demand/capacity imbalance as a consequence of an unplanned reduction in airport capacity.

- APOC supervisor,
- APOC participants
  - TWR supervisor,
  - TMA supervisor,
  - Airport Operations manager,
  - Airspace Users.
- FMP,
- NM,

5.1.1.3.3 Preconditions

Scenario starts on the day of operation (D) with the exchange to the NOP of an Airport Capacity and Event Plan update that contains a significant capacity reduction.

5.1.1.3.4 Post conditions

Success End State

In collaboration with the respective stakeholders, the demand is adjusted to meet the available (reduced) capacity.

Failure End State

No action is taken to mitigate the significant forecasted demand/capacity imbalance (large impact and high probability).

5.1.1.3.5 Notes

None

5.1.1.3.6 Triggers

The Unplanned Airport Capacity reductions provided by AOP to NM in the update of the Airport Capacity and Event Plan are the trigger to assess the impact of the significant forecasted demand/capacity imbalance (large impact and high probability) and to initiate measures for mitigation

5.1.1.3.7 Flows

Main Flow

1. In collaboration with the respective APOC (including all relevant stakeholders), solutions for the identified bottlenecks are defined, analysed, agreed. Using demand and airport capacity information, NM and stakeholders choose an ATFCM ground delay regulation.
2. ATFCM ground delay regulation is implemented
3. The excess traffic demand is adjusted in time to meet the available airport capacity.
4. The delayed flights receive Slot Allocation Messages with their Calculated Take Off Times (CTOTs).

5.1.1.4 UC-NP-34 Manage unplanned increase in traffic demand (Business aviation)

5.1.1.4.1 Purpose

This use-case concerns the process for managing an unplanned increase in traffic demand that manifests on the day of operation. This Use Case starts on D day when business aviation unexpectedly file flight plans to service their *on-demand* air transportation services.

Knowledge / visibility of Airport Capacity surpluses are required to plan these types of flight at short notice.

In this use case, the resulting assessment determines that the capacity surplus can accommodate the additional business aviation flights.

5.1.1.4.2 Actors

The following actors are responsible for managing a forecasted demand/capacity imbalance as a consequence of unplanned increase in arrival demand.

- APOC supervisor,
- APOC participants.
  - TWR supervisor,
  - TMA supervisor,
  - Airport Operations manager,
- NM,
- Airspace User.

5.1.1.4.3 Preconditions

- Scenario starts at D day
- The NOP contains the most recent update of the Airport Capacity and Event Plan.
- There are Airport Capacity surpluses.
- Airport Capacity surpluses are available for Business aviation

5.1.1.4.4 Post conditions

Success End State

Business Aviation traffic demand requests are accommodated at the airport

Failure End State

- Business Aviation traffic demand requests are not accommodated at the airport because the flights are filed to arrive where there is no arrival capacity surplus.
- Business Aviation traffic demand request cannot be accommodated due to not accessible Airport Capacity and Event Plan by NOP

5.1.1.4.5 Notes

None

5.1.1.4.6 Triggers

Sudden enquiry from business aviation to accommodate their clients' *on-demand* air transportation services requests.

5.1.1.4.7 Flows

Main Flow

1. The business aviation user queries the AOP's capacity plan on the NOP to determine when there is surplus airport arrival capacity to accommodate their client's *on-demand* requests.
2. Available periods are identified and flight plans are filed
3. The NOP updates with the new traffic demand showing that it is balanced with the available airport capacity.
4. The NOP exchange the flight information with the relevant AOP
5. The demand section in the relevant AOP is updated with the additional flight(s)

5.1.1.5 UC-NP-35 Recovery from a disrupted situation

5.1.1.5.1 Purpose

Timely and accurate update of the Airport Capacity and Event Plan and automatic exchange of that information with the NOP assists in a fast and efficient recovery of operations following a period of capacity disruption [**UC-NP-33 Managing unplanned reduction in airport capacity**].

5.1.1.5.2 Actors

The following actors are responsible for managing a fast and efficient recovery of operations following a period of capacity disruption.

- APOC supervisor,
- APOC participants
  - TWR supervisor,
  - TMA supervisor,
  - Airport Operations manager,
- NM,
- Airspace User.

The NOP/NM is responsible for acting on the exchanged updated Airport Capacity and Event Plan.

5.1.1.5.3 Preconditions

In this use case, NM employs DCB measures in coordination with the relevant APOC participants (Airspace Users, airport, local ANSP) to reduce the impact on the network.

5.1.1.5.4 Post conditions

Success End State

The airports inbound or outbound traffic flow is timely adjusted (increased) to make maximum use of the available airport capacity after a period of capacity constraint.

Failure End State

Airport capacity is not known in time to make the best use for in and outbound traffic. The airlines do not profit from the potential delay reductions. The unnecessary negative knock-on-effects on later flights are experienced by both the airport and the operating airlines.

5.1.1.5.5 Notes

[**UC-NP-33 Managing unplanned reduction in airport capacity**] was implemented to overcome the immediate demand/capacity imbalance. [UC-NP-35] is implemented coincidentally with or sequentially after [**UC-NP-33 Managing unplanned reduction in airport capacity**].

5.1.1.5.6 Triggers

The operational conditions of [**UC-NP-33 Managing unplanned reduction in airport capacity]** have taken place.

5.1.1.5.7 Flows

Main Flow

1. The timely update of the Airport Capacity and Event Plan presents the airport capacity increase
2. The AOP exchanges the updated Airport Capacity and Event Plan with the NOP via SWIM.
3. The airport capacity is updated in the NOP
4. NOP publishes the AOP Airport Capacity and Event Plan updates
5. The NM assesses the updated Airport Capacity Plan and identifies that there is now a capacity surplus at the end of the ATFCM ground delay measure implemented in [**UC-NP-33 Managing unplanned reduction in airport capacity**]
6. In collaboration with the respective APOC participants, NM introduces an increased rate in the last period of the ATFCM ground delay regulation
7. The updated ATFCM ground delay regulation is implemented
8. The traffic demand is re-adjusted in time to meet the increasing airport capacity
9. The affected flights receive Slot Revision Message with improved Calculated Take Off Times (CTOTs)
10. The AOP receives updated flight information from the NOP for the affected flights

5.1.2 Runway Configuration Plan and Arrival / Departure Information

5.1.2.1 UC-NP-36 Exchange Updated Runway Configuration Plan at D-1

5.1.2.1.1 Purpose

This use-case concerns the exchange of updated information related to the Runway Configuration Plan as contained in the AOP until D-1, 1500 UTC inclusive that is coincident with the publication of the NOP ATFCM Daily Plan (ADP).

This Use Case starts at D-1 when the default Runway Configuration Plan is updated due to anticipated changing operating conditions at the airport. These changing operating conditions could be due to a change in availability of airport infrastructure or specific forecasted weather phenomena.

5.1.2.1.2 Actors

The following actors are responsible for updating the Runway Configuration Plan when necessary and inclusion of these updates in the AOP.

- APOC supervisor,
- TWR supervisor,
- TMA supervisor,
- Airport Operations manager.

The NOP should reflect the update (displayed and exchanged in SWIM) and NMOC is responsible for acting on the exchanged updated Runway Configuration Plan.

Airspace User can access from NOP (displayed and available via SWIM) the updated runway configuration plan and their updated profiles (FTFM profile in flight progress information) and Airspace User is responsible for refiling a flight plan modification when required.

5.1.2.1.3 Pre-conditions

Availability of SWIM infrastructure

5.1.2.1.4 Post-conditions

Success End State

- The update to the default Runway Configuration Plan has been timely provided to the NOP.
- The update to the default Runway Configuration Plan is included in the NOP situation information.
- The NOP flight profiles are recalculated, exchanged with the respective AOPs and available for DCB analysis

Failure End State

- The update to the default Runway Configuration Plan in the AOP is inaccessible for the NOP.
- Calculation of flight profiles could not take place on updated Runway Configuration Plan information.

5.1.2.1.5 Notes

The NOP utilises historic and flight intention data in its D-1 planning for flights not yet filed ADP publication. In addition, the Default Runway Configuration Plan may be improved with historic information in this phase

At D-1 1500 UTC, the NOP utilises Filed Flight Plans only. This dataset is dependent upon timely filing of ICAO Flight Plans.

Default Runway Configuration Plan is available with the NM (through NOP) improved as historic information

5.1.2.1.6 Triggers

Any change to the default Runway Configuration Plan is a trigger to exchange a new/updated Runway Configuration Plan to the NOP.

5.1.2.1.7 Flows

Main Flow

1. The AOP has provided the NOP with the default Runway Configuration Plan.
2. At D-1, the AOP updates the default Runway Configuration Plan with the expected changes for the next day.
3. The AOP exchanges this updated Runway Configuration Plan with the NOP via SWIM.
4. The NOP updates its Situation Awareness (display) with the updated Runway Configuration Plan
5. The NM (re-)calculates 4D flight profiles based on the updated Runway Configuration Plan.
6. The NOP publishes the estimates times relevant to the (re-)calculates 4D flight profiles in the NOP
7. The Relevant AOPs are updated with the new ETOT and ELDT

Alternative Flow

None

5.1.2.2 UC-NE-23 Exchange Updated Runway Configuration Plan at Day of Operation (D)

5.1.2.2.1 Purpose

This use-case concerns the exchange of update information related to the Runway Configuration Plan as contained in the AOP on the day of operation. This Use Case starts when the previously exchanged Runway Configuration Plan is updated due to changing operating conditions at the airport. These changing operating conditions could be weather related (e.g. change in runway operating direction), change in availability of airport infrastructure (e.g. runway blockage), unexpected shift in traffic demand (e.g. a large number of diversions from a nearby airport).

5.1.2.2.2 Actors

The following actors are responsible for an immediate change of the Runway Configuration Plan when necessary and inclusion of these updates in the AOP.

- APOC supervisor,
- TWR supervisor,
- TMA supervisor,
- Airport Operations manager.

The NOP should reflect the update (displayed and exchanged in SWIM) and NMOC is responsible for acting on the exchanged updated Runway Configuration Plan.

Airspace User can access from NOP (displayed and via SWIM) the updated runway configuration plan and their updated profiles (flight progress information) and Airspace User is responsible to refile a flight plan modification when required.

5.1.2.2.3 Pre-conditions

Availability of SWIM infrastructure

5.1.2.2.4 Post-conditions

Success End State

- The updated Runway Configuration Plan has been determined and exchanged with the NOP.
- The NOP flight profiles are recalculated and available for DCB analysis

Failure End State

- The updated Runway Configuration Plan in the AOP is inaccessible for the NOP.

- No recalculation of flight profiles could take place, no DCB analysis on updated information could take place based on the updated AOP Runway Configuration Plan.

5.1.2.2.5 Notes

None

5.1.2.2.6 Triggers

Any change in the current Runway Configuration Plan is a trigger to exchange a new/updated Runway Configuration Plan to the NOP.

An alert/warning from the Airport Performance Monitor service can be a trigger to responsible stakeholder to update the Runway Configuration Plan.

5.1.2.2.7 Flows

Main Flow

1. At D, the AOP contains the Runway Configuration Plan for the day of operation.
2. The AOP exchanges this changed/updated Runway Configuration Plan with the NOP via SWIM.
3. The NOP updates its Situation Awareness (display) with the new runway configuration.
4. The NM (re-)calculates 4D flight profiles based on the updated Runway Configuration Plan using the flight intentions and the known flight plans.
5. The NOP publishes in SWIM the flight progress information with the estimates times relevant to the (re-)calculated 4D flight profiles
6. The NM coordinates with the relevant stakeholders when 4D flight profiles deviation has a network impact and an action is required.
7. The Relevant AOPs update with the new ETOT and ELDT

Alternative Flow

None

5.1.2.3 UC-NE-24 Exchange of API, DPI and ELDT

5.1.2.3.1 Purpose

This use-case concerns the exchange of flight specific information as contained in the AOP on the day of operation followed by flight progress information from NOP. This Use Case starts when flight specific information becomes available during the day of operation. In this UC, APOC using AOP assesses the impact of the updated ELDTs and ETOTs on its resource availability and on the turn-around process, concluding that there is no impact.

5.1.2.3.2 Actors

APOC supervisor/operator and AOP systems are responsible for an immediate exchange of arrival or departure planning information (API, DPI) when necessary and inclusion in the AOP of the consequent flight updates received from NOP in Flight progress information.
The NOP is responsible for updating the flight data and profiles, and for sending the Flight progress information, in particular the ELDT.
Upon the exchange of information,
NMOC Network Manager (NM) is responsible for acting on the exchanged API and DPI when necessary.
APOC is responsible for the impact assessment of the ELDT in the ATV and for taking any corrective actions if necessary.

5.1.2.3.3 Pre-conditions

Availability of SWIM infrastructure

5.1.2.3.4 Post-conditions

Success End State

- The API, DPI are successfully exchanged with the NOP.
- The NOP flight profiles are recalculated and flight data is updated. Finally, Flight Progress information is successfully exchanged with the AOP.

Failure End State

- The API and DPI is inaccessible for the NOP: No recalculation of flight profiles take place based on the updated AOP information in API and DPI, hence ELDT and ETOT data are not updated.
- Flight Progress Information is inaccessible for AOP: AOP is not updated and APOC cannot perform the impact assessment of the ELDT in the ATV with the most recent data.

5.1.2.3.5 Notes

The profile recalculation in NM (FTFM) is updated with the most up-to date information (SID, STAR, TTOT…). The ICAO flight plan or AU 4D profiles is not updated as it is the responsibility of the AU to do so. Hence unless AU refiles, the flight plan (or AU 4D profile in NM/IFPS) do not reflect latest changes.

Exception: A registration mark or aircraft type provided by DPI/API do not update the flight profile in NM. When different from the one in the flight plan, NOP triggers a discrepancy that is expected to be solved by the AU by refiling. For SESAR 2020 the aircraft type may update the flight profile in NM.

5.1.2.3.6 Triggers

Any change triggered by information exchanged in the API and DPI recalculates the profile (see note for exception) and update flight progress information in the NOP

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5.1.2.3.7 Flows

Main Flow

1. The AOP exchanges API and DPI with NOP via SWIM. This includes in particular, time estimates and actual values at specific milestones of the flight such as departing, landing, taxing, in or off block ..., other information like the STAR, SID and runway as well as the aircraft status (ATV).
2. The NM (re-)calculates the 4D flight profiles for flights with the received API or DPI information and Network constraints. It results in updating the Flight Progress Information, which includes flight status, relevant flight data and profile estimates (ELDT).
3. The NOP updates its situation awareness display and publishes in SWIM the updated Flight Progress Information.
4. The Relevant AOP (s) is updated with the new ETOT and ELDT

Alternative Flow

When no API and/or DPI is exchanged at all with the NOP, then NOP calculates the 4D flight profiles on less accurate / detailed Runway Configuration Plan (instead of the detailed information in the API and DPI) for one or both end of the trajectory.

1. NOP publishes the estimates times relevant to the (re-)calculates 4D flight profiles
2. The Relevant AOP(s) is updated with the new ETOT and ELDT.

5.1.2.4 UC-NE-25 Turn around delay, delayed outbound flight

5.1.2.4.1 Purpose

AOP assesses the impact of updated ELDTs and ETOTs on their resource availability and on the turn-around process. In this use case, the planned departure segment of an ATV is impacted.

The AOP stakeholders analyse the impact and available solutions. The decision is collaboratively taken, including the AU, to postpone the next leg departure time without mitigation.

The DPI is updated and included in the AOP. This information is exchanged with the relevant FOC/ Airspace User and the NOP.

5.1.2.4.2 Actors

APOC supervisor/operator and AOP systems are responsible for immediate exchange of arrival or departure planning information (API, DPI) when necessary.
The NOP is responsible for updating the flight data, profiles, and sending the Flight progress information, in particular the ELDT.
Upon the exchange of information,
NMOC is responsible for acting on the exchanged API and DPI when necessary.
APOC is responsible for taking any corrective actions if needed after the impact assessment of the ELDT in the ATV
AU is responsible for updating the affected flight plan if the delay is bigger than take off window (normally 15 min)

5.1.2.4.3 Preconditions

Use case starts at D.

The AOP has updated the arrival and departure demand forecasting based upon received ELDTs and ETOTs received information from NOP.

5.1.2.4.4 Post conditions

Success End State

A timely airport arrivals impact assessment is undertaken and the relevant stakeholders are able to decide to accept the plan deviation without needing to mitigate it.

Failure End State

No timely impact assessment. Stakeholder decisions are not possible

5.1.2.4.5 Notes

The profile recalculation in NM (FTFM) is updated with the most up-to date information (SID, STAR, TTOT…). The ICAO flight plan or AU 4D profiles is not updated as it is the responsibility of the AU to do so. Hence unless AU refiles, the flight plan (or AU 4D profile in NM/IFPS) do not reflect latest changes.

Exception: A registration mark or aircraft type provided by DPI/API do not update the flight profile in NM. When different from the one in the flight plan, NOP triggers a discrepancy that is expected to be solved by the AU by refiling. For SESAR 2020 the aircraft type may update the flight profile in NM.

5.1.2.4.6 Triggers

AOP has been updated with the new ELDT received from the NOP via SWIM.

5.1.2.4.7 Flows

Main Flow

1) The APOC receives an alert/warning from the AOP ATV that a late arriving aircraft is unable to undertake its turnaround in the planned time.
2) In close coordination with the relevant stakeholders, the situation is considered: The late arrival delay “knock-on” to the associated departing flight.
3) In close coordination with the relevant stakeholders, available solutions are considered.
4) The decision is taken to accept the changes. The outbound flight’s DPI is updated with the new TOBT, TTOT etc. in line with the updated (and coordinated) times for the outbound flight
5) The stand allocation is updated (the initial allocated stand might become available for another inbound flight).
6) The AOP of the outbound flight exchanges the updated DPI with the stakeholders and the NOP via SWIM.

7) The NOP (re-)calculates the 4D flight profile for the flight and updates the ETOTs and ELDTs based on the DPI TTOT information and Network constraints.
8) The NOP exchanges the ELDTs and ETOTs to the relevant AOPs via SWIM
9) The Relevant AOPs react to these updates.

5.1.2.5 UC-NE-26 Reduction in airport (runway) capacity

5.1.2.5.1 Purpose

This use-case concerns the process for managing an unplanned reduction in airport capacity that manifests on the day of operation. This Use Case starts on D when Unplanned Airport Capacity reductions caused by e.g., taxi way blockage (or runway blockage, failing infrastructure or specific meteorological weather events).

In this UC the airport, performance-monitoring service assesses the airport capacity reductions and identifies a demand/capacity imbalance.

In coordination with the relevant stakeholders (Airspace Users, airport, local ANSP) a new outbound flight departure time is planned and the AOP is updated.

5.1.2.5.2 Actors

The following actors are responsible for managing the demand/capacity imbalance due to the unplanned reduction in airport capacity.

- airport performance monitoring service
- APOC
- TWR supervisor,
- TMA supervisor,
- Airport Operations manager,
- FMP,
- NMOC
- Airspace Users.

5.1.2.5.3 Preconditions

- Use case starts at D
- This UC (applied to D) ends with an Airport Capacity and Event Plan update that contains a medium capacity reduction.

5.1.2.5.4 Post conditions

Success End State

In collaboration with the respective stakeholders, the departure demand is adjusted (spread out) to meet the available (reduced) capacity.

Failure End State

No action is taken to mitigate the significant forecasted demand/capacity imbalance.

5.1.2.5.5 Notes

Depending on the severity of the demand/capacity imbalance, from high to low, a regulation, a STAM or simply a delay (if within the take-off window) reflected in the TTOT assigned is used.

Not all actors listed above maybe needed, as it depends on the severity of the demand/capacity imbalance.

5.1.2.5.6 Triggers

The Unplanned Airport Capacity reductions received in the Airport Capacity and Event Plan are assessed to cause a moderate departures demand/capacity imbalance Flows

Main Flow

1. In collaboration with the respective stakeholders, solutions for the identified bottlenecks are defined, analysed, agreed. Using demand and airport capacity information, AOP and stakeholders choose to adjust flight departure times to compensate.
2. The excess traffic demand is adjusted in time to meet the available airport departure capacity.
3. New/updated departure times are coordinated among relevant stakeholders.
4. The AOP calculates flight specific DPI information based upon the newly allocated DPI Sequence times.
5. The AOP exchanges these updated DPI with NOP via SWIM
6. The NOP (re-)calculates the 4D flight profiles for flights with the received API or DPI information and Network constraints -e.g. an En-Route regulation or STAM
7. AU may need to update/refile the affected flight plan with the new departure time (i.e. if the delay is bigger than the take-off window, but not needed if handled via CTOT)
8. The NOP exchanges updated ETOT and ELDT, with the airports (origin and destination) and En-Route centre(s) via SWIM.
9. The Relevant AOPs are updated with the new ETOT and ELDT

5.1.2.6 UC-NE-22 Demand increase (additional unplanned flights)

5.1.2.6.1 Purpose

This use-case concerns the process for managing an unplanned increase in traffic demand that manifests on the day of operation. This Use Case starts on D when airborne flights are diverted to arrive at this aerodrome.

5.1.2.6.2 Actors

The following actors are responsible for managing a newly forecasted increase of traffic demand.

- Airspace User,
- APOC supervisor,
- TWR supervisor,
- TMA supervisor,
- Airport Operations manager,
- NMOC.

5.1.2.6.3 Preconditions

- Scenario starts at D
- Airport Capacity planning has confirmed the acceptance of these diverted flights at short notice.

5.1.2.6.4 Post-conditions

Success End State

The AOP updates with the new flights and their associated ELDT information.

Failure End State

The AOP is unable to assess and plan for the arrival of the diverted flights.

5.1.2.6.5 Notes

The process of coordinating and issuing the target times in execution a is not covered by this UC as the concept is not finalised in SESAR Step 1

The subsequent outbound leg of the aircraft is not considered here

5.1.2.6.6 Triggers

The ATC requests to divert flights to this airport are accepted by this airport

5.1.2.6.7 Flows

Main Flow

1. The NOP receives ATC FPL Proposal (AFP) messages for the diverting flights from the coordinating ACC.
2. The NOP issues ATC Flight Plan Messages (APL) for the flights to the diverted to aerodrome.
3. The NOP calculates the 4D flight profiles for flights including their ELDTs.
4. The NOP exchanges the ELDTs for the diverted flights to the destination AOP via SWIM.
5. The AOP calculates flight specific API information based upon the allocated runway of arrival, STAR and ELDTs.
6. The AOP exchanges these updated API with NOP via SWIM
7. The NOP (re-)calculates the 4D flight profiles for flights with the received API information and Network constraints.
8. The NOP exchanges updated ELDT to the destination AOP via SWIM.
9. The AOP is updated with the new ELDT information
10. The airport performs an impact assessment and may issue target times to specific flights after the necessary coordination

5.1.2.7 UC-NE-27 Traffic distribution adjustment

5.1.2.7.1 Purpose

This use-case (following UC-NE-25) concerns the process for managing an unplanned reduction in airport capacity that manifests on the day of operation. This Use Case starts on D when Unplanned Airport Capacity reductions caused by e.g., taxi way blockage (or runway blockage, failing infrastructure or specific meteorological weather events).

The airport performance monitoring service has assessed the airport capacity reductions and identifies a significant forecasted demand/capacity imbalance (large impact and high probability).

In the knowledge of the extent of the airport traffic flow adjustment requirement, the NM employs DCB measures in coordination with the relevant stakeholders (Airspace Users, airport, local ANSP) to reduce the impact on the network (Network-CDM) by adjusting the traffic distribution in time.

5.1.2.7.2 Actors

The following actors are responsible for managing a significant forecasted demand/capacity imbalance as a consequence unplanned reduction in airport capacity.

- Airport performance monitoring service
- APOC supervisor,
- TWR supervisor,
- TMA supervisor,
- Airport Operations manager,
- FMP,
- NM,
- Airspace Users.

5.1.2.7.3 Preconditions

- Use case starts at D
- Airport Capacity and Event Plan update that contains a significant capacity reduction.

5.1.2.7.4 Post conditions

Success End State

In collaboration with the respective stakeholders, the demand is adjusted to meet the available (reduced) capacity.

Failure End State

No action is taken to mitigate the significant forecasted demand/capacity imbalance (large impact and high probability).

5.1.2.7.5 Notes

This UC could be run with [**UC-NP-33 Managing unplanned reduction in airport capacity**] from the Airport Capacity and Event Information.

5.1.2.7.6 Triggers

The Unplanned Airport Capacity reductions received in the Airport Capacity and Event Plan have resulted in the application of an ATFCM ground based delay measure that reduces the airport arrival rate.

5.1.2.7.7 Flows

Main Flow

1. On application of the ATFCM arrival regulation flight profiles are recalculated and CTOTs determined and distributed.
2. The NOP exchanges updated CTOTs with the origin AOP, and ELDT with the destination AOP via SWIM.
3. The Relevant AOPs are updated with the new ETOT/CTOT and ELDT information.
4. The AOPs calculates flight specific API and DPI information based upon the allocated Arrival runway / STAR and allocated departure runway / SID.
5. The AOPs exchanges these updated API and DPI with NOP via SWIM
6. The NOP (re-)calculates the 4D flight profiles for flights with the received API / DPI information and Network constraints.
7. The NOP exchanges the updated ELDTs with the destination AOP via SWIM.
8. The AOP updates with the new ELDT information.
9. The APOC confirms that the arrival capacity reduction is acceptably planned. The APOC receives an alert/warning from the AOP ATV that the late arriving aircraft are unable to undertake their turnaround in the planned time.
10. In close coordination with the relevant stakeholders, the situation is considered: The late arrival delay “knock-on” to the associated departing flights is agreed and DPI updates are issued delaying those flights (new TTOT) to accommodate their rotation The stand occupancy is also considered but thanks to the ATFCM regulation, the later wave of arriving flights can be accommodated.
11. The AOP updates the outbound flight DPIs with new TTOT (TOBT + EXOT) etc. Where TOBT> EOBT+15,
12. FPL delay (DLA) messages are issued by affected AUs.
13. The AOP exchanges the DPI updates with the stakeholders and the NOP via SWIM
14. The NOP (re-)calculates the 4D flight profile for the flights and updates the ETOTs based on the DPI information, FPL delay (DLA) messages and Network constraints.
15. The NOP exchanges the ELDTs and ETOTs to the relevant AOPs via SWIM
16. The Relevant AOPs react to these updates.

5.1.2.8 UC-NE-28 Dissemination of Flight Progress information – Flight suspension from AOP DPI process

5.1.2.8.1 Purpose

This use-case concerns the process of disseminating flight progress information.

In this use case, the NOP accepts an unscheduled FPL. The departing aerodrome identifies the flight as unscheduled and then generates a Cancel DPI indicating that the flight has no coordinated airport slot. The NOP updates, suspends the flight and disseminates the new flight status to the AOPs and AU. The Destination AOP receives the notification and suspends the flight from its processes.

5.1.2.8.2 Actors

The following actors are responsible for managing flight status.

- APOC supervisor,
- TWR supervisor,
- TMA supervisor,
- Airport Operations manager,
- FMP,
- NM,
- Airspace User.

5.1.2.8.3 Preconditions

- Use case starts at D

5.1.2.8.4 Post conditions

Success End State

All stakeholders are notified that the flight's status is set to suspended and the reason for this.

Failure End State

No action – the arrival airport plans to handle the unscheduled flight.

5.1.2.8.5 Notes

None

5.1.2.8.6 Triggers

AOP (ADEP) receives an ICAO FPL flight plan from the NOP for which there is no coordinated airport slot.

5.1.2.8.7 Flows

Main Flow

1. AOP (ADEP) compares NOP flight information with scheduled flights and finds no correlation.
2. AOP(ADEP) updates the flights DPI status to Cancel-DPI (C-DPI) status to notify that the flight is unexpected
3. The AOP exchanges the new DPI status with NOP via SWIM
4. The NOP receives the C-DPI status
5. The NOP suspends the flight
6. The NOP exchanges the updated flight progress information with the AOP (ADEP) and (ADES) and other stakeholders including the AU
7. The AOPs receive the NOP flight progress information
8. The AOPs update their flight progress information to indicate the flight is suspended.

5.1.2.9 UC-NE-29 Dissemination of Flight Progress information – Flight diverted from AOP API process

5.1.2.9.1 Purpose

This use-case concerns the process of disseminating flight progress information for a flight departing USA and arriving in Europe. However, the flight diverts to a Canadian airport before entering European airspace.

In this use case the NOP receives an API message from the original ICAO FPL destination airport concerning the flight from the USA (out of area flight) in which the arrstatus field indicates that the flight has DIVerted.

The NOP updates, removing the flight from its traffic counts and disseminates this to all network actors involved with the flight.

5.1.2.9.2 Actors

The following actors are responsible for managing API.

- APOC supervisor,
- TWR supervisor,
- TMA supervisor,
- Airport Operations manager,
- FMP,
- NM,
- Airspace User.

5.1.2.9.3 Preconditions

- Use case starts at D

5.1.2.9.4 Post conditions

Success End State

All stakeholders are notified that the flight is removed

Failure End State

No action – the network plans to handle the unscheduled flight. (Note that the Arrival Aerodrome knows that the flight will not arrive)

5.1.2.9.5 Notes

None

5.1.2.9.6 Triggers

AOP (ADES) receives notification from the AU that the flight has diverted in the USA to a Canadian airfield

5.1.2.9.7 Flows

Main Flow

1. AOP (ADES) updates and removes the diverted flight from its arrival process.
2. AOP exchanges an API message to NOP with ATV status set to DIV.
3. NOP receives the API message and updates its flight progress information with suspended, whilst it waits for future messages.
4. The AOP, AU, FMPs, ACCs receive the NOP update and remove the diverted flight accordingly.

5.1.3 Traffic Demand Identification

5.1.3.1 UC-NP-39 Airport Traffic demand exchange

5.1.3.1.1 Purpose

This UC deals with the exchange of slots and or schedule information in the early planning - before the schedule season start - and later, the corresponding updates during the medium term planning. The provision of these data by AOP allows NOP to identify inconsistencies and ambiguities in traffic demand and flows between the AOP's of different airports (Network ground nodes). NOP informs both relevant AOP's of these identified inconsistency and ambiguity in order to have them solved or removed. NOP updates and improve the quality of its traffic demand data with this exchange.

5.1.3.1.2 Actors

The following actors are responsible for an immediate change of the Coordinated Slots when necessary and inclusion of these updates in the AOP.

- APOC supervisor,
- APOC participants,
  - Airport Operations manager
  - Airline or AU
- NMOC.

5.1.3.1.3 Preconditions

- NOP and AOP availability of information through SWIM infrastructure.

5.1.3.1.4 Post conditions

Success End State

Consolidated Flight Intentions are available

Failure End State

Incomplete set of Flight Intentions

5.1.3.1.5 Triggers

AOP updates with Schedule information.

5.1.3.1.6 Flows

Main Flow

1. The AOP slot and schedule information is available to the NOP via SWIM.
2. The NOP updates with the available AOP schedule information.
3. The NOP makes the schedule information available to its stakeholders (including other AOPs).
4. The NM creates Consolidated Flight Intentions (CFI) with 4D trajectories to logically connect the departure and arrival schedule information.
5. The CFIs are available on the NOP.
6. The NM identifies inconsistencies and ambiguities in the Airport Schedule Information. e.g., when an AOP's departure flight cannot be connected to an arrival flight in the AOP of the destination airport.
7. The NM (through the NOP) informs the relevant AOPs of the identified inconsistency / ambiguity.

Alternate Flow

None.

5.1.4 Network Impact assessment

5.1.4.1 UC-NE-31 Network Impact assessment of dDCB Measures proposed by LTM

5.1.4.1.1 Purpose

This use-case describes how the Network Manager analyses during the execution phase or short term, using What-If procedures and expert judgment, the performance impact of dDCB measures proposed by the LTM. The impact of the trajectory deviations in the neighbourhood, downstream sectors or and in the Network as a whole is analysed by NMOC. The LTM is responsible for CDM with downstream sector.

5.1.4.1.2 Actors

The following actors are involved:

- NMOC,
- LTM/FMP,

5.1.4.1.3 Preconditions

- Use case starts at D day a few hours or few minutes before sector entry time.
- LMT proposes a STAM measure

5.1.4.1.4 Post conditions

Success End State

The NMOC determines that there is no detrimental impact on the Network with the creation of the proposed STAM. The LTM starts the STAM coordination.

Failure End State

The NMOC cannot perform the Network impact of the creation of the proposed STAM when the neighbouring downstream area is outside ECAC. The STAM is not initiated.

5.1.4.1.5 Triggers

LMT detects a hotspot that analyses and monitors its evolution locally. The LTM proposes to apply STAM to resolve the hotspot.

5.1.4.1.6 Flows

Main Flow

1. NMOC looks at the nature or possible causes of the hotspot, and sees that itis a local problem that could be resolved by l STAM and does not require the creation of a regulation.
2. NMOC using the what-if tools simulates the effect of the proposed STAMed flights in the network. In simulation, NMOC looks at the occupancy counts in the neighbourhood, downstream sectors as well as entry counts. It concludes that there is no detrimental impact on the Network and that the proposed STAM would improve or resolve the hotspot.
3. NMOC informs LMT of the positive Network Impact Assessment
4. LMT launches the STAM coordination.

5.1.4.2 UC-NE-32 Network Impact assessment of airports AOP changes

5.1.4.2.1 Purpose

The use case describes how Network Manager analyses during short term and execution phase, using What-If procedures and or expert judgement, the performance impact on Network DCB due to changes provided by AOP such as capacity, runways configurations and departure and arrival flight specific data.

5.1.4.2.2 Actors

The following actors are involved:

- NMOC,
- APOC,

5.1.4.2.3 Preconditions

[**UC-NP-32 Exchange Updated Airport Capacity Plan and UC-NE-18 Critical Event Information and impact**] Exchange Updated Airport Capacity Plan and Critical Event Information and impact.

5.1.4.2.4 Post conditions

Success End State

With NMOC/AOPC coordination and in collaboration with stakeholders the demand is adjusted to meet the available (reduced) capacity.

Failure End State

No action is taken to mitigate the significant forecasted demand/capacity imbalance (large impact and high probability).

5.1.4.2.5 Triggers

NOP is updated by AOP of a change in AOP and its impact. The triggers are [**UC-NP-32 Exchange Updated Airport Capacity Plan and UC-NE-18 Critical Event Information and impact**]

5.1.4.2.6 Flows

Main Flow

1. NMOC looks into the reason and the capacity reduction provided by AOP and updated in the NOP.
2 NMOC using the what-if tools simulates the effect of the capacity reduction in the network and assesses it as large network impact.
3 NMOC/AOPC coordinates for the resolution of unplanned capacity reduction. Continue in the flow steps of [**UC-NP-33 Managing unplanned reduction in airport capacity**].

5.1.4.3 UC-NP-31 Provide Network Weather Information and Impact

5.1.4.3.1 Purpose

This use-case describes how the Network Manager shares during the short-term planning or phase execution, following input of different actors, the potential impact of significant weather forecast. The significant weather forecast is enriched with the LTM (En-Route and airport) assessment, including potential impact and mitigations.

5.1.4.3.2 Actors

The following actors are involved:

- NMOC,
- LTM/FMP/Airports where significant weather conditions are forecasted,

5.1.4.3.3 Preconditions

- Use case starts at D-1 or before whenever MET forecast any significant weather condition.
- NMF shares the forecast and monitors that the concerned units are aware it them and provide their local assessment.
- LTM/Airport enriches the significant weather forecast with the local impact assessment estimation including action taken or expected.

5.1.4.3.4 Post conditions

Success End State

The NMOC shares significant weather conditions together with impact analysis and actions (network weather assessment) making it timely available for all the ATM actors.

The NMOC monitors that the LTM and/or Airport is aware of the forecast significant weather and has taken the necessary actions.

Failure End State

The NMOC does not share or share incomplete significant weather conditions together with impact analysis and actions (network weather assessment).

5.1.4.3.5 Triggers

The provision of network weather information and impact is continuous. New entries or updates are done any time MET detects significant weather. This triggers an alert and LTM/Airports enrich the MET entry with local information on impact and actions.

5.1.4.3.6 Flows

Main Flow

1. MET provides a significant weather entry.
2. NMOC in parallel with LTM/Airports looks at the alert generated by the significant weather.
3. LTM/Airports analyse the phenomena in view of the local conditions and enrich the weather entry with their local assessment(s).
4. NMOC monitors that the affected LTM/Airports have provided their input and analyses globally the situation from the network perspective.
5. NMOC using the available tools simulates the effect of the impact and actions on the flights in the network. In simulation, NMOC also looks at the occupancy counts in the neighbourhood, downstream sectors as well as entry counts. It concludes that there is no detrimental impact on the Network.
6. NMOC shares the information and the process with all the ATM actors.

5.1.5 Network Performance

5.1.5.1 UC-NE-04 Monitor deviation between Agreed and Actual Flight Profile

5.1.5.1.1 Purpose to do

This use-case describes how the Network Manager monitors deviation between agreed and actual flight profile during execution to detect the risk that they propagate creating risks and potential in the short-term planning in a wider (network) context.

5.1.5.1.2 Actors

The following actors are involved:

- NMOC,
- LTM(s)

5.1.5.1.3 Preconditions

- Use case starts at D, on flight execution or before whenever there is a deviation between the agreed/expected and the actual flight profile. It can be extended post Operations.
- All actors share the same view on the ATM Network.

5.1.5.1.4 Post conditions

Success End State

The affected LTM(s) and NMOC monitor and detect deviation between agreed and actual flight profile.

According to roles and responsibilities predetermined, LTMs assess the impact of the deviation in the local traffic.

The NMOC assess the impact of the deviation on the neighbour areas and takes the necessary CDM actions.

The NMOC also analyses the cause of the deviation and shares it with the ATM actors.

NOTE: The NMOC actions are mostly focus on the deviation between agreed and actual flight profile in a global level.

Failure End State

The NMOC/LTM(s) do not assess the impact of deviations between agreed and actual flight profile.

5.1.5.1.5 Triggers

The assessment of deviations between agreed and actual flight profile is a continuous activity.

5.1.5.1.6 Flows

Main Flow

1. NMOC monitors in a global deviations between agreed and actual flight profile in accordance to procedures and tools.
2. LTM(s) monitor deviations between agreed and actual flight profiles in their area of responsibility.
3. When significant deviation is detected, NMOC assesses the situation in potentially affected downstream areas.
4. When significant deviation is detected, NMOC launches the necessary CDM with relevant LTM(s).
5. NMOC analyses the cause of deviation.
6. When necessary, NMOC takes the necessary actions to manage the cause of deviation to avoid extension and propagation.

5.1.5.2 UC-NE-19 Assess Military KPIs Adherence

5.1.5.2.1 Purpose to do

This use-case describes how the Network Manager monitors and shares military KPIs adherence during the short-term planning, execution and post-OPS phase to assess that they do or will be able to respect the agreed targets and to propose corrective actions following the agreed process in the contrary case.

5.1.5.2.2 Actors

The following actors are involved:

- NMOC,
- MIL

5.1.5.2.3 Preconditions

- Use case starts at D, on flight execution or before as soon as any of the military KPIs are available. It can be extended to post Operations.
- All actors share the same view on the ATM Network.

5.1.5.2.4 Post conditions

Success End State

The affected MIL and NMOC monitor the military KPIs. Affected LTMs may also monitor these KPIs when they consider that they may have an impact on their owns or wherever they consider necessary.

According to roles and responsibilities predetermined, MIL assesses the deviation of KPIs and decides whether corrective actions have to be taken.

The NMOC monitors the MIL KPIs globally in relation to other Network KPIs and takes the necessary CDM actions in accordance with agreed procedures.

The NMOC ensures that analyses of the cause of non-adherence to MIL KPIs is done and shares it with the relevant ATM actors.

Failure End State

The MIL KPIs adherence is not assessed.

5.1.5.2.5 Triggers

The assessment of MIL KPIs Adherence is a continuous activity.

5.1.5.2.6 Flows

Main Flow

1. NMOC monitors in global way the adherence to military KPIs.
2. MIL(s) monitor MIL KPIs according to their area of responsibility.
3. When significant non-adherence is detected, and/or the agreed targets seem not achievable, NMOC assesses the situation in a global way by evaluating the DCB impact in the Network and launch the necessary CDM regulatory actions, with all actors involved, to mitigate the disruption.
4. NMOC produces and shares the necessary reports of MIL KPIs.

5.1.5.3 UC-NE-20 Assess KPIs Adherence

5.1.5.3.1 Purpose to do

This use-case describes how the Network Manager monitors and shares KPIs adherence during the planning, execution and post-OPS phase to assess that they do or will be able to respect the agreed targets and to propose corrective actions following the agreed process in the contrary case.

5.1.5.3.2 Actors

The following actors are involved:

- NMOC,
- MIL
- LTM(s)
- Airport(s)

5.1.5.3.3 Preconditions

- Use case starts at on planning or flight execution as soon as any of the KPIs are available. It can be extended to post Operations.
- All actors share the same view on the ATM Network.

5.1.5.3.4 Post conditions

Success End State

The affected MIL, LTM(s), Airport(s) and NMOC monitor the KPIs.

According to roles and responsibilities predetermined, the different actors assess the deviation of KPIs and decide whether corrective actions have to be taken.

The NMOC monitors the KPIs globally and takes the necessary CDM actions in accordance with agreed procedures.

The NMOC ensures that analyses of the cause of non-adherence MIL KPIs is done and shares it with the relevant ATM actors.

Failure End State

The KPIs adherence is not assessed.

5.1.5.3.5 Triggers

The assessment of KPIs Adherence is a continuous activity.

5.1.5.3.6 Flows

Main Flow

1. NMOC monitors in global way the adherence to KPIs.
2. MIL(s), LTM(s), Airport(s) monitor KPIs according to their area of responsibility.
3. When significant non-adherence is detected, and/or the agreed targets seem not achievable, NMOC assesses the situation in a global way and launch the necessary CDM.
4. NMOC produces and shares the necessary reports of KPIs.

5.1.5.4 UC-NE-30 Post-OPS Analysis of Network adherence to Operational Performance KPIs

5.1.5.4.1 Purpose to do

This use-case describes how the Network Manager shares analysis to KPIs adherence after operations, during post-OPS phase to follow conformance and to assess observed non-adherence and its causes, for all the actors taking the necessary informed corrective actions to achieve agreed targets.

5.1.5.4.2 Actors

The following actors are involved:

- NMOC,
- MIL
- LTM(s)
- Airport(s)
- AU(s).

5.1.5.4.3 Preconditions

- Use case starts after operations when the set of agreed KPIs are available.
- All actors share the same data and analysis.
- All actors can provide their input to the process.

5.1.5.4.4 Post conditions

Success End State

The NMOC makes available the post OPS analysis of network adherence to Operational Performance KPIs to the relevant ATM actors and in accordance to the agreed procedure (timeframe, media, etc.).

According to roles and responsibilities predetermined, the different actors can provide input on the causes that may justify the KPIs achieved, informed on actions within their area of responsibility and propose corrective actions when considered necessary.

Failure End State

The post OPS analysis of network adherence to Operational Performance KPIs is not done.

5.1.5.4.5 Triggers

The post OPS analysis of network adherence to Operational Performance KPIs is a continuous activity.

5.1.5.4.6 Flows

Main Flow

1. NMOC compiles the data and produces and/or ensure that they are available the Operational Performance KPIs.
2. NMOC launches the post OPS analysis of Operational Performance KPIs.
3. MIL(s), LTM(s), Airport(s) and NMOC provide their input into the Operational Performance KPIs achieved, indicating causes, local actions and potential CDM actions to improve them when needed.

4. NMOC compiles all the input and when necessary launches an overall CDM process to agree in the conclusions.
5. NMOC produces and shares the necessary reports of KPIs.

5.2 NOP Scenarios

This section describes how the collaborative NOP is used by ATM stakeholders to facilitate and optimise their own planning while coping with all kinds of events (e.g. large military exercise, capacity-impacting weather, airport issue, etc.) that may compromise the stability of the reference plan.

In each NOP scenario, the storyline starts from the event planning and continues up to the post-flight phase. This is needed to address network operations planning in all its aspects ('plan-do-act-check' cycle).

The Use Cases (UC) is inserted in brackets in the text of the scenarios.

5.2.1 SCN-NOP1.1000 Large Military Event

A general principle of the layered planning process is that all planning should benefit from feedback on current events and operations. These are made available through in the NOP.

The proposed operational scenario describes how the collaborative NOP is updated and used in the case of Tactical Leadership Programme (TLP) event, which generates a significant demand on military AS structures.

5.2.1.1 Background

The Tactical Leadership Programme (TLP) is a flying programme to improve not only the execution (tactical) capabilities of air forces but also to develop tactics, techniques and procedures, which enhance multi-national execution (tactical) air operations

The Mission of Execution (tactical) Leadership Programme is to increase the effectiveness of Allied Air Forces through development of leadership skills, mission planning, briefing, execution (tactical) air operations and debriefing skills and conceptual and doctrinal initiatives.

This mission is achieved by working together on the different tasks such as training NATO Flying personnel in planning and executing Composite Air Operations (COMAO).

To achieve these complex tasks TLP undertakes academic courses and flying courses.

Practically, this means the daily usage of airspace by a large number of aircraft combined in the same exercise.

5.2.1.2 Context and assumptions

- Airspace Management Systems are used by all Military players in the Network and are interoperable with the NOP;
- The TLP Programme starts on 10 May;
- The TLP Programme requires AS structures in Belgium, Netherlands, France, UK, and Germany. In this particular scenario example, the following airspace segregation needs are assumed:
  - Belgium Airspace: requires ARES1 for special airspace use with a significant traffic demand. This AS is occasionally used by neighbouring air force bases;
  - UK Airspace: requires a ARES2 without significant traffic demand;
  - Netherlands Airspace: requires a ARES3 without significant traffic demand;
  - France Airspace: requires a ARES4 without significant traffic demand;
  - German Airspace: requires an ARES5 without significant traffic demand.

5.2.1.3 Scenario Synopsis

The scenario describes the update of the NOP in the different planning phases with the available information of one big military event involving a significant airspace demand.

One year to 6 months before the event

As soon as TLP dates and initial information are known, the Airspace Manager (Coordinator AMC, i.e. AMC Belgium in this case, and other military AMCs) updates the NOP through its ASM booking system. The information is integrated in the appropriate NOP instance i.e. the Seasonal NOP. **[UC-NL-03 Provide large National or Multinational Exercises Plans]**

From 2 months until one week before the event

About two months before the event, details on the AS affected and times of reservation are known by the military actors. The Airspace Managers update the NOP (through their ASM Booking Systems) with the information on the event and their AS structures needs **[UC-NP-07 Submission of Airspace Reservation requests]**

The Network Manager analyse airspace requirements and publish the forecasted airspace demand in the NOP. **[UC-NL-04 Elaborate Airspace Demand Forecast]**

Airspace Managers consult the NOP to see the forecast AS usage on the AS structures needed. **[UC-NP-18 Capture and Analyse Airspace Organisation Data]**

The Network Manager assesses the demand capacity balance using the NOP **[UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase]** and initiates / leads when necessary the coordination process (CDM) in case of significant impact in the Network. **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Some bilateral co-ordinations (i.e. Belgium AMC and Belgocontrol in this particular scenario) have concluded. **[UC-NP-19 Identify the Optimum Airspace Configuration]**

The NOP becomes more accurate as it has been receiving additional information from all contributors.

From one week until D-1

One week before the event the final coordination and preparation starts and concludes with the preparation of the Daily Plan at D-1. **[UC-NP-21 Collaboratively Agree and Implement Airspace Configuration]**

The Network Manager publishes the Daily Plan in the NOP at D-1. **[UC-NP-25 Publish and Update Airspace Configuration]**

D Day

The Airspace Managers confirm the activation of airspace reservation (and de-activation at end of exercise) through their local ASM system. The status of airspace is updated in the NOP accordingly, and the information is made available to all concerned through their NOP interface(s). **[UC-NE-15 Update Airspace Status in Real Time]**

Post-Flight

After day of operations, the different actors provide their comments and feedback in the NOP to share knowledge and lessons learned. These are used to improve the network planning process when similar type of events have to be coped with. **[UC-NE-01 Monitor the Application of DCB/dDCB measures] [UC-NE-19 Assess Military KPIs Adherence]**

5.2.2 SCN-NOP1.2000 Special Social Event

5.2.2.1 Background

This scenario takes the example of the UEFA Champions, which is a major sport event in Europe that generates a punctual and significant flow of traffic on specific days. Each year it takes place in a given

location known well in advance, but the main flows of traffic cannot be anticipated as they depend on the final teams that classify for the Final.

5.2.2.2 Context and assumptions

In this particular scenario, the Champions League Final takes place in Madrid on Saturday. The players are Bayern Munich (German team) and Inter Milan (Italian team). Significant additional traffic is expected. Most of the additional football related traffic to Madrid will be from Germany and Italy, although there are additional general / business aviation flights from other countries.

There is no major disruption (i.e. exceptional weather conditions) happen on this day.

An AOP is implemented in the Airports concerned: Munich, Milan, Madrid and Torrejón;

Finalists are Bayern Munich (German team) and Inter Milan (Italian team);

The UEFA Champions League Final ACCs affected are EDMM, LECB, LECM, LFBB, LFEE, LFMM, LSAG, and LSAZ. ATFM scenarios may be defined to transit these areas.

Traffic Demand

- Football related: Charter flights from Germany and Italy destination Madrid;
- Business / general aviation: flights destination Torrejón (LETO).

Airports involved

At least Madrid and Torrejón airport (Munich and Milan also would be an added value); Torrejón is a non-coordinated airport that requires temporary coordination for flights at the days of the event.

ANSPs involved

- EDMM, LECB, LECM, LFBB, LFEE, LFMM, LSAG, LSAZ

AUs involved

- German and Italian carriers;
- Business aviation.

ATFCM Scenarios – specific routing required

Specific routings are agreed and are required from FPL filing. ATFCM measures (ATFCM scenarios) will be applied to ensure compliance (times based on entry to LECM airspace).

5.2.2.3 Scenario Synopsis

The main scenario triggers are the different information made available at different timeframes by different actors. The first information is expected in the medium term timeframe.

From 2 months until one week before the event

About two months before the event, the location hosting the final is confirmed. This information is published in the NOP by the LTM concerned or directly input by the NM. [**UC-NP-30 Provide Special Event Information and Impact**]

Potential traffic flows (depending on match finalists) can be identified. The Network Manager updates the traffic demand forecast with known flight intentions and publishes the information in the NOP. **[UC-NP-10 Enrich Historical Demand Forecast with incoming Flight intentions][UC-NP-11 Assess Predictability and Uncertainty of Demand Forecast][UC-NP-12 Publish / Share Demand Forecast]**

The Network Manager assesses the demand capacity balance using the NOP **[UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase]** and initiates / leads when necessary the coordination process (CDM) in case of significant impact in the Network. **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Some bilateral co-ordinations (i.e. between Madrid FM, LEMD, LETO and NM) have concluded. **[UC-NP-19 Identify the Optimum Airspace Configuration]**

From one week up to D-1

One week before the event, the final coordination and preparation start, which will conclude with the preparation of the Daily Plan. **[UC-NP-21 Collaboratively Agree and Implement Airspace Configuration]**

The Daily Plan is published in the NOP at D-1. **[UC-NP-25 Publish and Update Airspace Configuration]**

Airspace users fine-tune their Flight Planning. **[UC-NP-02 Update iSBT/SMT]**

D Day

The LTMs and the Network Manager monitor the traffic situation using the NOP. **[UC-NE-03 Notify TTO in addition to CTOT][UC-NP-17 Monitor Declared Capacity Values]**

Post OPS

After the day of operations, the different actors provide their comments and feedback in the NOP to share knowledge and lessons learned. These will be used to improve the network planning process during the next UEFA Champions. **[UC-NE-01 Monitor the Application of DCB/dDCB measures]**

5.2.3 SCN-NOP2.1000 Single Airport Weather Phenomena

All workflow descriptions will specifically be describing the actor's actions and roles during periods of weather phenomena at an airport. This particular scenario attempts to show actions taken on receipt of an 80% hazardous weather warning at Day -1.

Monitoring (D-3 to D-1)

The LTM maintains a general picture of weather at D-3 and identifies fog forecast to the NM, which may result in a reduction in ATM capacity at the airport, TMAs and en route sectors within their area of responsibility via information sharing on the NOP. **[UC-NP-31 Provide Network Weather Information and Impact] [UC-NP-14 Define / Update Sector / Airport Capacities][UC-NP-15 Capture and Maintain Capacity Data]**

Mitigation strategies are planned if the phenomena and reduced capacities may cause a potential DCB issue. **[UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase] [UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Initiate (D-1)

MET provider issues an 80% hazardous fog warning for an airport at Day-1 via the NOP; the first is issued at 10.00 and an update hazardous weather assessment at 1400. Communication is initiated between the LTM and the airport to gain a local ATC/MET view on receipt of the first hazardous weather assessment and again on receipt of the second warning (preferably by the NOP HMI but in Step 1 a phone call may be deemed more effective). Further communication is initiated with the MET Service Provider to confirm severity of phenomena and time periods. **[UC-NP-31 Provide Network Weather Information and Impact]**

The LTM then carries out an updated weather impact assessment for the airfield to determine whether there will be a capacity reduction. **[UC-NP-14 Define / Update Sector / Airport Capacities] [UC-NP-15 Capture and Maintain Capacity Data]**

The LTM then makes an updated DCB assessment. **[UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase]**

Solutions are identified between the actors (Airfield ATC and airfield operators, TMA and en route sectors and Airspace Users). Simulation (what-if action) can be carried out on HMI to support considered measures and checking compliance to KPIs. The LTM performs an analysis to assess actions required to minimise and absorb air holding within agreed airspace. Any expectation of non-standard holding will be coordinated in advance with ATC units concerned using CDM and via the NOP. **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Implement (D-1)

The solution of an arrival regulation for the airport is confirmed via the NOP (due weather and reduced capacity). The regulation is applied as per the hazardous weather agreement agreed by all stakeholders.

Implementation is achieved when the regulation has been effectively applied and communicated with NM, airport ATC, Airport Operators, TMA and En-Route sectors and Airspace Users. **[UC-NP-02 Update iSBT/SMT]**

Day of operation

The LTM monitors the solution and weather using the NOP with the MET Service Provider, ATC units, Airport Operators and Airspace Users adjusting measures as necessary **[UC-NE-03 Notify TTO in addition to CTOT] [UC-NP-17 Monitor Declared Capacity Values]**

Post-Flight

Analysis is undertaken to ascertain the effectiveness of measures taken, adherence to KPIs and reports back. **[UC-NE-01 Monitor the Application of DCB/dDCB measures]**

5.2.4 SCN-NOP2.2000 Single En-Route Weather Phenomena

This scenario attempts to show the actions taken when due weather En Route, a dynamic DCB calculation is made to avoid a potential demand/workload issue.

This particular scenario describes actions taken when Clear Air Turbulence has been reported by the National MET Service Provider above FL290. A level cap measure is required to present an A/C into a different sector to that originally planned.

Monitoring (D-1 to D Day)

The LTM maintains a general picture of weather at D-1 and identifies clear air turbulence to the NM, which may result in a reduction in ATM capacity within their area of responsibility via information sharing on the NOP. **[UC-NP-31 Provide Network Weather Information and Impact] [UC-NP-14 Define / Update Sector / Airport Capacities] [UC-NP-15 Capture and Maintain Capacity Data]**

Mitigation strategies are developed if the phenomena and capacity shortfall may cause a potential DCB issue. **[UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase] [UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Initiate (– 4 to 3 hours)

National MET Service Provider publishes information on CAT above FL290 via the NOP. **[UC-NP-31 Provide Network Weather Information and Impact]**

The LTM identifies 4/3 hours in advance a potential period of excessive demand/workload within the sector family group where capacity may be reduced due to this phenomena. **[UC-NP-17 Monitor Declared Capacity Values] [UC-NE-07 Detection of Demand Capacity Imbalances (Hot Spots)]**

Situation is monitored and measures are left until approximately 1.5 to 1 hour before EOBT to assess the maturing weather situation.

Negotiate (- 1.5 to 1 hour)

The LTM carries out an initial assessment to generate a list of potential solutions (what if tool). **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

The LTM then communicates the solution of a level cap scenario including the appropriate relevant actors (NM, FM, ATC, and Airspace Users) and the potential solution is discussed using CDM (preferably by the NOP but in Step 1 a phone call may be deemed more effective). The optimised solution is confirmed via the NOP, at which point ownership of the solution is transferred to the departure TMA. Any conflicts with KPIs are flagged up to the LTM. **[UC-NE-10 Coordination of the STAM solution] [UC-NE-11 Implement STAM solution]**

Implement (- 1 hour to 30 minutes)

Implementation is achieved when the dDCB plan has been effectively communicated and agreed with the relevant ATC actors within the departure TMA via the NOP. **[UC-NP-02 Update iSBT/SMT]**

LTM and ATC Supervisors monitors the effectiveness of measures and maturing weather situation using the NOP, in order to adjust, and optimise ATC protection, flight efficiencies and minimise

delays. **[UC-NE-04 Monitor deviation between Agreed and Actual Flight Profile] [UC-NP-17 Monitor Declared Capacity Values]**

Post-Flight

Analysis is undertaken to ascertain the effectiveness of measures taken, adherence to KPIs and reports back **[UC-NP-24 Monitor the Network Effect] [UC-NE-01 Monitor the Application of DCB/dDCB measures]**

5.2.5 SCN-NOP2.3000 Multiple Weather Phenomena

This scenario attempts to show the actions taken when several weather phenomena (En-Route and at airports) have been reported by the MET Service Provider. ATM measure(s) are required and may present an A/C into a different sector to that originally planned.

All work flow descriptions will specifically be describing the actor's actions and roles during periods of weather phenomena. This particular scenario attempts to show actions taken on receipt of several 80% hazardous weather warnings at Day -1.

The times provided in brackets are just an indication for guidance. Initiation, negotiation and implementation cannot be put in such specific time windows and can even take place in parallel depending on the weather phenomena and actors involved.

Monitoring (D-3 to D-1)

The NM maintains with the Weather information received from the MET provider, a general picture of weather at D-3 and identifies fog forecast at two major airfields, which may result in a reduction in ATM capacity at the airports, TMAs and en route sectors within their area of responsibility via information sharing on the NOP.

The NM general picture of weather also identifies significant weather phenomena (wind shear and CB forecast) which may result in a reduction in ATM capacity within areas of responsibility of different LTM via information sharing on the NOP. **[UC-NP-31 Provide Network Weather Information and Impact] [UC-NP-14 Define / Update Sector / Airport Capacities] [UC-NP-15 Capture and Maintain Capacity Data]**

Monitoring (D-1 to D Day)

Mitigation strategies are developed if the phenomena(s) and capacity shortfall(s) may cause potential DCB issue(s). **[UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase] [UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Initiate (D-1)

MET provider issues an 80% hazardous fog warning for two airports, wind shear and two CB forecasts for En-Route areas at Day-1 via the NOP; the first is issued at 10.00 and an update hazardous weather assessment at 1400. Communication is initiated between the LTMs and the airports to gain a local ATC/MET view on receipt of the first hazardous weather assessment and again on receipt of the second warning (preferably by the NOP HMI but in Step 1 a phone call may be deemed more effective). Further communication is initiated with the MET Service Provider to confirm severity of phenomena and time periods. **[UC-NP-31 Provide Network Weather Information and Impact]**

The LTMs then carries out an updated weather impact assessment for the airfields and the En-Route sectors to determine whether there will be capacity reductions. **[UC-NP-14 Define / Update Sector / Airport Capacities] [UC-NP-15 Capture and Maintain Capacity Data]**

The LTM then makes updated DCB assessments. **[UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase]**

Solutions are identified between the actors (Airfield ATC and airfield operators, TMA and en route sectors and Airspace Users). Simulations (what-if actions) can be carried out on HMI to support considered measures and checking compliance to KPIs. The Local short-term planning function performs an analysis to assess actions required to minimise impact within agreed airspace. Actions will be coordinated in advance with ATC units concerned using CDM and via the NOP. Local weather is also visible for local group supervisors or equivalent roles. **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Negotiate (D-1)

The LTMs carry out an initial assessment to generate a list of potential solutions (what if tool). **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

The LTM then communicates the solution including the appropriate relevant actors (NM, FM, ATC, Airports, and Airspace Users) and the potential solution is discussed using CDM (preferably by the NOP but in Step 1 a phone call may be deemed more effective). The optimised solution is confirmed via the NOP. The NOP also reflects the resulting changing KPIs. The NOP also reflects the resulting changing KPIs. Any conflicts with KPIs are flagged up to the LTM. **[UC-NE-10 Coordination of the STAM solution] [UC-NE-11 Implement STAM solution]**

Implement (D-1)

The solution(s) for the airports are confirmed via the NOP (due weather and reduced capacity). The regulation(s) are applied as per the hazardous weather agreement agreed by all stakeholders.

Implementation is achieved when the regulation(s) have been effectively applied and communicated with NM, airport ATC, Airport Operators, TMA and En-Route sectors and Airspace Users. **[UC-NP-02 Update iSBT/SMT]**

Initiate (– 4 to 3 hours)

MET Service Provider publishes updated information on the weather phenomena via the NOP. MET Service Providers makes the same information available to the users should they have other means to access it. **[UC-NP-31 Provide Network Weather Information and Impact]**

The LTMs identify a potential period of excessive demand/workload within the sector family group where capacity may be reduced due to the phenomena. **[UC-NP-17 Monitor Declared Capacity Values] [UC-NE-07 Detection of Demand Capacity Imbalances (Hot Spots)]**

Some mitigation measures may be proposed and started. Situation is continuously monitored and for some weather phenomena, measures are left until approximately 1.5 to 1 hour before EOBT according to the assessed maturing weather situation.

Negotiate (Up to - 1.5 to 1 hour)

The LTMs carry out an initial assessment to generate a list of potential solutions (what if tool). **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

The LTM then communicates the solution including the appropriate relevant actors (NM, FM, ATC, Airports, and Airspace Users) and the potential solution is discussed using CDM (preferably by the NOP but in Step 1 a phone call may be deemed more effective). The optimised solution is confirmed via the NOP. The NOP also reflects the resulting changing KPIs. Any conflicts with KPIs are flagged up to the LTM. **[UC-NE-10 Coordination of the STAM solution] [UC-NE-11 Implement STAM solution]**

Implement (- 1 hour to 30 minutes)

Implementation is achieved when the dDCB plan has been effectively communicated and agreed with the relevant ATC actors. **[UC-NP-02 Update iSBT/SMT]**

LTM and ATC Supervisors monitors the effectiveness of measures and maturing weather situation using the NOP, in order to adjust, and optimise ATC protection, flight efficiencies and minimise delays. **[UC-NE-04 Monitor deviation between Agreed and Actual Flight Profile] [UC-NP-17 Monitor Declared Capacity Values]**

Post-Flight

Analysis is undertaken to ascertain the effectiveness of measures taken, adherence to KPIs and reports back **[UC-NP-24 Monitor the Network Effect] [UC-NE-01 Monitor the Application of DCB/dDCB measures]**

5.2.6 SCN-NOP3.1000 Arrival Capacity Issue at Large Airport

This scenario attempts to show actions taken from D-1 of a demand capacity imbalance issue.

3722 **Monitoring (D-1)**

3723 The LTM monitors the DCB situation at Day – 1 at the airport via the NOP/AOP information where
3724 ATC capacity issues are predicted.

3725 **Initiate (D-1 to D Day)**

3726 The LTM issues an arrival capacity warning at D-1 via the NOP/AOP. **[UC-NP-14 Define / Update**
3727 **Sector / Airport Capacities] [UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase]**

3728 The LTM considers various measures; simulation (what-if action) can be carried on HMI to consider
3729 potential measures and to check KPI compliance. **[UC-NP-22 Analyse and Prepare DCB/dDCB**
3730 **Measures]**

3731 **Negotiate (–4 to 3 hours)**

3732 Communication is initiated between the NM and LTM to gain a local view and an indication of capacity
3733 at approximately four hours before the expected capacity problem. (preferably by the NOP/AOP but in
3734 Step 1 a phone call may be deemed more effective). **[UC-NP-17 Monitor Declared Capacity Values]** The
3735 LTM assesses whether measures are required. **[UC-NE-07 Detection of Demand Capacity Imbalances**
3736 **(Hot Spots)]**

3737 Potential solutions are identified between the actors (Airport ATC, Airport Operators, and Airspace
3738 Users); the LTM then employs a what-if tool to analyse how efficient they are in minimising and
3739 absorbing air holding within agreed airspace. Any expectation of non-standard holding is coordinated
3740 in advance with ATC units concerned using CDM and via the NOP/AOP. **[UC-NP-22 Analyse and**
3741 **Prepare DCB/dDCB Measures]**

3742 The decision is agreed between all actors to apply TTAs as a solution to the airport arrival capacity
3743 issue. TTAs are computed and communicated via the NOP to all airspace users concerned. **[UC-NE-**
3744 **16 Communicate TTA/TTO Information]**

3745 This feeds through to the destination airport where an airport impact assessment is made looking at
3746 the impact of the TTA on next departure rotations. In coordination with the destination airport, the
3747 airspace user may propose possible TTA improvements to mitigate knock-on delays and the airport to
3748 avoid potential over deliveries. The NM assesses the proposed TTA into the overall Network situation
3749 and impact, and feeds back confirmation to the destination airport. **[UC-NP-23 Prepare and Coordinate**
3750 **DCB Measures using TTA]**

3751 **Implement (-3 to 1 hour)**

3752 The confirmed TTA is communicated to all concerned airspace users via the NOP. **[UC-NE-02 Notify**
3753 **TTA in addition to CTOT]**

3754 Implementation is achieved when the TTA measures have been effectively applied and
3755 communicated with the LTM, FM, NM, departure airfields, destination airport ATC, TMA, En-Route
3756 sectors and Airspace Users. **[UC-NP-02 Update iSBT/SMT]**

3757 The LTM monitors the solution using the NOP, to ensure that aircraft delivery is as expected to take
3758 maximum advantage of runway capacity and also to ensure that air holding does not exceed average
3759 holding for any considerable period of time. **[UC-NE-04 Monitor deviation between Agreed and Actual**
3760 **Flight Profile] [UC-NP-17 Monitor Declared Capacity Values]**

3761 **Post-Flight**

3762 Analysis is undertaken to ascertain the effectiveness of measures taken, adherence to KPIs and
3763 reports back. **[UC-NE-01 Monitor the Application of DCB/dDCB measures]**

3764 5.2.7 SCN-NOP3.2000 Anticipated Issue on Apron

3765 This scenario attempts to show the actions taken from D-1 of urgent WIP required which does not
3766 affect the whole airport but a number of stands at one of two terminals at a busy airport

3767 **Monitoring (D-1)**

The Airport Operator notifies the LTM, FM, NM and airport ATC via the NOP/AOP of urgent WIP required on the apron affecting one of two terminals at the airport **UC-NP-32 Exchange Updated Airport Capacity Plan with no demand capacity imbalances detected**

The APOC will inform the LTM of the impact on the airport (taxiways, stands unavailable, etc.) to the LTM. **[UC-NP-14 Define / Update Sector / Airport Capacities] [UC-NP-15 Capture and Maintain Capacity Data]**

The LTM carries out an initial demand/capacity assessment for the airport. **[UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase]** Simulation (what-if action) can be carried on HMI to support considered measures; adherence to KPIs where possible shall be maintained. **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Initiate (D-1 to D Day)

Communication is initiated between the NM and LTM to gain a local view and an indication of the time limit of the problem, scale and impact of potential stand capacity problems. (preferably by the NOP/AOP but in Step 1 a phone call may be deemed more effective).**[UC-NP-14 Define / Update Sector / Airport Capacities] [UC-NP-15 Capture and Maintain Capacity Data] [UC-NP-20 Detection of Demand Capacity Imbalances in the Planning Phase]**

The LTM identifies possible solutions and coordinates with other concerned actors (NM, FM, ATC Tower, Airport Operators, TMA and En-Route sectors and Airspace Users). The LTM then performs an analysis to assess actions required to minimise terminal and airfield congestion and air holding over prescribed limits (e.g. 20 minutes). Any expectation of non-standard holding will be coordinated in advance with ATC units concerned using CDM and via the NOP/AOP. **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Day of operation

Communication is initiated between the NM and LTM and the potential solutions of TTAs are discussed (preferably by the NOP/AOP but in Step 1 a phone call may be deemed more effective) and agreed. **[UC-NP-23 Prepare and Coordinate DCB Measures using TTA]**

TTAs are computed by NM and communicated via the NOP to all airspace users concerned. **[UC-NE-16 Communicate TTA/TTO Information]**

This feeds through to the destination airport where an airport impact assessment is made looking at the impact of TTAs on next departure rotations. The destination airport, in coordination with the airspace user, may propose possible TTA improvements to mitigate knock-on delays; since traffic to the concerned terminal departs from only three airports, the proposed TTAs would affect this traffic only. The NM assesses the proposed TTAs into the overall Network situation and impact, and feeds back confirmation to the destination airport. **[UC-NP-23 Prepare and Coordinate DCB Measures using TTA]**

The confirmed TTA is communicated to all concerned airspace users via the NOP **[UC-NE-02 Notify TTA in addition to CTOT]**. Implementation is achieved when the TTA plan has been effectively communicated and agreed with the relevant actors via the NOP/AOP **[UC-NP-02 Update iSBT/SMT]**

The LTM with ATC Sups monitors the effectiveness of measures and maturing capacity situation in order to adjust and optimise ATC protection, flight efficiencies and minimise delays. **[UC-NE-04 Monitor deviation between Agreed and Actual Flight Profile] [UC-NP-17 Monitor Declared Capacity Values]**

Post-Flight

Analysis is undertaken to ascertain the effectiveness of measures taken, adherence to KPIs and reports back. **[UC-NE-01 Monitor the Application of DCB/dDCB measures]**

5.2.8 SCN-NOP3.3000 Sudden Reduction in Runway Capacity

This scenario attempts to show the actions taken due to a sudden reduction in runway capacity due a/c burst tyre on landing at large dual runway airport leading to Single Runway Operations, and why TTAs are applied as opposed to an arrival regulation.

Monitoring (Execution)

The LTM maintains a general picture of the arrival demand via information sharing on the NOP/AOP after an a/c bursts a tyre on landing thus closing the arrival runway for an unspecified time. **[UC-NE-18 Provide Critical Event Information and impact] [UC-NP-14 Define / Update Sector / Airport Capacities] [UC-NP-15 Capture and Maintain Capacity Data] [UC-NE-07 Detection of Demand Capacity Imbalances (Hot Spots)]**

Initiate (Execution)

Communication is initiated between the LTM, FM, Airport ATC, NM and Airport Operators to provide a local view and indication of the time scales of the problem and the likelihood of any capacity issues affecting the airfield. Airport ATC and Airport Operators expect the incident to take approximately 20 minutes to resolve (preferably by the NOP/AOP but in Step 1 a phone call may be deemed more effective). **[UC-NP-17 Monitor Declared Capacity Values] [UC-NE-07 Detection of Demand Capacity Imbalances (Hot Spots)]**

Solutions are identified between the actors (LTM, FM, ATC Tower, Airport Operators, TMA and en route sectors and Airspace Users). The LTM then performs an analysis to assess actions required to minimise terminal and airport congestion and air holding over 20 minutes within agreed airspace. Any expectation of non-standard holding is coordinated in advance with ATC units concerned using CDM and via the NOP/AOP. A Network impact assessment is made by the LTM via a NOP-based what-if tool. **[UC-NP-22 Analyse and Prepare DCB/dDCB Measures]**

Negotiate (Execution)

Communication is initiated between the NM, FM, LTM, ATC Tower and Airport Operators where the potential solutions are discussed. (preferably by the NOP/AOP but in Step 1 a phone call may be deemed more effective). **[UC-NP-23 Prepare and Coordinate DCB Measures using TTA]**

Implement (Execution)

TTAs are applied for the airport. (An arrival regulation is deemed as inappropriate due to the length of time it takes for it to become effective, however if the incident will take some hours to resolve then an arrival regulation will be considered).

If the a/c is already being managed by AMAN then the flight will be issued with a CTA. If the runway issue is prolonged and the a/c is not yet airborne the TTA information feeds through to the AOP via the NOP **[UC-NE-16 Communicate TTA/TTO Information]** where an airport impact assessment is made looking at the impact of the destination airport and proposed possible TTA improvements. This then feeds back to the NOP with any TTA improvements. The NMF via the NOP/AOP assess the severity of the impact on all arrival aircraft. All other actors are communicated with via the NOP/AOP. **[UC-NP-23 Prepare and Coordinate DCB Measures using TTA]**

Implementation is achieved when the TTA plan has been effectively communicated and agreed with the relevant actors concerned via the NOP/AOP. **[UC-NE-02 Notify TTA in addition to CTOT] [UC-NP-02 Update iSBT/SMT]**

The LTM and ATC Sups monitors the effectiveness of measures and maturing capacity situation in order to adjust and optimise ATC protection, flight efficiencies and minimise delays. **[UC-NE-04 Monitor deviation between Agreed and Actual Flight Profile] [UC-NP-17 Monitor Declared Capacity Values]**

Post-Flight

Analysis is undertaken to ascertain the effectiveness of measures taken, adherence to KPIs and reports back. **[UC-NE-01 Monitor the Application of DCB/dDCB measures]**

5.2.9 SCN-NOP4.1000 AOP/NOP Medium term - The Steady State

5.2.9.1 Scope of Scenario

The scope of the scenario is the information exchange between AOP and NOP. Although defined as starting from six days before the start of the “Day of Operation” (D-6), in practice it is a continuous rolling process.

The scenario describes the information elements to be exchanged and the actions/activities undertaken by the AOP and NOP stakeholders with this initial and updated information.

5.2.9.2 Assumptions

Airline enters the schedule information into the AOP for both arriving and departing flights. It includes ICAO ARCID with the IATA FLID in the schedule information. As the ICAO ARCID is define far later than schedule in most of airline (e.g. only max 1 month before the season in AFR), schedule in advance do not mandatorily require ICAO ARCID. It is made in coordination with the operator.

The NM can coordinate schedule information inconsistencies with the airline (AU) and relevant AOPs when schedule information contained in the AOPs of the departing and arrival aerodromes is inconsistent, ambiguous or incomplete.

5.2.9.3 Scenario description

The scenario starts at D-6, six days before the start of the “Day of Operation” (D) **UC-NP-39 Airport Traffic Demand Exchange**

1. The AOP schedule information is available to the NOP via SWIM.
2. The NOP updates with the available AOP schedule information
3. The NOP makes the schedule information available to its stakeholders (including other AOPs).
4. The NM creates Consolidated Flight Intentions (CFI) with 4D trajectories to logically connect the departure and arrival schedule information.
5. The CFIs are available on the NOP.
6. The NM will identify inconsistencies and ambiguities in the Airport Schedule Information i.e. when an AOP’s departure flight cannot be connected to an arrival flight in the AOP of the destination airport.
7. The NM (through the NOP) will inform the relevant AOPs of the identified inconsistency / ambiguity.

5.2.10 SCN-NOP4.2000 Airport Capacity and Event Plan information exchange between AOP and NOP (The Steady State)

5.2.10.1 Scope of Scenario

The scope of the scenario is the information exchange between AOP and NOP. Although defined as starting from six days before the start of the “Day of Operation” (D-6), in practice it is a continuous rolling process.
The scenario describes the information elements to be exchanged and the actions/activities undertaken by the AOP and NOP stakeholders with this initial and updated information.

5.2.10.2 Assumptions

- The AOP is implemented at the relevant airport.
- The NOP is implemented.
- The AOP and NOP are logically connected by means of SWIM infrastructure
- The Airport Capacity Plan spans a period of up to six days ahead, starting from and including the “Day of Operation”.
- Any relevant change to the actual and forecasted Airport Capacity and Events are included in the AOP and immediately exchanged with the NOP.

5.2.10.3 Scenario description

The scenario starts at D-6, six days before the start of the “Day of Operation” (D).

The responsible airport stakeholder(s) determine and update the Airport Capacity and Event Plan for each of the next six days and includes that planning in the AOP.

Where practical capacity reductions are anticipated, then related event information (reason like weather, infrastructure etc.) and their mitigations are included in the AOP.

The AOP exchanges the Airport Capacity and Event Plan Information as also well as any other update with the NOP.

The NOP publishes the received Airport Capacity and Event Plan information including updates.

The NM collects all of the forecasted traffic demand updates and the available capacity plan updates from the Airports and Airspace sectors and uses these to assess the Network Impacts at D-2. The outcome of these assessments is the capacity distribution over the network (both Airport Capacities and Sector Capacities) which are included in the NOP and available (visible) for all stakeholders.

When, for whatever reason, the Airport Capacity and Event Plan is changed, these changes and the reason for these changes are automatically shared with the NOP [**UC-NP-32 Exchange Updated Airport Capacity Plan with no demand capacity imbalances detected**].. The NOP publishes these updates, updates the capacity plan and assesses the impact of the changes.

In case of a significant forecasted demand/capacity imbalance (large impact and high probability), the NM employs DCB measures in coordination with the relevant stakeholders (Airspace Users, airport, local ANSP) to reduce the impact on the network (Network-CDM).

Special events can in particular have a big impact on the airport capacity plan and network plan. The airport will provide to NOP information about special events in early planning–i.e. about two months before the event [**UC-NP-30 Provide Special Event Information and Impact**]. In its turn NOP will provide to AOP information, actions and decisions agreed with all impacted actors for dealing with special events [**UC-NE-18 Provide Critical Event Information and impact**]

Forecasted/expected Airport Capacity reductions within the timeframe of six days (D till D-6) ahead are normally weather related (forecasted strong wind/storm or winter conditions) or planned maintenance work to airport infrastructure. Within these six days look ahead time there are sufficient possibilities to adjust traffic demand and traffic flows where necessary.

Unplanned Airport Capacity reductions logically take place on the day of operation and need to be taken care for during the next few hours or the remaining part of the day of operation (D). Unplanned Airport Capacity reductions can be caused by runway blockage, failing infrastructure or specific and hard to forecast weather phenomena like thunderstorms or low visibility conditions. In these cases it is important for the NM to know to which extent the traffic flows to the relevant airport need to be adjusted and which nearby airports have available capacity to accommodate diverted flights [UC-NP-33].

Sudden increases of airport demand [**UC-NE-21 Manage unplanned increase in traffic demand (diverting flights)**] can be caused by accommodating diverting aircraft or from business aviation's provision of *on-demand* air transportation services for their clients. Knowledge / visibility of Airport Capacity surpluses are required to plan these types of flight at short notice [**UC-NP-34 Manage unplanned increase in traffic demand (Business aviation)**].

Timely and accurate update of the Airport Capacity Plan and automatic exchange of that information with the NOP will assist in a fast and efficient recovery of operations following a period of capacity disruption [**UC-NP-35 Airport capacity recovery from a disrupted situation**].

5.2.11 SCN-NOP4.3000 Flight planning information exchange between AOP and NOP (The Steady State)

5.2.11.1 Scope of scenario

The scope of the scenario is the information exchange between AOP and NOP (both ways). Although defined as starting at the beginning of the short term planning phase (24 hours before the start of the "Day of Operation") and ending at the end of the "Day of Operation", in practice it is a continuous rolling process.

The scenario describes the information elements to be exchanged and the actions/activities performed by the AOP and NOP stakeholders with this initial and updated information.

5.2.11.2 Assumptions

- The AOP is implemented at both ends of the flight; at the flight's origin and destination airports (network ground nodes).
- The NOP is implemented.
- The AOPs and NOP are logically connected by means of SWIM infrastructure.
- Any relevant update to the AOP or NOP is immediately communicated.
- The Airports' Runway Configuration Plans are available in the AOP at least 24 hours before the start of "Day of Operations" (D-1).
- The Airspace Users flight intentions/plans are available in the NOP at least 24 hours before the start of "Day of Operations" (D-1).
- The Airport Transit Views (ATV – each flight arrival is connected to a flight departure[9]) are available in the AOP at least 24 hours before the start of "Day of Operations" (D-1).
- NOP utilises extended FPL (eFPL) information in ELDT calculations.
- API and DPI is exchanged from AOP(s) to NOP
- Flight Progress Information is exchanged between NOP and AOP(s).
- The NOP traffic demand gap continues to exist between the end of pre-tactical planning that uses flight intentions and the acceptance of filed ICAO flight plans (up to three hours before EOBT). The NOP does not mix flight intentions and flight data from the two sources.

5.2.11.3 Scenario description

The scenario starts at D-1, 24 hours before the start of the "Day of Operations".

Runway Configuration Plan

The responsible stakeholder at the airport updates the Runway Configuration Plan for the "day of Operation" taking into account the planned availability of runway infrastructure (maintenance/inspection plan), the planned/scheduled traffic demand and distribution, the local operating rules (e.g. noise abatement procedures/regulations, curfew etc.) and also the weather forecast for the "Day of Operation". The AOP exchange the Runway Configuration Plan and any update thereafter with the NOP [**UC-NP-36 Exchange Updated Runway Configuration Plan at D-1**].

During the day of operation, the Runway Configuration Plan is updated. These updates can be initiated due to changing weather conditions, changes in traffic distribution and changing runway availability. Any update to the Runway Configuration Plan is included in the AOP and automatically shared with the NOP [**UC-NE-23 Exchange Updated Runway Configuration Plan at Day of Operation (D)**].

Arrival / Departure Planning Information (API / DPI)

On the day of operation, at T-x hours, the AOP provide the NOP with flight specific API and DPI information. This information includes assigned arrival/departure runway and also assigned STAR/SID based on the most recent flight information provided by the NOP.

The NOP recalculates the 4D flight profiles and provides updated flight progress information (ELDT's and ETOT's) [**UC-NE-24 Exchange of API and DPI**].

The AOPs update their arrival and departure demand forecasting based on these updated flight progress information (ELDT's / ETOT's). They assess the impact of updated ELDTs and ETOTs on

[9] There are different types of ATV. A flight arrival might be connected to a flight departure that in practice is not an airborne segment but a towing movement to a maintenance area or a long term parking position. The different ATV types are described in the 6.2 DOD.

their resource availability (DCB analysis) and also as well as on the turn-around process [**UC-NE-25 Turn around delay, delayed outbound flight**].

In case the planned departure segment of the ATV is impacted, the DPI is updated and included in the AOP. This information is exchanged with the relevant Airspace User and the NOP.

The airport performance monitoring service of each airport (= function within the AOP) continuously monitors the operational performance and where pre-agreed threshold are exceeded, triggers an alert/warning.

Performance degradation can be caused by an unplanned reduction in airport (often runway) capacity [**UC-NE-26 Reduction in airport (runway) capacity**] or an unplanned increase of demand [**UC-NE-22 Demand increase (additional unplanned flights)**]. Both cases have impact on the API and DPI with respect to assigned arrival/departure runway and respective STAR/SID. Updated information is provided to the NOP to allow the NOP to update/re-calculate the 4D flight profiles.

In case of disruptions or deviation from the plan, the Airport Performance Management service proposes changes to the plan (e.g. runway configuration change or flight adjustments/cancellations). The relevant stakeholders decide on these changes and once agreed and implement those changes. The NM (NOP) is included in this decision process to assess the feasibility of proposed changes in case flight arrival and/or departure times are shifted [**UC-NE-27 Airport traffic distribution adjustment**].

The NOP accepts and updates itself based upon API and DPI status information. The NOP accepts and disseminates flight progress information to the AOPs and AUs. E.g., to cancel an unscheduled flight [**UC-NE-28 Dissemination of Flight Progress information – Flight suspension from AOP DPI process**]**,** to divert a flight [**UC-NE-29 Dissemination of Flight Progress information – Flight diverted from AOP API process**].

The scenario ends at the end of “day of Operation”.

5.2.12 SCN-NOP4.4000 Daily Plan Monitoring

5.2.12.1 Background

This scenario shows how Network Performance Monitoring is used in the updating process of the Network Daily Plan at D-1 and continues throughout the execution at D day and at Post Flight phases.

5.2.12.2 Context and Assumptions

In this scenario, a Daily Plan has been coordinated and is ready to be published at D-1. The NOP will publish it after evidence is obtained that traffic demand can be managed by all local traffic managers (ATC and Airports), as no change has been reported either on traffic demand or in their declared capacity values and no impact on punctuality is envisaged throughout any unit,

Monitoring of deviations on traffic demand and/ or available capacity is monitored during the execution phase at D day and no significant change is detected that may have an impact on Network Performance.

During Post Flight Analysis, no significant impact on traffic predictability or punctuality is detected as no Demand Capacity imbalance has been produced during execution.

Actors Involved

Network Manager, LTMs, FMPs and Airport Operators

5.2.12.3 Scenario Synopsis

D-1 Monitoring

The daily plan, after been coordinated with all LTMs along the week is prepared by the NOP **[UC-NP-21 Collaboratively Agree and Implement Airspace Configuration]** taken into account sector and airport capacities published by ANSPs and Airports in the NOP during the medium term planning, providing

clear description of the up-to-date available capacities for a given time period**, [UC-NP-14 Define / Update Sector / Airport Capacities],** as well as the assessment of complexity and sector workload (complexity indicators) published by Local Capacity Managers; [**UC-NP-13 Assess Complexity and Sector Workload]**..

The Network Manager captures, maintains, and makes accessible on a need-to-know basis, the sector capacities using the NOP [**UC-NP-15 Capture and Maintain Capacity Data]**. No traffic imbalance is detected, so the NOP publishes the Daily Plan at D-1 **[UC-NP-25 Publish and Update Airspace Configuration]**

D Day Execution Monitoring

During execution, the performance of the Network in relation to daily targets will be monitored by the system **[UC-NP-17 Monitor Declared Capacity Values]**. Agreed threshold level deviations - where practicable for some KPIs - will automatically trigger NOP alerts to the concerned and relevant stakeholders. NMOC supervises Network Performance evolution during the day, monitoring the declared capacity values available from the NOP against the predicted or actual traffic flow and complexity values **[UC-NP-17 Monitor Declared Capacity Values]** and keeps track of the application of dDCB measures with relevant statistical metrics and performance indicators to assess their efficiency.

No changes into Demand and /or capacity values is produced, and no major deviation (impacting the Network) of actual trajectories from their agreed profiles is identified so no special action needs to be taken during the execution phase

Post Flight Monitoring

During the Post-flight phase, information published in the NOP is used by the Network Manager to analyse traffic deviations and their operational performance. Deviation from the established performance targets is assessed within the Operational KPIs; i.e.; Predictability, Flight Efficiency, Punctuality and Flexibility **[UC-NE-30 Post-OPS Analysis of Network adherence to Operational Performance KPIs]**

5.2.13 SCN-NOP4.5000 Daily Plan Monitoring and DCB Unbalance

5.2.13.1 Background

This scenario shows how Network Performance Monitoring is used in the updating process of the Network Daily Plan at D-1 and continues throughout the execution at D day and at Post Flight phases. During execution, at day D day, a Local Capacity Manager detects a demand-capacity imbalance, which launches a STAM procedure to solve the Hot Spot. At Post Analysis phase, complete assessment of Performance Impact is done and lessons learnt are integrated in the NOP

5.2.13.2 Context and Assumptions

In this scenario, a Daily Plan has been coordinated and is ready to be published at D-1. The NOP will publish it after evidence is obtained that traffic demand can be managed by all local traffic managers (ATC and Airports), as no change has been reported either on traffic demand or in their declared capacity values and no impact on punctuality is envisaged throughout any Network unit,

While monitoring of deviations on traffic demand and/ or available capacity during the execution phase at D day, a Hot Spot situation is detected by a Local Capacity Manager.

A coordination process is launched to solve the imbalance situation by means of STAM procedures

Three destination Airports are affected by the traffic flow crossing the Hot Spot

A what-if procedure to assess the impact of the proposed STAM solution is started. Two possible outcomes from this scenario are considered:

1. The what-if analysis can be completed and an optimum performance solution can be applied
2. What-if analysis cannot be performed and a solution based on expert judgement of both, Local Traffic Manager and NMOC, is applied

During the Post Flight phase, analysis of the performance impact of the STAM solution both on the Network and the affected airports is done.

In order to integrate lessons learn in the NOP, further analysis is addressed by comparing actual performance impact of the selected solution with other alternative solutions (impact assessment not done at execution)

Actors Involved

Network Manager, LTM, FMPs and Airport Operators

5.2.13.3 Scenario Synopsis

D-1 Monitoring

The daily plan, after been coordinated with all LTMs along the week is prepared by the NOP **[UC-NP-21 Collaboratively Agree and Implement Airspace Configuration]** taken into account sector and airport capacities published by ANSPs and Airports in the NOP during the medium term planning, providing clear description of the up-to-date available capacities for a given time period**, [UC-NP-14 Define / Update Sector / Airport Capacities],** as well as the assessment of complexity and sector workload (complexity indicators) published by Local Capacity Managers; [**UC-NP-13 Assess Complexity and Sector Workload]**..

The Network Manager captures, maintains, and makes accessible on a need-to-know basis, the sector capacities using the NOP [**UC-NP-15 Capture and Maintain Capacity Data]**. No traffic imbalance is detected, so the NOP publishes the Daily Plan at D-1 **[UC-NP-25 Publish and Update Airspace Configuration]**

D Day Execution Monitoring

During the execution phase, the NM monitoring function monitors the declared capacity values available from the NOP against the actual traffic flow and complexity values **[UC-NP-17 Monitor Declared Capacity Values]**.

A Local Traffic Manager detects a Hot Spot by monitoring the balance between demand and capacity in real time (starting 4 hours before entry), analysing entry and occupancy counts, and comparing them respectively with situational traffic Capacity values and Occupancy Traffic Monitoring values **[UC-NE-07 Detection of Demand Capacity Imbalances (Hot Spots)].**

After the Hot Spot detection, the LTM performs an analysis of different parameters to determine the nature of the hot spot and to identify and prepare a STAM solution for Flow Measures **[UC-NE-09Analysis and Preparation of the STAM Solution for Flow Measures]**

The Local Traffic Manager selects measures and coordinates through the system with all partners affected by the Hot Spot. The system proposes relevant partners to coordinate with, depending on flight profile **[UC-NE-10 Coordination of the STAM solution]** The DCB measures proposed by the LTM is escalated to the Network Manager for coordination and arbitration at regional level [**UC-NE-12Escalation to Network Manager]**

The Network Manager will initiate a What-if procedure by analysing the impact of the LTM DCB proposal in downstream sectors **[UC-NE-31 Network Impact Assessment of dDCB Measures proposed by LTM]** and the impact assessment received from the affected Airports upon the impact assessment request of the NM to Airports **[UC-NE-32 Network Impact Assessment of Airports AOP Changes].**

The NMOC will cascade down to the LTM the Network Performance impact resulting from the What-If procedures and /or expert judgment for final coordination of DCB measures [**UC-NE-12Escalation to Network Manager]**

The Local Traffic Manager implements and promulgates the STAM measures by publishing it in the NOP **[UC-NE-11 Implement STAM solution**]

All concerned Actors input information (e.g. changes to capacity, trajectories, stand allocation plans etc.) into the System, which is dynamically updating the Network Operations Plan. The System keeps

all actors informed about the Network Operations Plan updates. This action continues throughout the remaining phases of flight **[*UC-NE-13 Dynamically Updating the NOP*]**

The NMOC supervises Network Performance evolution during the day monitoring the declared capacity values available from the NOP against the actual traffic flow and complexity values **[UC-NP-17 Monitor Declared Capacity Values]** and keeps track of the application of dDCB measures with relevant statistical metrics and performance indicators to assess their efficiency **[UC-NE-01 Monitor the Application of DCB/dDCB measures]**

Post Flight Monitoring

During Post-flight phase, information published in the NOP is used by the Network Manager to perform a complete analysis of the Daily Plan vs. Actual situation.

Deviations of the declared capacity values available from the NOP against the actual traffic flow and complexity values **[UC-NP-17 Monitor Declared Capacity Values]** and the adherence of trajectories to agreed profiles using information from the NOP **[UC-NE-04 Monitor deviation between Agreed and Actual Flight Profile**] are analysed and their impact on Network Performance and their deviation from the established performance targets is assessed within the Operational KPIs; i.e.; Predictability, Flight Efficiency, Punctuality and Flexibility **[UC-NE-30 Post-OPS Analysis of Network adherence to Operational Performance KPIs]**

Both, in scenario outcome 1 and 2, analysis are performed:

1. Of the impact on Network Performance of the implemented DCB solution **[UC-NE-01 Monitor the Application of DCB/dDCB measures]**
2. Of the potential performance impact of other possible DCB alternatives used in the What-If procedures:
    a. Impact on downstream sectors [**UC-NE-31 Network Impact Assessment of dDCB Measures proposed by LTM]** and
    b. Impact on destination Airports published in their AOPs and updated in the NOP during the What-If procedures at execution [**UC-NE-32 Network Impact Assessment of Airports AOP Changes**]

Both, the result of the analysis of actual trajectories flown vs. Daily Plan and the analysis of the other alternatives considered during the What-If procedures are published in the NOP as lessons learnt from the procedures followed in the solution of the Hot Spot. In the analysis, the identified causes producing the DCB imbalance and the Performance deviation from the established Key Performance Targets will be addressed.

6 Requirements

6.1 NOP Requirements

6.1.1 Introduction

In order to ensure the “Collaborative NOP” concept coverage completeness, the NOP is consolidating the requirements (functional and non-functional) and validations (objectives, scenarios and use cases) to ensure coherency, identify gaps, establish common definitions and ensure traceability between NOP and other customer OFAs.

Note that this chapter contains the requirements with an updated status after performing the Step 1 validation exercises. For the requirements set as validated and not “covered” by any validation objective, it concerns “Live Trials” with OPS utilisation (and not in SESAR validation exercise). Some Requirements for the NOP have been implemented (at least partially) in OPS and as such, have been validated via day-to-day operations (marked as Live Trial in “Valid Method” column and further explained into the rationale).

Any new part of concept set as "Validated" should be "<Satisfied>" by a Technical Specification, implementing the concept in the system, and in status "Validated".

6.1.2 Sources

This OSED covers requirements from two main sources:

- NOP requirements needed to satisfy customer OFAs’ requirement (list of concerned OFAs in Table),
- Requirements produced by the P07.06.01 project for the NOP area not already covered by previously referenced OFAs (METEO, Network Performance management, AOP/NOP integration, support to NM function and Non-functional aspects).

In the table below is listed:

- Customer OFAs analysed to consolidate the NOP requirements,
- NOP-related processes,
- OSEDs and Artefacts from which the OFA requirements were sourced.

OFA	NOP-related processes (Cf. Chapter 3)	Corresponding OSED and other artefact analysed
OFA03.01.03 Free Routing	Airspace Structures Design §3.2.2.1, §3.2.3.3, §3.2.4.5 Airspace Management §3.2.2.5, §3.2.3.6, §3.2.4.5	See Table 1 for latest references
OFA03.01.04 Business and Mission Trajectory	Airspace Users’ Planning / Trajectory Management §3.2.2.7, §3.2.3.5, §3.2.4.4	See Table 1 for latest references
OFA04.01.02 Enhanced Arrival and Departure Management		See Table 1 for latest references
OFA05.01.01 Airport Operations Management	Airport Planning §3.2.2.4, §3.2.3.4, §3.2.4.3	See Table 1 for latest references
OFA05.03.01 Airspace	Airspace Structures Design §3.2.2.1, §3.2.3.3, §3.2.4.5	See Table 1 for latest references

OFA	NOP-related processes (Cf. Chapter 3)	Corresponding OSED and other artefact analysed
Management and FUA	Airspace Management §3.2.2.5, §3.2.3.6, §3.2.4.5	
OFA05.03.04 Enhanced ATFM processes	Airspace Demand and Traffic Forecast §3.2.2.2, §3.2.3.2, §3.2.4.1 ACC Capacity Planning §3.2.2.3, §3.2.3.3, §3.2.4.2 Significant Event Planning / Monitoring (incl. Weather) 3.2.2.6, §3.2.3.8, §3.2.4.7 DCB/dDCB §3.2.2.7, §3.2.3.9, §3.2.4.8	See Table 1 for latest references
OFA05.03.06 UDPP	Airspace Users' Planning / Trajectory Management §3.2.3.5, §3.2.4.4	See Table 1 for latest references
OFA05.03.07 Network Operations Planning	Network Performance Planning / Monitoring §3.2.2.9, §3.2.3.10, §3.2.4.9	
ENB02.01.02 AIM/MET	Airspace Users' Planning / Trajectory Management §3.2.2.7, §3.2.3.5, §3.2.4.4	See Table 1 for latest references

Table 30: OFAs mapping onto NOP-related processes

6.1.3 Traceability

The traceability is ensured via:

- a "*SATISFIES*" link between P07.06.01 OSED's requirement (s) and requirement from DOD,
- a "*SATISFIES*" link between P07.06.01 OSED's requirement (s) and requirement from customer's OFA,
- a "*APPLIES_TO*" link to the OFA05.03.07.

These links are maintained into the DOORS tool, allowing to baseline requirements and facilitate the propagation and impact checking of any future change or update of a requirement.

It is thought that traceability is complete as long as all the sources are confirmed positively as being identified in above table: "*Table 30: OFAs mapping onto NOP-related processes*".

6.1.4 Method

In order to extract and correlate the NOP aspects coming from all the above customer OFAs, the following method is used:

1. Artefacts related to requirement listed for each OFA (latest OSED (from the SJU extranet or asked the OFA leader) and other requirement document. The dedicated artefact are listed in the above "*Table 30: OFAs mapping onto NOP-related processes*" and their location is detailed in the associated reference (dynamic hyperlink pointing to the item in chapter "*7.2 Reference Documents*")
2. Chapters referring to the Network Operation Plan or SWIM analysed, identifying impacts for P07.06.01

3. Each requirement analysed (including pasts analysis already made with P07.06.01 team) to identify NOP services, NOP data & need of P07.06.01 support
4. The needs are correlated (grouping): regroup similar needs in main topics, create services list to prepare rational & requirements, create data list with associated justifications, keep traceability for DOORS links
5. Meet the project members to clarify any pending question
6. Captured all this analysis into a dedicated artefact (available for already covered OFA)
7. Elicit resulting requirements (based on common template - Volere) which allows OSED update
8. Link each created or existing requirement with OFA's requirement (into DOORS)

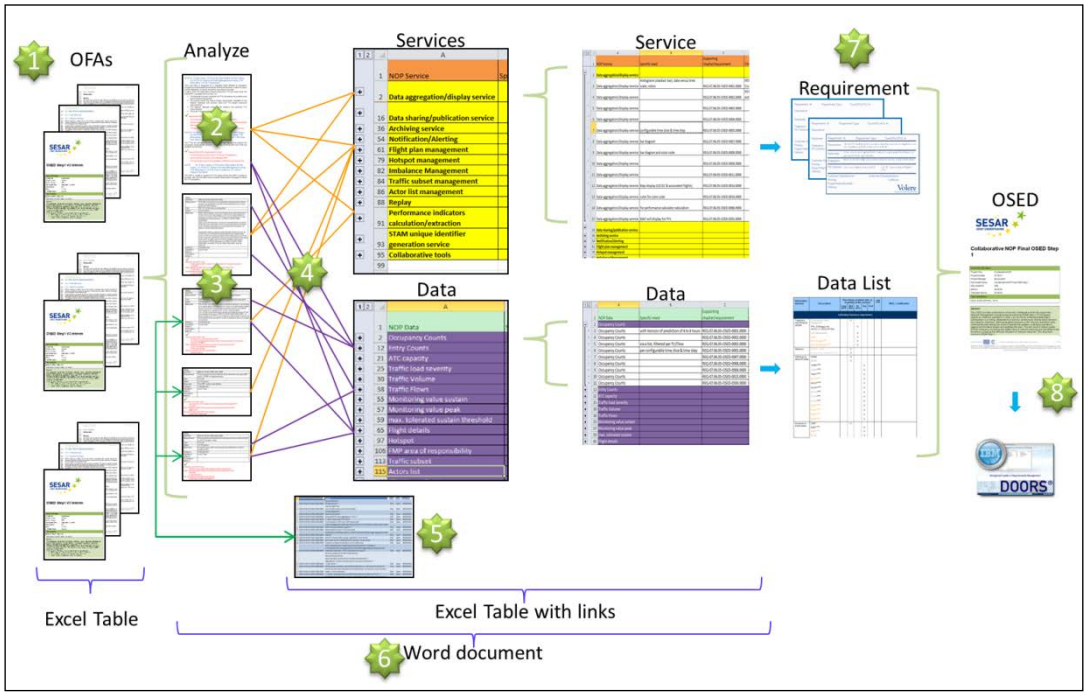

Figure 13: Requirement extraction methodology

As described, there is an interim step (services & data) between the OFA requirements & the P07.06.01 requirements. The output in the P07.06.01 OSED is accurately capturing the original requirement, which is checked during peers review with originators (OFA leaders, domain experts) thanks to the DOORS link kept all along the process and allowing checking the completeness of the resulting requirement (s).

The strategy adopted is to extract any element with NOP interest, and try to think of the resulting needs in term of:

- NOP requirements
- Requirements traceability (maintained into DOORS)
- NOP data and associated justification of the need (link to be documented in P07.06.01 OSED Annex A)
- NOP services
- Support from P07.06.01 (for example for interface definition)
- EATMA impacts (integration of the NOP into the modelled processes)
- AIRM integration status
- ISRM integration status for services

The term '*authorized user*' or '*end user*' found in most of below requirements refer to any stakeholder whose access to the NOP (or part thereof) duly authorized (include the role and the eligible access to

the information). This end user and associated role and eligibility criteria in term of access to the information are identified in the documents from which the P07.06.01 requirements are derived from.

The NOP data element needed by each requirement is described in the EATMA when updating the related data exchanges and in "Appendix B" for new information elements used in a validation exercise with the associated justification and links to requirements.

Each NOP requirement follows following rules:

- expressed from the "end user" point of view (for example "*authorized user shall access…*"), facilitating later corresponding use case description,
- Roles and responsibilities are mainly covered by primary projects (see Table 1) linked requirements (for example, NOP requirement to mention "*authorized user. . .* " where eligibility is defined into primary project,
- for the service description the NOP's requirement is mentioning the general purpose of the service (like an "*Alerting service*" which is required by several customer OFA's requirement), then the rational contains a reference to each specific projects' need (for example a reference to a customer OFA requirement requesting "*a pop-up when the Occupancy Count exceed the threshold value set for the corresponding sector*"),
- Each specific primary project usage could then lead to a specific implementation package.

The naming convention used is the following: REQ-07.06.01-OSED-XXXY. ZZZZ where:

- XXX is chosen depending on the origin of the requirement, as per below:
  - "GEN" for a "generic" requirement satisfying (fully or partially) multiple customer OFAs needs,
  - "PRF" for a "Network Performance management" related requirement,
  - "MET" for a METEO related requirement,
  - "NFR" for a Non-Functional domain related requirement,
  - "AOP" for an AOP/NOP integration related requirement,
- Y corresponds to the SESAR's step considered (1 for this OSED),
- ZZZZ are 4 digits.

Where services and information are identified in the process, the conventions of the SESAR Working Method on Services apply.

6.1.5 NOP Requirements

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0001
Requirement	The authorized user shall be able to access and share the same NOP data and Services via a customisable generic HMI.
Title	NOP generic HMI for NOP data & service access
Status	<Validated>

Rationale	The authorized user shall be able to use a generic HMI interface to access NOP services and data (without development on user side). This generic HMI shall offer default layout depending on user profile. The generic aspect shall the aspect of ""device independent"" HMI. This generic HMI shall be customisable, allowing creation of different dashboard and workspace layout to satisfy the needs expressed by other projects as linked to NOP OSED requirements (DOORS link). This generic HMI shall be based on a front end framework and a back end framework. The front end framework shall propose creation of specific HMI, using data feeds coming from back-end and using predetermined graphical representation of the data.. The back-end framework is covering the need of new data exchanges (independently of data consumption/management). Such structure is allowing each primary project to concentrate their requirements to their core business. This possibility covers the requirements of primary projects (UDPP, ...) in term of: - data management (input/output including filtering/querying), - data aggregation, - data sharing/publication (list, timeline, layered MAP, replay…). - access to a Notification/Alerting service, - management of data (flight plan, hotspot, imbalance, traffic subset, actor list) - ability to calculate or extract Performance indicators - collaborative tools (Teleconference service, messaging/chatting service…) See linked requirements for more details. Requirement requiring this development (among others): - Publication of consolidated traffic demand & ATM constraints REQ-07.06.02-OSED-0004.0080, - Distribution of iSBT/iRBT REQ-07.06.02-OSED-0005.0030, REQ-07.06.02-OSED-0005.0070. Functionality already existing in OPS in Step 1, and will continue to evolve under the umbrella of NM).
Category	<Functional><HMI><Interface><Interoperability>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0004	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0005	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.02-OSED-0005.0070	<Partial>

4276
4277 [REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0002
Requirement	The authorized user shall be able to access NOP data using B2B data exchange service.
Title	NOP B2B for NOP data & service access
Status	<Validated>
Rationale	The authorized user shall be able to have access to B2B data feed to access and integrate NOP data and services into local tools. A default set of B2B feeds will be accessible, depending on user profile. The NOP B2B services shall be based on the front end framework allowing creation of specific B2B data feed, using filtering rules applied onto the existing data feeds (data selection). The back-end framework is covering the need of new data exchanges (independently of data consumption/management). Such structure is allowing each project to concentrate their requirements to their core business. This possibility covers the requirements of primary projects in term of: - data management (input/output), - data aggregation, - data sharing/publication. - access to a Notification/Alerting service, - management of data (flight plan, hotspot, imbalance, traffic subset, actor list) - ability to calculate or extract Performance indicators - collaborative tools (Teleconference service, messaging/chatting service…) See linked requirements for more details. Requirement requiring this development (among others): - Publication of consolidated traffic demand & ATM constraints REQ-07.06.02-OSED-0004.0080, - Distribution of iSBT/iRBT REQ-07.06.02-OSED-0005.0030, REQ-07.06.02-OSED-0005.0070. Functionality already existing in OPS in Step 1, and will continue to evolve under the umbrella of NM).
Category	<Interface><Interoperability>
Validation Method	<Live Trial>
Verification Method	

4278
4279 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
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4280

4281 [REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0003
Requirement	The authorized user using the NOP HMI shall be able to display NOP data using a data list layout.
Title	NOP HMI - Aggregated data display - list layout
Status	<Validated>
Rationale	The authorized user shall be able to access NOP data using a data list, i.e.: - List of flights (filtered by OC/EC, with hotspots and regulations) REQ-07.06.05-OSED-0003.0000, REQ-07.06.05-OSED-0026.0000, REQ-07.06.05-OSED-0011.0000, REQ-07.06.05-OSED-0032.0000, (with traffic complexity) REQ-07.06.05-OSED-0033.0000, (with associated information) REQ-07.06.04-OSED-1GEN.0100, - Access to performance indicators REQ-07.06.05-OSED-0086.0000 - Receiving TTA/TTO REQ-07.06.05-OSED-0206.0000, REQ-07.06.05-OSED-0210.0000, REQ-07.06.05-OSED-0212.0000, REQ-07.06.05-OSED-0205.0000, - Airport Impact Assessment updates REQ-07.06.05-OSED-0303.0000, - List of hotspots per sector cluster REQ-07.06.05-OSED-0028.0000 - SAM/SRM messages REQ-07.06.05-OSED-0204.0000 Functionality already existing in OPS in Step 1, and will continue to evolve under the umbrella of NM).
Category	<HMI><Interface><Interoperability>
Validation Method	<Live Trial>
Verification Method	

4282

4283 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0011.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0026.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0028.0000	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0303.0000	<Partial>

4284

4285 [REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0004
Requirement	The authorized user using the NOP HMI shall be able to display NOP data using predetermined graphical layout.
Title	NOP HMI - Aggregated data display - graphical layout
Status	<Validated>

Rationale	The authorized user shall be able to choose a graphical display for NOP data into the generic NOP HMI, using predetermined set of graphical types. Example of these types could be found here: - Histograms (stacked bar), data versus time scale, colours selection + Threshold values (horizontal lines), with configurable time slice & time step REQ-07.06.05-OSED-0001.0000, REQ-07.06.05-OSED-0002.0000, REQ-07.06.05-OSED-0005.0000, REQ-07.06.05-OSED-0024.0000 - Bar diagram REQ-07.06.05-OSED-0007.0000, REQ-07.06.05-OSED-0008.0000 - Ability to enter rules for colour coding of the information displayed REQ-07.06.05-OSED-0016.0000, - Access to performance indicators (gauge...) REQ-07.06.05-OSED-0086.0000 - TimeLine, REQ-07.06.05-OSED-0500.0000 - Trajectory profiles in vertical dimension REQ-07.06.05-OSED-0027.0000, REQ-07.06.05-OSED-0055.0000 Functionality already existing in OPS in Step 1, and will continue to evolve under the umbrella of NM).
Category	<HMI><Interface><Interoperability>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<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-07.06.05-OSED-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0002.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0005.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0007.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0008.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0016.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0024.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0027.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0055.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0086.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0500.0000	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0005
Requirement	The authorized user using the NOP HMI shall be able to display NOP data using layers onto a MAP.
Title	NOP HMI - Aggregated data display - Layered MAP layout
Status	<Validated>

Rationale	The authorized user shall be able to choose a MAP to display NOP data on a geographical basis: - Display of data over regions covering several areas of responsibility REQ-07.06.05-OSED-0009.0000 - OC/EC & associated Flights REQ-07.06.05-OSED-0014.0000, - TFV (horizontal view, coloured areas) REQ-07.06.05-OSED-0502.0000 - DCB Monitor MAP with Occupancy Count, Trajectory Horizontal/Vertical View. REQ-07.06.05-OSED-0500.0000, - 2D flights tracks & aircraft position REQ-07.06.05-OSED-0003.0000, REQ-07.06.05-OSED-0027.0000, - trajectory profiles in horizontal dimension REQ-07.06.05-OSED-0055.0000 Functionality already existing in OPS in Step 1, and will continue to evolve under the umbrella of NM).
Category	<HMI><Interface><Interoperability>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<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-07.06.05-OSED-0003.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0009.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0014.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0027.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0055.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0500.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0502.0000	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0006
Requirement	The authorized user shall be able to manage (modification, update, creation, removal...) NOP data.
Title	NOP Data management
Status	<Validated>

Rationale	The authorized user shall be able to manage NOP data (modification, update, creation, removal...) using both generic NOP HMI and B2B. It is also interlinked with the requirement covering the management of sensitive data (access to the data based on user authentication/profile), see REQ-07.06.01-OSED-GEN1.0075 for more details. Some example of concerned data: - Input of data (""duration"" per ATCO), publication of the data REQ-07.06.05-OSED-0001.0000, Events publication (REQ-07.05.02-OSED-NOP1.0010), Impact assessment publication (REQ-07.05.02-OSED-NOP1.0020 and REQ-07.05.02-OSED-NOP1.0040), ARES publication (REQ-07.05.02-OSED-NOP1.0030, REQ-07.05.02-OSED-NOP1.0050 and REQ-07.05.02-OSED-EL01.0018) - Creation of TF/Flow REQ-07.06.05-OSED-0003.0000, REQ-07.06.05-OSED-0006.0000 - Input of threshold monitoring values REQ-07.06.05-OSED-0004.0000 - STAM messages, closure REQ-07.06.05-OSED-0048.0000, REQ-07.06.05-OSED-0053.0000, REQ-07.06.05-OSED-0056.0000, REQ-07.06.05-OSED-0060.0000, REQ-07.06.05-OSED-0079.0000 - Sharing performance indicators REQ-07.06.05-OSED-0086.0000, - Hotspot status update REQ-07.06.05-OSED-0020.0000, REQ-07.06.05-OSED-0021.0000, - STAM unique identifier management REQ-07.06.05-OSED-0113.0000, - Creation, update, reading of iSBT/iRBT and NPR: REQ-07.06.02-OSED-0003.0010, REQ-07.06.02-OSED-0003.0020, REQ-07.06.02-OSED-0003.0040, REQ-07.06.02-OSED-0003.0050, REQ-07.06.02-OSED-0003.0060, REQ-07.06.02-OSED-0004.0010, REQ-07.06.02-OSED-0004.0020,REQ-07.06.02-OSED-0004.0030, REQ-07.06.02-OSED-0005.0010, REQ-07.06.02-OSED-0005.0030, REQ-07.06.02-OSED-0005.0050, REQ-07.06.02-OSED-0005.0070, - Creation, update, reading of NPR: REQ-07.06.02-OSED-0004.0030, REQ-07.06.02-OSED-0004.0040, - consolidated traffic demand & ATM constraints REQ-07.06.02-OSED-0004.0080, - access to most penalising delay for a given flight REQ-07.06.04-OSED-1ESS.0300. The complete set of NOP data is listed in a dedicated annex in the P7.6.1 OSED. Functionality already existing in OPS in Step 1, and will continue to evolve under the umbrella of NM).
Category	<Functional><Interoperability><Maintainability><Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-EL01.0018	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NOP1.0040	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.02-OSED-0003.0010	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.02-OSED-0003.0040	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.02-OSED-0004.0010	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.02-OSED-0005.0070	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0003.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0004.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0006.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0020.0000	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0048.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0053.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0056.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0060.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0079.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0086.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0113.0000	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0007
Requirement	The authorized user shall be able to access past NOP data.
Title	NOP Archiving service
Status	<Validated>
Rationale	The authorized user shall be able to access archived NOP data (both via generic NOP HMI and B2B), e.g.: Information to be archived (REQ-07.06.05-OSED-0081.0000, REQ-07.06.05-OSED-0082.0000, REQ-07.06.05-OSED-0083.0000, REQ-07.06.05-OSED-0084.0000): - STAM messages, approval / disapproval, actors & roles, associated times, - Hotspot (notification, cancellation clearance, key decision making) times, DCB indicators (i.e. OC/EC), Performance REQ-07.06.05-OSED-0085.0000, REQ-07.06.05-OSED-0087.0000, REQ-07.06.05-OSED-0088.0000 FPLs, Trajectories, on-ground delay REQ-07.06.05-OSED-0086.0000 Airspace Users preferences & comment REQ-07.06.05-OSED-0092.0000 Storage of Dynamic DCB post-analysis REQ-07.06.05-OSED-0093.0000 Support to AFUA Post-OPS (ARES, Performance) REQ-07.05.02-OSED-PO01.0021 UDPP requests: REQ-07.06.04-OSED-1GEN.0500 Functionality already existing in OPS in Step 1, and will continue to evolve under the umbrella of NM).
Category	<Functional><Interoperability>
Validation Method	<Live Trial>
Verification Method	

4299 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0082.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0083.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0084.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0085.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0086.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0087.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0088.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0092.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0093.0000	<Partial>

4300
4301 [REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0008
Requirement	The authorized user shall be able to activate an alert for any NOP data passing a determined threshold.
Title	NOP Alerting Service
Status	<In Progress>
Rationale	The authorized user shall be able to be alerted when a specific NOP data is reaching predetermined criteria, the alert being chosen via a predetermined set of actions (colour changing, pop-up, email, window/widget focus...). Example of cases requesting an alert: - EC/OC passing a threshold REQ-07.06.05-OSED-0017.0000, - Automated warning for proposed hotspot (EC/OC & traffic load severity) REQ-07.06.05-OSED-0023.0000, - Alerted of imminent coordination time expiration REQ-07.06.05-OSED-0044.0000. Partially validated in OPS in Step 1. Further validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

4302
4303 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<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-07.06.05-OSED-0017.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0023.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0044.0000	<Partial>

4304
4305 [REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0009
Requirement	The authorized user shall be able to activate a notification for any NOP data passing a determined threshold.

Title	NOP Notification Service
Status	<In Progress>
Rationale	The authorized user shall be able to request a notification to be sent to a group of NOP users. Example of cases requesting a notification to be sent: - Hotspot notification REQ-07.06.05-OSED-0020.0000, - ""STAM Coordination" message REQ-07.06.05-OSED-0043.0000. Partially validated in OPS in Step 1. Further validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0020.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0043.0000	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0010
Requirement	The authorized user shall be able to manage data related to flight (plan or trajectory, including extended flight plan).
Title	NOP Trajectory management Service
Status	<Validated>
Rationale	In STEP1, concerns the flight management service including extended flight plan. This possibility covers the requirements of primary projects in term of: - Manage flight plan REQ-07.06.05-OSED-0020.0000, REQ-07.06.05-OSED-0077.0000, - Access and update of flight details REQ-07.06.05-OSED-0022.0000, REQ-07.06.05-OSED-0036.0000, REQ-07.06.05-OSED-0220.0000, REQ-07.06.05-OSED-0221.0000, - Flight list REQ-07.06.05-OSED-0037.0000, REQ-07.06.05-OSED-0039.0000, REQ-07.06.05-OSED-0202.0000, REQ-07.06.05-OSED-0303.0000, REQ-07.06.05-OSED-0306.0000, REQ-07.06.05-OSED-0500.0000, REQ-07.06.05-OSED-0505.0000, - Access to trajectory profiles REQ-07.06.05-OSED-0055.0000 - Submit Flight Plan REQ-07.06.05-OSED-0200.0000, REQ-07.06.05-OSED-0201.0000,
Category	<Functional><Interoperability><Operational>
Validation Method	<Shadow Mode>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0004	<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-07.06.05-OSED-0020.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0022.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0036.0000	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0039.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0055.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0077.0000	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0500.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0505.0000	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0011
Requirement	The authorized user shall have access to services (tools) supporting collaboration decision making.
Title	NOP Collaborative tools
Status	<Validated>
Rationale	The authorized user shall have access to following collaborative services/tools: - Chatting/Data sharing/Conferencing… REQ-07.06.05-OSED-0300.0000, - Teleconference service REQ-07.06.05-OSED-0090.0000, - Messaging/chatting service REQ-07.06.05-OSED-0051.0000. Mainly validated in Step 1 but improvements and extension to be done in SESAR 2020.
Category	<Functional><Interface><Interoperability>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0051.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0090.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0300.0000	<Partial>

4317 [REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0012
Requirement	The authorized user shall manage (create, query, modify, send, refer to, remove) list of actors
Title	NOP Actor list service
Status	<In Progress>
Rationale	The authorized user shall be able to have access to a service allowing to manage actor list. On top or actors list management, it includes also the ability to group actors, query actors with responsibility and/or geographical criteria, query details of actor(s). It is required by: - Management of actor list REQ-07.06.05-OSED-0045.0000, - List of FMP to receive RTSA information REQ-07.05.02-OSED-PO01.0022 Partially validated in OPS in Step 1. Further validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional>
Validation Method	<Live Trial>
Verification Method	

4318
4319 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0018	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0022	<Partial>
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4320
4321 [REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0013
Requirement	The authorized user shall be able to access all the NOP Data and services as they were at a past date.
Title	NOP Replay service
Status	<In Progress>
Rationale	The authorized user shall be able to replay NOP service in past conditions to allow post-ops analysis of decisions taken. This possibility satisfies the requirements of primary projects in term of: - Post-OPS analysis REQ-07.06.05-OSED-0081.0000 - Study of hotspot resolution improvement REQ-07.06.05-OSED-0085.0000 - Support to AFUA Post-OPS (ARES, Performance) REQ-07.05.02-OSED-PO01.0021 Partially validated in OPS in Step 1. More data should be recorded and ready for reply. Further validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Operational>
Validation Method	<Live Trial>
Verification Method	

4322
4323 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<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-07.05.02-OSED-PO01.0021	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0081.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0085.0000	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0014
Requirement	The authorized user shall be able to access a framework to manage data workflow (who is eligible to have access to what, to modify it, when).
Title	Workflow for Ownership/Responsibility of NOP data
Status	<In Progress>
Rationale	NOP usage shall support policies/rules/workflows agreed with the stakeholders (different aspects: responsibility of updating the information, obligation to provide information and responsibility to notify the concerned stakeholders). All ATM participants may be the owner of a piece of data at some moment in time. The responsibility of this update must be integrated into stakeholders' business processes. At the same time and in order to guarantee the consistency of a piece of information updated from different sources, a workflow is needed to ensure that the data will be made visible to ATM users only once it has been properly validated. The authorized user shall have access to a framework supporting any workflow associated with shared data. Partially validated in OPS in Step 1. Further validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interoperability><Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0015
Requirement	The authorized (super) user shall be able to administrate access rights of (lower level) user he is in charge of using a NOP service.
Title	NOP Services and data - User rights management
Status	<In Progress>

Rationale	The authorized (super) user shall be able to administrate access rights to the NOP data and services of other users (lower level) within the limits allowed by the Registry or other external entity managing global security of the access. It shall be in line with the access rights administration developed within the SWIM infrastructure. The management of user rights is ensured completely by the Network Manager in the previous operating method. In order to establish 2 levels for right management, a part of this administration rights should be delegated to the user (a super user). This would facilitate the integration of NOP-related workflows in local business processes. Workflow efficiency within the NOP is paramount to ensure smooth FOC operation and optimum decision making, again providing up to date information to the Network. It shall also have the added benefit of reducing workload on allocation of rights to a user access. this requirement is needed by the following Primary Projects expressed needs: - Access to all Aircraft Operators to the UDPP tool: REQ-07.06.04-OSED-1GEN.0400 Not implemented nor validated in Step 1. Validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interoperability><Security>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0016
Requirement	Authorized user shall be able to query the NOP with simulation data or scenarios (what-if) to assess the impact on the network.
Title	NOP WhatIf service
Status	<In Progress>
Rationale	The authorized user shall have access to a service allowing to evaluate the impact on the Network situation (NOP data, indicators, KPI) when providing new elements, supporting impact assessment. The provided data will not modify the NOP data. This possibilities satisfy the requirements of primary projects in term of: - impact of different VPA combination REQ-07.05.02-OSED-NL01.0015, - local decision-making support REQ-07.06.05-OSED-0046.0000. Not implemented nor validated in Step 1. Validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-NL01.0015	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.05-OSED-0046.0000	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.0010
Requirement	Authorized user shall have access to the D-10 European-wide weather forecast, depicting to the appropriate degree of accuracy, the development and movement of major weather systems (high/low pressure systems, wind, snow, jet stream, temperature change data) and events such as ash cloud trajectories, within the European airspace.
Title	Network Weather - Provision - D-10 forecast
Status	<In Progress>
Rationale	The knowledge of bad weather conditions in an adjacent or other ACC or at an airport must be taken into account for the implementation of local solutions to solve capacity issues (collaborative Network Weather Assessment). Although forecasts at D-10 level are not accurate enough to provide detailed information, a general regional outlook will provide early indication of developing weather patterns to enable timely and appropriate preparation by the affected units/areas. Not validated in Step 1. Forecast at D-10 is planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.0020
Requirement	Authorized user shall have access to the D-5 European-wide weather forecast, depicting to the appropriate degree of accuracy, forecast of strong high and low pressure systems (high/low pressure systems, wind, snow, jet stream, temperature change data), active fronts (CB and thunderstorm activity in the summer) and events, within the European airspace. MET confidence factors shall be applied to avoid incorrect behaviours within airspace users and other stakeholders if not caveated.
Title	Network Weather - Provision - D-5 forecast
Status	<In Progress>

Rationale	On D-5 level the forecast accuracy is increased to provide more detailed information in comparison to the D-10 forecast. The D-5 weather forecast shall depict the major weather patterns affecting the main geographical areas. Smaller areas may be utilised when the degree of certainty of the forecast phenomena exceeds 20%. Not validated in Step 1. Forecast at D-5 is planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.0030
Requirement	Authorized user shall have access to the D-3/D-2 European-wide weather forecast, depicting to the appropriate degree of accuracy, forecast of strong high and low pressure systems (high/low pressure systems, wind, snow, jet stream, temperature change data), active fronts (precipitation and CB and thunderstorm activity in the summer) and events, for particular flows or areas (e.g. axis flows, areas of critical demand/capacity balancing). MET confidence factors shall be applied to avoid incorrect behaviours within airspace users and other stakeholders if not caveated.
Title	Network Weather - Provision of D-3/D-2 forecast
Status	<In Progress>
Rationale	In the previous operating method, the daily Eurocontrol Network Weather Assessment only provide Charts showing Wind, Temp Pressure, Lightning, Turbulence for D-1. The D-3/D-2 forecast will enable the enrichment of the D-5 forecast with more accurate data concentrated on specific areas supported by additional data as measurements become available. The expected accuracy of the forecast becomes greater to enable small scale evaluation of the effect of the forecast weather phenomena. change req: Authorized user shall have access to the D-5 European-wide, depicting to the appropriate degree of accuracy, the development and movement of major weather systems (high/low pressure systems, wind, snow, jet stream, temperature change data) active fronts (CB and thunderstorm activity in the summer) and events, ... Not validated in Step 1. Forecast at D-3, -2 is planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4348
4349 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.0040
Requirement	Authorized user shall have access to the D-1 European-wide weather forecast, depicting at ACC/sector level: - forecast of strong high and low pressure systems (high/low pressure systems, wind, snow, jet stream, temperature change data), - active fronts (precipitation and CB and thunderstorm activity in the summer) and - events such as ash cloud trajectories.
Title	Network Weather Provision - D-1 forecast
Status	<Validated>
Rationale	The D-1 weather forecast shall be made on ACC sector level to enable the evaluation of the operational effect of the forecast weather phenomena at sector level.
Category	<Functional><Interoperability>
Validation Method	<Shadow Mode>
Verification Method	

4350
4351 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4352
4353 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.0041
Requirement	Authorized user shall have access to the European-wide weather forecast on the day of operation, at ACC/sector/Airport levels: - strong high and low pressure systems (high/low pressure systems, wind, snow, jet stream, temperature change data), - active fronts (precipitation and CB and thunderstorm activity in the summer) and - events such as ash cloud trajectories.
Title	Network Weather - Day of operations
Status	<Validated>
Rationale	The weather on day of operations shall be made available on ACC sector level to enable the evaluation of the effect at sector level and on Airport operation. Partially only for sectors but the principle has been validated in Step 1.
Category	<Functional><Interoperability>
Validation Method	<Shadow Mode>
Verification Method	

4354
4355 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4356
4357 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.0050
Requirement	Authorized user shall have access to the Jet stream related information (in addition to wind information).
Title	NOP WEATHER HMI - Network Weather Provision -Jet Stream
Status	<In Progress>
Rationale	The main traffic flows may deviate from day to day to take benefit of, or to avoid the jet stream. The location and strength of the jet stream and the resulting expected traffic flows will contribute to the dynamic sector definition and sector configuration management. Sharing the information in the NOP is needed to facilitate the local weather assessment and provide an early indication of potential flight intentions for DCB planning. Not validated in Step 1. Jet Stream is planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

4358
4359 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4360
4361 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.0060
Requirement	Authorized user shall have access to the Tropopause FL information.
Title	NOP WEATHER HMI - Network Weather - Provision of additional MET data (Tropopause)
Status	<Deleted>
Rationale	Tropopause FL forecast information is available on SWC provided e.g. by WAFC. Additional Tropopause height information can be retrieved from radio sounding data (00 and 12 UTC) at a limited number of meteorological stations. For some specific demands (e.g. operational flights, airline operator) such tailored information is already provided. Sharing the information in the NOP is needed to provide an early indication of potential flight intentions for DCB planning on the vertical plane. In the short term planning phase, this information will contribute to adapt the sectorisation according to the expected vertical distribution of flights. To be deleted
Category	<Functional><Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

4362
4363 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4364
4365 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.0070
Requirement	Authorized user shall have access to the temperature at flight levels defined in Amendment 76 to ICAO Annex 3 (valid in November 2013).
Title	NOP WEATHER HMI - Network Weather - Provision of additional MET data (Temperature)
Status	<Deleted>
Rationale	The temperature impacts directly the performance of the engines. Availability of temperature information through the NOP will enable the execution of more comprehensive network wide and local weather assessments and provide indication of flight intentions for DCB purposes. To be deleted
Category	<Functional><Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

4366
4367 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4368
4369 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.0080
Requirement	Authorized user shall have access to the Icing information (forecasts and observations) at flight levels as defined in Amendment 76 to ICAO Annex 3 (valid in November 2013)
Title	NOP WEATHER HMI - Network Weather - Provision of additional MET data (Icing)
Status	<Validated>
Rationale	Availability of icing information through the NOP will enable the execution of more comprehensive network wide and local weather assessments and provide indication of flight intentions for DCB purposes. Forecast was Validated and the observations were also validated as being the last forecast. However the observation needs to be properly measured as an independent measure for V4. Validated
Category	<Functional><Interoperability>
Validation Method	<Shadow Mode>
Verification Method	

4370
4371 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.0090
Requirement	Authorized user shall have access to the wind related information at flight levels defined in Amendment 76 to ICAO Annex 3 (valid in November 2013) for upper and lower airspace. The velocity for winds aloft shall be defined at 10 kt. intervals for the en-route environment.
Title	NOP WEATHER HMI - Network Weather - Provision of additional MET data (Wind)
Status	<Validated>
Rationale	The wind impact directly the performance of the aircraft. This will enable the execution of more comprehensive network wide and local weather assessments. Available in OPS already in Step 1.
Category	<Functional><Interoperability>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.1000
Requirement	Authorized user shall get access to the significant weather information of the European ATM network in a list layout.
Title	NOP WEATHER HMI - Aggregated data display - list layout
Status	<Validated>
Rationale	The authorized user shall be able to have access to: - the significant weather (if exists) at any airport or area of the European ATM network in the specified time period. - the expected impact in performance (if any) and the tactics to mitigate it (if any). This will increase common understanding of impact of weather and improve the cooperative decision making needed to ensure efficient and safe use of available network capacity in the event of weather phenomena affecting it.
Category	<Design><HMI><Interface>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.1010
Requirement	Authorized user shall have access to the up-to-date network weather forecasts (up to D-10) in the specified geographical areas (regional/sub-regional/local) or airports (e.g. snow situation), with variable granularity levels depending on the time horizon.
Title	Network View of severe weather - up to D-10
Status	<Deleted>
Rationale	Network Weather' refers to major capacity-impacting weather phenomena. The granularity of information may vary depending on the time horizon (the closer to the day of operation, the finer the granularity will be). Delete req., duplicated of MET1.0010
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0006	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.1020
Requirement	Authorized user shall have access to the up-to-date weather impact assessments (regional/sub-regional/local) related to the specified geographical area (regional/sub-regional/local) or airports, and the planned mitigation strategies/tactics.
Title	Network View of severe weather - impact and mitigations
Status	<Validated>
Rationale	Network operations (and performance) are sensitive to the influence of weather in en route airspace, in terminal areas and at airports; it is important to get early information on how weather can affect the network (e.g. airport bad weather impact on en route sectors) and the local/sub-regional/regional procedures that will be in place to mitigate the impact. This requires to share the same interpretation about the impact. Consistency between the collaborative and the local weather assessments will be achieved through the common and harmonised definition of the associated parameters, thresholds and other relevant criteria. The requirement has been V3 validated. Due to the limited effort in the validation, NM impact was displayed in a HMI for NMOC and shared in its display form with ANSPs, but shared in B2B . This point has been communicated in the recommendations to be taken in the next step of industrialisation. No further validation is required. => Validated in shadow mode,
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Shadow Mode>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	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>

4388
4389 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.1030
Requirement	Authorized user shall be able to identify (post-ops) the weather phenomenon impacting network operations when reporting weather induced delays. The reported phenomena shall include at a minimum delays due to TS /CB squall lines, CAT, wind, precipitation, and reduced visibility.
Title	Weather related reporting
Status	<In Progress>
Rationale	In the previous operating method, there is no detailed information provided by ANSPs about weather delays; it is not possible to identify by post-ops analysis what or if MET data was missing in the planning or in the execution phase to assess the impact on capacity. The granularity/reported phenomena related to weather induced delay reporting will be defined separately. Due to the validation effort limitation, observations data were not received and post-analysis data was not done. Planned to be further assessed in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

4390
4391 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4392
4393 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.1040
Requirement	Authorized user shall be able to estimate (simulate/report) the weather phenomenon impacting network operations relating it to a past sample of traffic (for example previous week sample).
Title	Weather related reporting - Report of potential impact of weather forecast based on previous week traffic.
Status	<In Progress>
Rationale	NOP tools allowing to get access to different data to support the local units (ANSPs/airport/NM) to analyse the best possible mitigation in relation to a significant weather forecast. The report shall link the weather phenomenon forecast to several traffic possibilities and to different strategies. Not validated in Step 1. Planned to be further assessed in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

4394

4395 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4396
4397 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.1050
Requirement	Authorized user shall get access to the significant weather information of the European ATM network in a geographical (map) layout.
Title	NOP WEATHER HMI - Aggregated data display - geographical (map) layout
Status	<Validated>
Rationale	The authorized user shall be able to have access to a geographical (map) display: - representing the significant weather (if exists) at any airport or area of the European ATM network in the specified time period. - providing access to additional information like the expected impact in performance (if any) by a colour code. - providing access to additional information like the tactics to mitigate it (if any) in a textual form (for example in a text displayed mousing over). This will provide a quick view of areas and/or airports affected by weather impact and the tactics applied. Available in OPS already in Step 1 (only validated for sectors). But the validation clearly already demonstrated the principle in Step 1.
Category	<Design><HMI><Interface>
Validation Method	<Shadow Mode>
Verification Method	

4398
4399 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4400
4401 [REQ]

Identifier	REQ-07.06.01-OSED-MET1.1200
Requirement	"Authorized user shall get access to some of the following significant weather phenomena information on the European ATM network: - airport ceiling - airport visibility, - enroute convection (CAT above FL310, CBs, lightning, turbulence), - terminal convection, - surface winds, - winds at 3000 feet, - severe precipitation (heavy rain or snow accumulation/fall rate), - icing - line squalls. "
Title	NOP WEATHER HMI - Weather data available
Status	<Deleted>

Rationale	The authorized user shall be able to have access to the various types of significant weather that enroute or at an airport may impact the network performance and launch mitigations following the agreed tactics. The concept was v3 validated in VP700 but due to effort limitation only enroute data was available. The recommendation has been communicated in the VALR to take airport data for the next step of industrialisation. Equally Validated for sectors but not for airports in Step 1. delete: covered by MET1.0010 MET1.0020 MET1.0030 MET1.0040 MET1.0041
Category	<Design><Interface>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.1250
Requirement	"Authorized user shall get access to an indication of the phases of alert following significant weather phenomena detected on the European ATM network: - monitoring when the forecast (from D-5) draws attention to an emerging weather phenomena, - alert when local unit (ANSP/airport/NM) considers that the significant weather forecast (up to H-6) may impact capacity but uncertainty remains on the evolution of the phenomena, - warning (after H-6) when local unit considers an impact in capacity and builds a response, - execution, when the response strategy is being applied."
Title	NOP WEATHER HMI - status of the alert phases following the weather data available
Status	<In Progress>
Rationale	The authorized user shall be able to have access to the significant weather forecast and the actions and strategies that the different European ATM actors are building. This information: - raises awareness of all actors, - may allow ANSPs and Airspace Users to develop in a collaborative way the strategies needed, - increases the awareness of neighbouring units potentially affected by other units significant weather impact and mitigation strategies, - increases awareness of airspace users of the tactics in place to cope with significant weather impact and may allow them to define own business strategies to minimise impact on operations. Alerts and warning not validated in Step 1. Planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Design><Functional><HMI><Interface>
Validation Method	<Real Time Simulation>

Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.1300
Requirement	ANSPs and/or Airports shall be able to provide potential capacity reductions (generic and specific) following significant weather.
Title	NOP WEATHER HMI - ANSPs and/or Airport provision of potential capacities reductions following significant weather
Status	<Validated>
Rationale	Up-to-date generic (default ones) and specific ANSPs and airports potential capacity reductions following significant weather will allow the Network Manager and network actors to evaluate possible DCB imbalances with a level of accuracy according to the overall data availability and predictability. Earlier detection of potential DCB imbalances shall offer a wider and more collaborative agreement on mitigations and tactics. Technically NOP supports already on OPS the Tactical capacities updates. Due to the constraints of a shadow mode validation the operational updates to tactical capacities in respond to weather was not part of the validated scenarios in Step 1 VP700. This is not considered an obstacle for the V3 validation of this requirement but it should be included in the operational process of MET-NOP Integration when it will be industrialised. => Validated
Category	<Design><Functional><HMI><Interface>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.1400
Requirement	Authorized user shall get access to the display of the capacity reductions and other significant weather impact assessment provided by the ANSPs/airport.
Title	NOP WEATHER HMI - Display of Significant Weather impact Assessment Information
Status	<Validated>

Rationale	Up-to-date generic (default ones) and specific ANSPs and airports potential capacity reductions and other local impact assessment information following significant weather will allow the Network Manager and network actors to evaluate possible DCB imbalances with a level of accuracy according to the overall data availability and predictability. Should exists a potential significant weather detected, with no data provided on impact assessment will allow the Network Manager and network actors to call for the relevant local actors weather strategy. Earlier detection of potential DCB imbalances shall offer a wider and more collaborative agreement on mitigations and tactics. Access to ANSPs and APT capacities (including tactical capacities) already available on OPS Portal display and via B2B. Planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Design><Functional><HMI><Interface>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-MET1.1500
Requirement	Authorized user shall get access to interface and/or facility providing the diversion information of the European ATM network when significant weather at an airport operating close to its capacity creates the conditions described in the activation of the diversion strategy procedures.
Title	NOP WEATHER HMI - Link to diversion information for weather reducing airport capacity under certain conditions.
Status	<Validated>
Rationale	The authorized user shall be able to have access to the interface and/or facility providing: - the diversion policy (if one available) at any airport of the European ATM network, - the list of associated diversionary airports and their capabilities (when applicable) in the specified time period (including remaining capacities and conditions of use, aircraft handling capabilities). This will increase predictability of diversions and improve the cooperative decision making needed to ensure efficient and safe use of available network capacity. Better deviations planning form initial intentions could also have a positive impact in safety and fuel consumption (e.g. avoiding routing to unavailable airfields). Following MASSDIV exercise airport diversion is currently part of the roadmap of APT in NOP. It does not required further validation in SESAR => Validated,
Category	<Design><Functional><HMI><Interface>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0001
Requirement	Look & feel of the HMIs developed to access, display or manage the NOP data and services shall be conform to the Human Performance recommendations.
Title	NOP HMI - Look & Feel, Usability
Status	<Validated>
Rationale	HMIs developed to access NOP services and data shall appear to be comprehensive and easy to use to the authorized users (an intuitive interface, user-friendly and efficient). The usability of the interface has an impact on efficiency at work. Arguably this one of the biggest issues with the system in use (e.g. it is very frustrating, with the NOP portal, to have 8/9 windows opened). A workspace / dossier system similar to CHMI would be welcomed. Support from the WP16.6.5 ""Human Performance"" shall be requested when designing an HMI related to NOP data. This is currently covered by the OPS n-CONECT project. It does not required further validation in SESAR.
Category	<Design><HMI><Interface><Interoperability>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0002
Requirement	The authorized user shall get access to the latest validated NOP information.
Title	NOP data - Latest validated info
Status	<Validated>

Rationale	The authorized user shall be able to access up-to-date information updated with the latest validated ATM information (this is true in all situations, incl. disruption and crisis for which a good situational awareness is extremely important). Data providers shall input/update the relevant NOP data at the relevant time. This responsibility must be integrated in the workflow (e.g. initial input by a local entity and validation by the Network Manager before publication to all ATM authorised users). Supported by following requirements: - AFUA - Status of the airspace shall be accurate and consistent between the ASM Support Systems and the ATC systems(REQ-07.05.02-OSED-EL01.0019) Functionality already existing in OPS in Step 1, and will continue to evolve in SESAR2020.
Category	<Design><Interoperability><Reliability>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0003
Requirement	Any authorized user shall receive the same NOP data, service or view when accessing the NOP.
Title	NOP Collaboration - data unicity
Status	<Validated>
Rationale	Authorized users collaborating on the NOP shall access the same baseline information (common view). As such, the NOP data provided shall be unique (availability, unicity of the data, timestamp), whatever is the access mode (HMI, B2B). Having stakeholders using different version of the same information may result in inconsistent decisions. For example, when a what-if is ongoing, other users shall be able to see it when trying to access the same data. Supporting requirements: - AFUA - information about ARES status shall be identical for all users at the same time (REQ-07.05.02-OSED-EL01.0017). Functionality already existing in OPS in Step 1, and will continue to evolve under the umbrella of NM).
Category	<Design><Interoperability><Reliability><Safety>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<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-0001.0018	<Partial>

4432
4433 [REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0004
Requirement	Authorized user shall be ensured to have access to NOP data as per his own service level. It includes NOP services protection against deny of service attack.
Title	NOP Data access - Service level and availability
Status	<Validated>
Rationale	The authorized user shall be guaranty to have access NOP service which are modulated/managed/balanced in term of load. The infrastructure supporting the NOP must be stable and ensure adequate response times, especially in network disruption situations. Access should be restricted based on pre-determined priorities, considering end users' type/role/profile. Measures shall be implemented to prevent single client monopolizing all available server resources and creating deny of service to other clients. Each user shall have the same priority in term of resources availabilities for the NOP data and services. It must be noted that Airspace Users do NOT support a public version of the NOP (to protect AU intentions and not cloud customers' expectations which may impact on system latency and performance). This is currently covered by the OPS n-CONECT project. It does not required further validation in SESAR.
Category	<Functional><Interface><Interoperability><Security>
Validation Method	<Live Trial>
Verification Method	

4434
4435 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

4436
4437 [REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0005
Requirement	The authorized user shall be able to check each NOP tools release/evolution history/evolution planning.
Title	NOP Services - User view of release management
Status	<Validated>

Rationale	The authorized user shall be able to get information about: - the service release he is accessing to, - the planned evolutions (NOP toolset / services / interfaces) including planned/foreseen downtime, - each tool release historical evolution. There is a lack of visibility on NOP development plan in the previous operating method. It is important for the end user to know well in advance the planned evolutions. Functionality already existing in OPS in Step 1, and will continue to evolve under the umbrella of NM).
Category	<Functional><Interoperability><Reliability>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0006
Requirement	The access, display and management of the NOP data shall follow the SWIM recommendations.
Title	NOP Services - SWIM compliance
Status	<Validated>
Rationale	The authorized user shall have access to NOP services shall respecting SWIM recommendations and guidance. Functionality already existing in OPS in Step 1, and will continue to evolve in SESAR2020.
Category	<Design>
Validation Method	<Shadow Mode>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0010
Requirement	All NOP assets shall be clearly identified and inventoried, including sensitivity classification.
Title	Security - NOP Assets identification, inventory and classification.
Status	<Validated>

Rationale	The different assets concerning the NOP shall be described and named where they are used/defined, into the project's OFA/OSED documents (being primary project or in the 7.6.1 project). The P07.06.01 ensure a common naming, thanks to its transversal view and associated cross document review. The rules for the acceptable use of assets shall be identified, documented, and implemented.
Category	<Security>
Validation Method	<Shadow Mode>
Verification Method	

4446
4447 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

4448
4449 [REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0020
Requirement	Authorized user dealing with NOP data and/or services shall follow procedures and processes to ensure personnel Security: - pre-employment screening, - awareness of organisational security, - adherence to established security policies.
Title	Security – Human resource security
Status	<Deleted>
Rationale	Personnel security shall be ensured for all the people dealing with the NOP data and/or services. Procedures and process shall be put in place, which includes for the concerned people: - Having passed a pre-employment screening, - Be properly briefed with awareness training and regular updates of the organisational security policies and procedures relevant for their job function, - To adhere to the established security policies. Pre-employment screening is the foundation of good personnel security. It seeks to verify the credentials of those you are seeking to grant access to NOP information, and to check that they meet preconditions of employment. The level of verification checks (and re-screening) should be in accordance with relevant laws, regulation, and ethics. It shall be adapted to the role and responsibility of the staff and could, for instance, require a full background investigation in the case of an individual working with sensitive information. Privacy, protection of personal data and/or employment based legislation shall be also taken into account. Deleted requirement as it goes beyond the coverage (out of the scope) of this project.
Category	<Security>
Validation Method	<Shadow Mode>
Verification Method	

4450
4451 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0030
Requirement	The user shall have access to the NOP data and services based on authorization level.
Title	Security – Physical and Environmental Security
Status	<In Progress>
Rationale	In order to ensure the physical security of the systems and installations implied in delivering NOP data and services, standards have to be set so that any unauthorized access are prevented or, if not prevented, are promptly detected and notified, and that all the authorized accesses are correctly tracked (log). Security perimeters shall be built in order to limit the chance of damage, interference and unauthorized access. The NOP (physical) systems shall be covered by a Security perimeter to protect the NOP sensitive areas and processing facilities. The associated areas (building, premises…) shall be securely protected by appropriate entry controls which allow access only to authorized personnel and which detect unauthorized access. Not validated in Step 1. Covered by cybersecurity which is planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Security>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0040
Requirement	The NOP data and services transfer and access shall be protected.
Title	Security – Transfer over data network
Status	<Validated>
Rationale	The NOP data and services are accessed and transferred over wide area networks (Internet and others like AFTN, SITA). They are encrypted at transport layer level (based on HTTPS for B2B services) end to end; client credentials shall only be sent via an encrypted session. Functionality already existing in OPS in Step 1.
Category	<Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0045
Requirement	The authorized user shall get access to information concerning NOP data and services software change and evolution situation.
Title	Security – Change management control
Status	<Validated>
Rationale	NOP operational systems and application software should be subject to strict change management control (Acceptance criteria to be established, suitable security tests carried out during development and acceptance, changes to the information system and service are analysed for potential security impacts prior to implementation). Functionality already existing in OPS in Step 1.
Category	<Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0019	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0050
Requirement	The authorized user shall get access to NOP data and services with a guaranty to be protected against malicious code.
Title	Security – Protection against malicious code
Status	<Validated>
Rationale	Detection, prevention, and recovery controls shall be in place to protect NOP software against malicious code and appropriate user awareness procedures shall be implemented (malicious code detection and repair software, security awareness, appropriate system access and change management controls and integrity verification tools to detect unauthorized changes to NOP software). Functionality already existing in OPS in Step 1.
Category	<Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-NFR1.0055
Requirement	Authorized user shall be able to trace any critical NOP data to its origin.
Title	Security – NOP critical data traceability
Status	<Validated>
Rationale	Traceability (authentication of the origin) of NOP data shall be ensured for all critical information. Functionality already existing in OPS in Step 1.
Category	<Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0060
Requirement	The authorized user shall pass by an eligibility process to get access to the NOP services and data.
Title	NOP User eligibility and service agreement
Status	<Validated>
Rationale	The access to the NOP services, information, information processing facilities, and business processes is controlled. Security controls are implemented before granting access to the data and services. Formal exchange agreements shall be established for the exchange of NOP services, information and software.
Category	<Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0065
Requirement	The authorized user shall be able to access statistics about NOP Services and data access/usage/update for the users he is in charge of.
Title	NOP data and services usage reporting
Status	<In Progress>

Rationale	Procedures for monitoring the access to NOP Services and their usage (system load per service, usage per user) shall be put in place and the results of the monitoring activities reviewed regularly (a reporting facility shall be provided). Partially validated in OPS in Step 1. Further validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0070
Requirement	The authorized user shall be able to report any fault he faced using any of NOP software/service suing a dedicated NOP service.
Title	Security – NOP faults treatment
Status	<Validated>
Rationale	The authorized user shall be able to report a fault related to any NOP service/software. Such fault shall be logged, analysed, and appropriate action taken: - Faults reported by users or by system programs related to problems with NOP information processing or NOP communications systems should be logged. - Clear rules shall be put in place for handling reported faults including a review of fault logs to ensure that faults have been satisfactorily resolved.
Category	<Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0075
Requirement	The authorized user shall be able to get access to the data is entitle to. Eligibility relies on profile definition per user access. The access to sensitive data is restricted to a set of authenticated identified users.
Title	Security – Access control and Secure access to sensitive data
Status	<Validated>

Rationale	The authorized user shall have access to a control mechanism regarding the access to his services and data. The access is based on an authentication mechanism. The authentication relies on a secure mechanism, i.e. use of a unique digital client certificate issued by a recognised certification authority. In this way the probability of an unauthorized user access that compromises information confidentiality or integrity is minimized, and if it happens, it could be investigated (thanks to the logs). The access control relies on a central notion of user profile. Each user (or user class in the case of non-authenticated users) is given a profile that defines: a) Which roles he can play on which domains. b) What information he can see with a given role in a given domain. c) What actions he can perform with a given role in a given domain. This requirement is needed by (among others): - Restricting access to some flight data REQ-07.06.02-OSED-0003.0060.
Category	<Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<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-0001.0018	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.02-OSED-0003.0060	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-GEN1.0080
Requirement	The NOP data and services shall be compliant with SESAR Policies, law and regulatory requirement.
Title	Security – Compliance with SESAR Policies, law and regulatory requirements
Status	<In Progress>
Rationale	All the NOP systems and applications shall comply with SESAR policies and standards, with law and regulatory requirements concerning the security. Such compliance shall be regularly verified. Personal information should be protected and handled in accordance with locally applicable laws and regulations. Partially validated in OPS in Step 1. Further validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Security>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
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[REQ]

Identifier	REQ-07.06.01-OSED-NMF1.0001

Requirement	Authorized user shall be able to require help using dedicated NOP service.
Title	NOP and NMF – Helpdesk
Status	<Validated>
Rationale	Collaboration between the NOP and the user looking for support about any NOP related activity shall be available via a helpdesk provided via an electronic mean. This is required for all airspace users, including non-ICAO 8585. Requirement already available on OPS (helpdesk).
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0013	<Partial>
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[REQ]

Identifier	REQ-07.06.01-OSED-NMF1.0010
Requirement	Authorized user shall be able to access a network view aggregating all impacts known at NOP level.
Title	NOP and NMF - view of anticipated impacts at network level
Status	<Validated>

Rationale	The authorized user shall have access to a service allowing to access the pre-tactical Network plan and the anticipated impact on operations and on the nominal preferred routings & planned schedules. It shall include all (known) sources of impacts: - Weather (REQ-07.06.01-OSED-WX01.0010, REQ-07.06.01-OSED-WX01.0020) - DCB measures (REQ-07.06.01-OSED-DCB1.0040) - Airspace status (REQ-07.06.01-OSED-AOP1.0060) & MIL activities (REQ-07.06.01-OSED-ASM1.0020) Associated KPIs shall also be calculated and accessible (non-exhaustive): - REQ-07.06.01-OSED-PRF1.0050 - REQ-07.06.01-OSED-PRF1.0020 Requirement already available on OPS.
Category	<Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0010
Requirement	Authorized user shall be able to manage Post-OPS reports using NOP toolset.
Title	Performance - Reports management
Status	<Validated>
Rationale	authorized user shall have access to post-ops comments and performance reports related to any past daily / weekly / seasonal NOP instances. Access to post-OPS reporting is needed to enable the different stakeholders to share lessons learned. Supported by following requirements: - Support to AFUA Post-OPS REQ-07.05.02-OSED-PO01.0021 Available currently on OPS although not yet in B2B. Planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational><Performance>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0013	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0014	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-DACP.1010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-DACP.1020	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-DACP.1030	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.05.02-OSED-PO01.0021	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0050
Requirement	Authorized user shall have access to the list of trajectories filtered per DCB/dDCB measure.
Title	Integration of KPI information
Status	<In Progress>
Rationale	Sharing performance impact in a set of KPIs will help gaining a common understanding of the network situation. Trajectories to be filtered per DCB/dDCB measure impacting them and selected via a specific delay (e.g. more than x minutes) or route extension. Partially validated in VP700. The remaining is planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational><Performance>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0013	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-AMAP.1020	<Partial>
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4508
4509 [REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0001
Requirement	The authorized user shall be able to monitor the Network performances indicators by using open and standard technologies (HMI/B2B/devices) provided by the NOP.
Title	Network Performance monitoring
Status	<Validated>
Rationale	The authorized user shall have access to open and standard technologies (HMI/B2B/devices) allowing the authorized user to monitor the Network performances. Using the NOP capabilities (using REQ-07.06.01-OSED-GEN1-0001) and associated features, this requirement enable access to: - Predetermined graphical display (Histograms, Gauge... using REQ-07.06.01-OSED-GEN1.0004), - MAP display (layered display using REQ-07.06.01-OSED-GEN1.0005), - List of data (using REQ-07.06.01-OSED-GEN1.0003). This requirement is covering network performance monitoring both in Planning and/or Execution phases (i.e. addressed via different workspaces). About the covered Network Performance indicators, see REQ-07.06.01-OSED-PRF1.0004. Requirement already available on OPS (helpdesk).
Category	<Functional><Interface><Interoperability><Operational><Performance>
Validation Method	<Live Trial>
Verification Method	

4510
4511 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-AMAP.1010	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-EAPP.1020	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0002
Requirement	The authorized user shall be able to analyse the Network performances indicators by using open and standard technologies (HMI/B2B/devices) provided by the NOP.
Title	Network Performance analysis
Status	<In Progress>
Rationale	The authorized user shall have access to open and standard technologies (HMI/B2B/devices) allowing the authorized user to analyse the Network performances he is authorized to have access to. Using the NOP capabilities (using REQ-07.06.01-OSED-GEN1-0001) and associated features, this requirement enable access to: - Predetermined graphical display (Histograms, Gauge... using REQ-07.06.01-OSED-GEN1.0004), - MAP display (layered display using REQ-07.06.01-OSED-GEN1.0005), - List of data (using REQ-07.06.01-OSED-GEN1.0003). This requirement is covering network performance monitoring in Post-OPS phase and as such shall use the NOP Archiving service (REQ-07.06.01-OSED-GEN1.0007) as well as the NOP Replay capability (REQ-07.06.01-OSED-GEN1.0013). About the covered Network Performance indicators, see REQ-07.06.01-OSED-PRF1.0004). Planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational><Performance>
Validation Method	<Real Time Simulation>
Verification Method	

4515 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-AMAP.1000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-AMAP.1010	<Partial>
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-BMTP.1010	<Partial>
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4516

4517 [REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0003
Requirement	The authorized user shall be able to setup alerts or warnings based on any Network performance indicator via NOP services.
Title	Network Performance alerting/warning into the NOP
Status	<In Progress>
Rationale	The authorized user shall have access to service (B2B or HMI) allowing the authorized actor (like NMOC) or group of actor to setup alerts (email, warning) and warnings when a Network performance indicator is passing a predetermined threshold for any indicator he is authorized to have access to. The HMI is build using the NOP HMI capabilities (using REQ-07.06.01-OSED-GEN1-0001) and the NOP Alerting service (using REQ-07.06.01-OSED-GEN1.0008). For the Network Performance indicators concerned, see REQ-07.06.01-OSED-PRF1.0004. Planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational><Performance>
Validation Method	<Real Time Simulation>
Verification Method	

4518

4519 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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4520
4521 [REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0004
Requirement	The authorized user shall be able to access the real time value of the Network Performance indicators.
Title	Network Performance indicators generation
Status	<In Progress>
Rationale	The NOP shall calculate the Network Performance indicators as described into the Annex C of P7.6.1 OSED (Algorithm) and make the results available into the NOP. The concerned NOP data are listed in the NOP Data list and are attached to this requirement. Partially validated in VP700, planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational><Performance>
Validation Method	<Real Time Simulation>
Verification Method	

4522
4523 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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[REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0020
Requirement	The authorized user shall be able to access published information regarding the impact on Network Performance coming from changes in airspace/airport capacity.
Title	Network Capacity Monitoring and Assessment
Status	<Validated>
Rationale	The NOP shall capture changes in sectors/airports capacity, as well as changes in traffic demand in real time, to support DCB management procedures and update the Network Operations Plan. Changes in Capacity and or demand and the resulting updated NOP are recorded and time stamped to enable post operational analysis (covered by REQ-07.06.01-OSED-GEN1.0007). Covered on OPS as NOP captures changes in sectors/airports capacity and the flight profiles, hence the demand.
Category	<Functional><Interoperability><Operational><Performance>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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[REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0021
Requirement	The authorized user shall be able to access published information regarding the assessed impact on Network Fuel Efficiency Performance resulting from the flight trajectories deviations from initial plan.
Title	Network Fuel Efficiency Monitoring and Assessment
Status	<Validated>
Rationale	The NOP shall compare and record planned versus current aircraft trajectories to detect changes in horizontal and vertical flight profiles, in order to assess extra miles flown, level capping duration and elapsed time of speed control to analyse how flight changes impact on fuel efficiency, Already available currently on OPS.
Category	<Functional><Interoperability><Operational><Performance>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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[REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0022
Requirement	The authorized user shall be able to access published information regarding the assessed impact on Network Delay Performance resulting from the flight trajectories deviations from initial plan.
Title	Network Punctuality Monitoring and Assessment
Status	<Validated>
Rationale	The NOP shall compare planned arrival and departure times to and from Airspace Sectors/TMAs/Airports versus actual flight arrival and departure times, in order to assess impact of change in flight profiles on delays. Recording of data should be performed to assess traffic punctuality index. Data exits currently on OPS and indexes related to punctuality has been validated with the new KPIs in VP700. => Validated
Category	<Functional><Interoperability><Operational><Performance>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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[REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0023
Requirement	The authorized user shall be able to have access to the monitored and recorded flight trajectories deviations entry and exit times to/from airspace sectors/airport from initial plan and the assessment result of how adherence to the expected crossing times and elapsed flight times impact Network Predictability Performance.
Title	Network Predictability Monitoring and Assessment
Status	<Validated>
Rationale	The NOP shall record and compare planned flight profiles versus actually flown to assess in post analysis flight adherence to ETOs, ETAs and EOBTs in terms of time variability greater than a specified time and standard deviation of actual performance from their estimated/target times. Validated with the new KPIs in VP700 => Validated
Category	<Functional><Interoperability><Operational><Performance>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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[REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0025
Requirement	The authorized user shall be able to access the monitored and recorded Airspace Users change requests from their initial plan (change in flight profile or requests of new unplanned operations), as well as to the level of acceptance to their requests in order to be able to assess impact on Network Flexibility Performance.
Title	Network Flexibility Monitoring and Assessment
Status	<Validated>
Rationale	The NOP shall capture and record Airspace Users request for flight profile updates (vertical or horizontal), alternative routes, changes on their flight schedule departing times or requests for non-scheduled flights or cancelations. The level of acceptance to the requests (partial, total) should also be recorded in order to assess network Flexibility Performance. Currently on OPS, these data recorded in the Oplog.
Category	<Functional><Interoperability><Operational><Performance>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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[REQ]

Identifier	REQ-07.06.01-OSED-PRF1.0027
Requirement	The authorized user shall be able to access the monitored and recorded changes in flight profiles impacting Airspace Users Operational Costs.
Title	Network Cost-Effectiveness Assessment
Status	<In Progress>
Rationale	The NOP shall monitor and record the significant changes in flight profiles from their original plan which have an impact on fuel efficiency; i.e.; extra miles flown, level capping, and changes in optimal speed in order to translate them into extra fuel consumption. Delays will also be recorded to assess their impact on Airspace Users operational costs (average estimated delay cost per minute = 57 $) The technical feasibility of this requirement planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interoperability><Operational><Performance>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
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<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-EAPP.1000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-EAPP.1010	<Partial>
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4548
4549 [REQ]

Identifier	REQ-07.06.01-OSED-TRJ1.0040
Requirement	Authorized user shall have access to the Flight ID (ICAO call sign - ARCID) which corresponds to the specified commercial Flight Number (CFN) (and conversely).
Title	Integration of Flight ID Bridge Information
Status	<Validated>
Rationale	Bridge information between IATA and ICAO flight designators is required to facilitate the matching between a) commercial flight identifier used for commercial flight plans, schedules and allocated airport slots b) and the operational flight identifiers used by ATM operations and communicated in ATC flight plans. Information is currently on OPS systems supporting NOP but still required improvements. Link between ICAO and IATA indicators has been introduced from AOP in the eDPI and API => Validated with VP749
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

4550
4551 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<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-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.02-OSED-0005.0014	<Partial>

4552
4553 [REQ]

Identifier	REQ-07.06.01-OSED-TRJ1.0050
Requirement	Authorized user shall have access to the description of all ATM environment and constraints several AIRAC in advance.

Title	Network view - ATM environment and constraints
Status	<Validated>
Rationale	The ATM environment and constraints shall be made available at least two AIRAC cycles (and more if possible) in advance to allow proper planning for the Airspace Users. Support requirement REQ-07.06.02-OSED-0004.0065. Airspace related elements are covered by REQ REQ-07.06.01-OSED-ASM1.0050. Restrictions related elements in REQ-07.06.01-OSED-ASM1.0060 Currently on OPS.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.02-OSED-0004.0065	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-TRJ1.0060
Requirement	Authorized user shall have access to the consolidated traffic demand forecast into the NOP (via HMI and system-to-system service)
Title	Network view - consolidated traffic demand & ATM constraints
Status	<In Progress>
Rationale	The NOP shall offer a service via HMI and B2B exchanges to provide the authorised user a consolidated view of traffic demand forecast and ATM constraints. This need is also based on following requirements output: - REQ-07.06.01-OSED-GEN1.0001 NOP generic HMI for NOP data & service access - REQ-07.06.01-OSED-GEN1.0002 NOP B2B for NOP data & service access This requirement is requested by REQ-07.06.02-OSED-0004.0080. NOP cont. planned to be further validated in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.06.02-OSED-0004.0080	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-AOP1.0010

Requirement	The authorized user shall be able to access information on planned/available airport capacity resources in the specified time period at any airport(s) of the European ATM network.
Title	Integrated network - View of airports capacities
Status	<Validated>
Rationale	The authorized user shall be able to access the declared capacities and tactical updates of aerodromes capacities for the period, role (arrival, departure, global) and the reason of a capacity change (weather like low visibility, de-icing...). This will possibly include in step 2 the breakdown for runway/stand capacities. This is needed for instance by airspace users who need to know capabilities available at destination airport or diversionary airport. This requirement was not part of the validation Step 1. Mainly implemented in OPS and the rest for SESAR 2020.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	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>

[REQ]

Identifier	REQ-07.06.01-OSED-AOP1.0020
Requirement	Authorized user shall be able to access airport information specific to a flight.
Title	Integrated network- airport view information (ATV) of a flight
Status	<Validated>
Rationale	he authorized user shall be able to access the flight progress information of a selected flight (HMI and/or B2B). Flight progress information includes data as actual and estimates times related to its trajectory and status . This data is updated as the flight evolves in time and it is particularly interested in the context of AOP-NOP in short term and execution phases. The ELDT (estimated landing time) is a good example of flight progress information of great interest for airports; AOP would use the ELDT in its monitoring of actual flight progress and based on that will update the ATV view
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Shadow Mode>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-AOP1.0030
Requirement	Authorized user shall get access to the diversion information of the European ATM network.

Title	Network view - diversion capabilities
Status	<Validated>
Rationale	The authorized user shall be able to have access to: - the diversion policy (if one available) at any airport of the European ATM network, - the list of associated diversionary airports and their capabilities (when applicable) in the specified time period (including remaining capacities and conditions of use, aircraft handling capabilities). This will increase predictability of diversions and improve the cooperative decision making needed to ensure efficient and safe use of available network capacity. Better deviations planning form initial intentions could also have a positive impact in safety and fuel consumption (e.g. avoiding routing to unavailable airfields). This requirement was overall validated by MASDIV. The specific requirements required for the deployment of MASDIV are on-going now on NM OPS (and APT). => validated
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-AOP1.0040
Requirement	Authorized user shall have access to interlinked trajectories transiting at any airport of the European ATM network.
Title	Network view - 'interlinked trajectories' integration
Status	<Validated>
Rationale	The authorized user shall have access to the list of flights (or any selection thereof) transiting at any airport of the European ATM network. This includes information on interlinked (ATV) arrivals and departures thanks to the previous and next flight leg id. This is required to facilitate Airspace Users' monitoring of operations and, in post-ops, the analysis of knock-on effects due to arrival delays/deviation from plan.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Shadow Mode>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-AOP1.0045
Requirement	Authorized user shall have access to runway configuration plan information for any airport of the European ATM network.
Title	Network view - Runway Configuration Plan Information
Status	<Validated>
Rationale	The authorized user shall be able to have access to runway configuration plan information at any airport of the European ATM network from planning to execution. This includes period, designators (direction/position – L/C/R) of planned runways in use and also runway operating modes (Arrivals, departures or mixed mode) as well as the STARs/SIDs assignment to specific arrival/departure runways. On the D-1 or on the day of operations (short-term planning, execution) the updates to the runway in use and runway operating mode will be also provided from AOP to NOP and updated in NOP. The runway configuration information permits the Network to anticipate on pre-planned Runway configuration changes (e.g. change from inbound to outbound priority mode runway availability – maintenance/inspection, noise abatement etc.) and to apply these changes to the 4D flight profile models. This will increase the accuracy of the profiles that will be further improved upon reception of flight specific departure and arrival runway and SID/STAR on the D day -see REQ-07.06.01-OSED-AOP1.0050 and REQ-07.06.01-OSED-AOP1.0051. Functionality already existing in OPS in Step 1.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	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>

[REQ]

Identifier	REQ-07.06.01-OSED-AOP1.0050
Requirement	Authorized user shall have access to departure planning information specific to a flight, for any flight departing at any airport of the European ATM network.
Title	Network view - Flight specific Departure Planning Information
Status	<Validated>
Rationale	The authorized user shall be able to have access to departure planning information flight specific, for a flight departing at any airport of the European ATM network on the day of operations (short-term planning, execution). This includes time estimates and actual values at specific milestones of the flight: off-block, start-up, take-off, as well as statuses like de-icing and other information like the SID/runway dep. terminal and previous leg. The flight specific arrival/departure information will allow the NOP to calculate the flight profile (4D-trajectory) with these more detailed departure and arrival times and data provided by the airport. This will result in more accurate NOP profiles and more predictability as it will improve the traffic demand accuracy and DCB process. By NOP providing access to the improved flight profiles (e.g. more predictable ELDT), NOP is supporting a better planning for the air[port ATV (airport transit view) and airspace users.

Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Shadow Mode>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-AOP1.0051
Requirement	Authorized user shall have access to arrival planning information specific to a flight, for any flight arriving at any airport of the European ATM network.
Title	Network view - Flight specific Arrival Planning Information
Status	<Validated>
Rationale	The authorized user shall be able to have access to arrival planning information flight specific, for a flight arriving at any airport of the European ATM network on the day of operations (short-term planning, execution). This includes time estimates and actual values at specific milestones of the flight: landing, taxing, in-block... as well as statuses like entered-TMA, holding and other information like the STAR/runway, target time of arrival or at IAF, arrival terminal and next leg. The flight specific arrival/departure information will allow the NOP to calculate the flight profile (4D-trajectory) with these more detailed departure and arrival times and data provided by the airport. This will result in more accurate NOP profiles and more predictability as it will improve the traffic demand accuracy and DCB process. By NOP providing access to the improved flight profiles (e.g. more predictable ELDT), NOP is supporting a better planning for the air[port ATV (airport transit view) and airspace users.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Shadow Mode>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0008	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-AOP1.0060
Requirement	Authorized user shall have access to major changes or constraints at any airport of the European ATM network.
Title	Network view - Constraints at airports & impact
Status	<In Progress>

Rationale	The airport will provide NOP with Event Planning Information and Contingency Plan that contains elements like the event kind, probability, area or process of airport impacted, expected recovery scenario and possible aircraft type restrictions. This information will allow NOP to establish the network impacts of a sudden or planned capacity changes or reductions due to the event. NOP will share the airport event planning, the constraints and the network impact. Airspace Users would be able to anticipate any changing conditions as early as possible they could adjust flight plans, transfer passengers re-routed or additional fuel taken to allow for a longer period of holding, as required. This requirement was not validated in Step1, It has been communicated to APT in NM and added to the road map. Validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Shadow Mode>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-ASM1.0010
Requirement	Authorized user shall have access to the latest information on planned ARES and allocated ARES (ARES status and change thereof) within the ATM European Network.
Title	Network view - airspace status
Status	<Validated>
Rationale	Authorized user shall have access to the latest information on planned ARES and allocated ARES (ARES status and change thereof) within the ATM European Network. Timely access to network-wide consistent airspace information is required for planning and monitoring the NOP.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-ASM1.0020

Requirement	Authorized user shall have access to the planned military exercises at any specified time period (during long/mid-term planning) and the estimated impact on traffic.
Title	Network view - military exercises status
Status	<In Progress>
Rationale	Collaboration between the NOP and the user looking for support about any NOP related activity shall be available via a helpdesk provided via an electronic mean. This is required for all airspace users, including non-ICAO 8585. Validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

4598
4599 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4600
4601 [REQ]

Identifier	REQ-07.06.01-OSED-ASM1.0030
Requirement	Authorized user shall have access to the flights impacted by a new ARES or ARES status change (e.g. airspace activation/de-activation/cancellation/closure).
Title	Network view - impact on flight of Airspace reservation change
Status	<Validated>
Rationale	his information is needed both on an individual flight basis (for use by AUs) and in the list of flights (for use by ANSPs/NM). This is particularly relevant in case of disruptions. Simplifying the access to the relevant information should contribute to increase the effectiveness of planning
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

4602
4603 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4604
4605 [REQ]

Identifier	REQ-07.06.01-OSED-ASM1.0040

Requirement	Authorized user shall have access to the opportunities arising from any ARES status change.
Title	Network view - opportunity of airspace status change.
Status	<Validated>
Rationale	This is needed to facilitate airspace users' planning. Validated in validation exercise VP710.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

4606
4607 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4608
4609 [REQ]

Identifier	REQ-07.06.01-OSED-ASM1.0050
Requirement	Authorized user shall have access to the description of all airspace configurations (route network, airspace structures, and airspace sectorisation) available in the specified time period and airspace.
Title	Network view - airspace structures
Status	<Validated>
Rationale	Authorized user shall have access to the description of all airspace configurations (route network, airspace structures, and airspace sectorisation) available in the specified time period and airspace. Requirement already available on OPS.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

4610
4611 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0012	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4612
4613 [REQ]

Identifier	REQ-07.06.01-OSED-ASM1.0060
Requirement	Authorized user shall have access to all restrictions (incl. RAD-like route conditions) applicable within the specified time period and airspace.
Title	Network view - airspace restrictions
Status	<Validated>

Rationale	In the previous operating method, the access to airspace restrictions is not possible via available NOP interfaces (e.g. NM portal, B2B services). Airspace Users should also be given the possibility to access automatically the applicable ATM constraints to enable them creating and optimising their iSBT/Flight Plans using their own systems. Requirement already available on OPS.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0012	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-DCB1.0040
Requirement	Authorized user shall have access to the dDCB measures being coordinated and applied in the specified area, their status at any moment in time, and the impacted traffic demand (and related trajectories).
Title	Network view - dDCB measures and associated impacts
Status	<In Progress>
Rationale	Timely access to dDCB actions is required, access to dDCB actions being prepared (re-routing proposals) and executed may be available, to facilitate airspace users' management of trajectories and to help LTMs/NM ensuring consistency of actions/decisions across the network. There is a need of a generic HMI to integrate a network view of the DCB measures, constraints, planned actions. Further validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0005	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

[REQ]

Identifier	REQ-07.06.01-OSED-DCB1.0060

Requirement	Authorized user shall have access to a support tool allowing the creation of a network consolidated plan for DCB.
Title	DCB - Integrated view of stakeholders' plans
Status	<In Progress>
Rationale	The authorized user shall have access to a support tool to the elaboration of a consolidated plan (view of network DCB status) grouping: - daily brief elaborated by NM + pre-tactical by ANSPs +..., - weekly plans (incl. related traffic demand forecast, bottlenecks) and actions (incl. capacity plans, configurations, pre-determined scenarios/DCB measures) planned for area(s)/airport(s) and calendar week (up to 6 months ahead), - seasonal plans (up to 3 years ahead). All actors need to share the relevant information on DCB actions carried out at sub-regional level in an integrated NOP providing the overall network DCB plan. Timely access to pre-defined measures/scenarios (e.g. Axis confirmed plans) is also needed, in order to facilitate collaborations at an early stage and consistency of actions/decisions that will be developed throughout the planning phase. Partially validated in step 1, further validation is planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational>
Validation Method	<Real Time Simulation>
Verification Method	

4622
4623 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0001	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4624
4625 [REQ]

Identifier	REQ-07.06.01-OSED-DCB1.0080
Requirement	Authorized user shall find a confidence factor attached to each forecast.
Title	Network forecast - confidence factor
Status	<In Progress>
Rationale	The authorized user shall have access to a confidence factor with each forecast. Shall be part of all the forecast management tools (input/output). Planned in SESAR 2020. Not a blocking issue for the achievement of V3.
Category	<Functional><Interface><Interoperability><Operational><Reliability>
Validation Method	<Real Time Simulation>
Verification Method	

4626
4627 [REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES TO>	<Operational Focus Area>	OFA05.03.07	N/A
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0000	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0002	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-07.02-DOD-0001.0017	<Partial>

4628

6.2 Information Exchange Requirements

The IERs below have been identified for AOP/NOP integration and are a necessary input for SVA001.

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-07.06.01-OSED-AOP1.0010	Submit Early DPI	Airport Operations Support	Network Management	Early Departure Planning Information	[DPI/API-UC-002] [DPI/API-UC-003] [DPI/API-UC-004] [DPI/API-UC-005] [DPI/API-UC-007]	One-way	<In Progress>	AOP-NOP Integration	REQ-07.02-DOD-0001.0010<Partial>	<<NM B2B>> FligthManagement service :: earlyDPI
IER-07.06.01-OSED-AOP1.0020	Submit Target DPI Targeted	Airport Operations Support	Network Management	Target Departure Planning Information	[DPI/API-UC-002] [DPI/API-UC-003] [DPI/API-UC-004] [DPI/API-UC-005] [DPI/API-UC-007]	One-way	<In Progress>	AOP-NOP Integration	REQ-07.02-DOD-0001.0017<Partial>	<<NM B2B>> FligthManagement service :: targetDPITarget
IER-07.06.01-OSED-AOP1.0030	TargetDPISequenceRequest	Airport Operations Support	Network Management	Target Departure Planning Information	[DPI/API-UC-002] [DPI/API-UC-003] [DPI/API-UC-004] [DPI/API-UC-005] [DPI/API-UC-007]	One-way	<Validated>	AOP-NOP Integration The new version of this service "TargetDPISequenceRequest" replaces: Submit Early DPI , Submit Target DPI Targeted, Submit Target DPI Sequenced For more details about TargetDPISequenceRequest, see page 83 of the Reference Manual	REQ-07.02-DOD-0001.0010<Partial>	<<NM B2B>> FligthManagement service :: targetDPISequence

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-07.06.01-OSED-AOP1.0040	Submit ATC DPI	Airport Operations Support	Network Management	ATC Departure Planning Information	[DPI/API-UC-002] [DPI/API-UC-003] [DPI/API-UC-004] [DPI/API-UC-005] [DPI/API-UC-007]	One-way	<In Progress>	AOP-NOP Integration Could not be used as it was in simulation	REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	<<NM B2B>> FligthManagement service :: actDPI
IER-07.06.01-OSED-AOP1.0050	Submit Cancel DPI	Airport Operations Support	Network Management	Cancel Departure Planning Information	[DPI/API-UC-002] [DPI/API-UC-003] [DPI/API-UC-004] [DPI/API-UC-005] [DPI/API-UC-007] [DPI/API-UC-008]	One-way	<In Progress>	AOP-NOP Integration Not required in the scope of VP-749	REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	<<NM B2B>> FligthManagement service :: cancelDPI
IER-07.06.01-OSED-AOP1.0100	EstimatedAPI Request	Airport Operations Support	Network Management	Arrival Planning Information	[DPI/API-UC-002] [DPI/API-UC-003] [DPI/API-UC-004] [DPI/API-UC-005] [DPI/API-UC-006] [DPI/API-UC-007] [DPI/API-UC-009]	One-way	<Validated>	AOP-NOP Integration Submit Arrival Planning Information replaced by the new version named EstimatedAPIRequest	REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	<<NM B2B>> FligthManagement service :: API
IER-07.06.01-OSED-AOP1.0200	Publish Flight Progress	Network Management	Airport Operations Support	Flight Progress Message	[DPI/API-UC-001] [DPI/API-UC-002] [DPI/API-UC-003] [DPI/API-UC-004] [DPI/API-UC-005] [DPI/API-UC-006] [DPI/API-UC-007] [DPI/API-UC-008] [DPI/API-UC-009]	Publication	<Validated>	AOP-NOP Integration	REQ-07.02-DOD-0001.0001<Partial>; REQ-07.02-DOD-0001.0008<Partial>; REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	<<NM B2B>> FligthManagement service :: FlightDetails

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-07.06.01-OSED-AOP1.0300	Update Airport Capacity Plan	Airport Operations Support	Network Management	Airport Capacity Plan	[DPI/API-UC-001] [DPI/API-UC-003] [DPI/API-UC-005]	One-way	<In Progress>	AOP-NOP Integration As a similar service is available in OPS but not with the full information exchange.	REQ-07.02-DOD-0001.0006<Partial>; REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	<<NM B2B>> AirspaceStructure service :: updateCapacityPlan
IER-07.06.01-OSED-AOP1.0310	Retrieve Airport Capacity Plan	Network Management	Airport Operations Support	Airport Capacity Plan	[DPI/API-UC-001] [DPI/API-UC-003] [DPI/API-UC-005]	One-way	<In Progress>	AOP-NOP Integration As a similar service is available in OPS but not with the full information exchange.	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	<<NM B2B>> AirspaceStructure service :: retrieveCapacityPlan
IER-07.06.01-OSED-AOP1.0400	Update Runway Configuration Plan	Airport Operations Support	Network Management	Runway Configuration Plan	[DPI/API-UC-001] [DPI/API-UC-002]	One-way	<Validated>	AOP-NOP Integration "Validated" As a similar service is available in OPS.	REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	<<NM B2B>> AirspaceStructure service :: updateRunwayConfigurationPlan
IER-07.06.01-OSED-AOP1.0410	Retrieve Runway Configuration Plan	Network Management	Airport Operations Support	Runway Configuration Plan	[DPI/API-UC-001] [DPI/API-UC-002]	One-way	<Validated>	AOP-NOP Integration "Validated" As a similar service is available in OPS.	REQ-07.02-DOD-0001.0007<Partial>; REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-	<<NM B2B>> AirspaceStructure service :: retrieveRunwayConfigurationPlan

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
									0001.0017<Partial>	
IER-07.06.01-OSED-AOP1.0500	Update Airport Capacity and Event Plan	Airport Operations Support	Network Management	Airport Capacity and Event Plan	[DPI/API-UC-007] [DPI/API-UC-001] [DPI/API-UC-003] [DPI/API-UC-005]	One-way	<In Progress>	AOP-NOP Integration Not validated in VP-749.	REQ-07.02-DOD-0001.0000<Partial>; REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	
IER-07.06.01-OSED-AOP1.0510	Retrieve Airport Capacity and Event Plan	Airport Operations Support	Network Management	Airport Capacity and Event Plan	[DPI/API-UC-007] [DPI/API-UC-001] [DPI/API-UC-003] [DPI/API-UC-005]	One-way	<In Progress>	AOP-NOP Integration Not validated in VP-749.	REQ-07.02-DOD-0001.0000<Partial>; REQ-07.02-DOD-0001.0010<Partial>; REQ-07.02-DOD-0001.0017<Partial>	

Table 31: IERs identified for AOP/NOP integration (SVA001).

The table below describes the safety and performance requirements on the information exchanges. It collects the Information Exchange Requirements (IER) defined in the above table and completes them with the required safety and performance aspects.

The coordination has been done with WP08 (VAH) to fill out the below IER table properly.

Note: B2B NM services are NOT yet in DOORS as their reference in ISRM is ongoing.

[IER]

Identifier	Name	Content Type	Frequency	Safety Criticality	Confidentiality	Maximum Time of Delivery	Interaction Type	Free
IER-07.06.01-OSED-AOP1.0010	Submit Early DPI	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Early Departure Planning Information

Identifier	Name	Content Type	Frequency	Safety Criticality	Confidentiality	Maximum Time of Delivery	Interaction Type	Free
IER-07.06 .01-OSED-AOP1.0020	Submit Target DPI Targeted	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Target Departure Planning Information
IER-07.06 .01-OSED-AOP1.0030	Submit Target DPI Sequenced	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Target Departure Planning Information
IER-07.06 .01-OSED-AOP1.0040	Submit ATC DPI	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	ATC Departure Planning Information
IER-07.06 .01-OSED-AOP1.0050	Submit Cancel DPI	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Cancel Departure Planning Information
IER-07.06 .01-OSED-AOP1.0100	Submit Arrival Planning Information	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Arrival Planning Information
IER-07.06 .01-OSED-AOP1.0200	Publish Flight Progress	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Flight Progress Message
IER-07.06 .01-OSED-AOP1.0300	Update Airport Capacity Plan	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Airport Capacity Plan
IER-07.06 .01-OSED-AOP1.0310	Retrieve Airport Capacity Plan	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Airport Capacity Plan
IER-07.06 .01-OSED-AOP1.0400	Update Runway Configuration Plan	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Runway Configuration Plan
IER-07.06 .01-OSED-AOP1.0410	Retrieve Runway Configuration Plan	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Runway Configuration Plan

Identifier	Name	Content Type	Frequency	Safety Criticality	Confidentiality	Maximum Time of Delivery	Interaction Type	Free
IER-07.06 .01-OSED-AOP1.0500	Update Airport Capacity and Event Plan	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Airport Capacity and Event Plan
IER-07.06 .01-OSED-AOP1.0510	Retrieve Airport Capacity and Event Plan	<Data>	Several per flight	<No Effect>	<Public>	1 minute	<Two-way dialogue>	Airport Capacity and Event Plan

4639 Table 32: Safety and Performance Requirements per IER

7 References

7.1 Applicable Documents

[1] Template Toolbox Ed.04.00.00 22/03/2014

[2] Requirements and VV Guidelines Ed.03.01.00 05/02/2014

[3] Template and Toolbox User Manual Ed.03.01.01 28/02/2014

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

[5] EUROCONTROL ATM Lexicon https://int.eurocontrol.int/airial

7.2 Reference Documents

The following documents were used to provide input/guidance/further information/other:

[6] P07.02-D29 Step 1 Release 4 Network Operations Detailed Operational Description (DOD), Ed.00.04.01, 02/05/2016

[7] P06.02-D122 Step 1 Airport Detailed Operational Description (DOD), Ed.00.01.01, Ed. 31/03/2015

[8] P11.01.01-D11.01.01-1 Definition of trajectory requirements for Step 1, including gap analysis, support to standardization report from Airspace Users perspective, Ed.00.00.04, July 2012

[9] P11.02.01-D26 MET Detailed Operational Description (MET-DOD)-final, Ed.00.00.02.00 23/06/2016

[10] P07.06.01-D05 Network Performance Monitoring & Management Report for Step 1, 2016

[11] P07.05.03-D33 User Preferred Routing Operational Service and Environment Definition (OSED), Ed.00.07.01, 12/12/2013

[12] P07.06.02-D56 Step 1 Business Trajectory Management OSED 2016, Ed. 00.05.00, 01/09/2016

[13] P07.06.02-D51 Step 1 Mission Trajectory Management OSED Ed.00.02.05, 20/07/2016

[14] P11.01.02--D11.1.2-1 FOC Operational Requirements for Step 1 (Quick-wins) including the traceability of the AU comments (OSED), Ed.00.01.04, November 2012

[15] P11.01.02-D11.1.2-3m WOC operational and performance requirements for Step 1, Step 2 and Step 3 as available including the traceability of the AU comments V2, Ed.00.01.02, 12/12/2013

[16] P13.02.03-D303 Enhanced DCB OSED Step ,1 Ed.00.05.01, 2016

[17] P04.07.01-D68 Step 1 V3 Complexity Management OSED, Ed. 00.01.00, 02/09/2016

[18] P07.06.02-D366 UDPP User Driven Prioritisation process final OSED Step1 V3, Ed. . 00.02.01, 13/11/2015

[19] P07.05.04-D45 Advanced Flexible Use of Airspace OSED Step 1, Ed.00.04.01, 16/04/201600.04.01, 02/03/2016

[20] P05.04.01-1 Co-Operative Planning in the TMA Final OSED Step 1, D04, Ed.00.01.02, 18/05/2016

[21] P05.04.01-1 Co-Operative Planning in the TMA Final OSED Step 1, D04, Ed.00.01.02, 18/05/2016

[22] P05.06.04-1 Tactical TMA and En-Route Queue Management Updated OSED, D32, Ed.02.00.00, 30/09/2014

[23] P13.02.02-D118 Aeronautical Information Management sub system definition OSED for Step 1, Ed.01.01.01, 30/06/2016

[24] WPB.01 Integrated Roadmap DataSet DS15

[25] SESAR Security Reference Material https://extranet.sesarju.eu/Programme%20Library/Forms/Procedures%20and%20Guidelines.aspx

[26] EUROCONTROL Architecture of Network Technical Systems – Release NM-18.5 – v1.0

[27] EUROCONTROL Network Manager – Service Catalogue – http://www.eurocontrol.int/nm-services-catalogue

[28] EUROCONTROL Network Manager– Security Management Manual file://\\cfmufs01\Public\ENG_doc\Cms\Official\POL\SMS-SecMgManual\2.000\Network Manager - Security Management Manual.pdf

[29] EUROCONTROL Network Manager– Network Technical Systems – integrated Management System https://intra.eurocontrol.int/cfmu_cms/cms/index.html

[30] EUROCONTROL Network Manager– Network Technical Systems - Processes - CBA template file://\\cfmufs01\Group\ORA\Support\Supporting materials\Functional Block (FB) - CBA – Release\CBA_File_Template.doc

[31] P07.06.01 Mini OSED AOP-NOP Airport Capacity and Event Plan Information, Edition 00.01.00 https://extranet.sesarju.eu/WP_07/Project_P07.06.01/Other%20Documentation/Working%20Documents/MiniOSED

[32] P07.06.01 Mini OSED AOP-NOP Traffic Demand Identification, Edition 00.01.00 https://extranet.sesarju.eu/WP_07/Project_P07.06.01/Other%20Documentation/Working%20Documents/MiniOSED

[33] P07.06.01 Mini OSED AOP-NOP Target Time Coordination, Edition 00.01.00 https://extranet.sesarju.eu/WP_07/Project_P07.06.01/Other%20Documentation/Working%20Documents/MiniOSED

[34] P07.06.01 AOP-NOP Information sharing, Edition 00.01.00 https://extranet.sesarju.eu/WP_07/Project_P07.06.01/Other%20Documentation/Working%20Documents

[35] P08.03.10-D65 Information Services Reference Model Service Portfolio Version 2.0, Ed.00.08.0 The complete ISRM 2.0 delivery including all Service Description Documents (SDDs) and Service Identification Documents can be found in the SESAR extranet: ISRM 2.0 folder in SESAR extranet: SESAR Joint Undertaking Programme > WP 08 > Project 08.03.10 > Project Execution > ISRM 2.0

[36] P11.02.01 D23 - MET-OSED, Ed. 00.01.01 https://extranet.sesarju.eu/WP_11M/Project_11.02.01/Project%20Plan/Forms/AllItems.aspx?RootFolder=%2fWP%5f11M%2fProject%5f11%2e02%2e01%2fProject%20Plan%2fOSEDs

[37] P11.02.01 D24 - MET SPR, Ed. 00.01.01 https://extranet.sesarju.eu/WP_11M/Project_11.02.01/Project%20Plan/Forms/AllItems.aspx?RootFolder=%2fWP%5f11M%2fProject%5f11%2e02%2e01%2fProject%20Plan%2fSPR

[38] P11.02.01 D21 - MET INTEROP, Ed. 00.01.01 https://extranet.sesarju.eu/WP_11M/Project_11.02.01/Project%20Plan/Forms/AllItems.aspx?RootFolder=%2fWP%5f11M%2fProject%5f11%2e02%2e01%2fProject%20Plan%2fINTEROP

[39] Session H of EATMA v6, allocation matrix V1.1, 05/06/2015
https://extranet.sesarju.eu/WP_B/Project_B.04.03/Other%20Documentation/01%20ADD%20-%20STG/EATMA%20Update/EATMA%20V6/

[40] B04.01 D41 - Performance Framework, Ed. 01.01.00
https://extranet.sesarju.eu/WP_B/Project_B.04.01/Project%20Plan/Performance%20Deliverables/B_4_1_D41_Performance_Framework_Edition2_V01.01.00.docx

Appendix A Justifications

This appendix shows a summary extract from EATMA of the WP7/13 operational processes (operational activities and information exchanges) in the scope of the NOP. It details the result of the P07.06.01 contribution in ensuring the coherence between federating and primary projects at WP7/13 level (operational activities and information exchanges).

A.1 Processes

The DOD processes were under revision at the time of updating this document. The section provides an insight into the kind of support provided by the NOP referring to the High Level Process Model addressed in the 7.2 DOD [7].

A.1.1 Plan Network Management Operations

This process focuses mainly on the elaboration of the Network Operations Plan (NOP), which is built in the planning phase initially as a result of analysing the plans of partners as well as requests from Airspace Users. This takes place at network level and is supported and mirrored at sub-regional level and local level. An internal collaborative decision making process harmonizes the demand/capacity balancing requirements of each separate area.

A.1.1.1 Determine Network Demand

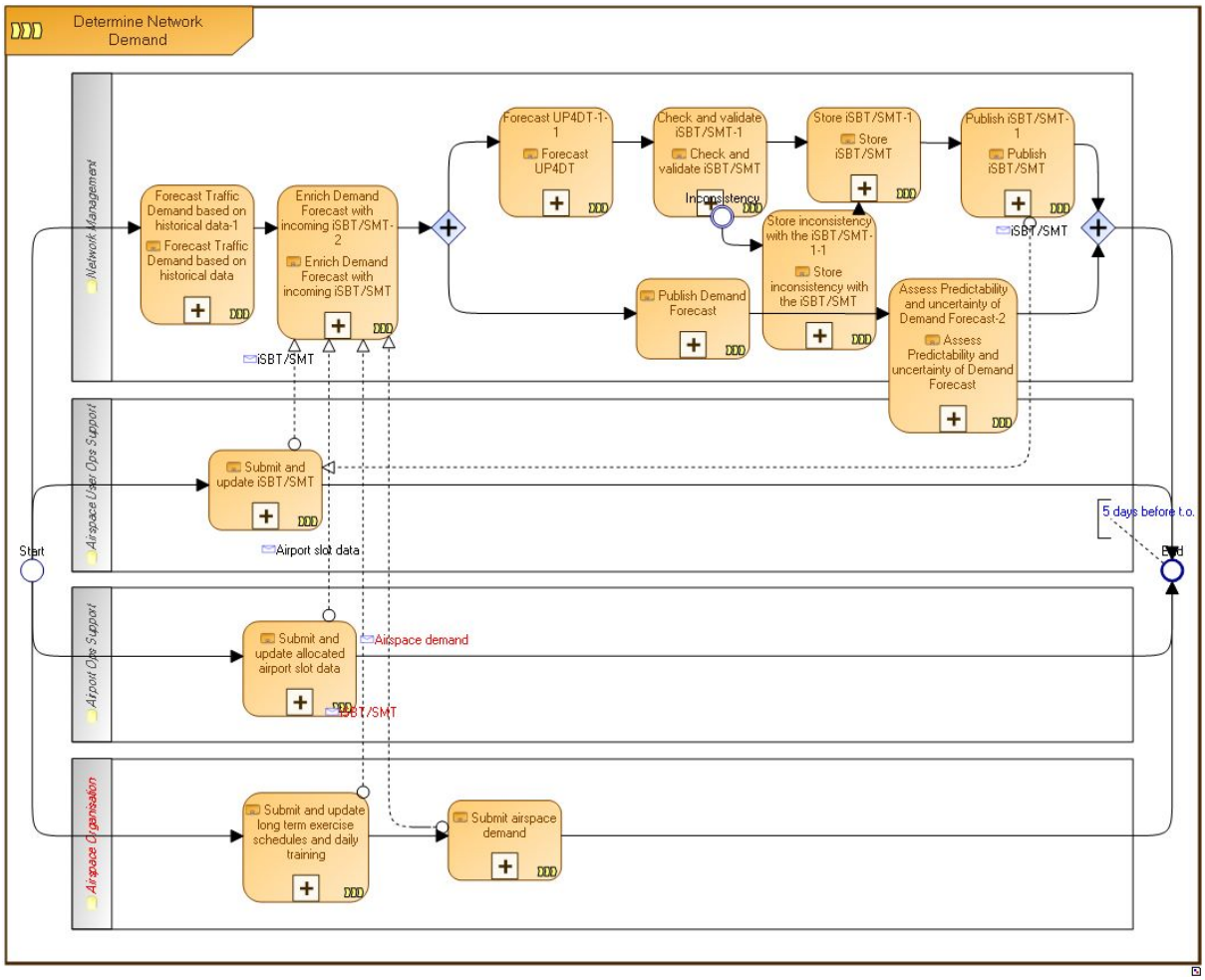
Long-term planning of Network Operations requires the elaboration of a Demand Forecast. The Network Manager elaborates the Demand Forecast in close coordination with his partners. The phase stretches over many years (between 6 months and up to 5 years) and stops six months before the start of the next season. It consists of the elaboration of the Traffic Demand Forecast and the Airspace Demand Forecast.

Medium and Short term planning of Network Operations requires the further elaboration of Traffic Demand. In these periods, the demand is based on historical traffic demand, enriched, where possible, with available flight intention information (flight schedules and allocated airport slots). Flight intention information in the Medium and Short-Term phases can be seen as a continuum progressively updated and fine-tuned. The Network Manager elaborates, maintains, and makes accessible, enhanced forecasts of Traffic and Airspace Demand used to support the Medium and Short-Term planning phases, when detailed information on traffic demand derived from flight plans is not yet available.

Main output available in the NOP: The long-term Network demand (Traffic and Airspace forecast) with the associated assessed predictability and uncertainty, built from enriched historical data. The Medium and Short-term Network demand forecast (published with FPLs when they exist), with progressively more accuracy, less uncertainty and greater predictability over time, plus enriched historical data.

4771

A.1.1.1.a BMT in Long and Medium Term (up to 5d before TO)



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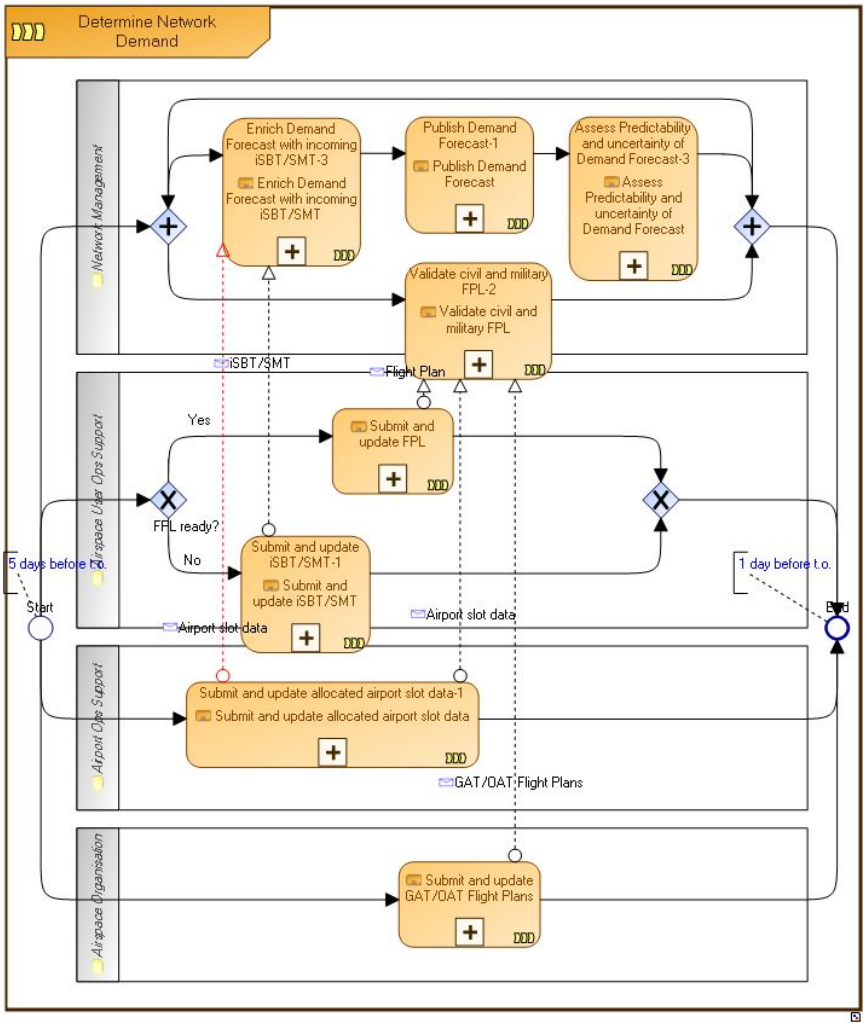
A.1.1.1.b BMT in Short Term (5d to 1d before TO)



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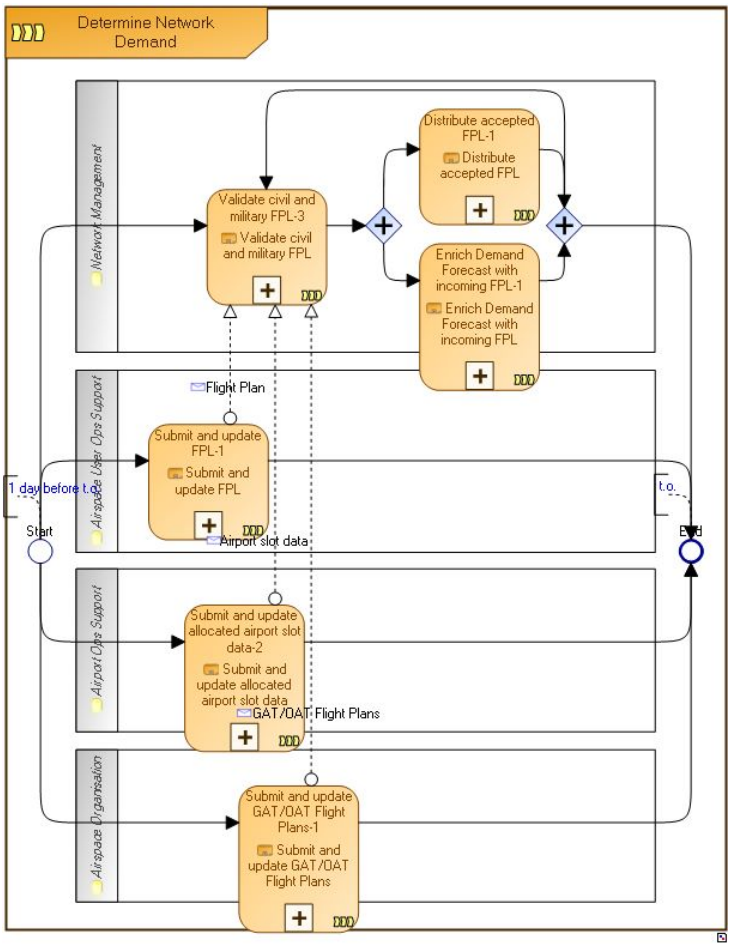
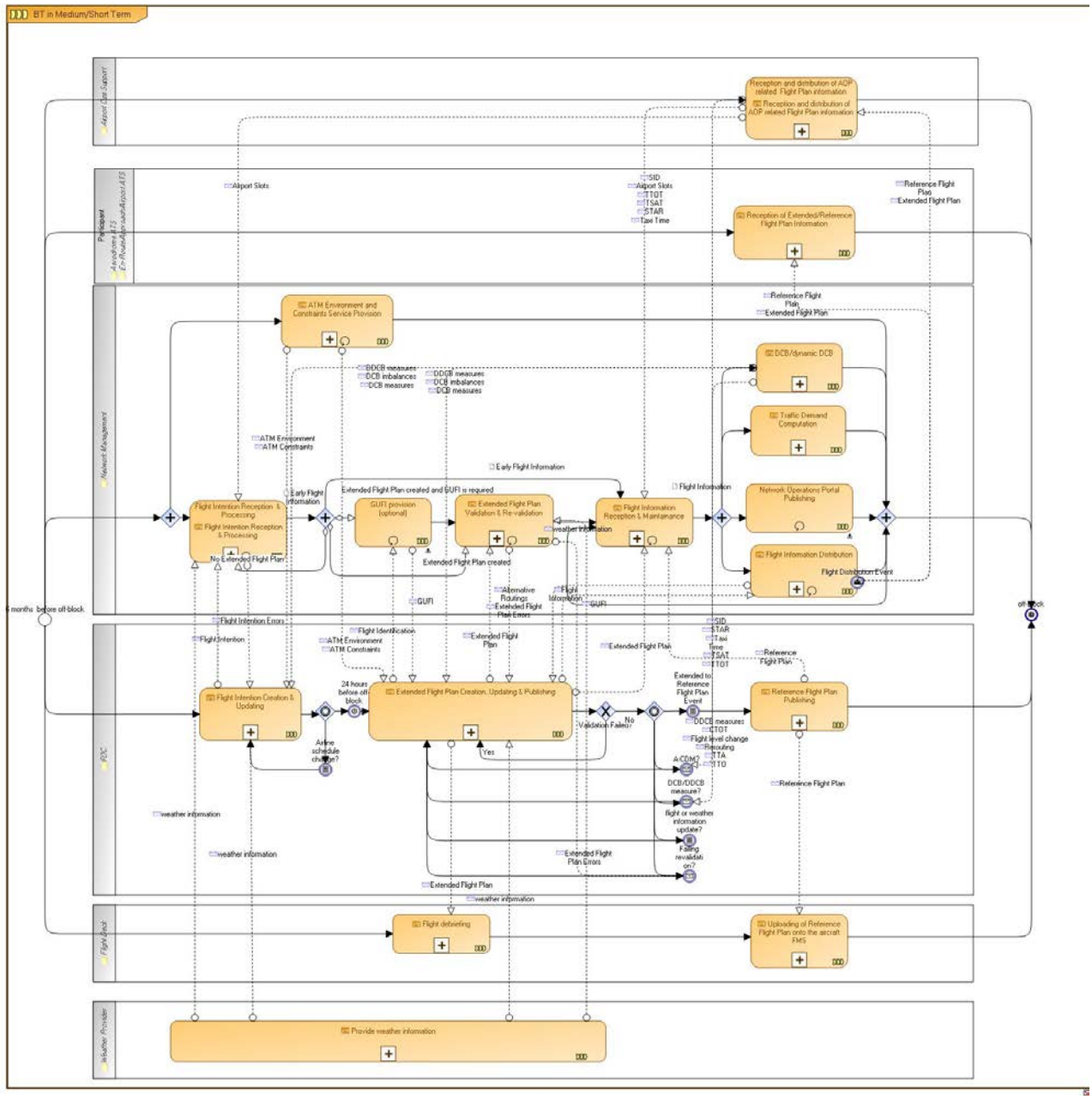
A.1.1.1.c BMT in Short Term (1d before TO until TO)



4776

A.1.1.1.d Detailed BT in Medium and Short Term (6m before OB until OB)



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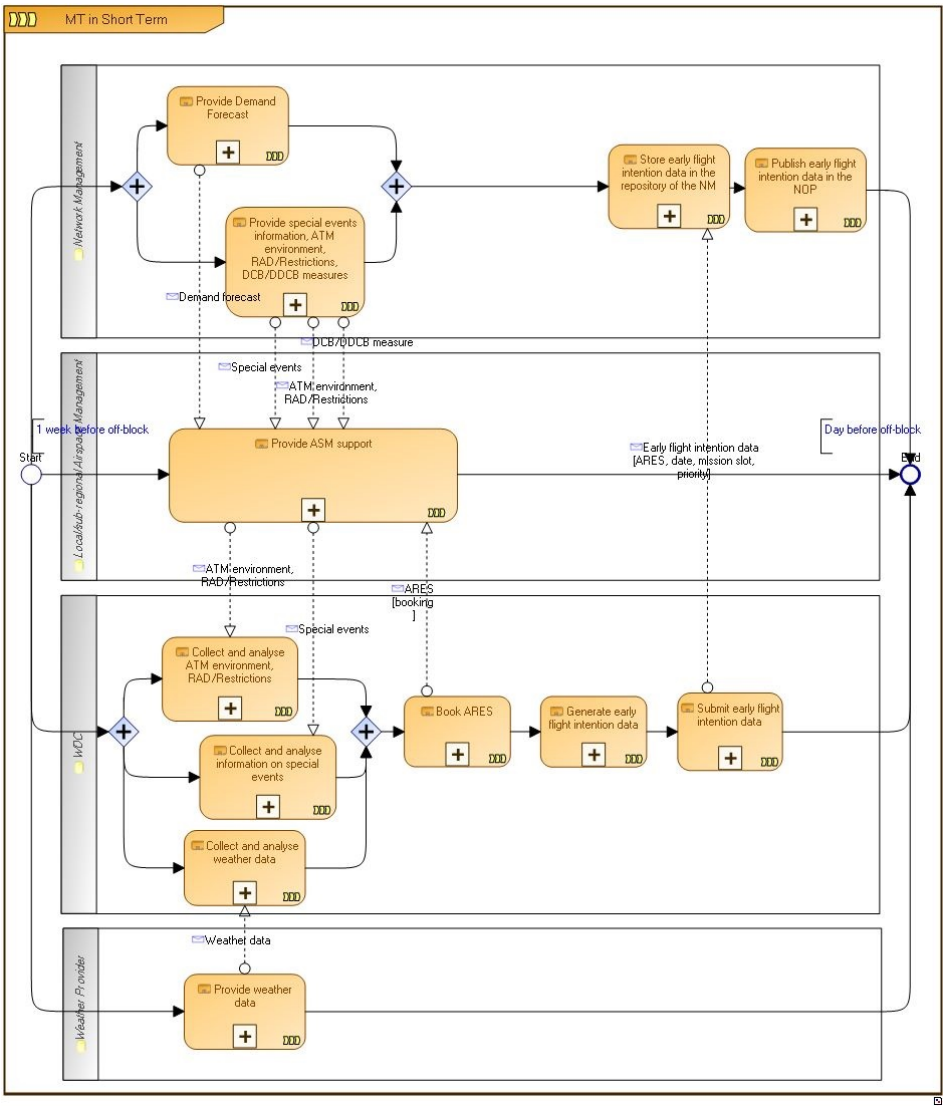
A.1.1.1.e Detailed MT in Short Term (6d until 1d before OB)



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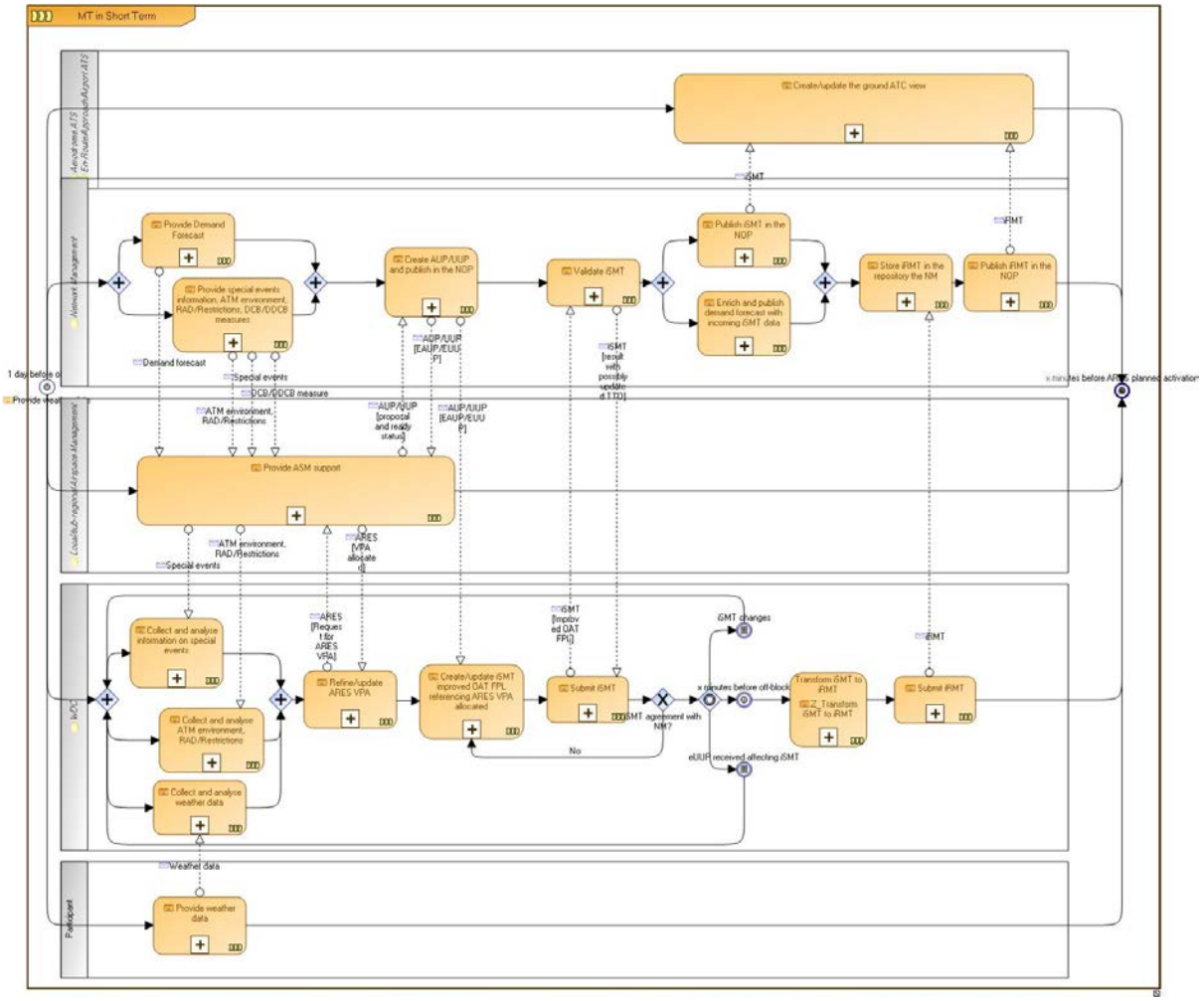
A.1.1.1.f Detailed MT in Short Term (1d before OB until OB)



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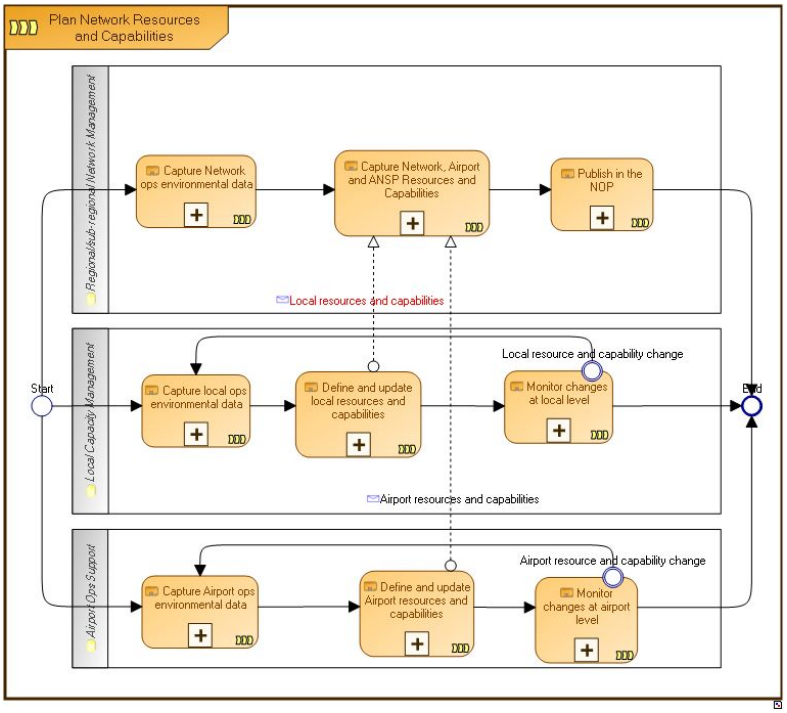
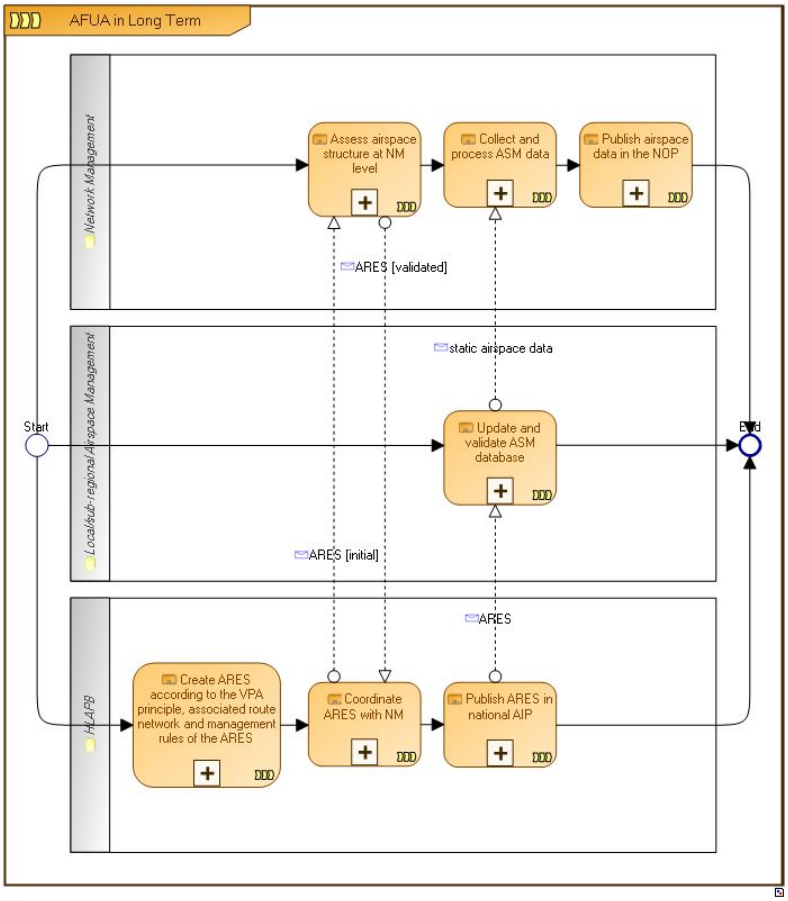
A.1.1.2 Network Resources and Capabilities (AFUA)



A.1.1.2.a AFUA in Long Term

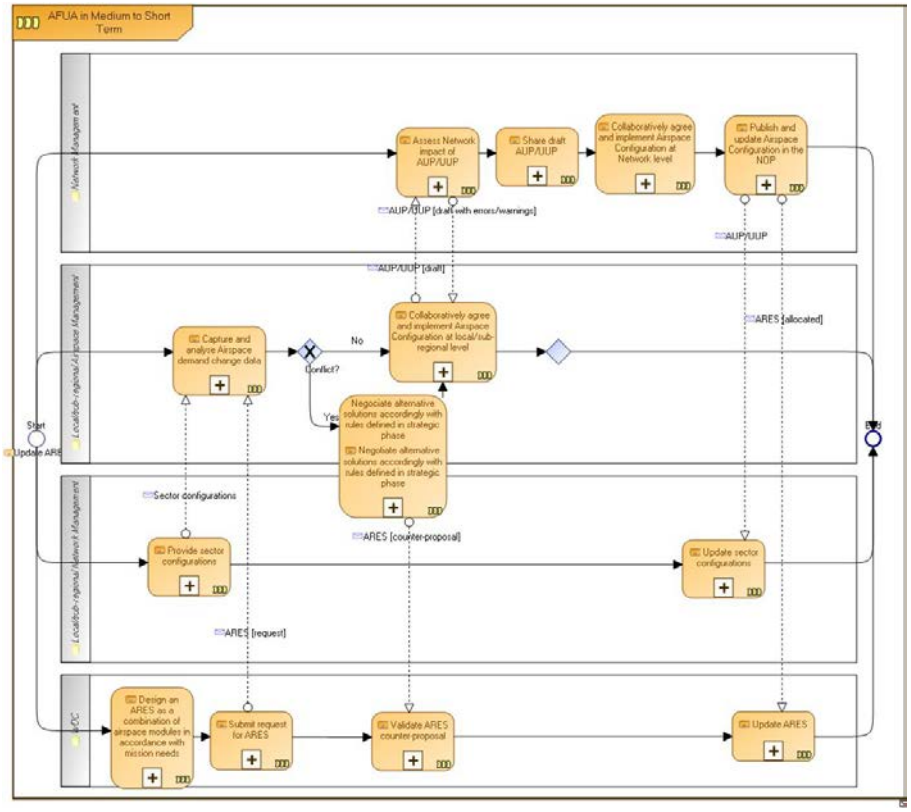
The long term planning requires the elaboration of a Capacity Forecast achieved by determining planned ATM infrastructure changes and planned Airport infrastructure changes.



Main output available in the NOP: Long-term Network capacity plan (workable operational network capacity model providing a view of constraints and possible resolution strategies).

A.1.1.2.b AFUA in Medium to Short Term

Resources and capabilities available at all levels (from sector to Network level) have to be managed to provide a clear description of the available capacity for a given time period. Up-to-date and comprehensive capacity data and information from ANSPs and airports are made available, supporting stakeholders in the development of medium-term plans, in particular Demand Capacity Balancing. The Network Manager captures, maintains, and makes accessible on a need-to-know basis, the published sector capacities necessary to build the Network Operations Plan using a CDM approach.



Main output available in the NOP: Capacity plans.

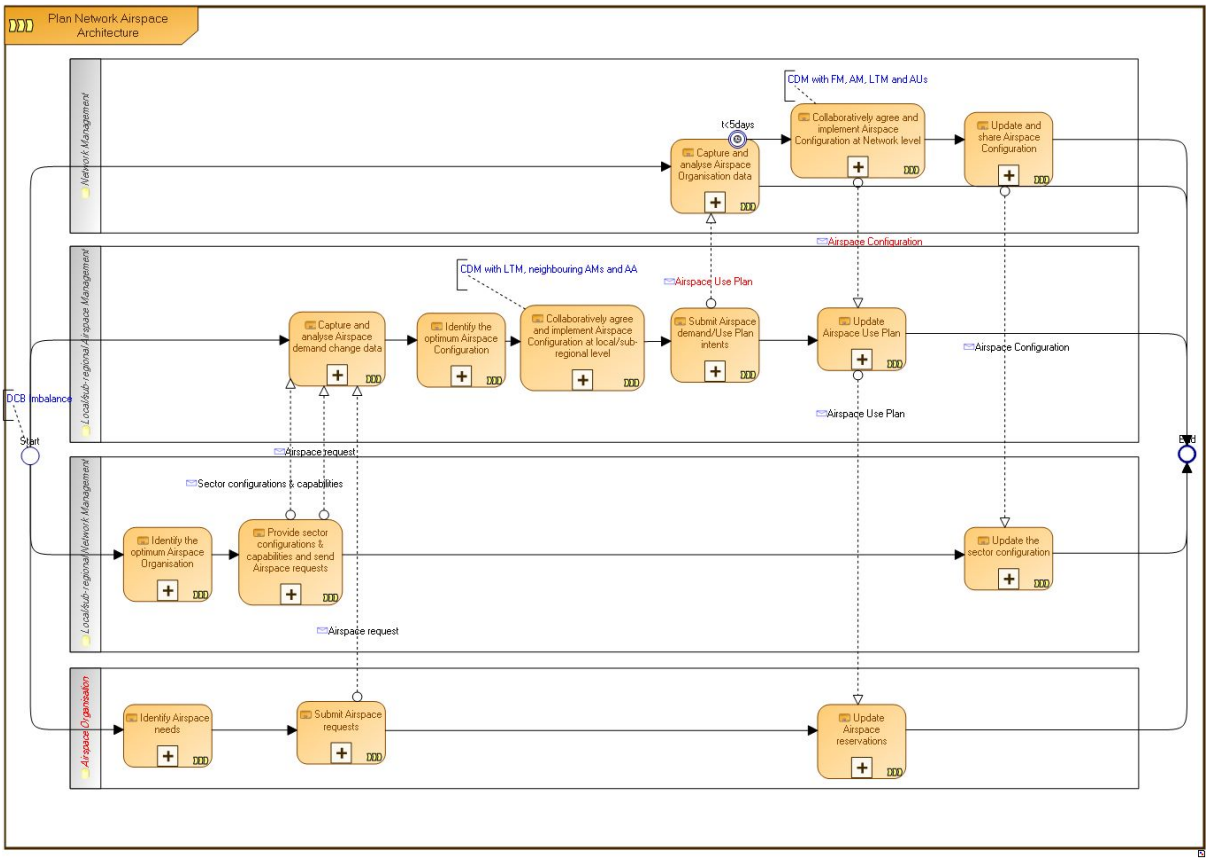
A.1.1.3 Network Airspace Architecture

A.1.1.3.a Airspace Management in Long, Medium and Short Term

The planning of airspace consists in capturing and analysing the Traffic and Airspace reservation demand, making it available in the NOP and evolving it over time (rolling process) to support the relevant ATM actors (e.g. Airspace Management, Flow and Network Managers) in identifying the optimum Airspace Organisation (though collaborative agreement).

After identification, the optimised Airspace Organisation is implemented and updated collaboratively at regular intervals (as soon as an airspace change has happened or is anticipated to happen) up to a defined time before the Execution Phase.

Main output available in the NOP: Agreed Airspace Configurations (and successive updates).



A.1.1.4 Balance Demand with Resources and Capabilities

From the information incrementally received and elaborated to represent the Traffic and Airspace Demand and the available information regarding resources and capacities, the Long and Medium Term Planning elaborates a plan (including measures) that can be applied in order to minimize negative impacts on ATM and Airspace Users' performance.

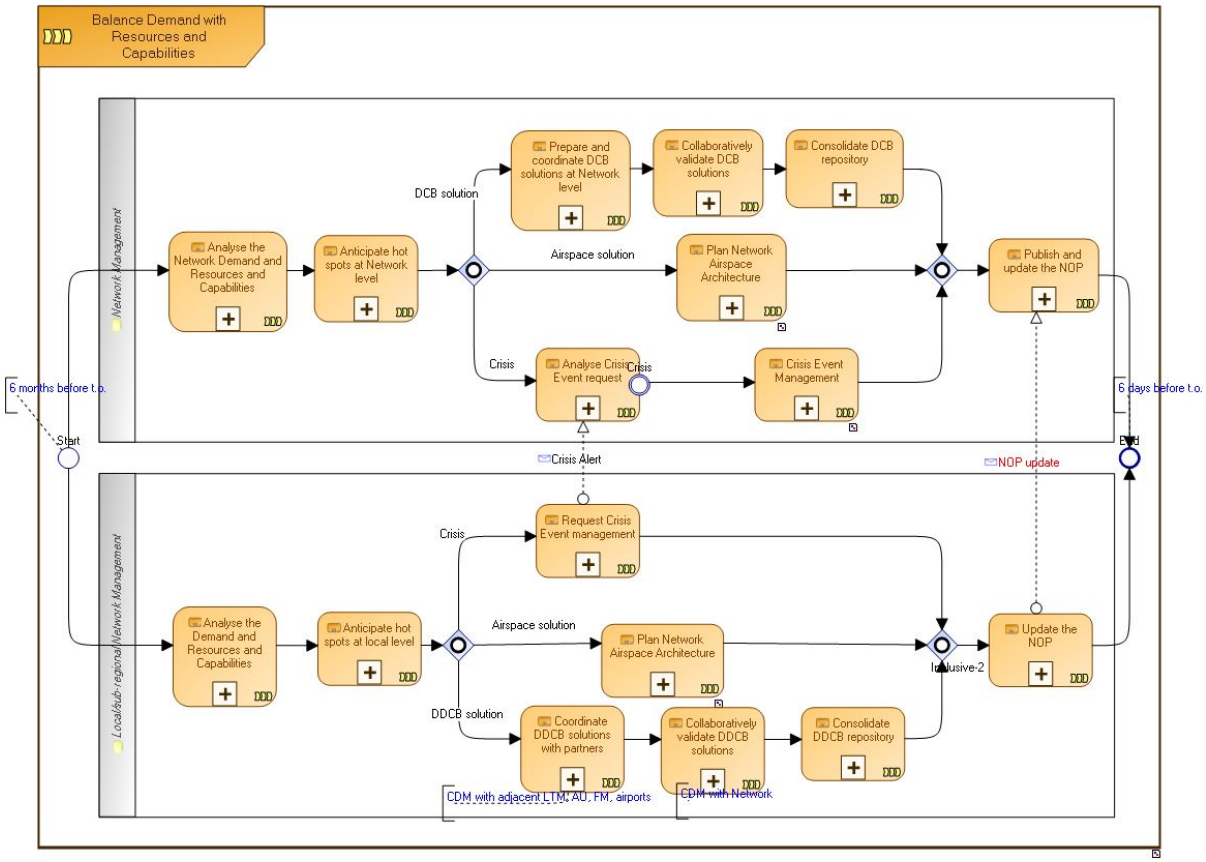
CDM ATFCM planning and DCB are iterative processes, which progressively generate and detail the NOP. Processes are initiated several months ahead, on a rolling pattern, and are progressively refined (Seasonal planning, Short-term planning). The validated solution scenarios are made available in the NOP.

Solutions / scenarios relate to the planning of the Flexible Use of Airspace, planning the Dynamic Demand Capacity balancing and planning the Dynamic Airspace Configurations.

Main output available in the NOP: Network Long term (strategic) Plan (scenarios, basic input data for the Network Operational Plan – NOP including performance goals, contingency response strategies, incentive based solutions, management measures and techniques, Airport measures, large events), constraints. DCB plans (including pre-defined DCB measures / constraints).

4833

A.1.1.4.a DCB in Long and Medium Term



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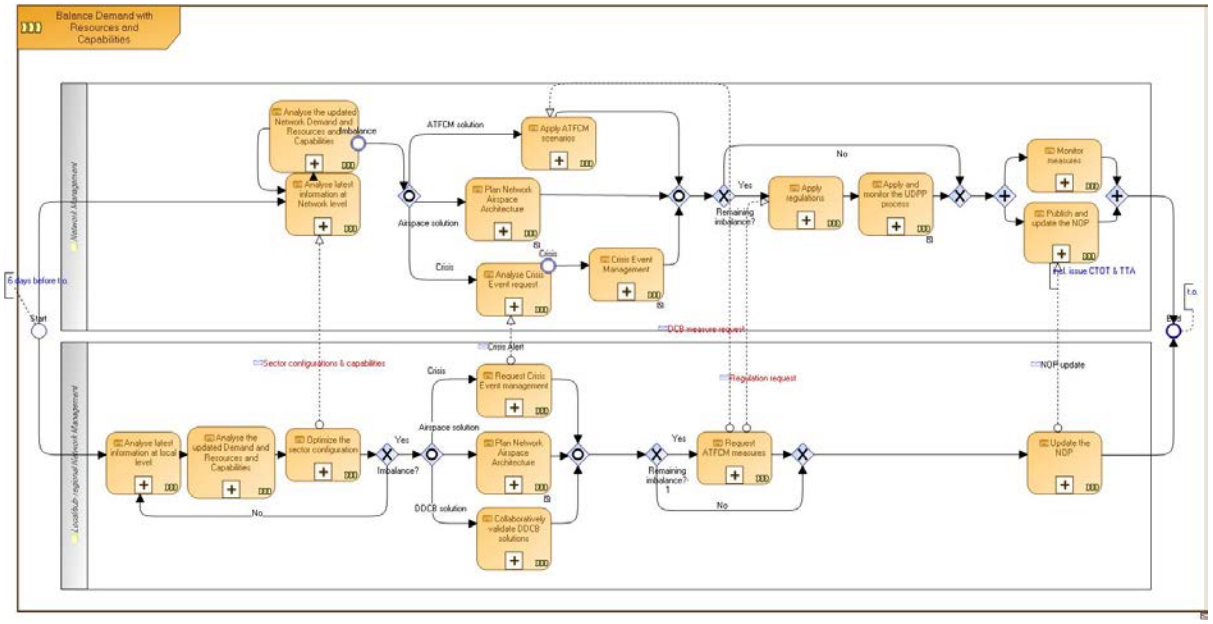
A.1.1.4.b DCB in Short Term



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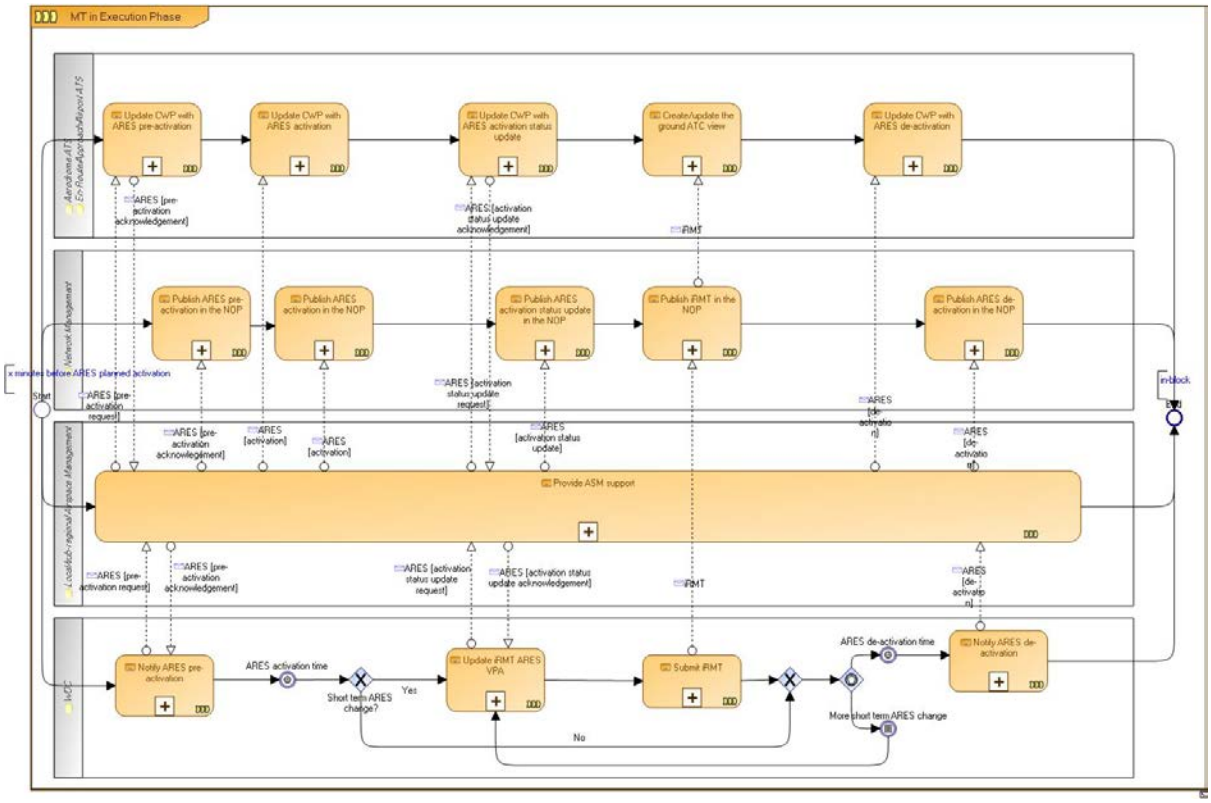
A.1.2 Execute Network Management Operations

A.1.2.1 Determine Network Demand (BMT)



A.1.2.2 Network Resources and Capabilities (AFUA)

During the execution phase, the allocation of airspace and the availability of network capacity are dynamically adapted and fine-tuned to meet changing requirements (e.g. exercise cancellation, necessary re-routing due to weather, Free Route Airspace, direct routes, sectorisation, reduction of required capacity, adaptation of sector configuration etc.) impacting the actual traffic flow and complexity values with regard to the declared capacity values.

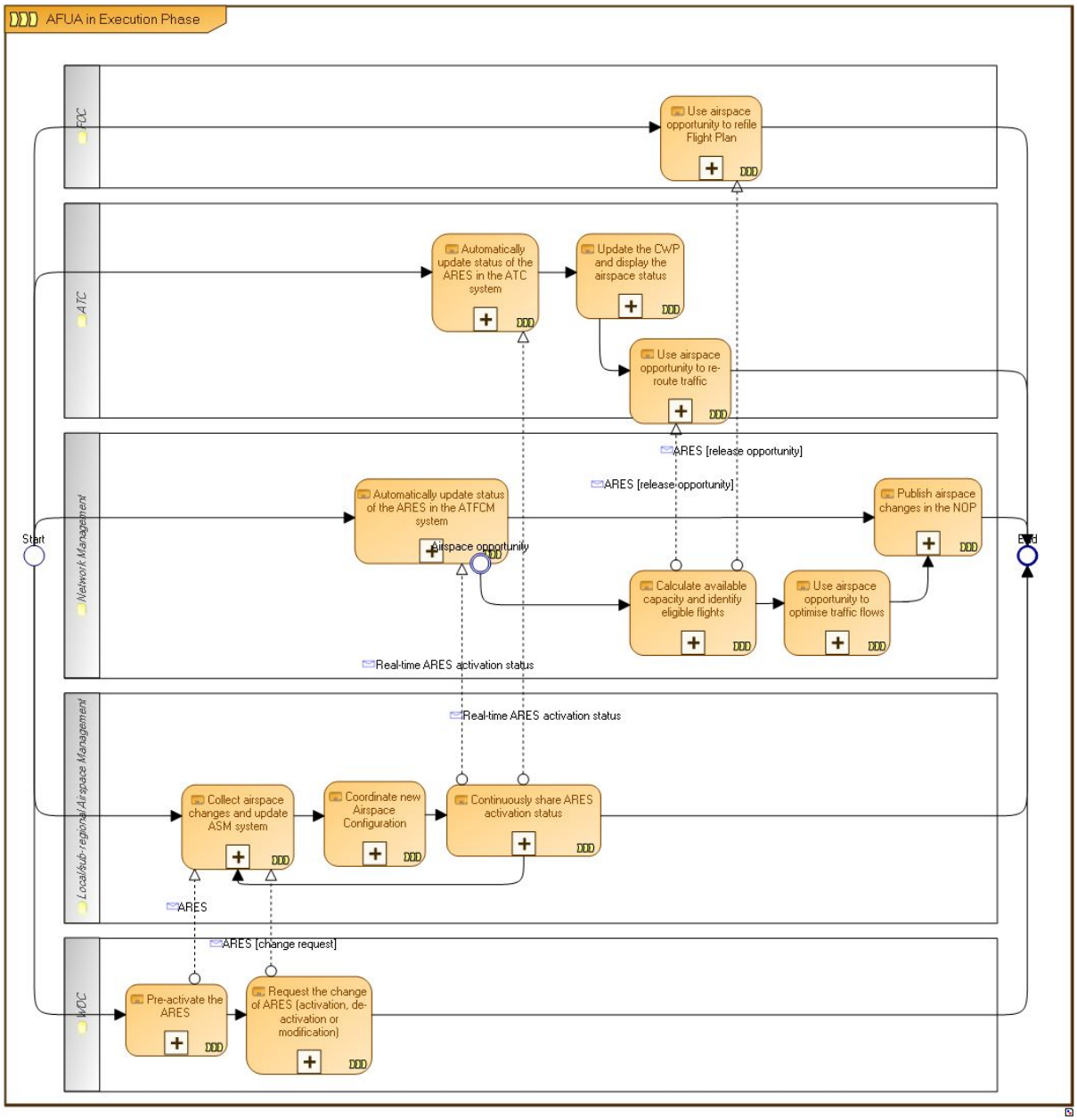
This process relies on availability of Airspace Status in real time and information sharing between ASM tools and ATFCM systems (through the NOP). Deviations from the Network Operations Plan are coordinated amongst the network actors (through integrated and user-friendly functions permitting quick decisions: CDM enabled by the NOP) and the agreed DCB measures for routes, sectors and areas are input into the NOP.

Actual or potential losses of network capacity are also monitored to react dynamically by the application of adequate and agreed DCB measures. CDM processes between relevant NOP actors take place - Activation of scenarios to resolve substantial capacity problems.

When considering the current situation and scenario refinements needed, an assessment of their impact on the Network situation has to be calculated. This allows appropriate decisions to be made to minimise the impact of any disruptions and to meet network stability demands, capacity optimisation and airspace users' flight plan requests until the flight is off blocks and in compliance with the airport capabilities.

The NOP contains the latest available information shared in the system and facilitates the processes necessary to reach agreement on demand and capacity. It supports a set of collaborative

applications, providing access to traffic demand, airspace and airport capacity and constraints and scenarios to assist in managing diverse events.

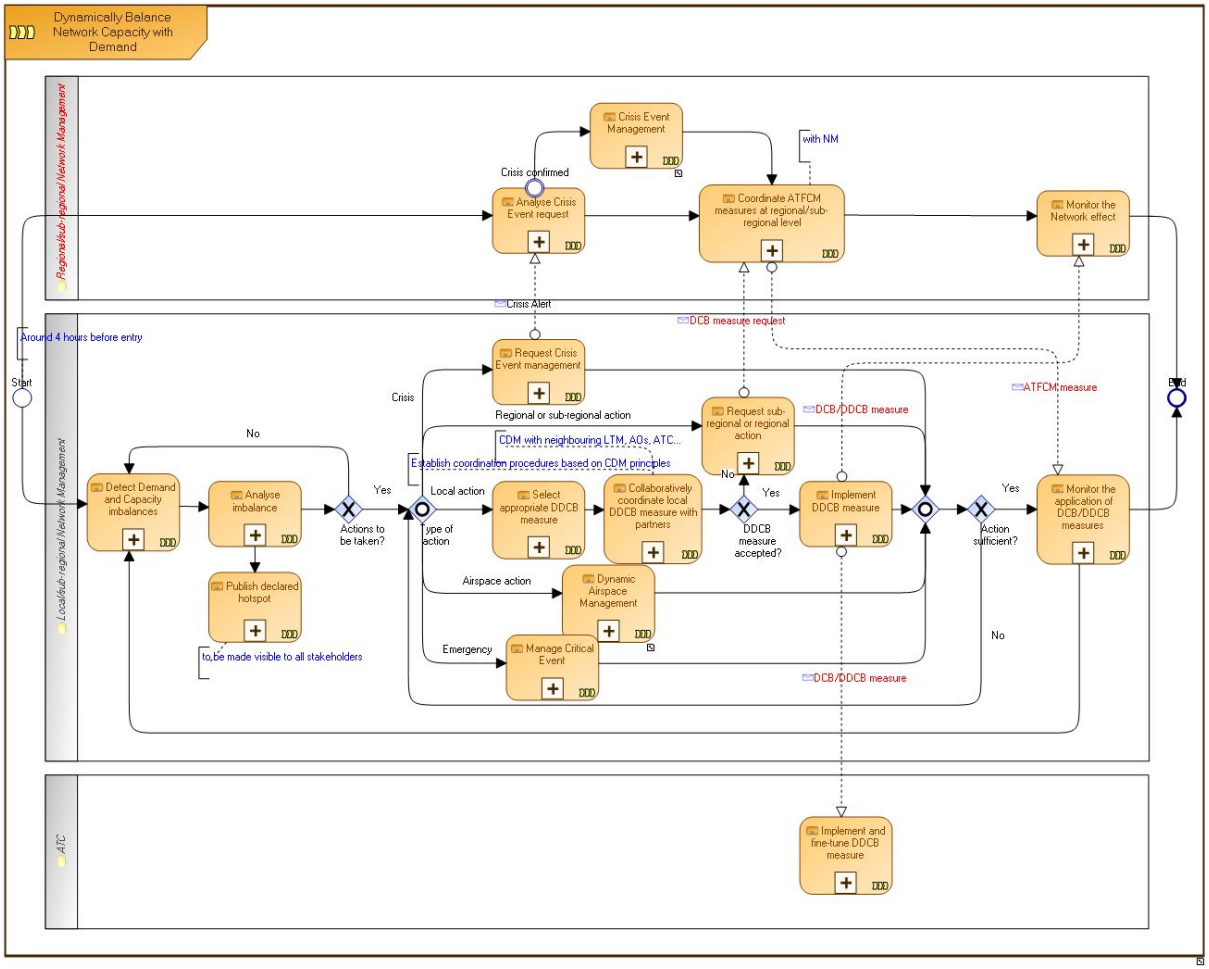


Main output available in the NOP: Optimised and fine-tuned Airspace Configurations, Optimised Network Capacities.

A.1.2.3 Balance Network Capacity with Demand (DDCB)

This process consists of a reactive mode to monitor the network demand and react on the ATC demand to an over-delivery (regulation/ scenario).

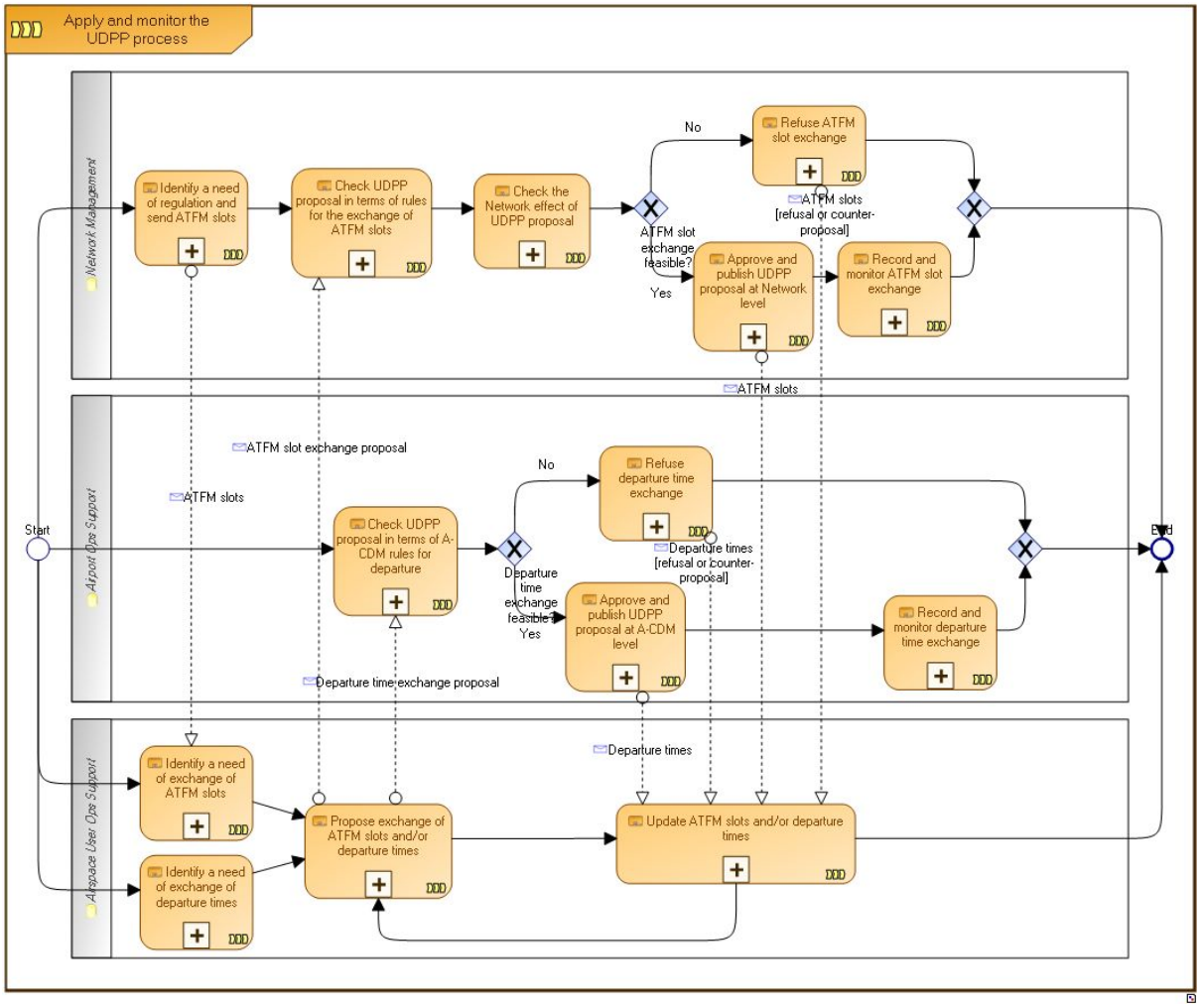
All phases: All concerned Actors input information (e.g. changes to capacity, trajectories, stand allocation plans etc.) into the NOP, which is dynamically updated. All NOP users are notified of NOP updates (for the NOP data they have subscribed to). This action continues throughout all of the ATM Phases including post-flight.



A.1.2.4 Balance Network Capacity with Demand (UDPP)

When demand for air traffic services is expected to exceed the available capacity of airports or airspace within the ECAC area, the Network Manager issues slot times to balance demand with capacity on a First-Planned-First-Served basis. This process does not take into account Airspace Users' priority needs.

However, for an AU, not all flights are equivalent, and swapping flights to protect important ones is a capability that allows them to protect their schedule. Before SESAR1, ATFM Slot Swapping existed for flights sharing the same Most Penalising Regulation. In SESAR, this capability has been reinforced with swap with a pre-allocated flight, Multi-swapping (up to 3 times) and Substitution on Cancellation and with a Swap Identification Tool. At Airports, Departure-Flexibility can be achieved by allowing Reference-time reordering in the pre-departure Sequence at certain Airports. A generic work-flow for both processes is described in the diagram below.



A.1.3 Monitor/Analyse Network Management Performance

In order to assess the performance of the Network Management, the post processing of the day of operation is essential to identify success and failure points to improve.

Network Performance is monitored according to SES Performance Framework approved KPIs and targets, including flight efficiency, impact on environment, safety, cost etc. The assessment of the Network Management Performance must be performed throughout all the ATM phases. A series of performance indicators are identified, according to the main objectives and targets set for Network Operations, monitored and analysed in order to optimise Network Performance.

Deviations from performance targets should be detected, allowing corrective action(s) to be implemented. Post-analysis is essential for this process as it enables the identification of areas where initiatives have been applied and how well (or otherwise) they worked.

Base-lining of the Network Operations Plan has taken place all along the planning and execution lifecycle and these planned baselines (or NOP/Plan instances) are stored in the NOP together with actual performance, DCB actions performed, scenarios and mitigations and their relative success. This information complements historical data and be available to the relevant ATM Actors for future reference and information.

A.1.3.1 Monitor/Analyse network Operational KPAs in Post Flight Phase (Step1)

During the whole operation of the flight, Key Performance Indicators or KPIs including agreed Civil Users - Military Users Key Performance Indicators on airspace usage have monitored throughout the operation to determine how effective ATM has meet Airspace User's demand (airspace, airport / aerodrome services).

Both Users and Providers (ANSPs, APs, Network, Meteorological and Aeronautical Information and auxiliary services) are able to assess the actual operation (Routes actually flown, usage of allocated airspace, mission effectiveness and flexibility, runway utilisation, stands allocated, taxi routes used, time deviations from Target Times and their causes) against the planned operation.

For keeping environmental sustainability of the ATM System, Network efficiency indicators are monitored to describe the environmental performance of the ATM network. Even though most of the sustainability policies are valid at local level, the defined Sustainability Framework for ATM has integrated a set of Key environmental Performance Indicators that takes into account local specificities for assessing the operation.

[Process Diagram to come]

A.1.3.2 Monitor/Analyse Network Resources and Capabilities Performance in Post Flight Phase (Step1)

Both Users and Providers (ANSPs, APs, Network, Meteorological and Aeronautical Information and auxiliary services) are able to assess the adequacy of the Network / Regional / Local capacity provision and to take suitable actions as to continuously enhance civil-military cooperation and coordination.

[Process Diagram to come]

A.2 Services

A.2.1 Network Management Domain System / SWIM Services Mapping

These SWIM services contribute to the NOP by either providing information to be aggregated (consumer) in order to elaborate the plan or to disseminate (provider) consolidated network information from the plan to stakeholders.

This mapping has been reviewed during the session H of the EATMA publication process (see [39])

Network Management Domain System / SWIM Service Mapping		Capability Configurations	Regional NM/AM	Sub-Regional/National AM	Sub-Regional/National NM
Service Types (interface types)					
ARESActivation	1.1		C	P	P
ARESDeactivation	1.1		C	P	P
ARESPreActivation	1.1		P	C	C
AresQuery	1.3		P	C	C
ARESRelease	1.1		C	P	P
ExtendedFlightPlanSubmission	1.3		P		
FlightPlanDataDistribution	1.3		P		
HotspotManagementService	NA		P		P
M-CDMMeasureService	NA		P		c
METAR	1.1		C		C
METHazardEnRouteForecast	1.3		C		
METHazardEnRouteObservation	1.3		C		
NetworkOperationPlan	1.1		P		
NMCapacityDataService	NA		P		C
NMFlightDataService	NA		P		C
OATFlightDataDistribution	1.3		P		
OATFlightPlanSubmission	1.3		P		
RunwayManagement	1.3				
SNOWTAM	1.1		C		C
STAMMeasuresService	NA		P		C
TAF	1.1		C		C
TrafficVolumesInformationService	NA		P		p

Table 33: Network Management Domain System / SWIM Services Mapping

A.2.2 Service Definitions

The list of services below is in line with ISRM AOP-NOP services [35] are therefore not yet present. The already identified future services are “labelled” (NA). AOP-NOP services have been added as soon as they were available.

Service name	Description	Service version
ARES Activation	The ARESActivation service provides the CDM to coordinate the activation of an ARES between the ASM and the concerned ACCs.	1.1
ARES De-Activation	The ARESDeActivation service provides the CDM to coordinate the deactivation of an ARES between the ASM and the concerned ACCs.	1.1
ARES Pre-Activation	The ARESPreActivation service allows pre-activation of ARES.	1.1
ARES Query	The ARESQuery is a request/reply service that provides information on a specific Area Reservations (ARES) to sustain Advanced Flexible Use of Airspace (AFUA) operations.	1.3
ARES Release	The ARESRelease service provides the CDM to coordinate the release of an ARES between the ASM and the concerned ACCs.	1.1
Extended Flight Plan Submission	The ExtendedFlightPlanSubmission service supports the service consumer to request validation, submission and cancellation of Extended Flight Plans.	1.3
Flight Plan Data Distribution	The FlightPlanDataDistribution Service supports the service provider (Network Manager) to distribute flight plans copies and changes.	1.3
HotspotManagementService	**<Final description in progress>**	NA
M-CDM Measure Service	**<Final description in progress>**	NA
METAR	The METAR service covers the dissemination of standard ICAO METAR bulletins over SWIM.	1.1
MET Hazard En-Route Forecast	The METHazardEn-RouteForecast service defines an information service for exchanging Forecasts and Nowcasts of significant weather phenomena.	1.3
MET Hazard En-Route Observation	The METHazardEn-RouteObservation service defines an information service for information exchanges for Observations of significant weather phenomena.	1.3
Network Operation Plan	The NetworkOperationPlan service supplies the data common to the Network Operations Plan (NOP) and the Airport Operations Plan (AOP) to the airport in order to synchronize the data and maintain a common view of the overall network demand.	1.1
NM Capacity Data Service	**<Final description in progress>**	NA
NM Flight Data Service	**<Final description in progress>**	NA
OAT Flight Data Distribution	The OATFlightDataDistribution service: to enable the NM to: distribute OAT Flight Data to a set of users identified from the trajectory of the flight and other users based on internal rules and Letters of Agreement.	1.3
OAT Flight Plan Submission	The OATFlightPlanSubmission service: to enable the Military or State Airspace User to: • request the verification of a new OAT Flight Plan before its submission. • receive the result related to the Validation of a new OAT Flight Plan. • request the submission of a new improved OAT Flight Plan, or of an update to an improved OAT Flight Plan. • receive the result related to the submission of a new improved OAT Flight Plan or of an update to an improved OAT Flight Plan. • request the delay of an improved OAT Flight Plan. • request the cancellation of an acknowledged improved OAT flight plan. • notify the NM of a flight's suspension or de-suspension.	1.3
Runway Management	This service aims at providing information about the runway status and configuration (current and planned) at an aerodrome.	1.3
SNOWTAM	The SNOWTAM service covers the dissemination over SWIM of standard ICAO SNOWTAM, which are shared with a wide range of subscribing ATM users.	1.1
STAM Measures Service	**<Final description in progress>**	NA

Service name	Description	Service version
TAF	The TAF service covers the dissemination of standard ICAO TAF bulletins over SWIM.	1.1
Traffic Volumes Information Service	**<Final description in progress>**	NA

4952 Table 34: NM Domain System Services Definitions

Appendix B New Information Elements

The detail of information elements are provided below, via 2 chapters. Chapter B.1 refereeing to the WP8 work in identifying the new information elements, chapter B.2 listing all the information elements directly extracted from the EATMA.

B.1 Information elements as defined by WP8 via services activities

This section contains a detailed description of the new Information Elements that are exchanged by actors and relevant for the Network Operation Plan. In order to extract these new elements, all the WP7 validation exercises needed to cover DCB-0103-A OI Step have been considered (see Table 35).

The P07.06.01 contributes actively to P13.02.03VALP; via the exercises VP-749 (SVA001) and VP-700 (SVA010). In addition P07.06.01 Collaborative NOP, due to its transversal nature, is validated throughout the primary projects that are already documenting the new information elements necessary for each validation exercise they are leading.

Exercises addressing DCB-0103-A	P07.06.02	P13.02.03	P07.05.04
Exercises including NOP specific Validation Objectives	• VP-713 EFPL • VP-716 OAT FPL	• VP-700 STAM => SVA010 MET Hazard • VP-749 CTOT to TTA => SVA001 AOP/NOP	• VP-710 ASM/NM/ATC Interop
Executed Exercises with results to be added to NOP validation results	• VP-616 EFPL • VP-712 Slot swapping	• VP-522 Dynamic DCB (STAM) • VP-632 (NOP-TTA Update • VP-772 MassDivGaming	• VP-016 ASM tools–ATFCM systems

Table 35: Exercises Addressing OI Step DCB-0103-A

The brown shaded exercises have already been executed. They are only analysed to see if NOP requirements are meet. No new Information Elements have been created by P07.06.01 concerning these exercises.

The identification of the information element, is done during the activities that are conducted in support of validation of the Step 1 Collaborative NOP defined in the P07.06.01 OSED. For each concerned validation exercise, SerVice Activity(ies) (SVA) or Fast Track (FT) are performed (see Table **36**), tracked by the Service Coordination Group (SCG). Identifying the information element is a mandatory step for the SWIM compliance level determination of a service.

Validation exercise	Supporting physical Service Instance	SVA ID
07.05.02-VP-710	**AresActivation TBC**	FT9
	ARESDeactivation TBC	FT9
	ARESPreActivation TBC	FT9
	ARESRelease TBC	FT9
	Extension of FT9 AFUA-ARES	SVA008
	ARESQuery	FT9
07.06.02-VP-713	**EFPLSubmissionService**	FT14
07.06.02-VP-716 (V2)	**OAT Flight Intent (distribution/Submission)**	SVA004
13.02.03-VP-749	**TBD**	SVA001
	HotspotManagementService	SVA009

Validation exercise	Supporting physical Service Instance	SVA ID
	NMFlightDataService	SVA009
	TrafficVolumeInformationService	SVA009
	NMCapacityDataService	SVA009
	StamMeasuresServices	SVA009
	M-CDMMeasuresService	SVA009
13.02.03-VP-700	AirportMETForecastService	SVA003
	AirportMETInducedCapacityReductionService	FT1/2
	AirportMETObservation	SVA003
	METHazardEnRouteForecast	SVA010
	METHazardEnRouteObservation	SVA010
	HotspotManagementService	SVA009
	NMFlightDataService	SVA009
	TrafficVolumeInformationService	SVA009
	NMCapacityDataService	SVA009
	StamMeasuresServices	SVA009
	M-CDMMeasuresService	SVA009

4976 Table 36: Correspondence between Validation exercise, Services and Service activities (Service
4977 roadmap extract)

4978 The information corresponding to each service mentioned into the above table are detailed in a SDD
4979 document, which lists, in chapter 5.1, the different Information element needed. The SDD taken into
4980 account are located in the SESARJU extranet, project P08.03.10 / Execution / ISRM 1.3 (See ref [35])
4981 Some SDD are still under generation at the date of this OSED delivery. As such, they are not yet
4982 available on the extranet and have been coloured in a grey background.

4983 B.1.1 IEs identified for SVA001

4984 The IEs below have been identified for AOP/NOP integration and are a necessary input for AIRM and
4985 SVA001.

Identifier	IE-01
Name	Early Departure Planning Information
Description	Departure Planning Information message which notifies the ETOT. The main purpose of the E-DPI is to confirm that the flight is going to occur, thus eliminating ghost and duplicated flights.
Properties	
Rules applied	• E-DPI is sent between the time at which the airport receives the Flight Plan and EOBT-2h. • Before an E-DPI is sent, it is required that the Airport CDM Platform matches the flight plan and airport slot.
Comments	Present in AIRM.

4986 Table 37: Early Departure Planning Information

Identifier	IE-02
Name	Target Departure Planning Information
Description	Departure Planning Information message which notifies an accurate Target Take Off Time (TTOT).
Properties	
Rules applied	• T-DPI is sent between 2 hours before off-block time and ATC time of pre-departure sequencing.

	• Use of the variable taxi time calculation permits an accurate TTOT to be calculated, which then allows the Network Operations to optimise the CTOT re-calculation and send improvements whenever possible.
Comments	Present in AIRM.

4987 Table 38: Target Departure Planning Information

Identifier	IE-03
Name	ATC Departure Planning Information
Description	Departure Planning Information message which notifies a very accurate Target Take Off Time (TTOT) based on the ATC established and stable departure sequence.
Properties	
Rules applied	• A-DPI is sent between off-block and take off. • It allows a better monitoring of departures and facilitates the identification of late updates requiring specific attention.
Comments	Present in AIRM.

4988 Table 39: ATC Departure Planning Information

Identifier	IE-04
Name	Cancel Departure Planning Information
Description	Departure Planning Information message which notifies the cancellation of a previously sent ETOT or TTOT.
Properties	
Rules applied	• Applied when previously sent ETOT or TTOT is no longer valid and when a new one is not yet known. • A typical operational example is a technical problem with the aircraft after an ATC clearance has been given. The C-DPI message suspends the flight in ETFMS.
Comments	Present in AIRM.

4989 Table 40: Cancel Departure Planning Information

4990

Identifier	IE-05
Name	Arrival Planning Information
Description	Message sent by the airport which notifies detailed flight arrival information such as STAR and EIBT.
Properties	
Rules applied	
Comments	

4991 Table 41: Arrival Planning Information

Identifier	IE-06
Name	Flight Progress Message
Description	Message sent by the Network Operations which notifies various stakeholders, including airports, with detailed flight information, including Estimated Landing Time (ELDT).
Properties	In addition to the ELDT, the Flight Progress Message contains the last point in the flight plan route with the corresponding Estimated Time Over (ETO) and also a flight status.
Rules applied	• A Flight Progress Message is sent for the first time at 3 hours before the ELDT. • Flight Progress Message updates are sent each time a significant update of the flight occurs in ETFMS. • It contains the most recent information known to the Network Operations, based upon its own flight profile calculation, flight data and radar position

	updates received from ATC and DPI messages concerning the flight if it is not yet airborne.
Comments	

Table 42: Flight Progress Message

Identifier	IE-07
Name	Airport Capacity Plan
Description	The plan of the maximum number of aircraft (throughput) that can be accommodated for flight operations in and out of the airport.
Properties	It includes arrival, departure and total airport capacity.
Rules applied	
Comments	

Table 43: Airport Capacity Plan

Identifier	IE-08
Name	Runway Configuration Plan
Description	The plan of runway configurations to be used on a given day for flight operations in and out of the airport.
Properties	
Rules applied	
Comments	

Table 44: Runway Configuration Plan

Identifier	IE-09
Name	Airport Capacity and Event Plan
Description	Airport Capacity Plan enhanced with the events impacting the capacity.
Properties	It includes the event reason and kind.
Rules applied	
Comments	

Table 45: Airport Capacity and Event Plan

B.2 Information exchanges as extracted from EATMA

The following tables provide a description of the content of the NOP in term of information elements.

These tables are preparatory information; which is used to cross-check the completeness of NOP requirements and to support the development of information exchange requirements.

The below tables have been extracted from EATMA and have been amended, corrected and completed directly via updating EATMA. This work has started and is ongoing.

The comment column "*Additional information*" is only filled when it is deemed necessary to provide more information on the information element for clarification purpose.

5005

5006 B.2.1 Network Operations

5007 B.2.1.1 Network Airspace Architecture

Information Element	Sending Operational Activity	Receiving Operational Activity
Airspace allocation	Collaboratively refine Airspace Allocation	Define and publish new Airspace Configuration
Airspace change request	Request the change of Airspace reservation	Capture LTM Airspace change request
Airspace Configuration	Collaboratively agree and implement Airspace Configuration at Network level	Update Airspace Use Plan
	Define and publish new Airspace Configuration	Capture new Airspace Configuration
		Change Mission Trajectory
	Update and share Airspace Configuration	Update the sector configuration
Airspace Configuration modification request	Delegate to LTM	Define and publish new Airspace Configuration
Airspace request	Provide sector configurations & capabilities and send Airspace requests	Capture and analyse Airspace demand change data
	Submit Airspace requests	Capture and analyse Airspace demand change data
Airspace Use Plan	Submit Airspace demand/Use Plan intents	Capture and analyse Airspace Organisation data
	Update Airspace Use Plan	Update Airspace reservations
Mission change request	Request the change of Airspace Reservation/Mission Trajectory	Capture Mission change request

5008 B.2.1.2 Network Resources and Capabilities

Information Element	Sending Operational Activity	Receiving Operational Activity
ARES (Airspace used in a mission trajectory)	Assess airspace structure at NM level	Coordinate ARES with NM
	Calculate available capacity and identify eligible flights	Use airspace opportunity to refile Flight Plan
		Use airspace opportunity to re-route traffic
	Coordinate ARES with NM	Assess airspace structure at NM level
	Define ARES needs	ATM Environment and Constraints Service Provision, Traffic Demand Computation, DCB
		Provide ASM support (AMC)
	Negotiate alternative solutions accordingly with rules defined in strategic phase	Validate ARES counter-proposal
	Notify ARES de-activation	Provide ASM support (AMC)
	Pre-activate the ARES	Collect airspace changes and update ASM system
	Provide ASM support (AMC)	ATM Environment and Constraints Service Provision, Traffic Demand

Information Element	Sending Operational Activity	Receiving Operational Activity
		Computation, DCB
		Publish ARES activation in the NOP
		Publish ARES activation status update in the NOP
		Publish ARES de-activation in the NOP
		Publish ARES pre-activation in the NOP
		Receive ARES pre-activation
		Refine/update ARES
		Update CWP with ARES activation
		Update CWP with ARES activation status update
		Update CWP with ARES de-activation
		Update CWP with ARES pre-activation
		Update iRMT ARES VPA
	Publish and update Airspace Configuration in the NOP	Update ARES
	Publish ARES in national AIP	Update and validate ASM database
	Receive ARES pre-activation	Provide ASM support (AMC)
	Refine/update ARES	Provide ASM support (AMC)
	Request the change of ARES (activation, de-activation or modification)	Collect airspace changes and update ASM system
	Submit request for ARES	Capture and analyse Airspace demand change data
	Update CWP with ARES activation status update	Provide ASM support (AMC)
	Update CWP with ARES pre-activation	Provide ASM support (AMC)
	Update iRMT ARES VPA	Provide ASM support (AMC)
AUP/UUP	Assess Network impact of AUP/UUP	Collaboratively agree and implement Airspace Configuration at local/sub-regional level
	Collaboratively agree and implement Airspace Configuration at local/sub-regional level	Assess Network impact of AUP/UUP
	Create AUP/UUP and publish in the NOP	Create/update iSMT improved OAT FPL referencing ARES VPA allocated
		Provide ASM support (AMC)
	Provide ASM support (AMC)	Create AUP/UUP and publish in the NOP
	Publish and update Airspace Configuration in the NOP	Update sector configurations
Local resources and capabilities	Define and update local resources and capabilities	Capture Network, Airport and ANSP Resources and Capabilities
Real-time ARES	Continuously share ARES	Automatically update status of the

Information Element	Sending Operational Activity	Receiving Operational Activity
activation status	activation status	ARES in the ATC system
		Automatically update status of the ARES in the ATFCM system
Sector configurations	Provide sector configurations	Capture and analyse Airspace demand change data
static airspace data	Update and validate ASM database	Collect and process ASM data

5009

B.2.1.3 Determine Network Demand

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
Airport slot data		External input	Enrich Demand Forecast with incoming iSBT/SMT-1
			Validate civil and military FPL
		Participant	Validate civil and military FPL-1
		Submit and update allocated airport slot data	Enrich Demand Forecast with incoming iSBT/SMT
			Enrich Demand Forecast with incoming iSBT/SMT-2
		Submit and update allocated airport slot data-1	Enrich Demand Forecast with incoming iSBT/SMT-3
			Validate civil and military FPL-2
		Submit and update allocated airport slot data-2	Validate civil and military FPL-3
		Validate civil and military FPL-1	External output
Airspace demand		Submit airspace demand	Enrich Demand Forecast with incoming iSBT/SMT-2
Alternative Routings	Alternate routings for the flight, with an evaluation of differences in flight performance indicators like delay, flight duration, route length etc	Extended Flight Plan Validation & Re-validation	Extended Flight Plan Creation, Updating & Publishing
ATM Constraints	ATM Constraints are restrictions described in the RAD (Route Availability Document) (published monthly). They consist of Flight Level Capping and Re-routing scenarios, En-Route DCT limits, Airport connectivity, Flight Profile Restrictions (PTR), FUA	ATM Environment and Constraints Service Provision, Traffic Demand Computation, DCB	Define ARES needs
			Provide ASM support (AMC)
		Provide ASM support (AMC)	Define ARES needs

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	Restrictions (ARES), Network wide restrictions valid for States/FABs/ANSPs on waypoints, navaids, ATS route segments, ACC/UAC sectors.		
ATM Environment	This consists of all information (referred also as AIRAC information) on aerodromes, significant points, airspaces, sectors, free route airspace (FRA), air routes, departure and arrival procedures, aircraft types and aircraft performance, air navigation units.	ATM Environment and Constraints Service Provision, Traffic Demand Computation, DCB	Define ARES needs
			Provide ASM support (AMC)
		ATM Environment Provision	Alternative Trajectories Creation & Update, Negotiating Trajectory Optimization
			Desired Trajectory Creation & Update
			Desired Trajectory and User Preferences Creation & Update
		Provide ASM support (AMC)	Define ARES needs
ATM environment, RAD/Restrictions		ATM Environment and Constraints Service Provision, Traffic Demand Computation, DCB	Provide ASM support (AMC)
		Provide ASM support (AMC)	Collect and analyse ATM environment, RAD/Restrictions
		Provide special events information, ATM environment, RAD/Restrictions	Collect and analyse ATM environment, RAD/Restrictions
		Provide special events information, ATM environment, RAD/Restrictions, DCB/DDCB measures	Collect and analyse ATM environment, RAD/Restrictions
			Provide ASM support (AMC)
DCB imbalances	DCB imbalances comprise 4D points or areas of the ATM network which are temporarily overloaded. They are the result of imbalances between traffic demand(including traffic complexity and workload aspects) and ATC capacity. They are detected and shared	[Context] OFA05.03.04 Enhanced ATFCM processes	Extended Flight Plan Creation, Updating & Publishing
			Flight Intention Creation & Updating
		DCB/dynamic DCB	Extended Flight Plan Creation, Updating & Publishing
			Flight Intention Creation & Updating

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	by the DCB/dynamic DCB activities.		
DCB measures	DCB measures aim to resolve traffic demand (including traffic complexity and workload aspects) versus capacity imbalances and optimise available capacity. They include dynamic sector or airspace configuration changes to adapt capacity to demand, group re-routings, what-if re-routings and ATFCM regulations.	[Context] OFA05.03.04 Enhanced ATFCM processes	Extended Flight Plan Creation, Updating & Publishing
			Flight Intention Creation & Updating
		ATM Environment and Constraints Service Provision, Traffic Demand Computation, DCB	Define ARES needs
			Provide ASM support (AMC)
		DCB/dynamic DCB	Extended Flight Plan Creation, Updating & Publishing
			Flight Intention Creation & Updating
			Reception and distribution of AOP related Flight Plan information
		Provide ASM support (AMC)	Define ARES needs
DCB/DDCB measure	DCB/DDCB measures correspond to the DDCB/STAM measures to solve complexity situations with actions that are delegated to ATC (Extended ATC planning): actions on airborne flights, possibly also on flights departing from nearby airports. So it is also in execution. e.g. "cherry-pick", "re-route flights"...	ATM Environment and Constraints Service Provision, Traffic Demand Computation, DCB	Provide ASM support (AMC)
		Implement DDCB measure	Implement and fine-tune DDCB measure
			Monitor the Network effect
		Provide special events information, ATM environment, RAD/Restrictions	Collect and analyse DCB/DDCB measures
		Provide special events information, ATM environment, RAD/Restrictions, DCB/DDCB measures	Collect and analyse DCB/DDCB measures
			Provide ASM support (AMC)
DDCB measures	Dynamic DCB measures (STAM) are elaborated and applied on the day of operations and they mainly consist of : a) Take Off Not Before (TONB): delaying of specific flights on the ground by a few minutes (typically less than 10min) b) Minimum Departure Interval: (MDI): sequencing of specific flights on	[Context] OFA05.03.04 Enhanced ATFCM processes	Extended Flight Plan Creation, Updating & Publishing
			Flight Intention Creation & Updating
		DCB/dynamic DCB	Extended Flight Plan Creation, Updating & Publishing
			Flight Intention Creation & Updating

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	the ground by applying departure time intervals: c) negotiation of level or route changes (e.g. to avoid sector) prior to flight execution (with flight briefing sent to pilot, fuel loaded etc.) d) Change of SID. They mainly aim to reduce sector load peaks and traffic demand complexity by acting on specific flights.		
Demand forecast		ATM Environment and Constraints Service Provision, Traffic Demand Computation, DCB	Define ARES needs
			Provide ASM support (AMC)
		Provide ASM support (AMC)	Define ARES needs
		Provide Demand Forecast	Provide ASM support (AMC)
Early Intent	An Early Intent includes the following data: 1.Airbase (Departure/Arrival) 2.Airspace Designator(s) (for the intended Airspace (ARES) to be used) 3..Time/Duration of the activity (including Date) 4. Mission Type 5. Priority Information 6.Number of Aircraft in the mission	Publish Early Intent Information	Receive Early Intent Information
Extended Flight Plan	The Extended Flight Plan includes all flight planning information. This consists of the flight planning information defined in the ICAO flight plan and 4D flight trajectory information. The Extended Flight Plan may also include information on the flight's climb	Extended Flight Plan Creation, Updating & Publishing	Extended Flight Plan Validation & Re-validation
			Flight debriefing
			Flight Information Reception & Maintenance
		Flight Information Distribution	Reception and distribution of AOP related Flight Plan information
			Reception of Extended/Reference Flight Plan Information

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	and descend profiles, referred as flight performance information. Calculated Take-off Time (CTOT), and target times over points (TTO) or at arrival (TTA), that have been used to compute the 4D Trajectory (as a result of applying an ATFM regulation), may also be included in the Extended Flight Plan. In SESAR Step 1 CTOT and TTO/TTA information are not included in the Extended Flight Plan, but instead the Extended Flight Plan includes ETOT and EET information that is linked to CTOT and TTO/TTA.		
Extended Flight Plan Errors	Errors found during the validation of the Extended Flight Plan against the ATM Environment and Constraints. These include all errors found during the validation of the 4D Trajectory information, as well as a corrected and proposed 4D Trajectory by Network Management. If there are no errors, a valid flight plan status is included instead.	Extended Flight Plan Validation & Re-validation	Extended Flight Plan Creation, Updating & Publishing
Flight Performance	The climbing and descending capabilities of the aircraft specific to the flight, taking into account the	Extended Flight Plan Creation, Updating & Publishing	Extended Flight Plan Validation & Re-validation
		Extended Flight Plan Publishing	Flight Plan Reception
		Flight Information	Reception of

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	performance of the airframe that is used to operate the flight as well as any other parameters that may influence it such as engine settings and status, cost factor applied by the aircraft operator.	Distribution	Extended/Reference Flight Plan Information
Flight Information	This consists of all types of flight information (including 4D Trajectory information), as maintained in the Network Management flight database.		Extended Flight Plan Creation, Updating & Publishing
Flight Intention	Flight Intention is the first information published for a flight. It is created by the FOC using as input the airline schedule, and consists of flight schedule and nominal preferred route information.	Flight Intention Creation & Updating	Flight Information Reception & Maintenance
			Flight Intention Reception & Processing
Flight Intention Errors	Errors or inconsistencies found during the validation of the nominal preferred route(s) against ATM environment and Constraints. A corrected by Network Management nominal preferred route may also be included.	Flight Intention Reception & Processing	Flight Intention Creation & Updating
flight schedule	The flight schedule information is derived from the airline schedule (series of flights with same city pair) that an airline publishes. The flight schedule information normally consists of commercial flight	Flight Intention Creation & Updating	Flight Intention Reception & Processing
		Request GUFI	GUFI provision (optional)

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	identifier, airport of departure (ADEP), airport of destination (ADES), day of flight, scheduled times of departure (STD) and arrival (STA) and the planned aircraft type.		
GAT/OAT Flight Plans		External input	Validate civil and military FPL
		Participant	Validate civil and military FPL-1
		Submit and update GAT/OAT Flight Plans	Validate civil and military FPL
			Validate civil and military FPL-2
		Submit and update GAT/OAT Flight Plans-1	Validate civil and military FPL-3
		Validate civil and military FPL	External output
		Validate civil and military FPL-1	External output
GUFI		Extended Flight Plan Creation, Updating & Publishing	Flight Information Distribution
		Generate and provide GUFI	Request GUFI
		GUFI provision (optional)	Extended Flight Plan Creation, Updating & Publishing
			Flight Schedule Information Update
			Request GUFI
iRBT		Publish iRBT in the NOP	Create/update the ground ATC view
			Feed the AOP with iRBT
		Revise airborne trajectory with updated iRBT	Synchronise air/ground trajectory and distribute updated iRBT
		Submit iRBT	Store iRBT in the repository of the NM
			Upload iRBT
		Synchronise air/ground trajectory and distribute updated iRBT	Check if updated iRBT is affected by DDCB measures
		Update iRBT	Revise airborne trajectory with updated iRBT
iRMT		Publish iRMT in the NOP	Reception of improved OAT Flight Plan Information
		Submit iRMT	Publish iRMT in the NOP
			Store iRMT in the repository

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
			the NM
iSBT		Publish iSBT in the NOP	Create/update the ground ATC view
			Feed the AOP with iSBT
		Request GUFI	Generate and provide GUFI
		Submit iSBT	Store iSBT in the repository of the NM
			Upload iSBT
			Validate iSBT Extended Flight Plan and check against DCB/DDCB measures
		Validate iSBT Extended Flight Plan and check against DCB/DDCB measures	Submit iSBT
iSBT/SMT		External input	Enrich Demand Forecast with incoming iSBT/SMT
			Enrich Demand Forecast with incoming iSBT/SMT-1
		Publish iSBT/SMT	External output
		Publish iSBT/SMT-1	Submit and update iSBT/SMT
		Submit and update iSBT/SMT	Enrich Demand Forecast with incoming iSBT/SMT
			Enrich Demand Forecast with incoming iSBT/SMT-2
		Submit and update iSBT/SMT-1	Enrich Demand Forecast with incoming iSBT/SMT-3
		Submit and update long term exercise schedules and daily training	Enrich Demand Forecast with incoming iSBT/SMT
			Enrich Demand Forecast with incoming iSBT/SMT-2
iSMT		Store iSMT in the NM repository and publish iSMT in the NOP	Reception of improved OAT Flight Plan Information
		Submit iSMT	Store iSMT in the repository of the NM
			Validate iSMT
		Validate iSMT	Submit iSMT
nominal preferred route	Nominal Preferred Route is the Airspace User's preferred routing information for series of flights (same city pair, same aircraft type, eventually other defined elements like week-end) when planning for nominal	Flight Intention Creation & Updating	Flight Intention Reception & Processing

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	situations. A nominal preferred route consists of an "ICAO field 15 like"' route or a 4D trajectory or a combination of "ICAO field 15 like route" and 4D trajectory.		
NOP update		Publish Demand Forecast (update the NOP)	External output
		Publish Demand Forecast (update the NOP)-1	External output
		Update the NOP	Change Reference Trajectory
			Publish and update the NOP
		Update the NOP-1	Publish and update the NOP-1
Reference Flight Plan	The Reference Flight Plan consists of all flight planning information that has been agreed to be used as a reference during the flight execution phase.	Flight Information Distribution	Reception and distribution of AOP related Flight Plan information
			Reception of Extended/Reference Flight Plan Information
		Reference Flight Plan Publishing	Flight Information Reception & Maintenance
			Uploading of Reference Flight Plan onto the aircraft FMS
SID	Standard Instrument Departure procedure that is allocated to the flight.	Reception and distribution of AOP related Flight Plan information	Flight Information Reception & Maintenance
Special events	Special events comprise events like new ATC system implementation, big sport events, big military exercises that need to be communicated to Network Management because of their impact on ATM operations.	ATM Environment and Constraints Service Provision, Traffic Demand Computation, DCB	Define ARES needs
			Provide ASM support (AMC)
		Provide ASM support (AMC)	Collect and analyse information on special events
			Define ARES needs
		Provide special events information, ATM environment, RAD/Restrictions	Collect and analyse information on special events
		Provide special events information, ATM environment, RAD/Restrictions, DCB/DDCB measures	Collect and analyse information on special events
			Provide ASM support (AMC)
Taxi Time	Estimated elapsed time between the	Reception and distribution of AOP related Flight	Flight Information Reception & Maintenance

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	flight's Off-Block and Take-Off time.	Plan information	
TTO	TTO (Target Time of Overflight) is 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. TTO should be managed and facilitated like an accurate prediction with a precision in the order of +/- 3 min allowing Network Management, ATC and AUs to monitor and facilitate the trajectory adherence during execution.	Balance Network Demand with Resources and Capabilities in Medium/Short Term Planning (Step2)	Update Trajectories with ATM constraints in Medium/Short Term Planning (Step2)
		Plan Network Management Operations in Medium/Short Term Planning (Step2)	Balance Local/Sub-regional Demand with Resources and Capabilities (Step2)
			Update Trajectories with ATM constraints in Medium/Short Term Planning (Step2)
Weather data		Participant	Manage flight information in Cruise (Step2)
			Monitor Network Capacity in Execution (Step2)
			Re-plan trajectories in Cruise (Step2)
		Provide weather data	Collect and analyse weather data
weather information	Digital (preferably in WXXM format) meteorological information forecasting for aviation, enhanced with probability of occurrence and describing wind vectors and significant meteorological phenomena such as turbulence, thunderstorms, jet streams, icing, volcanic ash. The forecasts can be		Define ARES needs
		Provide weather information	Create/update Desired Trajectory
			Define ARES needs
			Extended Flight Plan Creation, Updating & Publishing
			Extended Flight Plan Validation & Re-validation
			Flight Intention Creation & Updating
			Flight Intention Reception & Processing

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	distributed in regular time intervals or upon request of the concerned ATM stakeholder.		

5010

B.2.1.4 Balance Demand with Resources and Capabilities

Information Element	Sending Operational Activity	Receiving Operational Activity
ATFM slot exchange proposal	Propose exchange of ATFM slots and/or departure times	Check UDPP proposal in terms of rules for the exchange of ATFM slots
ATFM slots	Approve and publish UDPP proposal at Network level	Update ATFM slots and/or departure times
	Identify a need of regulation and send ATFM slots	Identify a need of exchange of ATFM slots
	Refuse ATFM slot exchange	Update ATFM slots and/or departure times
Crisis Alert	Request Crisis Event management	Analyse Crisis Event request
	Request Crisis Event management-1	Analyse Crisis Event request-1
Crisis measure	Coordinate and implement crisis measure	Implement crisis measure at local level
		Monitor the crisis
	Instruct a crisis measure	Coordinate and implement crisis measure
		Implement crisis measure at local level
	Propose a crisis measure at Crisis Cell level	Validate crisis measure
DCB measure request	Request ATFCM measures	Apply ATFCM scenarios
	Request sub-regional or regional action	Coordinate ATFCM measures at regional/sub-regional level
Departure time exchange proposal	Propose exchange of ATFM slots and/or departure times	Check UDPP proposal in terms of A-CDM rules for departure
Departure times	Approve and publish UDPP proposal at A-CDM level	Monitor UDPP measures
		Update ATFM slots and/or departure times
	Refuse departure time exchange	Update ATFM slots and/or departure times
Regulation request	Request ATFCM measures	Apply regulations
Sector configurations & capabilities	Optimize the sector configuration	Analyse latest information at Network level
	Provide sector configurations & capabilities and send Airspace requests	Capture and analyse Airspace demand change data

5011

B.2.2 En Route Operations

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
Flight Identification	Flight identification consists of the	Abrogate coordination with the original accepting	Display abrogation to controller

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
	minimal set of flight information necessary for creating a GUFI for the flight. This includes aircraft identification, airport of departure (ADEP), airport of destination (ADES), estimated off block date (EOBD) and estimated off block time (EOBT).	ATSU	
		Accept release of flight	Display release to controller
		Assess coordination counter-proposal	Display coordination counter-proposal response to controller
		Assess coordination proposal	Display coordination response to controller
		Assume communications with flight	Relinquish responsibility for flight
		Cancel point and update flight object	Remove highlight of the flight from HMI
		Confirm correlation and highlight of flight	Display confirmation to controller
		Extended Flight Plan Creation, Updating & Publishing	GUFI provision (optional)
		Flight Schedule Information Update	GUFI provision (optional)
		Make coordination	Display coordination data to controller
		Notify next unit of change of frequency	Update controller awareness of transfer status
		Offer coordination	Display coordination offer to controller team
		Point flight to 3rd ATSU	Display point to controller
		Point flight to D-ATSU	Display point to controller
		Propose revision to coordination level	Display revision proposal to controller team
		Propose revision to route and coordination point	Display revision proposal to controller team
		Request flight on frequency	Assess request for flight on frequency
		Request GUFI	GUFI provision (optional)
		Request release of flight	Assess release of flight request
		Request revised coordination level	Accept coordination revision
		Revise coordination level	Retrieve revised coordination data and display it to controller
		Revise coordination time	Retrieve revised coordination data and display it to controller
		Revise coordination time and point	Retrieve revised coordination data and display it to controller
		Update planning trajectory	Check updated planning trajectory
		Update trajectory with new filed speed	Update local planning trajectory
			Update planning

5012

B.2.3 Airport Operations

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
Airport resources and capabilities		[Determine and Review Airport Resources and Capabilities]	[Balance Airport Demand with Resources and Capabilities]
		Define and update Airport resources and capabilities	Capture Network, Airport and ANSP Resources and Capabilities
		Participant	[Identify Future Airport Demand Capability Imbalance]
Airport Slots	Airport Slots define the times for departing and arriving at coordinated airports, that are allocated to a flight during the flight scheduling process.	[Provide Airport slots]	Participant
		Reception and distribution of AOP related Flight Plan information	Flight Information Reception & Maintenance
			Flight Intention Reception & Processing
CTOT	CTOT (Calculated Time of Take-Off) is a delayed Take-Off Time, as computed by Network Management in case that a flight is affected by an ATFM regulation, in order to ensure that the flight's 4D trajectory is time shifted so as to enter the ATFM regulated area or airport, at the Target Time on the entry point (TTO) or arrival (TTA) respectively.	External input	Calculate an integrated arrival / departure sequence
Flight Plan			Monitor Airport Conformance in the Runway Protected Volume
		Submit and update FPL	Validate civil and military FPL-2
		Submit and update FPL-1	Validate civil and military FPL-3
TTOT	Target Take Off Time as provided by ATC	Calculate a departure sequence	Calculate an accurate pre-departure sequence
			External output
		Departure Management	Calculate an integrated arrival / departure sequence
			Monitor departures and request late tweaks
		Reception and distribution	Flight Information

Information Element	Additional information	Sending Operational Activity	Receiving Operational Activity
		of AOP related Flight Plan information	Reception & Maintenance

5013

Appendix C Performance Indicators, Performance Drivers and Performance Areas

C.1 Understanding Network Performance indicators

As already reflected in Figure 5, the preparation of the Network Operations Plan, to provide airspace and airport resources and capabilities, to facilitate the execution of airspace users planned trajectories, needs to be done within a pre-established Performance Framework.

During execution, Process Monitoring alerts of potential trajectory deviations from the plan to enable the adoption of early actions to mitigate plan disruptions. The main objective is to enhance Network performance by complementing with pro-active management decisions those process improvements derived from the post-operation analysis (reactive management).

shows the standard Business Management Cycle diagram (**P**lan-**D**o-**C**heck-**A**ct) to be followed under Network Performance Assessment and Monitoring; i.e.; *Network Performance Management*

The First Step addresses the development of the Activity Plan, shown in the illustration as "*Reference Network Plan*" which is built to comply with the service demand, to allocate the needed resources to cope with the service demand and to meet the performance targets. This is the **"P"** in the PDCA management cycle, which is further detailed in the following paragraphs:

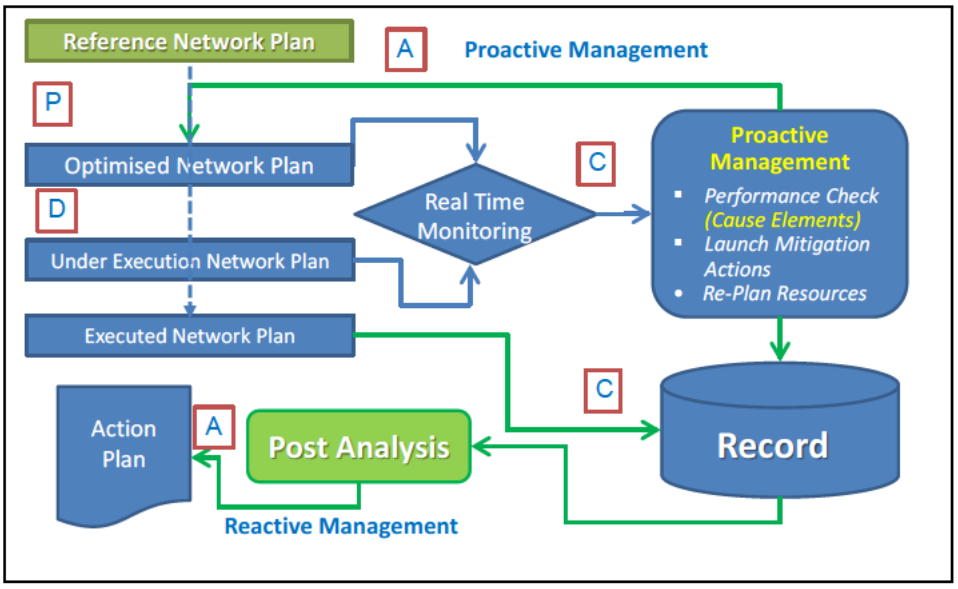


Figure 14: PDCA Management Cycle

PLAN As the first step in the management process cycle, final performance highly depends on the quality of the Plan (*garbage-in garbage-out*); the most accurate and detailed the Plan, the greatest the chances to obtain a high level of performance.

DO The main objective of this second Step is to perform as close as possible to the plan during the execution phase. Service demand is attended by using the allocated, planned resources and applying the agreed performance criteria. In order to ensure this objective, process monitoring detects deviations from the Plan during the following management phase: CHECK

CHECK (MONITOR). The third Step in the Management Cycle addresses the necessary monitoring activities to check if execution is performed as planned, assessing performance deviations and the potential for launching the necessary actions and/or mitigations.

As shown in process monitoring is done both, during execution (*proactive management approach)* and at Post Operational Analysis (*reactive management approach*).

- During Execution to monitor up-stream process performance in an attempt to early and timely detect disruptions and/or potential new constraints on those key process-elements, whose driver effect delivers anticipated information on potential output miss-performance
- In Post Analysis, output performance is measured to check compliance with the expected planned performance. Causes for performance disruption need to be assessed by measuring the performance driver effect of those cause elements identified as having the greatest impact on performance. Influence diagrams are used to support the assessment.

ACT

Proactive Performance Management

Focus is on measuring deviations in performance drivers in order to anticipate as much as possible potential miss performance in output performance; e.g. knowing that the main performance driver for airport departure delays is arrival punctuality, deviation on arrival traffic should be monitored in order to early predict departure traffic shifts

Reactive Performance Management

During the post analysis phase, focus is on output recorded performance to assess the level of compliance with performance targets. Causes of miss performance is investigated based on the deviations of performance drivers, as identified in the influence diagrams. Corrective actions may be tested and proposed and the results of the investigation and analysed corrective actions are sorted and made available in such a way that can be reutilised at a future planning cycle.

Performance Drivers or *leading indicators* are the cause elements in Cause-and-Effect Relationships. They facilitate the relationship between objectives (outcome) or *lagging indicators* and the needed measures to achieve them, based on "*leading indicators"* (drivers).

Cause-and-effect relationships can be expressed by a sequence of if-then statements and are specially indicated in ATM pro-active monitoring and management to early predict (before it happens) outcomes of a process, enabling actions to be taken to mitigate output performance disruptions.

The following Focus Areas have been selected, based on their potential to be used in Step 1 and their relevance into Network Performance Assessment and Monitoring,

Their description is based on the last updated version of B04.01 [10] and on the aforementioned principles, together with the rationale for their selection.

LONG TERM PLANNING

Long Term Planning and Medium & Sort Term Planning, is currently based in STATFOR historical information mainly from ATCs and not much integrated with Airport Data

During the Long Term Planning Phase, only Network Capacity KPA is addressed.

Network Capacity is concerned with overall network throughput, taking into account the network effect of the airspace (TMA Airspace capacity, En-Route Airspace capacity, and ARES capacity) and Airport capacity in function of traffic demand patterns. It assesses the ability of the network as a whole to handle the traffic demand without negative consequences in other KPAs

In Step1, a major improvement is expected by the integration of Airport planning information (AOP) into the Network Operations Plan (NOP)

Figure 15 shows a quality map of the available demand information versus its proximity to execution

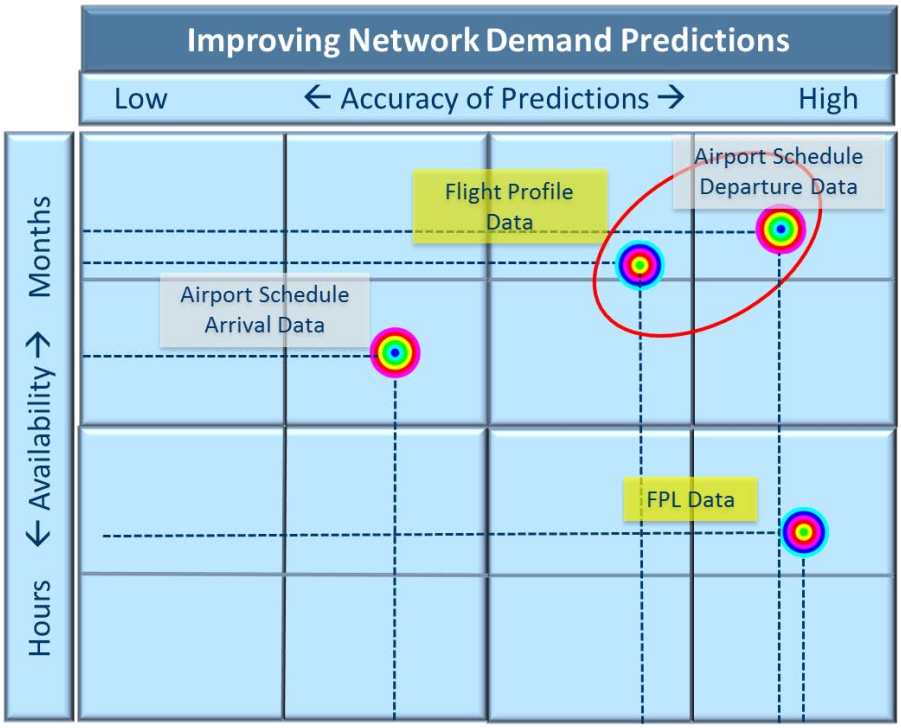


Figure 15 Quality of Demand Assessment

- Airport Departure Data is based on real AUs demand, continuously updated until execution. It is the most accurate available data, especially in the Medium-Short term Planning Phase
- Airport Arrival Data is less accurate due to the time buffer added by airlines to block to Block times to compensate for its low predictability
- Flight Plan data is the most accurate, but only a few hours before execution, which leaves little margin for an efficient allocation of resources (Capacity)
- NMOC flight profile data is also high accurate, due to the extensive statistically information of point-to-point flight profiles

The integration of Schedule Departure data with NMOC Flight Profile Data is expected to offer –short time planning phases, which enhance Network Capacity Planning

MEDIUM-SHORT TERM PLANNING:

During Medium and Short Term Planning, demand assessment improves due to AOP / NOP integration. Besides Capacity, expected impact of DCB imbalance on (ICAO) Temporal Efficiency is addressed under (SESAR) Punctuality Focus Area

- Capacity.- Better information on Demand and or Capacity changes, both Airspace and at Airports are monitored under Capacity KPA
- Punctuality.- Expected traffic delays caused by imbalance situations are addressed under Punctuality Focus Area

EXECUTION

During Execution, rolling NOP information integrated with rolling AOP data and the combination of entry counts and occupancy counts improve Traffic Volume demand assessment, enhancing Demand Capacity imbalance assessment and declaration of Hotspots

- Network Capacity Accurate Monitoring of Demand on identified hotspots

- **Efficiency:** Efficiency KPA, also referred as Flight Efficiency KPA, addresses the actual flown 4D trajectories of aircraft in relationship to their Shared Business Trajectory. Two focus areas are addressed in this section
    - **Fuel Efficiency**.-Aircraft Trajectory changes evaluate during execution their impact on Flight Efficiency: extra fuel burn from extra miles flown or due to level capping.

      What –if procedures based on Fuel Efficiency are launched to mitigate impact on fuel consumption
    - **Punctuality.** - Aircraft Trajectory changes evaluate during execution their impact on delays.

      Delay Performance Drivers (cause elements) are selected during execution monitoring to anticipate their impact on the Network and facilitate early actions to be taken to mitigate their effect: Main cause elements identified:
        - Airspace capacity shortfalls: ATFM measures; extra time holdings,
        - Airport capacity shortfalls: Arrival and Departure Punctuality; Reactionary delays due to knock-on effect
        - Weather impact
- **Predictability:** Closely related to Punctuality, Predictability addresses Time Adherence of aircraft trajectories from their initially planned, at both key Airspace waypoints and Airports. Not only Adherence to crossing times but also to time duration is monitored:
    - Traffic volume Entry Time and Occupancy Time Predictability
    - Airport Arrival and Departure predictability;
    - Airport Turnaround predictability
    - Block2Block (In-Flight) predictability

A specific section within B04.01 dedicates to cover the close relationship between two elements related to the ICAO Efficiency and Predictability KPAs: Punctuality and Predictability.

The focus here is on Punctuality and Predictability aspects that are related to temporal quality of service aspects of ATM. Special attention is given to the expected performance results from Punctuality and Predictability limiting its scope to these two KPAs by defining them as follows:

✈ Departure Punctuality:

% Flights departing (AOBT) within +/- 3 minutes of scheduled departure time (SOBT) after accounting for ATM and weather related delay causes

✈ Arrival Punctuality:

- **Airport Schedule Reference*: % flights arriving within +/- 3 minutes of SIBT (Scheduled In-block Time)***
- **Flight Plan Reference:** ***% flights arriving within +/- 3 minutes of RBT arrival time***

✈ Predictability:

Variance of differences between actual and flight plan or Reference Business Trajectory (RBT) durations

As already stated, in order to enable pro-active management, early detection of those cause elements that drive output performance need to be considered during execution, so Sub-focus areas of Predictability and Punctuality containing their performance drivers are addressed

Some discussion have been held with B04.01 experts on Punctuality, as its definition as “ON-Time” Arrival and Departure performance, is considered in this document rather as

Arrival and Departure Predictability Drivers, due to their adherence nature, typical characteristic of variance measurements.

Furthermore, Punctuality index is widely used by Airports and Airlines to assess (IN-Time) Delay Performance; percentage of flights departing (or arriving) with a delay below a (T) parameter; that is; as a performance driver of Temporal Efficiency (Delay Performance).

The proposed KPIs for Punctuality are therefore:

- Departure Punctuality

  % Flights departing (AOBT) within a fixed time delay (in minutes) of scheduled departure time (SOBT) after accounting for ATM and weather related delay causes

- Arrival Punctuality (Schedule reference)

  % flights arriving within a fixed time delay (in minutes) of SIBT (Scheduled In-block Time)

- Arrival Punctuality (FPL reference)

  % flights arriving within a fixed time delay (in minutes) of RBT arrival time

POST OPERATIONAL ANALYSIS

Both Output Performance and Performance Drivers KPIs are addressed in Post Operational analysis for the already addressed KPAs in Planning and Execution Flight Phases

- Network Capacity
- Flight Efficiency: Fuel Efficiency and Punctuality
- Predictability:

Additionally new Focus Areas is monitored in the post operational Phase:

- **Resilience**, under Predictability KPA

  SESAR definition for the Resilience performance focus area is the following:

  "Resilience is the ability to withstand and recover from planned and unplanned events and conditions which cause a loss of nominal capacity

  The framework covers two aspects of Resilience related to the magnitude of the effect / impact of a disruptive event and the time that it takes for ATM to recover, i.e. return to nominal condition capacity.

  Planned and unplanned events and conditions include:

  - Weather such as thunderstorm, strong wind, freezing, low visibility conditions;
  - Infrastructure degradation such as technical failures, strikes, accidents, runway maintenance and special events such as Olympic Games

  Nominal, Degraded and Disrupted conditions are defined as:

  - Nominal conditions are 90% to 100% of the nominal capacity.
  - Degraded conditions are 50% to 90% of the nominal capacity.
  - Disrupted conditions are below 50% of the nominal capacity

  Resilience is measured as:

  - ***% Loss of airport and airspace capacity avoided***
  - ***Airspace User impact – delays and cancellations resulting from capacity deg***

- **Flexibility:-**

Flexibility addresses the possibility of Airspace users to be allowed to change their planned operations under short notice in congested situations and under normal operational conditions

SESAR definition for Flexibility performance focus area includes:

- User requests for new flight plans including unscheduled flights, and
- Changes to the Reference Business / Mission Trajectory to satisfy user requests to:
  - Change the trajectory (time, vertical, horizontal).
  - Modify departure and arrival times.
  - Swap ATFCM and/or departure slots.
  - Change airport destination.
  - Changes to airspace requirements, e.g. military training or operational needs.

- **Environmental Sustainability**

The main Focus Area for **Environment** is "Gaseous Emissions", which is closely linked to the Focus Area "G2G **Fuel Efficiency**" in KPA Efficiency.

Initially, KPIs in Environment were more related to CO2 emissions but these emissions are directly linked to fuel consumption in such a way that the same influence factors affect both indicators at the same time. For this reason both focus areas have been developed together under a general denomination of "Fuel Efficiency".

The metric used is the "***Average fuel burn per flight***"

The following table shows the main performance drivers and influence factors allocated to each focus area and the Flight Phase to obtain the data

Note: Cost-effectiveness KPA is proposed to be left out of scope since it can only be addressed from indirect Cost drivers' perspective and only in post-analysis; thereby, feasibility of implementation is considered unlikely. Complete Cost-effectiveness focus areas, including ATCOs productivity, are already addressed by SESAR WP 16

The following table shows the main performance drivers and influence factors allocated to each focus area and the Flight Phase

KPA	Selected Main Focus Area		Flight Phase	Influence Factors / Performance Drivers
CAPACITY	Network Capacity		Planning	- Demand / Capacity Imbalances - Block-to-Block Predictability - Arrival Predictability - Departure Predictability
			Execution	- Arrival Predictability - Departure Predictability
(FLIGHT) EFFICIENCY	FUEL EFFICIENCY	Fuel Efficiency	St Planning, Execution & Post Analysis	- Capacity shortfalls /DCB imbalances - Flight Profile adherence
		Mission Effectiveness	Post Analysis	- Departure Predictability
		Airspace Efficiency	St Planning, Execution & Post Analysis	- Capacity shortfalls / DCB imbalances

KPA	Selected Main Focus Area		Flight Phase	Influence Factors / Performance Drivers	
	Temporal Efficiency	Arrival Punctuality	ST Planning Execution & Post Analysis	- Capacity shortfalls (Approach Holdings) - ATFM Regulations - Fuel Efficiency (In-flight Re-routings) - Departure Predictability (from ADEPs) - Departure Delays (from ADEPs)	
		Departure Punctuality	ST Planning Execution and Post Analysis	- Capacity shortfalls - Arrival Predictability - Arrival Delays - ATFM Regulations - Airport Ground Process Disruptions	
		Knock-on Effect	Execution and Post Analysis	- Arrival Punctuality - Early prediction of Knock-on Effect (level of AOP/ NOP integration)	
PREDICTABILITY	On-Time Operation		Execution and Post Analysis	Block-to-Block	- Capacity shortfalls - Fuel Efficiency - Planning Accuracy Timely Detection of Traffic Deviations
				Arrival	- Planning Accuracy - Departure Punctuality Timely Detection of Departure Traffic Deviations
				Departure	- Planning Accuracy - Arrival Predictability Timely Detection of Arrival Traffic Deviations
	RESILIENCE		Execution Post Analysis	- Anticipation to predict Weather Events and its duration - Anticipation to predict degraded conditions - validity of the prediction	
FLEXIBILITY			Execution Post Analysis	- Capacity Headroom - Predictability - Anticipation of Request	
ENVIRONMENT (Atmospheric Impact)			Execution Post Analysis	Efficiency	

Table 46: KPA / Focus Areas and their Performance Drivers

When developing a Network Performance Monitoring System, an appropriate selection of Performance Indicators needs to be addressed. Indicators can be categorised in the following way depending on their use:

- **Quantitative indicators** which **can** be presented with a number;
- **Qualitative indicators** which **cannot** be presented as a number;
- **Leading indicators** which can **predict** the future outcome of a process;
- **Lagging indicators** which **present** the success or failure *post ops;*

- **Output indicators, which** reflect the **outcome** or results of the process activities

Performance Drivers help managers to identify the best allocation for performance measurement and define its numeric KPI. They are also useful in post operational analysis as they can guide managers in the detection of process gaps or inconsistencies

C.1.1 Influence Analysis for Key Performance Areas

Key Performance Areas are closely related to each other; i.e. any change in one of them has an impact on other KPAs. The following paragraphs try to analyse the cause and effect relationships among the relevant KPAs addressed in Network Performance Monitoring and Management.

Capacity

European ATM Network objective:

The European ATM **Network** intends to provide sufficient, cost-effective capacity to accommodate the demand in typical busy hour periods without imposing significant operational, economic or environmental penalties under normal circumstances. The objective does not imply an increase in Capacity, but the ability to efficiently use the available one.

- **Medium / Short Term Planning**

  A "***Balanced Demand Capacity***" Network Plan has been developed based on accurate demand and capacity information to be used under execution.

  Early Detection of DCB imbalances: monitoring of capacity shortfalls at key Network ATS units and/or significant shifts in the demand; entails the capability to anticipate the times and locations when and where the imbalances between demand and capacity are expected to be high, in particular during the weekends and the seasonal peaks.

- **Execution**

  Rolling 20 minutes **Network Throughput at Network Peak Hour** can be used together with and indicator of **number of aircraft affected by ATFM regulations** at that peak hour and the **average delay of those delay flights** to check if the established delay threshold has been reached;

  Continuous Detection of DCB imbalances: monitoring sudden and very short-term capacity shortfalls at key Network ATS units and /or significant shifts in the demand; entails the capability to anticipate the times and locations when and where the imbalances between demand and capacity are expected to be high.

- **Post Analysis**

  Efficient use of Available Capacity: Comparison of rate (declared capacity) during regulations versus actual throughput (available capacity).

Performance Driver: Predictability acts as a performance driver of Capacity. The variability associated to low predictability, actually means inaccuracy, uncertainty and loss of confidence. This is a key factor influencing capacity planning, or better said, the inability to fully plan (and use) the available capacity. Just as an example, due to the low block-to-block predictability, aircraft operators may schedule their flights adding extra time buffers, which may sum up to 20% increase over a normal operation; that actually means they may be missing one operation per day, i.e. a loss of airspace capacity.

Predictability

European ATM Network objective:

The European ATM Network intends to have an increased predictability. Predictability is a priority for Airspace Users and a key area for Network performance due to its significant influence in the selected KPAs. Both trajectory and time variability shall be assessed and monitored.

- **Medium & Short-Term Planning**

  The recorded standard deviation of aircraft operations is used by Stakeholders to develop their operational plan;

  - time buffers are normally added to ATM planning processes to compensate for potential time extensions, calculated by their variability analysis

- **Execution**

  - Traffic Volume Entry times and Occupancy on-line adherence monitoring
  - Airport Variability Monitoring

- **Post Analysis**

  - Block to block, “In-Flight” variability
  - Arrival time variability
  - Departure time variability
  - Resilience.- Lost of Capacity avoided

Performance Drivers:

- Arrival Punctuality and Quality of arrival information in terms of ***Accuracy and Timeliness*.**
- Anticipation of disruptive events and monitoring of time adherence during execution
- Rolling NOP upgraded by integration of AOP rolling information

Efficiency

European ATM Network objective:

The European ATM Network intends to have an increased efficiency. In this respect, it focus on Fuel Efficiency, taking into consideration that airborne operation is the main contributor to fuel efficiency and in Punctuality. Both deviations to trajectory and punctuality variability shall be assessed and monitored.

Fuel Efficiency:

- **Medium & Short-Term Planning**

  Impact of ATFM measures on Fuel Efficiency due to level capping and /or time extensions is addressed

- **Execution**

  Number of flights affected by trajectory changes and flight extension are monitored

- **Post Analysis**

  - Airspace monitoring at Key Network flows of traffic of lateral and flight level deviations from the initially planned;
  - Airspace monitoring at Key Network flows of traffic of block time deviations from the initially EETs planned in the operational flight plans;
  - Average arrival delays occurring at Key Major Airports;
  - Total Holding Time.

Punctuality: Airport Arrival and Departure Punctuality

- **Medium & Short-Term Planning**

  Expected impact on delays due to potential imbalance situations is assessed

- **Execution**
  - Network monitoring at Key Major Airports of Arrival and Departure punctuality: percentage of flights arriving and / or departing IN-TIME; that is; within a predefined delayed tolerance (e.g. 3 minutes).
  - Anticipation of Knock-on Effect given by Airports, whose AOPs are integrated into the NOP
- **Post Analysis**
  - **Knock-on effect.** Propagation of arrival delays to departure performance.
  - Network analysis of delays and causes of delays.

Performance Driver: Predictability is the main Influence Factor for Flight Efficiency and Punctuality. Both Predictability and Efficiency use the same data sources, although the performance approach is different.

Flexibility

European ATM Network objective:

The European ATM Network intends to measure the ability of the ATM Network to accept Airspace Users requests.

- **Post Analysis**
  - Acceptance rate to Stakeholder requests.
  - Airport change requests affecting the Airport Operations Plan (AOP), in the way of extra slot requests, or modifications to slot times, or TWR Slot extensions
  - Airspace requests for route changes, flight level or DCTs [10], as recorded in the NOP

Performance Driver: Capacity headroom, Predictability

[10] In order to assess airspace flexibility during flight execution, recording of the requests by the Air Traffic Service Unit and their uploaded to the NOP is needed.