High Level Network Operational Framework 2019

Approved by the Network Management Board - 22 January 2016
Abstract

This High Level Network Operational Framework has been developed in line with the content and direction of the Network Strategy Plan (NSP) 2015-2019 (approved through EC decision 4660, 22 July 2014), as high level operational target of the activities towards implementation of the NSP. Release no. 1 of this document, then titled “Network Operational Concept”, was approved by the NMB on 21 Nov 2014. As part of the consultation on Release 2 of this document, NETOPS/13 (21-22 Oct 2015) agreed to change the title to High Level Network Operational Framework. This High Level Network Operational Framework has been approved by the NMB in their 14th meeting on 22 January 2016 (after agreements by NETOPS and NDOP).
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**Publications**
EUROCONTROL Headquarters
96 Rue de la Fusée
B-1130 BRUSSELS

Tel: +32 (0)2 729 11 52
Fax: +32 (0)2 729 51 49
E-mail: publications@eurocontrol.int
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**ABBREVIATIONS**

**RELEVANT DOCUMENTATION**
Seamless and Flexible Airspace

European airspace will consist of an upper airspace in which operations will be predominantly “free route” and a lower airspace including terminal airspaces around major airports in which operations will need to be planned to a high level of predictability. Thus flexible and dynamic management in the en-route phase and well structured and ordered operations in lower airspace will be integrated in specific airspace that is designed to fit the transition. Advanced flexible use of airspace procedures and data exchange will ensure that airspace reservation is based on the precise knowledge of civil and military requirements. ATC sectors, reserved/restricted airspace and airports are configured & managed to optimise network performance, and to provide Airspace Users with operational options balancing capacity with flight efficiency and mission effectiveness. FABs will have developed their own regional network capabilities which will contribute to network operational improvements.

Optimum Capacity and Flight Efficiency Planning

Aiming to meet user’s business needs, capacity is delivered where & when needed, while ensuring flight efficiency, based on expected demand and operational context. Through the Network Operations Plan focus is maintained on planning and implementation of improvements to properly deliver required en-route and airport capacity. Major ATM transition projects need to be coordinated across the network to ensure synchronised deployments. This is achieved through collaborative decision making at local, FAB and network level, using what-if assessments, aligning resource planning, and minimising adverse effect of individual responsibilities or requirements on network performance.

Business Trajectories and Cooperative Traffic Management

Network Operations will be integrated through cooperative traffic management, projected trajectories, and allocation of entry/exit times for airspace volumes and airports to mitigate imbalances. Targets are continuously delivered to reflect the operational situation and users’ capabilities. Airports, ATC and Airspace Users manage together issued targets thus increasing the predictability of network operations. This is based on cooperative traffic management procedures for the operational use of targets, on continuous sharing of real-time traffic information and on operational decision and capability data between all actors.

Airport - Network Integration

Efficient access to airports will be characterised by high density segregated departure and arrival routes requiring performance based navigation capabilities that prioritise continuous climb and departure operations, supported by extended arrival/departure managers to maximise access into and out of the airports. Local partners in the Airport Operations Centre (APEC) and network capacity managers collaboratively decide on appropriate measures considering network and local airport demand and capacity constraints to ensure the appropriate balance between efficient Airport/TMA operations in all weather conditions and efficient En-route operations.
CHAPTER 1 - INTRODUCTION

Purpose

This High Level Operational Framework describes the European network operations as envisaged by 2019. As such this Operational Framework is defined to enable meeting the Single European Sky (SES) Performance Targets for Reference Period (RP) 2 which addresses the period 2015-2019.

The 2019 framework is built on current network operations, on the strategic direction and objectives as defined in the Network Strategy Plan (NSP) 2015-2019 as approved through European Commission Decision C (2014) 4660 of 22 July 2014, and supports the implementation of improvements as defined in the Pilot Common Project Implementing Regulation (PCP IR) No 716/2014 (27 June 2014). As such, the aspiration level of this framework is the same as in the NSP and PCP IR. Through alignment with the NSP and PCP IR, this High Level Operational Framework is in line with the SESAR ATM Master Plan directions and objectives. The objective of this Operational Framework is to serve as a common high level view for all operational actors on the target for operating the network in 2019. Further, it provides a basis to ensure all improvement activities are in place to achieve the required performance over and above what can be achieved using current ATM network methods, processes and enabling system support.

This Operational Framework does not aim to specifically address Roles & Responsibilities (e.g. local, FAB, Network). However, the described elements imply roles of the various actors as an organisation of the activities that is inherently required to achieve those operational framework elements.

Framework Structure

The operational framework elements are structured in line with the Strategic Objectives (SOs) of the NSP 2015-2019 (see diagram below), and focusses on the operations oriented SOs 3-6, while also addressing relevant ops aspects of the other SOs.
Assumed ATM capabilities

Whilst this Operational Framework does not explicitly address (system/resource) enablers, its operational elements are fully dependent on the other NSP Strategic Objectives. Notably **SO2 - Deploy interoperable and effective information management systems** - is a key prerequisite to enable all envisaged operational procedures and processes described in this document. Further, this framework takes advantage of ATM capabilities that are specified by the PCP IR No 716/2014, to the extent that the associated target deployment dates (mostly beyond 2019) are expected to provide increased capabilities already by 2019 through the deployment projects facilitated by SESAR Deployment Manager.

In 2019, Network Operations will see a mixture of capabilities of ATM actors, varying from 2014 capabilities to the most advanced. Network operations is challenged to facilitate all combinations of capabilities and optimise stakeholders’ performance.

Document Structure

**Chapter 2** describes the main directions of the High Level Network Operational Framework and specific foreseen developments in the key areas addressing identified shortcomings.

**Chapter 3** describes the foreseen impact on performance of the identified key improvement areas.

**Annex A** describes the Network Operations continuous processes to ensure a complete picture in which specific areas will evolve towards 2019.
The Performance Scheme for air navigation services and network functions includes key and challenging targets for enhancing the future operational performance of the European ATM network. A clear description of the European ATM network operations will be required. This will play a major role in building up all the necessary measures to ensure that operational performance targets are reached.

The operations of the European ATM network will support airspace users to reach their business needs by helping to ensure an appropriate balance between flight efficiency, the optimisation of airspace & airport capacity and its utilisation and the overall cost of the network thus minimising the total costs for the airspace users and the ANSPs. To succeed, effective operational performance management of the network in business partnership with stakeholders is required.

Many different business models of airspace users, airports and ANSPs require different operational solutions. Primary operational focus of airspace users vary between flight efficiency, cost-efficiency, connectivity, flexibility and predictability. All elements are directly impacted by the (network) performance of ANSPs and airports.

This network operational framework, while delivering safer ATM operations, aims to reduce existing ATM constraints, exploiting existing and emerging aircraft and ground system capabilities, and exploiting opportunities in the Single European Sky context. Its purpose is to increase cost-efficiency through improved network performance, notably airspace capacity and flight efficiency, and to support Airspace Users, Airport Operator and ANSP in meeting their business objectives (and implicitly their performance targets).

2.1 Current situation of network operations and identified shortcomings

Current network operation can be depicted as an iterative process linking network operation planning with execution and review phases, all contributing to deliver network performance according to the defined performance targets.
The following identified shortcomings areas limiting the performance of current network operations are addressed by the High Level Network Operational Framework 2019.

**About the route network:**

While Free Route Airspace has been introduced and the ATS route network is optimized to a large extent as regards route length extensions, it is currently still pre-dominantly a fixed route network, which still limits AO flexibility in optimising its flights according to its own business models, with associated environment and flight efficiency penalties.

This is further constrained by airspace fragmentation and the lack of cross-border solutions and sub-optimal TMA design, especially in multi-airport environments, all limiting a network approach to performance optimisation.

**About network information sharing and the integration of airport planning:**

Current processes and data exchange possibilities between the various operational ATM actors do not allow a full network collaborative planning and operations, due to limitations in the timely sharing and consolidation of common data at any stage of the process and allowing a common network situation awareness. Improved interoperability is key in that respect.

The gaps experienced between the successive planning and execution phases must be overcome through a smoother transition in the data sharing and its consolidation at network level.

**About integration of airspace and airport planning**

The current airspace capacity and throughput planning does not sufficiently consider and often runs in isolation from the airport capacity planning and declaration process. As a consequence, bottlenecks are not adequately identified during the strategic planning phase, which is carried on into the pre-tactical and tactical phases.

Airport CDM (A-CDM) must be extended to incorporate Arrival Planning Information (API). It will also provide a solid foundation for the further integration of airports with the network through AOP and NOP integration.

More systematic network impact assessment and coordination of local plans are required to ensure network consistency.
About the transition from planning to execution:

Network and ATC operations are currently not necessarily aligned, with network optimisation based on a planning that is not sufficiently accurate to allow execution fully in line with that planning.

This results in reduced predictability for ATC and flight operations and inaccurate network measures (e.g. CTOT), negatively affecting trust in the system (over-deliveries, reduced declared capacity) impacting flight efficiency and delay figures.

Network and ATC alignment would result into improved predictability, allowing performance issues to be detected earlier, more accurately and managed with proportionate solutions.

About the Review results and analysis at D+:

The absence of network business intelligence techniques and tools results in the perceived inertia of the Network Manager to support its stakeholders and researchers to detect general trends, validate hypothesis and analyse generalised past events and behaviours.

2.2 Main Directions

Network operation is driven by enhanced stakeholders’ participation in a rolling cooperative process with several layers over time (Civil & Military airspace users, ANSPs, Airports, NM, outside EUR interfaces). By continuously sharing latest flight intentions resulting in demand and available capacity, defining measures in the network operations plan, realising the plan as a target by all actors taking into account operational updates, evaluating operations against performance targets and updating the plan.

Overall network performance will be closely monitored and managed, including the definition of performance targets for the main actors in aviation. This enables Member States and Stakeholders enhancing their local performance from a network perspective. All partners operate with a high level of transparency, through intensive information sharing, allowing dynamic management of available resources responding to the airspace/airport user needs.

The future operational framework relies on a paradigm shift from airspace-based to (business/mission) trajectory-based operations in which all flights’ trajectories interact. This enables the network management to adapt the solutions to the scope of the problem and thus optimise network performance.
Critical success factor is increased ATC, Airports and AU participation (including human, systems and procedures) through systematic application of highly cooperative mechanism by all partners at local, sub-regional and regional level. ASM/ATFCM/ATS/APT/AU management interact at all planning levels, with the NM ensuring the continuous monitoring of the network performance and acting as a last resort arbitrator, based on agreed CDM processes.

Network operation requires accurate and continuously updated network operations plan, aiming to reduce the ‘gap’ between planning and execution. If planning reflects operational actors’ expectations better, more effective measures are expected, increasing the added value of network planning and coordination and increasing the efficient utilisation of network resources, improving network operations’ performance. Even the smallest deviations need to be communicated uninterruptedly and integrated at network level, to allow continuous accurate network impact assessment and identification of opportunities for users.

Key areas of the network operational concept\(^1\) supporting the previous graphical illustration are:

- **Seamless and Flexible Airspace.** A simplified and flexible airspace structure enabling maximum deployment of free routing is required to meet the flight efficiency and environment performance objectives. Cross-border solutions will be key for achieving the RP2 targets.

- The airspace structure should continue to evolve, addressing the requirements of civil and military users with an advanced flexible use of airspace concept reconciling the airspace needs of both civil and military users, reaping the benefits of existing or planned technological improvements and supported by harmonised data exchange at planning and tactical level.

- **Proactive and dynamic Capacity Planning and Flight Efficiency.** A proactive and dynamic capacity management process is required to balance...
capacity with demand in a timely and efficient manner, benefiting from flexible airspace structures, and thus helping to avoid ATFM delays and continue to improve the flight efficiency.

This includes a better anticipation of demand/capacity imbalances, in particular during weekends and seasonal peaks. When growth returns, ATM should be agile enough to deliver capacity in order to respond to air traffic evolutions, taking into account the available ground network capabilities.

- **Business trajectories and Cooperative Traffic Management.** Civil and Military Airspace Users are able to initially plan optimal (business/mission) trajectories that reflect their operational needs. Network measures to flights are considered as targets to be adhered to by all involved actors. New constraints or priorities (also during the execution phase) will possibly update measures and targets. Improved adherence to the plan that provides optimised flow of traffic entails a move towards time-based operations and ultimately trajectory-based operation. Updates in the planning and execution phase are shared and coordinated with all involved operational actors in a network environment following a CDM approach.

Increased sharing of operational information and data supports the predictability of network events and their impact, and it reduces uncertainty, thereby improving operational performance. Typically, common up to date flight trajectory information at any stage of the process (planning and execution) is an essential step in this direction.

Numerous tools and processes facilitate the sharing of flight data and/or flight profile information: DDR, ADR, AMAN extension, Target Time of Arrival (TTA), Airport CDM, Network Ops Portal, Extended Flight Plan, Flight Object, etc. Through these solutions aimed to resolving network and individual issues, stakeholders will be cooperatively supported in their activities.

- **Airport - Network Integration.** Airports cooperate to better share and present their own operations plans into a network overview. In the network planning and execution the impact of local operations on network performance (and v.v.) is clearly visible.

An overview of network capabilities are obtained by linking airport ground capacities obtained via the continuous planning of airport operations (A-CDM/AOP) with continuous planning in the Network via the NOP. E.g., for Flight Diversion Planning

These major changes will further improve the quality and reliability of network planning and boosts the effectiveness of decision making which in return allows network management to use finer and more proportionate measures up to real time operation. The benefits effect a number of KPIs by means of increased capacity exploitation, reduced regulations, reduced negative side-effects on the network and improved flexibility and predictability.

The main directions mentioned here should never be seen in isolation. They go together in a consolidated package delivering network performance and requiring often common technical (e.g. information management) enablers.

**2.2.1 Seamless and Flexible Airspace**

Combined operation of Flexible Airspace Management and Free Route enable airspace users to fly as closely as possible to their preferred trajectory without being constrained by fixed airspace structures or fixed route networks. It further allows operations that require segregation, for example military training, to take place safely and flexibly, and with minimum impact on other airspace users.

The European airspace structure design will feature the free route airspace concept in the upper airspace where the majority of en-route portions of flight are conducted. It is expected that the current FRA application will be further extended within FABs and then gradually throughout the whole of the pan-European airspace. Airports and (multi-hub) TMAs will be linked to FRA by dedicated fixed routes aimed at maximising arrivals to and departures from airports in an implementation sequence which prioritises the top hub airports. The airspace between the FRA and the fixed route network serving the airports would be airspace which can contain either an extension of FRA or a fixed route network established and managed flexibly to best suit the expected traffic demand.

Improvement of airspace utilisation is obtained through flexibility in airspace organisation and design and through flexibility and dynamicity in airspace management. This will be facilitated by the widespread implementation of modular areas (e.g. variable profile area –VPA) to be dynamically and flexibly managed in 4D. The modularity will also be applied cross-border.

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The increased flexibility in the planning of packages (incl. time) of runways, SID/STARs, ATC sectors, ATS routes, modular airspace reservations, terminal routes, Free Route Airspace, minimises the effect on network operations of national borders and uncoordinated local decisions. These packages are called Airspace Configurations and aim to accommodate specific civil and military demand requirements through synchronised agreements. Airspace configurations (including en-route and TMA structures) are dynamically adapted to the traffic demand and military exercises in order to respond to any Airspace Users performance needs, for instance by enabling that the Airspace Users benefit from capacity opportunities as soon as they become available.

As a step towards Airspace Configurations, airspace and routes are designed and dynamically managed to provide alignment of airspace and route availability through collaborative decision making processes at national, regional (FAB) and network level. Operational performance requirements addressing both flight efficiency and capacity are taken as an input.

A network operations oriented development of the local route availability constraints (as reflected in the Route Availability Document) will be focused upon simplified restrictions that are dynamically applied. Network operations efficiency and capacity will be improved by the reduced focus on national boundaries and by the removal of redundant and obsolete restrictions.

Meeting the diversity of user requirements requires effective and dynamic management of the pre-designed airspace configurations through a highly flexible and integrated Collaborative Decision Making (CDM) process at network, sub-regional, national and local level. The effective and dynamic management will be addressed through an integrated airspace configuration process, supported by appropriate ATS/ASM/ATFCM procedures.

Between ATM actors real time airspace status data will be exchanged and provides the basis for ASM/ATFCM planning updating and fine-tuning.

### 2.2.2 Capacity Planning and Flight Efficiency

Network Collaborative Management improves the European ATM network performance, notably capacity and flight efficiency through exchange, modification and management of trajectory information. In the airspace and airport planning process, stakeholders aim at meeting user’s business needs by providing capacity more proactively and dynamically where & when it is needed while ensuring flight efficiency, based on expected demand and operational context.

Through the Network Operations Plan (NOP) focus is maintained on planning and implementation of improvements to properly deliver required en-route and airport capacity (the latter through integration with the AOP). This is a rolling process, through continuous assessment of performance and identification of improvement and/or mitigation actions.

Potential bottlenecks are anticipated early enough and with sufficient accuracy to enable efficient resource allocation where available and coordinate less impacting measures required to solve the remaining demand/capacity imbalances.

Major ATM transition projects are coordinated across the network to ensure synchronised deployments.

AU’s (civil and military), through their operations centres, are interfaced with the airspace and airport planning process. The improved dynamicity and transparency of the airport and airspace planning process allows AU’s to optimise their fleet planning or mission planning and allows for improved flight planning for individual flights.

Local plans will show more dynamicity through modular and flexible sectorisation by taking into account basic complexity indicators based on specific shapes of demand, network flight efficiency needs, in addition to the current capacity processes, and by taking into account all the existing ATC technology enabled capabilities.

Network operations will collaboratively address the overall Network stability & efficiency and take the necessary actions to optimise overall network performance.

The timely sharing of dynamic operational data by ANSPs will improve predictability of sector capacities and contribute to improve capacity and flight efficiency coordination processes in the network and improve effective application of measures.

High level network operations performance targets are cascaded down geographically orientated (regional, sub-regional, local operational targets) and/or periodically orientated (yearly, monthly, weekly, daily operational targets) to a workable operations level.

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The Network and its operational stakeholders will have to ensure:

- the timely development of operational plans and their coordination at network level,
- performance analysis resulting in improved capacity (e.g. weekends, sector configurations, airport capacity values, traffic peaks, route restrictions, areas of responsibility);
- Recommend measures and improve transparency to better manage critical events (e.g. low visibility airport operations, temporary airspace closures).

2.2.3 Business Trajectories and Cooperative Traffic Management

Flow Management shall move to a Cooperative Traffic Management (CTM) environment, optimising the delivery of traffic into sectors and airports and the need for Air Traffic Flow and Capacity Management (ATFCM) measures.

In the perspective of the business trajectory development, the flight plan data set is extended (EFPL) with the aim to facilitate the implementation of the planned trajectory in the operational phase – meaning that the aircraft FPL adherence is facilitated by ATC. In specific areas special attention by ATC is given to flights subject to downstream constraints, to ensure that targeted measures established in the planning phase are respected. Trajectory modifications will be implemented in the execution phase for separation purposes and contingency.

Short notice reserved/restricted airspace requirement changes are continuously shared between the ASM/ATFCM/ATS partners in a rolling airspace update process, facilitating immediate responses from service providers and airspace users. Real time coordination supported with what-if functionality support the selection of appropriate responses. Airspace availability is shared in real time to optimise utilisation of airspace. Traffic synchronisation actions may follow as a result.

The monitoring process of Network Capacity also takes into account new indicators and threshold values related to complexity and workload. This requires en-route and airport capacities to be updated in real time.

The network planning processes will be continuous, sharing the latest updated data to all users (interoperability between ASM, ATFCM and ATS). Network actors will link their own processes (continuous or snapshot) to the network processes supported by SWIM compliant infrastructure. Flight information exchanged during the pre-tactical and tactical phases by ATC systems and Network Manager supports the predictability of network events and their impact, and it reduces uncertainty, thereby improving operational performance.

In the planning phase, to efficiently use resources, an optimal plan of sectors and airspace restrictions/reservations will be timely updated to balance with the demand and achieve the most optimum airspace configuration.

Planned 4D-measures (e.g. Target Times) will be communicated to all relevant actors as targets so to ensure that the flight execution is performed against the plan to permit optimised network performance.

ATC will optimise network operations by, in principle, implementing the coordinated targeted measures (4D: time, route, level) through adherence to the agreed business/mission trajectory, and in addition, to anticipate to opportunities for airspace users when and where possible, based on cooperative traffic management procedures in coordination with relevant ATC centres, FOCs/WOCs and with the network manager. In addition, ATC will be supported by the network operations for specific ATC requirements such as data sharing in support of arrival (pre-)sequencing.

To support airspace users to optimise their business in the network, AUs will have more flexibility to select the flights to which specific measures will be applied, including automated processes where AUs provide information on the optimisation of departure sequences (for priority flights) in order to swap slots with other flights inside or outside the airline group.

ATC will provide efficient flows of traffic by, in principle, implementing trajectories optimised during the planning phase while maintaining the required level of safety.

In addition, adjacent control centres (e.g. ACCs) agree and apply cooperative over-the-horizon traffic management & coordination procedures with greater emphasis on resolving issues before they materialise, through traffic demand adaptations that reduce the dependency on downstream reactive controller workload. By identifying hotspots (overloads/conflicts) based on complexity and occupancy values, local measures will be cooperatively decided to prevent negative impact on downstream controller workload (e.g. Short Term ATFCM Measures - STAM). These measures could be
traditional measures but also more fine-tuned and targeted measures to optimise complexity/workload. The application of a measure takes into consideration the expected network effect, including the interface with airports.

A level of trajectory flexibility to support flight efficiency targets is available in low traffic levels when the network can accommodate it.

ATC evolves to provide efficient flows of traffic by, in principle, implementing trajectories optimised during the planning phase whilst maintaining the required level of safety.

Trajectory modifications for flight efficiency purposes will be beneficial to airspace users and without negative impact to downstream operations.

Clear organisational processes are established to deal with unplanned major events and/or significant reduced operations (applicable to local and Pan-European disruptions, but also to global disruption or out of area disruption having an impact on the Pan-European network). Depending on the nature of the situation the normal ATFM toolbox and rules can be extended, including adapted prioritisation rules, buffers, new what-if applications, etc.

The tactical phase improves the accuracy of the traffic demand management by including OAT information, comparing ICAO FPL flight planning information with the flight intention information\(^4\), incorporating the Airspace Users trajectories, shared resolution of detected inconsistencies and by increased instances of Airports passing departure and arrival planning information until commencement of flight execution.

### 2.2.4 Airport – Network Integration

A Collaborative NOP consists of increased integration of NOP and Airport Operations Plan (AOP) information. The development of a Collaborative NOP shall focus on the availability of shared operational planning and real-time data\(^5\).

Airport capacity declaration (and the subsequent airport slot allocation) process and airspace planning are closely linked and need to be consistent. The quality of the data used for network planning purposes is significantly enhanced with the provision of more accurate data directly from airport operators and airspace users. In addition data from all airports (or groups of airports) that generate any significant levels of traffic will be used as inputs into the planning process so a complete and accurate picture of expected traffic situations can be established.

An overview of network capabilities are obtained by linking airport ground capacities obtained via the continuous update of the airport operations plan (through concepts of A-CDM, Airport Surface Traffic Management, Departure Management, Advanced Tower, Extended Arrival Management, and Airport Operations Centre) with the Network via the NOP.

Smaller airports, who decided local CDM development to be not feasible, are linked to the network NOP via their APOC AOP, assuring that data constituting the local Airport Operations Plan (AOP) for the small airport is available for the NOP, and can be updated as needed to assure with the required quality.

For airports comprehensive capacity assessments are carried out to ensure that all aspects of the slot allocation process are fully aligned and accurate data is used as part of the network planning process. The agreed capacity figures issued by airports are to be seen as a contract.

The planning process from strategic through pre-tactical until tactical operations is adapted to allow for a constant quality management cycle including post operational analysis, which is consistent with the application of the Gate-to-Gate and air-to-air concept. The present reporting of airport delays has evolved from one of reporting effect to one of more accurately reporting the causes for the delay, which includes information on when the demand exceeded the agreed capacity figure and the reasons for the excessive demand.

Local partners in the Airport Operations Centre (APOC) and network capacity managers collaboratively decide on appropriate measures considering network and local airport demand and capacity constraints to ensure the appropriate balance between efficient Airport/TMA operations (also delivered through PBN and CCO/ CDO implementations) in all weather conditions and efficient En-route operations. Further techniques like RECAT-EU and Time Based Separation (TBS) will provide for additional efficiency increase.

### 2.2.5 Performance analysis capabilities

Network business intelligence techniques and tools will be made available and applied to the Network Manager operational archives to support detection of trends, validating hypothesis and analysing past events or behaviours.

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\(^4\) Compliance with Article 9 of Regulation (EC) No 255/2010 on common rules on air traffic flow management.

\(^5\) Commission Implementing Regulation (EU) No 716/2014, L 190/34, Collaborative NOP.
CHAPTER 3 - IMPACT ON PERFORMANCE

Starting infrastructure design from an integral network perspective will allow accommodating the traffic with a minimal of measures, thereby supporting network performance.

Flexible Airspace Management and Free Routeing are expected to enable a more efficient use of airspace, thus providing significant benefits linked to fuel consumption and delay reduction. It will also form the foundation for more dynamic and flexible operation of the network aligned with traffic demand and orientations.

Network Collaborative Management is expected to improve the quality and the timeliness of the network information shared by all ATM stakeholders, thus ensuring significant benefits in terms of Air Navigation Services (ANS) productivity gains and delay cost savings.

Continuous coordination of network operations based on expected and realised network performance in both the planning phase and the execution phase, creates the ability to respond to opportunities in the network or to react to network issues with the right level and amount of measures. This minimises limitations and creates opportunities in the network, directly to the benefit of airspace users in terms of less delay and resulting increase of punctuality, connectivity and better flight efficiency, but also better mission effectiveness for military airspace users.

In case of network issues, they will be directly managed by measures, instead of the issues being translated to a target on the departing airport. The network issue will thus be more effectively managed, increasing significantly the predictability of network operations. Lack of predictability, and particularly sector over-deliveries, currently result in reduced declared capacity to have a ‘buffer’ for unplanned traffic. The flight level adherence trials showed an increase of predictability of more than 30% in most participating ACC’s, demonstrating that predictability improvements are feasible. If 4-dimensional measures (horizontal, vertical, time) are initially used for managing network issues and for the entire network operations in 2019, significant benefit can be expected in terms of predictability of traffic delivery and therefore capacity increase is expected. Today, the lack of predictability of traffic has a significant negative impact on capacity declaration. A dedicated study on this involving 7 ANSPs showed a potential for 10% more capacity for planning purposes.

Also the direct management of network issues will create flexibility upstream to, ultimately, airport operations. Currently, airports operations are forced to deal with en-route limitations, by issuing CTOTs in response to en-route issues. Targeted measures (through STAM coordination) addressing en-route limitations directly, will be coordinated with airport operations by linking with A-CDM. In many cases this reduces the impact of en-route limitations on airport operations. Especially the complex large airports operations will benefit significantly from this increased coordination. Airport Users will be better able to handle their operational business priorities, optimising connectivity, departure sequences, etc., to, ultimately, satisfying their passengers. In combination with the continuous coordination processes, including airport CDM, benefits resulting from increased airport’s flexibility will even be amplified.

Bringing planned airport operations closer to the operations that actually takes place will reduce a negative impact of peaks in unforeseen and unplanned demand on airport operations and network performance.

The Network & Airport Integration is expected to improve throughput, ensuring benefits in terms of fuel consumption and delay reduction as well as airport capacity.

The Initial Trajectory Information Sharing functionality with enhanced flight data processing performances is expected to improve predictability of aircraft trajectory for the benefit of airspace users, the network manager and ANS providers, implying less tactical interventions and improved de-confliction situation. This is expected to have a positive impact on ANS productivity, fuel saving and delay variability.

Above mentioned directions of change will create synergy between each other, amplifying the individual benefits.
ANNEX A - 2014 NETWORK OPERATIONS

While this document addresses the 2019 operations framework with its specific improvements areas as defined by the NSP, this Annex provides an overall description of 2014 network operations to provide a common reference of the scope of network operations.

A.1 Network operations - Overall Process

Network operation is steered to performance targets as set by SES regulation and powered along by operational stakeholders participation in a cooperative phased rolling process, illustrated in figure Figure 2.1a. (see section 2.1)

Cooperative phased rolling process refers to the development by the Network Manager of the ‘Network Operations Plan’ (NOP), in collaboration with the operational stakeholders, with the aim to coordinate and optimise operational planning activities through cooperative decision making process, in the short, medium and longer term and in accordance with the guiding principles of the Network Strategic Plan.

The NOP mainly supports the overall operations planning process, i.e. identification of potential network congestions and the measures to address them, Air Traffic and Capacity Management (ATFCM) Demand and Capacity Balancing process, European Route Network Design (ERN) Improvement Plan (ERNIP), the civil-military coordination of airspace availability, the optimised implementation of Network evolutions, the collaborative planning of scheduled events, and ensuring preparedness for unscheduled events and crises that potentially affect Network operations, regionally or globally.

Network Operations Planning is a dynamic, iterative layered process, set to deliver network performance against its targets. It is progressively detailed and adapted with the latest available information in each of its phases up to, and including the flight execution phase.

The strategic phase starts from 5 years and continues until one week before the operational date. It focusses upon strategic decisions and network enhancement activities.

The Network Operations planning pre-tactical covering six days until 17:00 UTC one day before operation, and tactical network operations thereafter delivers core operational services across several domains:

- Flow and Capacity Management
- ATM Access Gateway and Flight Planning Operations
- Information Management
- Events and Crises Management, including Contingency management
- Post-operations analysis and reporting

The post-operational Review phase analyses NOP performance results then feeds this knowledge into both the planning phase and into the forecasting phase in preparation for the future seasons. It ensures monitoring of the global Network focusing on network indicators measuring flight efficiency, mission-effectiveness, predictability, environment and capacity. It launches ad-hoc lessons learnt investigation processes involving the relevant actors.

Figure A.1-1 further illustrates the iterative process supporting the Network Operation Planning and its underlying activities. The objective is to iteratively build a network plan that optimises air traffic flows according to available airport, airspace and air traffic control capability whilst enabling airlines to operate safe and efficient flights.

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6 Civil & Military airspace users and ANSPs, Airport operators, Airport slot Coordinators, the Network Manager, any operating organisations and additional stakeholder groups considered relevant for the management of Network Operations.
A.2 Network Demand

Timely forecast and management of reliable civil and military traffic demand is principal to establishing a performant network.

**Forecast**

The forecast makes use of historic flight data sets and extrapolates these with forecasted future traffic growth. By comparing past operational performance, the forecasts are used to propose new performance targets for the coming periods.

**Planning Phase**

Civil traffic demand is built on historical traffic demand enriched with flight intentions collected in the Demand Data Repository from Airspace Users and Airports. 4D trajectories are generated by the Network Manager based upon different scenario (historical routes, shortest, cheapest routes), to anticipate and forecast the traffic demand pictures, in time and for the different geographic airspace of the Network.
Throughout the strategic and pre-tactical phases, traffic demand is iteratively re-assessed with the latest available received flight intentions updated according to different scenario based trajectories and uploaded in pre-arranged batches.

Recent improvements to the accuracy of traffic demand are the result of the collaboration between all stakeholders, in particular airports, airport slot coordinators and Airspace User (AU), committed to share and to update their flight intention data when available. Both the completeness and timeliness of this data should be improved.

However, this traffic demand ceases to be maintained after D-1 1700 UTC of the pre-tactical phase.

The received ICAO flight plans (FPLs) and their successive updates collected & validated by the NM are the other source used to assess civil traffic demand using a combination of airspace information and the FPL route fields to calculate 4D trajectories. The vast majority of FPLs become available in the last 20 to several hours before take-off, FPL based traffic demand is currently only used during the tactical phase.

During the tactical phase, every 2 hours and until 3 hours before the flight’s off-block time, the flight plans are compared against the available airspaces and flight efficient trajectories are simulated and assessed. Flight efficient routes are then offered to airspace users where these will provide mutual traffic and network benefits.

The FPL can be updated taking into account operational limitations until ATC activation, e.g. pushback. The FPLs are shared / distributed to all relevant operational stakeholders.

Coordination with Airport CDM (A-CDM) helps to build the network picture in the tactical phase and to integrate local time based decisions made at connected airports, about the 4D trajectory impacts of traffic sequencing planning for departures and arrivals.

The gaps experienced between pre-tactical and tactical planning must be overcome through extended pre-tactical maintenance of flight intention data and a smoother transition between pre-tactical intention and FPL based traffic demand data sets. A-CDM must be extended to incorporate Arrival Planning Information to incorporate better STAR information. The generation of the 4D trajectory must be migrated to the Airspace Users.

Execution Phase

At the commencement of a flight’s execution phase, the NM continues to manage flight progress information and disseminates this to its stakeholders.

A level of trajectory flexibility is available in low traffic levels when the network can accommodate it. (See section A4 Balance Demand with Capabilities and Events)

The shared common understanding of the FPL trajectory is considered to be the initial step towards Reference Business Trajectories and Reference Mission Trajectories.

Operational updates and changes are assessed using also new capacity indicators referring to workload and complexity as mentioned in the planning phase. Traffic from other regions is also taken into consideration.

Review Phase

At D+1 the Demand is examined whenever a particular flow is identified by stakeholders to have contributed to a demand capacity imbalance. The D+1 analysis looks at what was planned in terms of Playbooks, ATFCM Daily Plan (ADP) processes and Flight Efficient route offerings. When additional, unexpected flights are considered to be a causal factor, their effect is analysed against ATC pressure.

The analysis also looks at uptake of flight efficient route offerings and at unexpected demand patterns. In the short term – those planning the next iteration are informed of any lessons learnt. Where demand trends are detected these are communicated into the strategic planning phase and updated in the playbooks for the next season.
A.3 Network Resources and Capabilities

**Forecast**
Forecasting takes on board expected resources and evolving (notably ATC, aircraft and airport) capabilities that influence the strategic network operations planning, and provides a basis for deriving strategic requirements on those resources and capabilities.

**Planning**
NM Strategic planning involves preparing all the capabilities of the Network that relate to achievement of the performance targets: management of scarce resources; airport capacity, runways, SID/STARS; and airspace capacity involving: ATS routes, terminal routes, optimised trajectories, FRA, military airspace reservations and ATC sector configuration & capacity plans. A specific part of the NOP includes the European Route Network Improvement Plan (ERNIP), for the European route network design (ERND). The Airport Capacity planning is comparatively less well communicated to the NOP.

Network Operations Planning contains six main elements:
- Local and Network Operational Planning
- Route Network and Airspace Structure Development
- Airspace Management (ASM)
- ATM (ATS/ASM/ATFCM) Procedures
- Airspace Modelling
- Airspace Simulations

The Network Manager works in partnership with all the operational stakeholders for the enhancement of European ATM network capacity at ACC and network level, through the use of long-term strategic traffic forecast information and improved capacity planning processes and tools.

The en-route part of capacity planning process is a mature, rolling process, with the integration of agreed delay targets at European Network and local level. It has the full support and commitment of ANSPs, in regard to the assessment of current ACC capacity, the evaluation of future capacity requirements and the cooperative development of capacity plans.

The Network Manager support to airports for capacity planning and assessment requires it to coordinate with all the different entities involved in airport operations. The Network Manager therefore has to focus its resources into those airports that have the greatest impact or have the most significant demand upon the ATM network. The aim is to fully integrate airport capacity plans with the network capacity planning process.

The Network Manager distributes to all operational stakeholders the common network capacity planning and airspace design tools and data, and provides support and training to ANSPs. Through these actions a collaborative, interactive capacity and airspace planning process has evolved. In addition, local traffic growth information is supplied directly by many airports, based upon their local knowledge of aircraft operator intentions.

The Network Manager ensures dynamic and systematic provision of data relevant to the capacity planning and airspace design process, in a format suitable for various tools, both internal and external to the Network Manager.
The capacity commitments of every operational stakeholder in the network are consolidated and reflected in the NOP.

In addition to the planning and management of the ATM Network Operations, the Network Manager is responsible for the management of scarce resources, specifically frequencies and transponder codes.

As part of the Network Manager CDM Process, the Capacity Planning Sub-Group (CPSG) of the Network Operations Team (NETOPS) is a dedicated group, made up of ANSP capacity managers and planners, and is the driver for improvements to the medium term en-route capacity planning process and tools development, while agreeing the work programme for the coming years.

The annual capacity planning process of the Network Manager, starting in summer and terminating the following spring, looks ahead over a 3-5/6 year period.

Airspace data (routes, sectors, airspace definitions and other data sets relevant to the network management) are collected and consolidated for the whole network by the NM. This data is maintained and published at the aircr cycle basis, with additional dynamic updates to specific data sets.

Route availability constraints as reflected in the Route Availability Document (RAD) aim at preventing disruption to the major traffic flows through the congested areas and enabling ANSPs to maximize capacity and to reduce traffic complexity. The RAD with flight planning restrictions information is provided through national RAD Coordinators and consolidated by NM into a single pan-European network document. The RAD is developed and coordinated through cooperative decision making, ensuring that its content is agreed upon between the Network Manager and the relevant Operational Stakeholders. The RAD (Route Availability Document) integrates both ATFCM and structural requirements.

The pre-tactical and tactical network operations is reliant upon a number of services managed on behalf of the stakeholders in steady state operations to timely update the shared Network Information System with updates to AIRM information, airport and airspace configuration and capacity updates, Route Availability Document, Airspace restriction updates, Airspace Use Plans and conditional route availability.

However, in the tactical phase, a number of ANSPs rightly anticipate airspace utilisation with localised monitoring value thresholds in lieu of the traditional hourly capacity values. The NM does not access these values and no longer provides steady-state situational monitoring services to these ANSPs.

During unanticipated or unscheduled events including contingency or crisis situations, the NM capabilities can be utilised in the solutions supporting Network Operations prior, during and recovering from these disruptive Network events.

**Execution**

The execution phase relates to the actual airspace and airport configurations in place in real time. These can differ from the Network planning due to coordination issues during the tactical planning phase or due to an unscheduled operational situation e.g., blocked runway, meteo activity (thunderstorm) or unavailable ATS infrastructure etc.

**Review Phase**

At D+1 the Capacity is examined whenever unplanned ATFCM interventions, including ATFCM regulations, have been applied. Firstly, the D+1 analysis looks at what was planned in terms of the Axis, Playbooks and ATFCM Daily Plan processes. When the available capacity has been less than that planned, then the contributory factors are discussed with the stakeholders. In the short term – those planning the next pre-tactical iteration are informed of any lessons learnt. Where capacity issue trends are detected these are communicated to those planning the future season and updated in the playbooks.
Planning

NM Strategic planning helps the Air Navigation Service Providers (ANSPs) to predict what capacity they will need to provide in each of their air traffic control centres, considering the forecast traffic demand and the scenario based generated flight trajectories (strategic DCB). These are drawn up and maintained from 5 years ahead and confirmed during the seasonal planning stakeholder consultation groups AXIS and playbook meetings.

In support to solving anticipated DCB imbalances, predefined DCB solutions (lateral re-routing, vertical level caps, routes restrictions) are designed and assessed in terms of impact for the network and for airspaces users. The assessment results are discussed with relevant stakeholders through different consultation groups in order to reach agreements on acceptable solutions in case anticipated imbalances are confirmed during the next planning iterations.

Event Management involves the balancing of capacity and demand for specific scheduled events anticipated to significantly impact the network (large-scale military exercises, major sports events, technical infrastructure and airspace enhancement). In support of this activity the Network Manager maintains the Transition Plan for Major Projects.

The Crisis Management includes coordination of management of response to network crises impacting aviation in Europe, e.g., political and societal crises, environmental crises (Atmospheric hazards (meteo, volcanic ash), public health threats (pandemic, nuclear or chemical hazards), geological events and technical crises (widespread disruption to technical infrastructure), etc.

From six days before real time operations (pre-tactical), network operations include:

- Assess the demand & capacity (im)balances resulting from the available sector configurations (defining the airspace capacity) and airport capacity information, and the forecast traffic demand intentions;
- Assess the ATFCM/DCB measures proposed to solve detected imbalances;
- With operational partners collaboratively define the ATFCM Daily Plan to optimise the overall ATM network performance and minimising the impact of DCB/ATFCM measures;
- Publish the agreed ATFCM Daily Plan for the day of operations informing stakeholders about the ATFCM/DCB measures that will be in force in European airspace on the following day.

As such, the daily plan corresponds to the NOP part resulting from the pre-tactical planning process.

During the tactical phase (from the last 20 hours before execution), the daily plan is implemented, monitored and optimised according to real time traffic demand and newly appearing capacity constraints (e.g., meteo conditions).

Where aircraft are affected by DCB measures, alternative solutions are offered to minimise impact.

DCB measures include inter alia the allocation of individual aircraft departure slots, re-routings to avoid
bottlenecks in an attempt to maximise flight efficiency and make the best use of the available capacity.

From 3 hours before take-off, it is essential for airports to share dynamic and highly accurate data with the European ATM network.

The Departure Planning Information messages received from CDM airports supply the Network Manager Operations Centre with airport situational information direct from the airport Collaborative Decision Making systems updating the real-time flight situation prior to take-off.

In a symmetric process, the Flight Update Messages sent by the NM provide airports with an estimated landing time of arriving flights, thus improving the airport arrival planning for these flights.

The evolution of the Network situation (traffic forecast and ATFCM situation) is shared in real time and in transparency with operational stakeholders, through customised HMI and the NOP Portal.

During the tactical, short term ATFCM / DCB measures (STAM) can be applied locally in collaboration with NM, to optimise the flows of traffic. These STAM measures may affect ground based and airborne flights (See Execution).

Events & Crisis Management during the pre-tactical and tactical timeframes includes the detailed operational impact assessment, planning and communications for both the events anticipated during the strategic phase and for unanticipated events and crises.

1. Anticipated Event Management

In addition to the strategic planning (see above), from six days before real time operations (pre-tactical), the NM role is to:

- cooperatively assess the event with particular regard to demand and capacity impacts
- cooperatively assess the available mitigations
- cooperatively assess the ATFCM / DCB measures proposed to solve detected imbalances;
- collaboratively define the ATFCM Event Plan to optimise the overall ATM network performance and minimising the Event impact,
- Publish the agreed Event Plan (ATFCM Daily Plan) for the day of operations informing stakeholders about the ATFCM / DCB measures that will be in force

During the tactical phase, either the Event Plan is followed or else in the case of unscheduled events the strategic phase event/crisis planning is implemented, monitored and optimised according to real time traffic demand and evolution of the event.

In addition NM acts at the political and societal level in close cooperation with the affected agencies, operational partners, authorities and crisis structures e.g. through the European Aviation Crisis Coordination Cell (EACCC).

2. Crisis and Unanticipated Event Management

The NM acts to operationally mitigate the unanticipated event or crisis using its available capabilities and those generally available within the aviation community.

Following the unanticipated event or crisis, NM acts to coordinate management of the network response and the recovery actions to safely restore normal Network Operations.

In addition, NM with support of the European Aviation Crisis Coordination Cell (EACCC), acts at the political and societal level in close co-operation with the affected operational parties, agencies, authorities and crisis structures.

Execution

Execution (flight) phase is mainly under responsibility of pilots and ATC.

The Network Manager monitors the network situation and reacts to specific conditions which may impact the next hours operations: e.g., specific meteo conditions, unexpected reduction in capacity in some areas of the network. When a new problem is anticipated or detected, Network Operations monitor that a solution is being investigated and initiated by the relevant actors and will ensure the solution takes into account the network impact.

During the execution phase, short term ATFCM / DCB measures (STAM) can be applied locally in collaboration with NM, to optimise the flows of traffic. STAM measures may affect airborne flights or flights close to departures but still far enough from the imbalanced downstream airspace.

Review Phase

At D+1 the Key Performance Indicators are reviewed against the D-1 planning (ADP and Play books and
critical event management). Where performance gaps and contributory factors are identified and discussed with the stakeholders: any unplanned ATFCM interventions are fully investigated to identify any underlying Demand and Capacity variations. Analysis and recommendations are made of the cause, reaction and effect. Feedback is presented to stakeholders participating in the next planning phase and where trends are noted, the strategic phases are informed in preparation for the forthcoming playbook and season planning.

Following an Event, the review phase will perform lesson learnt exercises and feeds the recommendations back into the strategic phase.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>4D</td>
<td>A4 Dimensional</td>
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<tr>
<td>A-CDM</td>
<td>Airport CDM</td>
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<td>ACC</td>
<td>Area Control Center</td>
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<td>AMAN</td>
<td>Arrival Management</td>
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<td>ANSP</td>
<td>Air Navigation Service Provider</td>
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<td>Aircraft Operator</td>
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<td>Airport Operations Plan</td>
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<td>ATFCM</td>
<td>Air Traffic Flow &amp; Capacity Management</td>
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<td>CBA</td>
<td>Cross Border Area</td>
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<td>Collaborative Decision Making</td>
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<td>CNS</td>
<td>Communication, Navigation, Surveillance</td>
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<td>DCB</td>
<td>Demand Capacity Balancing</td>
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<td>DPI</td>
<td>Departure Planning Information</td>
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<td>ECAC</td>
<td>European Civil Aviation Conference</td>
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<td>EC</td>
<td>European Commission</td>
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<td>E-FPL</td>
<td>Extended Flight Plan</td>
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<td>FAB</td>
<td>Functional Airspace Block</td>
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<td>FDPS</td>
<td>Flight Data Processing System</td>
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<td>FO</td>
<td>Flight Object</td>
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<td>FPL</td>
<td>Flight Plan</td>
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<td>Abbreviation</td>
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<td>FRA</td>
<td>Free Route Airspace</td>
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<td>A_FUA</td>
<td>Advanced Flexible Use of Airspace</td>
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<td>GAT</td>
<td>General Air Traffic</td>
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<td>IFR</td>
<td>Instrument Flight Rules</td>
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<td>KPI</td>
<td>Key Performance Indicator</td>
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<td>NM</td>
<td>Network Manager</td>
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<td>Performance Based Navigation</td>
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<td>R&amp;D</td>
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<td>REG</td>
<td>Regulation (European)</td>
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<td>SES</td>
<td>Single European Sky</td>
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<td>SESAR</td>
<td>SES ATM Research</td>
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<td>SID</td>
<td>Standard Instrument Departure</td>
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<td>STAM</td>
<td>Short Term ATFCM Measures</td>
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<td>STAR</td>
<td>Standard Arrival Route</td>
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<td>SWIM</td>
<td>System Wide Information Management</td>
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<td>TMA</td>
<td>Terminal Manoeuvring Area</td>
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<td>TP</td>
<td>Trajectory Prediction</td>
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<td>TTA</td>
<td>Target Time of Arrival</td>
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<td>TTO</td>
<td>Target Time Over</td>
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<td>UDPP</td>
<td>User Driver Priority Process</td>
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<td>Updated airspace Use Plan</td>
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<td>VFR</td>
<td>Visual Flight Rules</td>
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<tr>
<td>VPA</td>
<td>Variable Profile Area</td>
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<td>WOC</td>
<td>Wing Operations Center</td>
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<td>WP</td>
<td>Work Package</td>
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RELEVANT DOCUMENTATION


COMMISSION IMPLEMENTING REGULATION (EU) No 716/2014 of 27 June 2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan

SESAR, European Air Traffic Management Master Plan, Edition 2, October 2012

ICAO, (draft) Performance Improvement Areas and Improvements for Block 0 (- 2013), 1 (- 2018), 2 (- 2023) and 3 (- Long Term)

EUROCONTROL, Concept of Operations for Advancing the ASM/ATFCM/ATS Processes from the FUA Perspective -2017 FUA Concept-, version 0.4.1, 17/05/2011

EUROCONTROL, The 2015 Airspace Concept & Strategy for the ECAC area & Key enablers, version 2.0, 28/02/2011