EUROCONTROL

Network Performance Plan 2020-2024

EC Decision C(2022) 3022
May 2022

SUPPORTING EUROPEAN AVIATION

FOUNDING MEMBER OF sesar JOINT UNDERTAKING

NETWORK MANAGER

EXECUTIVE SUMMARY

The Network Manager (NM) is a key component of the Single European Sky (SES) together with the performance framework and Functional Airspace Blocks (FAB). NM is the European Commission (EC) tool to implement SES in a pan-European dimension and deliver performance in partnership with all operational stakeholders.

The EC has re-appointed EUROCONTROL as the NM for a further two reference periods, effective 1 January 2020.

This document contains the Network Performance Plan (NPP) for Reference Period 3 (RP3) 2020-2024, in compliance with the Performance and Charging Scheme Implementing Regulation 2019/317[1] and the Network Function Implementation Regulation 123/2019, hereafter NFIR 2019/123[2].

The NPP conforms to the template in Annex III of the Performance IR 2019/317 and sets out:

(a) NM's added value in support of the activities of Member States, functional airspace blocks, air navigation service providers and civil and military airspace users towards achieving capacity and environment targets, as well as the contribution of the network functions towards achieving the Union-wide performance targets;
(b) the NM performance targets and objectives and those for each network function, and the measures aimed at achieving those targets.

The actions, programmes and plans agreed with the operational stakeholders will help in accelerating the decarbonisation of the European ATM network and the delivery of additional capacity. The benefits estimated for the end of the decade are:

- approximately 1000 million NMs, i.e. the equivalent of 6 million tons of fuel saved, or reduced emissions of 20 million tons; this represents a reduction by 2% of the European average route flown resulting from airspace design improvements;
- up to 20% reduction of ATFM delays resulting from direct and indirect actions of NM representing more than 10 million minutes of delay.

As part of its planning process, NM has assessed the changed economic and operating context due to the COVID-19 pandemic and identified how it needs to adapt to the challenges ahead. NM has revised the NPP to take account of the new environment and has used the new performance targets defined in Decision 2021/891.

The NPP fully embraces the Green Deal of the EU. This is a priority policy of the Union. The European Commission has set the goal for the EU to be climate neutral by 2050 and has launched or reinforced a wide set of initiatives to protect the environment and boost the green economy. To be consistent with the European Green Deal objectives, as proposed by the European Commission in December 2019, transport emission will need to be reduced by 90% in the next 30 years.

NM has defined a number of additional performance indicators in the NPP. It will monitor the full set of indicators and take remedial action when performance is off target.

[1] Commission Implementing Regulation (EU) 2019/317 of 11 February 2019 laying down a performance and charging scheme in the single European sky and repealing Implementing Regulations (EU) No 390/2013 and (EU) No 391/2013
[2] Commission Implementing Regulation (EU) 2019/123 of 24 January 2019 laying down detailed rules for the implementation of air traffic management (ATM) network functions and repealing Commission Regulation (EU) No 677/2011

NM has a clear vision of what it needs to do and how to achieve it. That vision ensures NM delivers on the Single European Sky (SES) and Member States' expectations.

NM and the network partners need to continue to develop their commitment on building a single aviation value chain. Robust technical and operational coordination and integration at network level will ensure the necessary evolution towards a sustainable, optimum and efficient network. And the execution of the NDOP/NDTECH work programme will ensure even closer coordination between NDOP, NDTECH and NMB.

It is crucial to build a scalable and agile ATM network, and that strategy becomes everyone's job, therefore a full engagement of all stakeholders is required.

NM's approach to achieve such an ATM network will be based on:

- Coordinating airspace and managing air traffic flows both at strategic and tactical level;
- Driving coordinated implementation of operational concepts and technologies;
- Monitoring network performance;
- Monitoring and coordinating the provision of infrastructure services;
- Coordinating and supporting crisis management.

NM will promote a network-centric approach to ensure these challenging tasks succeed. This means that all ATM stakeholders should acknowledge that the benefits of the network are beneficial for all, both at network and especially at local level. The NM will act in the interests of the whole ATM community servicing the operational stakeholders in order to provide them with a real value added in their day-to-day operations.

Network safety is paramount in order to guarantee safe operations of both the NM and all stakeholders as a whole. NM does not compromise on safety in any circumstance: the NM safety management system will address the safety of any change to the ATM system and the network operations, whose maturity will constantly improve in RP3.

Network integration will be data-driven, so NM will continue to build a new digital platform that will be accessible and open to all aviation stakeholders.

NM will strengthen its relationships with its key partners. NM is developing an advanced CDM in order to ensure a fair treatment of all parties and balance their needs.

NM will continue to undertake various cost efficiency measures during RP3. It will also have a strong succession planning and agility in managing the workforce.

FOREWORD TO THE NETWORK PERFORMANCE PLAN

EUROCONTROL has been the Network Manager (NM) since 2011 covering two Single European Sky (SES) performance reference periods. The European Commission (EC) has re-appointed EUROCONTROL as the Network Manager for a further two reference periods effective 1 January 2020.

This document is the Network Performance Plan (NPP) for Reference Period 3 (RP3) 2020-2024[3].

As part of its planning process, NM has assessed the changed economic and operating context due to the COVID-19 pandemic and identified how it needs to adapt to the challenges ahead. NM has a clear vision of what needs to be done and how to achieve it. That vision ensures NM delivers on the Single European Sky (SES) policy objectives and Member States' expectations.

NM has revised the NPP to account of the new, future environment and has used the new performance targets defined in Commission Implementing Decision 2021/891.

The new reality

The COVID-19 pandemic has had far-reaching effects on air transport and NM has had to adapt to the new reality.

At the start of RP3, NM expected traffic growth, capacity shortages and a potential "exponential" increase in ATFM delays. Traffic is now expected to return to pre-COVID levels in two to four years. There are currently few network capacity problems, but there is a stronger emphasis on very short-term network operations planning and collaboration.

Societal, political and business attitudes to the environment have changed in the last eighteen months. The Green Deal of the EU is a priority policy of the Union. The European Commission has set the goal for the EU to be climate neutral by 2050 and has launched or reinforced a wide set of initiatives to protect the environment and boost the green economy. To be consistent with the European Green Deal objectives, as proposed by the European Commission in December 2019, transport emission will need to be reduced by 90% in the next 30 years.
The Green Deal and its Sustainable and Smart Mobility Strategy states "The success of the European Green Deal depends on our ability to make the transport system as a whole more sustainable."
The EC emphasizes that "environmentally optimal trajectories should continue to be the main objective" in a post COVID world. But if nothing is done CO2 emissions would increase 58% relative to 2017 under the base traffic forecast.

The absence of airspace restrictions during 2020/2021 has shown the possible environmental gains of a non-complex operating environment. A key RP3 challenge will be to ensure the operational implementation of a number of key policy priorities for the EU such as the Green deal and the smart and sustainable transport policy. NM will need to support aircraft operators, airports and ANSPs to achieve their environmental targets.

RP3 will have significant emphasis on cost effectiveness. Given the economic effects of COVID, particularly in aviation, there is a strong emphasis of cost effectiveness in RP3. This may affect the operational services of NM and ANSPs, which highlights the importance of the short-term operational planning to react to changing operating conditions. There is strong pressure to rationalise operational services and infrastructure, particularly through digitalisation, as envisaged in the Airspace Architecture study.

Network performance – the main priority

The balance between the network perspective and the local operational and business needs remains critical, particularly through an extensive collaborative decision-making process. The pace of adoption

[3] The creation of the Network Performance Plan follows from the Article 10 paragraph 5 of Commission Implementing Regulation 2019/317

of a network-centric culture needs to improve in RP3 and more convergence on actions of proven network benefit would be key.

The commitment to the network is paramount to achieve both network and local targets. Operational stakeholder plans will change in RP3 thus affecting the network performance, therefore a more robust Collaborative Decision Making (CDM) process is needed. This must support NM, together with the Member States and operational stakeholders, to deliver on network-centric actions.

At times of high network disruption, network initiatives addressing both capacity and flight efficiency improvements need to be developed through the CDM process coordinated by the NM[4]. The Network Manager will ensure a pro-active role through the CDM processes to influence local flow management practices where there is a network issue to resolve.

The network will overcome the current short-term issues, nevertheless the structural **capacity issues** will return without the implementation of new operational concepts and supporting technological systems and tools.

In parallel, in the short term, NM will need to continue and boost its effort to support ATM with accurate traffic and flight data predictions, and coordinate ANSPs capacity commitments.

It is key that the network maintains safe operations and deliver on the SES target of reducing environmental impact by 10%, whose achievement in RP3 might be challenging and adequate countermeasures shall be evaluated.

Within the next reference period **innovative SESAR technological solutions** should be available. The challenge would be that of deploying them in the right way, thus fully supporting the operational concept roadmap. The work on single value chain that NM has launched will be instrumental to achieve this initial objective. For this, strong project management processes and tools will be necessary. Moreover, NM needs to ensure that its systems fully integrate with the rest of the network and with local systems and supports SESAR Deployment.

In order to meet the challenges highlighted, also responding to the new functions and tasks assigned to NM by NF IR 2019/123, the NM will engage new staff with the right operational and technical skills for the medium and long term as a very important goal, considering also the NM aging workforce. NM will do so while improving **cost effectiveness** targets (through a 2 out 3 staff replacement policy) and **financial transparency**.

Vision

NM and the network partners need to continue to develop their commitment on building a single aviation value chain. Robust technical and operational coordination and integration at network level will ensure the necessary evolution towards a sustainable, optimum and efficient network. Even closer coordination between NDOP, NDTECH and NMB will be ensured through the execution of the comprehensive common NDOP/NDTECH work programme.

The NM has to construct an approach to achieve an agile and scalable ATM network. This will be based on:

- Coordinating airspace and managing air traffic flows both at strategic and tactical level
- Driving coordinated implementation of operational concepts and technologies
- Monitoring network performance
- Monitoring and coordinating the provision of infrastructure services
- Coordinating and supporting crisis management

In order to be able to perform successfully these challenging tasks, the NM will promote a network-centric approach, which means that all ATM stakeholders in the network agree that the benefits of the network are beneficial for all, both at network and especially at local level. The NM will act in the interests

[4] As referred in Article 15 of Commission Implementing Regulation 2019/123

of the whole ATM community servicing the operational stakeholders in order to provide them with a real value added in their day-to-day operations, with the aim of gaining the trust to drive the transformation of the network and to deliver network functions and other operational/technical services for high-performing ATM.
It is crucial to build a scalable and agile ATM network, and that *strategy becomes everyone's job*, therefore a full engagement of all stakeholders is required.

To deliver its vision, the NM will focus on specific areas:

Shaping the network
The Network Strategy Plan 2020-2029 remains the guide for the network long-term development with the ultimate objective of achieving the performance targets for the network functions in a safe, secure, predictable, operationally efficient, environmentally friendly and cost-efficient manner through close cooperation with all operational stakeholders. It will be subject to review when necessary to ensure that its policy objectives are fit for purpose and in line with the policy initiatives such as the green deal and the smart and sustainable transport policy.

In the context of the Airspace Re-structuring programme, NM will continue to work with ANSPs on the re-sectorisation projects and the next steps for the expansion of cross-border FRA and will present them through the CDM process to the NMB.

Following the agreement of the Programme Management Plan by NDOP/NDTECH and approval by the NMB, the work on the Operational Excellence Programme started during winter 2020/21. The main activities in 2021 will be focused on a review and update of related documentation, agreement on the harmonisation approach, and the initiation of detailed implementation planning.

The actions, programmes and plans agreed with the operational stakeholders will help in accelerating the decarbonisation of the European ATM network and the delivery of additional capacity. The benefits estimated for the end of the decade are:

- approximately 1000 million NMs, i.e. the equivalent of 6 million tons of fuel saved, or reduced emissions of 20 million tons;
- up to 20% reduction of ATFM delays resulting from direct and indirect actions of NM representing more than 10 million minutes of delay.

Functions & Services

The NM will continue to work on the optimum airspace organisation, in cooperation with the operational stakeholders, for the network, as part of the European Route Network Design (ERND) Function. When managing the ATFM function, the NM will focus on the improvement of Flow Management activities both from the operational concept and from systems perspective. As a matter of fact, in the NM vision, the future ATFM should be able to support the management of complete traffic flow in the network context, looking at the flight as a whole, from a flow and network perspective rather than segmented portions of its trajectory, as it is the case today.

NM will ensure the full implementation of its obligations with respect to the SESAR Deployment Programme and support the operational stakeholders in the implementation of their own obligations.

NM will support **the implementation of the interoperability standards** and will continue the integration from planning into operations, covering the whole span of activities, as per the agreed NM Interoperability Strategy. The NM will also play a central role in the development and implementation of new operational concepts, among which the 4D trajectory management, target times, integration of airport within network and System-Wide Information Management (SWIM) as per the Flight and Flow Information for a Collaborative Environment (FF-ICE) and Cooperative Traffic Management (CTM) developments conducted through the CDM processes. To do so, the NM intends, while respecting the need to avoid impinging on the liabilities / safety accountabilities of operational stakeholders, to take decisions, in the network's interest, through an extensive Collaborative Decision Making (CDM)

process, involving all operational stakeholders (ANSPs, Airspace Users and Airports) and Member States as described in the articles 15, 16 and 17 of the NF IR 2019/123.

NM will coordinate the **organisation of the airspace** together with the operational stakeholders**,** defining the capacity requirements to satisfy demand across the network, providing accurate traffic prediction and formalising extensive consultation processes with airspace users in order to achieve firmer user demand prospects than today. Similar processes will be conducted with the ANSPs for accommodating local and regional requirements in order to enhance the commitment in delivering the required capacity. Full airports integration in the network will represent an added-value in defining and managing airspace capacity, covering all parts of the ATM system.

Systems

It is evident that the current legacy NM operational system is obsolete and cannot deliver the future capabilities required by the business. Designed in the late 1980s and based on a concept of airspace stretching back to the 1960s, it is at the end of its lifecycle. It is not one software system as such, but many software systems linked together that today have a significant technical gap compared to the current and future needs of the network. If not modernised in a timely manner, there is a significant and high risk that the network services will be interrupted. Unfortunately, the current situation of the system is a result of many factors, mainly due to the uncertainties surrounding the designation of the Network Manager in the past and the subsequent difficulty to plan adequate significant investments.

In this context, the renewal of the technology developed and deployed in the last 25 years is necessary. On one hand, NM needs to cater for obsolescence and maintainability issues of the current systems. On the other hand, there is a need to deploy modern technology and development methods capable to cope with the increasing demands and shorter reaction times, while meeting the regulatory requirements.

NM will invest in a number of areas: consistent data, scarce resources, monitoring infrastructure performance, common network support services, safety, and information on traffic forecast and operational performance analysis. Such investment addresses NM's new tasks from the NF IR 2019/123, but also makes up for any past programme delay.

The iNM programme will provide a flexible, data-driven and agile digital platform allowing smooth and efficient processes, and integrating with external stakeholders via interoperability standards.

The NM will focus not only on the modernisation of its systems, but it will provide extensive support to its stakeholders to implement local solutions with the aim at enhancing capacity management. Based also on best practices, the NM will support stakeholders in implementing solutions to reduce national cross-border constraints improving interoperability. In this framework, the use of current performance analysis and historical data will represent useful tools to manage disturbances and improve the flight efficiencies.

Integration will be data-driven, so we have already started to build a new digital platform – which will be accessible and open to all aviation stakeholders.

Safety

Network safety is paramount in order to guarantee **safe operations** of both the Network Manager and all stakeholders as a whole. NM does not compromise on safety in any circumstance: the NM safety management system will address the safety of any change to the ATM system and the network operations, whose maturity will constantly improve in RP3. The identification of the top safety risks in the network and their mitigation is part of the core activities of NM in RP3 to improve the safety performance.

Working in partnership

NM, through the roles defined in the existing legislation, has its network performance responsibilities as well as **the role of advising the European Commission** on network performance in general.

NM will provide the key network-wide knowledge and expertise in order to influence the standards that will shape the future of the network, while ensuring and facilitating the implementation of the standards decided by the EC.

NM is building **strong partnerships at a European and Global level,** e.g. SESAR Deployment Alliance with operational stakeholders, so that it can lead the changes that are required to cope with capacity limitations and the technology improvement. NM wants a network culture of change for the better where needed. The NM will work proactively with stakeholders to introduce much needed changes and will act quickly so parties realise the value. Moreover, the NM will also ensure that implementations are not fragmented and delivered on target.

NM will strengthen its **relationships with its key partners**. NM is developing an advanced CDM in order to ensure a fair treatment of all parties and balance their needs. To create this culture, NM will proactively improve individual relationships with operational stakeholders and be the key interface between Member States, ANSPs, Airspaces Users, and Airports in their overall interactions within the network.

This would also entail maintaining European Aviation Safety Agency (EASA) certification as a **pan-European Network Manager Service provider**.

Resources and cost-effectiveness

Cost effectiveness. NM has developed a robust cost efficiency programme targeting unit cost reduction over a 10-year timeframe, in line with performance scheme targets. NM will continue to undertake various cost efficiency measures during RP3 including but not limited to: control and optimization of indirect / overhead costs; optimization of operating costs; organizational improvements and synergies; optimized technical solutions through the implementation of the new NM system architecture.

Succession Planning and skills. Key enablers will be a strong succession planning and agility in managing the workforce. NM will deliver while regenerating and engaging resources, and developing expertise. NM will build up staff capabilities and skills to match priorities and fulfil its given tasks.

Finally, the Network Manager will need to deploy its "**business plan"** at all levels in order to ensure a coordinated, efficient and cost-effective approach to all its streams of activities. A clear communication strategy to all Stakeholders would be a key enabler.

The following sections of the document describe:

(a) the value added of the Network Manager in support to the activities of Member States, Functional Airspace Blocks, Air Navigation Service Providers, Airports and Civil and Military airspace users towards the achievement of capacity and environment targets, and the contribution of the network functions towards the achievement of the Union-wide performance targets;

(b) the performance targets for the Network Manager and for each network function, along with the measures aimed at achieving those targets.

This NPP is the "commitment" that ensures NM will deliver on the Single European Sky (SES) policies and Member States' expectations.

Table of Contents

1. INTRODUCTION

1.1. Description of the situation, including scope of the Network Performance Plan, network functions covered, roles and responsibilities and other general information relevant to the plan.

This document contains the Network Performance Plan (NPP) for Reference Period 3 (RP3) 2020-2024, in compliance with the Performance and Charging Scheme Implementing Regulation (Performance IR) 2019/317[5] and the Network Function Implementation Regulation 2019/123, hereafter NF IR 2019/123[6]. The NPP was developed in accordance with the template in Annex III of the Performance IR 2019/317.

This performance plan for the Network Manager (NM) contains performance targets for all relevant key performance areas and key performance indicators in Annex I, Section 3 of the Performance IR 2019/317, consistent with the Union-wide performance targets.

For practical purposes, the network management functions apply to EU Member States, EUROCONTROL States and third parties with bilateral agreements with NM[7], referenced throughout the document as the NM area. The scope of the targets and objectives defined in NPP is consistent with this pan-European approach.

The NM targets are fully compliant with Performance IR 2019/317and the targets defined in the Article 1-3 of the Decision 2021/891/EU[8] for the EU Member States plus Norway and Switzerland, referenced throughout the document as the SES area. The targets in Decision 2021/891 were revised following the COVID-19 pandemic to take into account the resulting significantly changed circumstances for air transport.

NM has defined a number of additional performance indicators to monitor, analyse and take corrective actions in regard of the NM and network performance, see Appendix II.

The Network Manager is a key component of the Single European Sky (SES) together with the performance framework and Functional Airspace Blocks (FAB). NM is the EC tool to implement SES in a pan-European dimension and deliver performance in partnership with all operational stakeholders.

EUROCONTROL, through its Network Management Directorate has been designated to execute NM functions as per scope, role, responsibilities, obligations, working arrangements, oversight arrangements defined in the NF IR 2019/123. NPP reflects the roles and responsibilities entrusted to NM by the NF IR 2019/123.

Performance IR 2019/317 defines in Annex I the key performance indicators (KPIs) and indicators for monitoring at different levels. In RP3 there are KPIs defined both at Union-wide

[5] Commission Implementing Regulation (EU) 2019/317 of 11 February 2019 laying down a performance and charging scheme in the single European sky and repealing Implementing Regulations (EU) No 390/2013 and (EU) No 391/2013

[6] Commission Implementing Regulation (EU) 2019/123 of 24 January 2019 laying down detailed rules for the implementation of air traffic management (ATM) network functions and repealing Commission Regulation (EU) No 677/2011

[7] EU Member States: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom of Great Britain and Northern Ireland until 31 December 2020; EUROCONTROL Member States not members of EU: Albania, Armenia, Bosnia and Herzegovina, Georgia, Moldova, Monaco, Montenegro, Norway, Serbia, Switzerland, North Macedonia, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland as of 01 January 2021; EUROCONTROL Comprehensive Agreement States: Morocco and Israel

[8] COMMISSION IMPLEMENTING DECISION (EU) 2021/891of 2 June 2021 setting revised Union-wide performance targets for the air traffic management network for the third reference period (2020-2024) and repealing Implementing Decision (EU) 2019/903;

level (Section 1) and for the network functions (Section 3). Not all the Union-wide KPIs are directly applicable to network functions.

The NPP sets targets and defines measures for the network functions KPIs. The NM will monitor all the indicators and take remedial actions when targets are not being met.

NM has been on the front line in supporting all operational stakeholders during the COVID-10 crisis and its recovery phase. This can be summarised as follows (including both past and future actions):

- EACCC Support
- Compendium of daily COVID restrictions through a daily NOTAM summary
- 1200 RAD measures suspension
- RAD restructuring as from Spring 2022
- Business Continuity NOP (14 editions March-April 2020)
- Weekly NOP Recovery Plan (24 editions April – October 2020)
- Weekly Rolling Seasonal NOP (as from October 2020, 47 editions until 1 October 2021, to be continued UFN with an expansion of the traffic and capacity outlook from 6 to 8 weeks as from Spring 2022)
- Flight Efficiency Task Force (dealing with flight efficiency improvements for airspace users and Computer Flight Plan Service providers) continuing post COVID
- Initiation of the Airspace Restructuring and Operational Excellence Programmes to be implemented over RP3 and beyond
- Initiation of the iNM project to be implemented over RP3 and beyond
- Re-organisation of the working arrangements with strong and full engagement of all the operational stakeholders.

The unprecedented COVID-19 crisis has affected the entire aviation industry from airlines and airports to Air Navigation Service Providers (ANSPs) and the entire supply chain. One of the principal strands of the Network Manager's DNA is to coordinate the network response in a crisis. The COVID-19 pandemic had certainly tested that to the full. NM, in partnership with all stakeholders, and with the support of the European Aviation Crisis Coordination Cell (EACCC), has coordinated the network response to the COVID-19 crisis. It has developed crisis response measures in line with the provisions in Chapter IV of the NFIR 2019/123.

NM's experience of close cooperation with operational stakeholders in operational and technical matters, and with Member States in the field of crisis management, proved invaluable. It provided robust foundations for a number of processes in support of the crucial flights still operating, as well as for network recovery.

The level of maturity of the Network Operations Plan (NOP) achieved over the years of Cooperative Decision Making (CDM) has made it suitable to become, with a few relevant adaptions, the main instrument to support a coordinated network and its recovery.

NM consolidated the COVID-19 restrictions published by Member States through Notice to Airmen (NOTAMs). The NM ensured close cooperation with operational stakeholders via the weekly Network Directors of Operations Forum (NDOP) Ad-hoc Coordination Cell teleconferences.

The NM also took the initiative to develop a weekly editions of the European Network Operations Plan (NOP) – 2020 Recovery Plan. This Plan was a special version of the NOP,

developed to provide a coordinated response to the COVID-19 crisis. The plan has been monitored and further developed on a weekly basis via the regular NOP 2020 Recovery Coordination Cell teleconferences. It also included a safety argument and a list of potential hazards/safety problems in order to help ANSPs plan and execute a safe and resilient return to normal operations.

As from October 2020, NM started the production of the European Network Operations Plan (NOP) – Rolling Seasonal Plan, as from 23 October 2020, which would initially cover a period of six weeks and be based on similar inputs to those for the NOP Recovery Plan and will continue in the longer term to address short-term network actions. NM will expand the outlook of the Rolling Seasonal NOP from 6 weeks to 8 weeks as from Spring 2022 to enable a better adaptation of the capacity available to the traffic demand.

Summer traffic re-orientation plans were cancelled. NM, together with the operational stakeholders, relaxed up to 1,200 Route Availability Document (RAD) measures. This generated distance flown and fuel savings amounting to daily savings of 520 tons of CO2. And the current relaxations of RAD measures was extended and the need for re-instating some of those will be further assessed taking into account environmental and decarbonisation drivers. NM has prepared a European Route Network Improvement Plan – ARN Version 2021-2030 to cover all the short, medium and long term airspace structures evolutions in support of an efficient and environmentally responsive airspace design and utilisation in Europe. The RAD will be entirely re-structured as from Spring 2022 and RAD network impact assessments will be gradually introduced at the same time. All this will contribute to the Green Deal initiative of the European Commission, the decarbonisation of aviation in Europe and will contribute to maintaining the low levels achieved in 2020 and 2021 for the KEA indicator.

NM will work closely with all the operational stakeholders to ensure a smooth recovery following the COVID-19 crisis to support European aviation by facilitating the achievement of the Union-wide targets in an effective manner and with more focus on network interests. The high level strategic areas addressed are summarised in the figure below.

In the **Safety** area the NM will use the latest standards and best practices developed by the NM in cooperation with its stakeholders, like Standard of safety management system (SMS) Excellence, in the implementation of its own SMS, to achieve not only the target but the highest possible maturity for each safety management objective.

The main strategic projects for the achievement of the RP3 **route network design and flight efficiency** target are the full implementation of Free Route Airspace (including cross-border FRA) and of the Advanced Flexible Use of Airspace (A-FUA). They are a catalyst for

optimising airspace configuration and design, in line with the proposals in the Airspace Architecture Study.

ATFCM processes will evolve to support the management of complete traffic flow in the network context and in a collaborative manner. RP3 will see the transition to a flow-centric ATFM approach, whereby the flights are considered within a flow and network context rather than as segmented portions of its trajectory. NM will continue to bring its direct contribution to the reduction of ATFM delays through the NM delay savings actions.

NM intends to keep its cost aligned with the requirements of the SES performance scheme established for RP3, as revised following the impact of the COVID-19 pandemic. NM will continue to present a transparent work programme and budget to the operational stakeholders in the NMB. For the provision of common network support services, NM will duly justify their development and execution, supported by cost-benefit analyses.

In addition, NM will support the ANSPs and Member States to implement the Union-wide targets (as detailed in chapter 2 of NPP). NM will use the Union-wide targets to perform an impact assessment on the national targets included in the local performance plans. NM will propose further remedial measures through the Network Operations Plan (NOP) and European Network Improvement Plan (ERNIP) to achieve the Union-wide targets. The Union-wide KPIs are monitored and the yearly updates of the NOP will address the identified gaps between results and targets.

The implementation of the NPP and the NM support to the implementation of the Union-wide targets will help tackle the limits to growth in the air and on the ground by reducing capacity constraints and improving efficiency and connectivity, in line with the Aviation Strategy for Europe. The chapter 3 of the Network Strategy Plan gives an overview of how NM and the wider European ATM network will contribute to the implementation of the European Aviation Strategy.

The Network Performance Plan sets out:

(a) the value added of the Network Manager in support to the activities of Member States, functional airspace blocks, air navigation service providers and civil and military airspace users towards achieving capacity and environment targets, as well as the contribution of the network functions towards achieving the Union-wide performance targets;

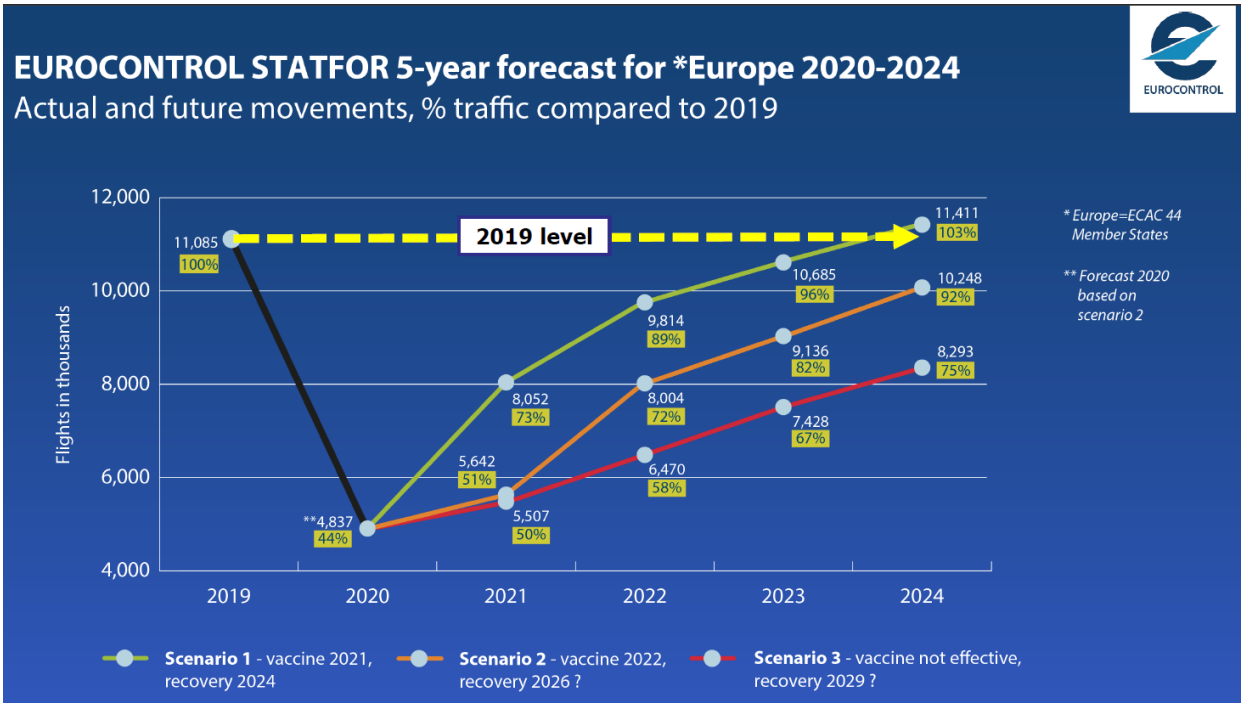
(b) the performance targets and objectives for the Network Manager and for each network function and the measures aimed at achieving those targets

1.2. Description of the traffic forecast and macroeconomic scenario underpinning the Network Performance Plan.

Traffic assumptions in the NPP

The outbreak of the COVID-19 pandemic has led, since mid-March 2020, to a significant drop in air traffic, due to the measures taken by the Member States and third countries to contain the pandemic. Whilst air transport continued to be heavily impacted by the COVID-19 crisis since then, the sector is expected to gradually recover in the course of RP3. However, substantial uncertainty remains as to the pace and intensity of the recovery which are contingent on the evolution of the sanitary and economic situation in the Union and the rest of the world.

The NPP takes into account the EUROCONTROL STATFOR en route traffic forecast of 4 November 2020. The middle scenario or 'Scenario 2'is regarded as the 'STATFOR base forecast', which foresees a traffic recovery to 2019 level in 2025.



The forecast assumes that continued transport connectivity will be ensured after withdrawal of UK from the European Union. The economic recovery remains fragile and a further deterioration of the economic situation (e.g. financial crisis) is a downside risk.

Economic context and network forecast

Air transport has long seen cycles of growth driven by world-wide economic expansion. Historically, this generated an average annual flight growth of 3-4 percent. There were also periods of economic crisis that lead to a traffic decline. To ensure predictability of the overall network performance, it is important that planning assumptions still consider the most demanding scenarios, depending on geographical areas, to accommodate all possible volatility in the traffic demand arising from economic evolutions or political impacts.

For the period 2021-2025, the forecast will continue to be driven by the impact of the COVID-19 pandemic, namely the public health restrictions and the effectiveness of the vaccine against

new virus variants. The economic recovery will therefore remain fragile. The lingering reduction in demand for business travelers (e.g. increased uptake of video conference instead of face-to-face meetings) could push the recovery to 2019 traffic level beyond 2025.

Worldwide evolution and long-term trends

The evolution of the COVID-19 pandemic in the rest of the world will influence the RP3 evolution of the traffic from outside Europe. The measures taken at European level with respect to the acceptance of third countries citizens based on vaccination level will increase the level of visitors to Europe and, consequently, the number of long and medium haul flights. The combination of such measures would provide a potential boost to the recovery. In the same time the pandemic will continue to affect parts of the world in the coming years, which will limit the extent of traffic levels normalization in RP3.

A long-term trend feature will be the implementation of a number of key environmental policies such as the EU Green deal, the smart and sustainable transport policy.

Post-pandemic, the faster long-term growth from outside Europe means that there will be a gradual shift in the composition of European traffic, with an increasing proportion of flights to and from Russia, the Middle East and Asia as compared to intra-European and North Atlantic (NAT) traffic. In view of the current geographical distribution of traffic in Europe, this factor is not expected to have a major impact on European traffic patterns, bearing in mind that intra-European flights will continue to represent around 3/4 of the total traffic at network level.

1.3. Description of the consistency of the Network Performance Plan with the Network Strategy Plan.

The following correspondence has been established between the Network Strategic Objectives in the Network Strategy Plan [4] and their contribution to the performance Key Performance Areas, as defined in the Performance IR 2019/317. The contribution of Network Strategic Objectives (SO) to the Key Performance Areas is illustrated as follows: ‘X’ is used to show a contribution and ‘XX’ is used to show a significant contribution.

	Capacity	Environment	Safety	Cost-efficiency
SO 1: Manage network performance through ‘Network-minded’ decision-making	X	X	X	X
SO 2: Deploy and integrate interoperable and secure information management systems	X	X	X	XX
SO 3: Optimise Network design	XX	XX	X	XX
SO 4: Optimise Network operations	XX	XX	X	X
SO 5: Develop European connectivity and airport services	X	X		X
SO 6: Ensure network safety and security and reinforce crisis management	XX		XX	X
SO 7: Optimise ATM/CNS infrastructure and services to support evolutions towards more efficient network operations and services	X	X	X	XX
SO 8: Develop the network human capital and improve its flexibility through excellence	XX	X	X	XX
SO 9: Improve environmental sustainability	X	XX		X
SO 10: Support European aviation at global markets	X	X	X	X

The NSP operational drivers and the strategic objectives have a direct and/or indirect impact on the key performance areas of the performance scheme. The table below gives an overview of the relationship between SOs and the key performance indicators (KPIs) and indicators for monitoring (PIM) of the performance of the Network Manager and of the network functions (reference to EU-wide indicators is also made when relevant). Details on the definition of various indicators are to be found under the sections referenced in the last column of the table.

NSP Strategic Objective	KPI and indicators for monitoring (PIM) of the performance of the Network Manager and of the network functions	NPP section reference
SO 1: Manage network performance through 'Network-minded' decision-making	Monitoring of all KPIs and subsequent performance analysis and corrective actions	Chapters 3 and 4
SO 2: Deploy and integrate interoperable and secure information management systems	Network Functions related indicators for monitoring	3.3
SO3: Optimise Network design	All environment KPI (KEP, KEA) and indicators for monitoring Conditional Route (CDR) planning and usage, but also other indicators as DES,SCR	2.2, 3.3.1, 4.1
SO4: Optimise Network operations	Improve predictability and reduce volatility: en-route capacity indicators for monitoing and flight efficiency indicators, both KPI (KEP,KEA) and PIM (SCR). PIM Over-deliveries reduction (OVD)	2.3, 2.4,2.5,2.6, 3.3 3.1.3
SO 5: Develop European connectivity and airport services	Better predictability for departing aircraft will have a positive influence on all capacity indicators. Better flight plan / airport slot consistency will make better use of the available airport capacity.	2.1,2.5,3.3.2
SO 6: Ensure network safety and security and reinforce crisis management	EoSM KPI, reduction of over-deliveries, as well as the top 5 safety priorities in the network Support to ANSP for achieving their safety KPIs and PIMs	3.3.3
SO 7: Optimise ATM/CNS infrastructure and services to support evolutions towards more efficient network operations and services	All Radio Frequency Function (RFF) and Transponder Code Function (TCF) functions indicators	2.7,3.1
SO 8: Develop the network human capital and improve its flexibility through excellence	Improve capacity and reduce delay	3.3.2
SO 9: Improve environmental sustainability	All Flight Efficiency indicators	2.2, 3.3.1
SO 10: Support European aviation at global level	Improved integration will increase predictability for traffic coming from outside NM and as such release additional capacity.	3.3.2

1.4. Description of the outcome of the stakeholder consultation on the draft Network Performance Plan, including the points of agreement and disagreement as well as the reasons for any such disagreement, and description of the outcome of the consultation of the Network Management Board.

Consultation before the beginning of RP3

NM consulted NPP with Network Directors of Operations (NDOP) and Network Management Board (NMB) members in June and July 2019. A first round of consultation was conducted with European Commission and Performance Review Body in September 2019.

The results of the consultation process is detailed in the Common Response Document (CRD). Most of the comments were either incorporated in the document or clarification on the points raised was given. No major disagreement was found during the consultation.

The Staff Associations in EUROCONTROL were also consulted in September 2019 and no significant issues were raised.

NMB endorsed the 2019 version of the NPP in September 2019

Consultation planned for updated version of NPP

Consultation with PRB and EC in June/July 2021.

Circulation to NDOP/NDTECH for comments until end July.

Consultation of NM social partners - August 2021.

Distribution to NMB requesting for early comments in second half of August.

Ad-hoc NMB on Budget and Work Programme – mid-September

Draft NPP endorsement (including the cost-effectiveness part in parallel with the budget endorsement)

30 September 2021 - submission of NPP to EC.

2. NETWORK MANAGER'S VALUE ADDED

This chapter details the NM improvement actions and added value from operations and services, as well as specific improvements and short to medium term evolutions to provide direct benefit and effective support to the tasks and activities of Member States, functional airspace blocks, air navigation service providers, airports, civil and military airspace users.

The actions, programmes and plans agreed with the operational stakeholders will help in accelerating the decarbonisation of the European ATM network and the delivery of additional capacity. The benefits estimated for the end of the decade are:

- approximately 1000 million NMs, i.e. the equivalent of 6 million tons of fuel saved, or reduced emissions of 20 million tons; this represents a reduction by 2% of the European average route flown resulting from airspace design improvements;
- up to 20% reduction of ATFM delays resulting from direct and indirect actions of NM representing more than 10 million minutes of delay.

The following initiatives are mapped against enhancements for the Environment key performance area:

- Development and implementation of the airspace changes included in the ERNIP Part 2 – ARN version 2021-2030 (including FRA and FUA evolutions)
- RAD re-organisation measures;
- Increased cooperation with the Computer Flight Plan Service Providers (CFSPs)on the evolution of their own systems based on the guidelines material published by NM;
- Implementation of the actions agreed as part of the NM Flight Efficiency Task Force
- Implementation of the Free Route Airspace Network Strategic programme
- Implementation of the Airport and TMA Network Integration Network Strategic Programme
- Implementation of the ASM and A-FUA Network Strategic Programme
- Implementation of other initiatives, e.g. CCO/CDO and PBN
- All those initiatives are described in detail in the sections 2.2, 2.3, 2.4 and in the sections below. More details are also available through the ERNIP Part 2 – ARN version 2021-2030, ERNIP Part 3 – ASM procedures and ERNIP Part 4 – RAD User Manual.

The following initiatives are mapped against enhancements for the Capacity key performance area:

- Implementation of the Cooperative Traffic Management Network Strategic Programme
- Implementation of the FF-ICE Initial Trajectory Information Sharing Network Strategic Programme
- Implementation of the Airport and TMA Network Integration Network Strategic Programme
- Implementation of new Network Operations Plan processes, notably the availability of a 8 weeks outlook weekly Rolling Seasonal NOP

- Re-enforcement of ATFM strategic, pre-tactical and tactical planning processes
- Network CDM processes for en-route weather
- Network ATFM measures to maximise utilisation of available capacity
- Network CDM process to optimise ATFM regulations,
- Re-enforcement of post operational analysis processes and feed-back loop into the planning processes

2.1. Elaboration and harmonisation of network and regional operational concepts;

The achievement of a true pan-European partnership approach is one of the key strategic NSP objectives for the NM and the principal stakeholders. It requires a network operation concept that delivers safe operations, reduce existing operational constraints to airspace users by using the latest technical development and support its ANSPs, airspace users and airport operators in meeting their objectives.

Following the first editions of the High Level Network Operational Framework 2019 published in 2015 and 2019, a new edition of the High Level Network Operational Framework was developed in 2020 and approved by the Network Management Board [5], describing the high level operational target of the activities towards implementation of the NSP 2020-2029. The operational concept was based on seamless and flexible airspace, which allows free routing in upper airspace, with organised traffic flows into/out of major TMAs and airports, more efficient infrastructure and harmonised data exchange at planning and tactical levels. The Network Operation Concept will further evolve to meet the strategic objectives of the NSP for RP3 and RP4.

Over the last years NM developed, promoted and implemented, together with the operational stakeholders, a number of advanced operational concepts and solutions able to further support the operational performance evolutions, the environmental performance and the decarbonisation of the European ATM network:

- **Free Route Airspace** – covering one of the most forward looking concepts in airspace design
- **Airport and TMA Network Integration** – covering Airport CDM and AOP/NOP integration
- **Cooperative Traffic Management** – aiming at the implementation of innovative solutions that optimise traffic delivery through a cooperative approach
- **FF-ICE Initial Trajectory Information Sharing** – covering the process for the submission, dissemination and use of flight data within the future ATM System and so acts as an enabler for many of the requirements identified by the Global ATM Operational Concept, namely trajectory based operations
- **Airspace Management and Advanced Flexible Use of Airspace (A-FUA)**

NM defined the next steps envisaged over the next 5-10 years to address the interdependencies between various network and regional operational concepts and to facilitate the introduction of new operational concepts. The implementation of these concepts requires transversal evolutions of the Air Traffic Flow and Capacity Management (ATFCM) and of the flight planning processes to address their interdependencies between those concepts. The overall and aggregated outcome will reinforce the network capabilities and will increase the

further integration and operational performance of the European ATM Network. This will be achieved through the network CDM processes.

The planned evolutions require changes on the NM Service Architecture, Human Machine Interface, B2B services and data exchange between the Network Manager and the different stakeholders.

The changes planned to be implemented during RP3 and RP4 will impact several areas of the operational concepts evolutions. Their description and implementation roadmap are described in the High Level Network Operational Framework 2020-2029

Strategic, Pre-tactical and Tactical Measures and Monitoring

a) Restrictions and Traffic Volumes will be merged into a single model (supporting 4D trajectories developments, accommodating the associated improvements of FRA and CTM programmes)

b) Advanced and dynamic flows in support of DCB by integrating additional information in the definition of the ATFCM measures (Communication, Navigation & Surveillance (CNS) conditions, dynamic components of the flights)

c) Traffic Counts Model enhancement to provide a better connection between the traffic counts and the controller's workload as evaluated at local and network level.

d) Computer Assisted Slot Allocation evolution - to accommodate the different count models, depending on the use of entry and/or occupancy counts, the necessity to integrate simultaneous capacity constraints on the same airspace and the reconciliation of the different network constraints.

e) Dynamic Sectorisation enabling cross-border developments (FRA, sector configuration)

Consolidated flight view and flight status

Through FF-ICE, NM will implement an enhancement in the organization of the flight view and the status (reflecting flight's lifecycle) to reinforce alignment amongst flight planning and ATFCM and increase operational awareness to actors involved in flight planning and ATFM procedures.

This will help the further integration (not centralisation) of the NM systems and those of the stakeholders (via B2B). In time, it will reduce maintenance costs and discrepancies among the systems, which increase the cost of system evolutions at both local and network level. Moreover, Aircraft Operators (AOs) and Computerised Flight plan Service Providers (CFSPs) will have one consolidated view of the status of the flight, regardless of which system is involved, thus the NM will offer a sole clear and coherent interface.

Coherent Enhancement and integration of flight planning, flow management and Airport Collaborative Decision Making (A-CDM)

NM will further improve flight planning and ATFCM by moving from a trajectory based on the latest known estimated off-block time (EOBT) to an enhanced trajectory that includes runway configuration changes, meteorological updates, SID or taxi time changes and A-CDM Departure Information updates. These enhancements will include:

a) Alignment of Integrated Initial Flight Plan Processing System (IFPS) original trajectory and estimated Enhanced Technical Flow Management Service (ETFMS) trajectory (FTFM / Filed Traffic Flight Model).

b) Enhancement on the flight planning processing of out of area traffic, traffic with special status and traffic close to EOBT by improving the current flight advisory information.

c) Enhancement on the flow management of out of area traffic affected by exceptional regulations, by distributing to individual flights the advisory information.

d) IFPS re-validation process and flights departing from CDM airports and Advanced ATC TWR airports

e) Enhance ETFMS/ Computer-Assisted Slot Allocation (CASA) behaviour to allow integration with IFPS, ATFCM and A-CDM constraints.

Airspace Data Scalability

The implementation of FRA, A-FUA and Performance Based Navigation (PBN) will require further evolutions on the airspace data structure and scalability through transversal standardization and simplification. NM will reduce the complexity of the data and of the associated rules allowing for a better categorisation of the environment entities. This will drastically reduce the number of restrictions used to accommodate the traffic during flight planning negotiation.

The improvements will address the *efficiency* – standardizing and simplifying the data model and the rules associated, *performance improvement* – the standardization and simplification of data and derived, common metrics and performance measurement, *management and support* – data standardization eliminates the need for specialized skills, resources and investments.

Evolution on Network Support Systems

a) *Rerouting tools* support all ATFCM phases: creation and impact analysis of ATFCM measures, improve the demand generated during pre-tactical activities, provide alternatives to aircraft operators to avoid regulated or closed areas, and support the creation of STAM measures.

b) Network Impact Assessment and Simulation Tools supporting all operational stakeholders to take decisions based on both the local and network impact, in the process actors minimising ATFM delays and optimising the use of network capacity.

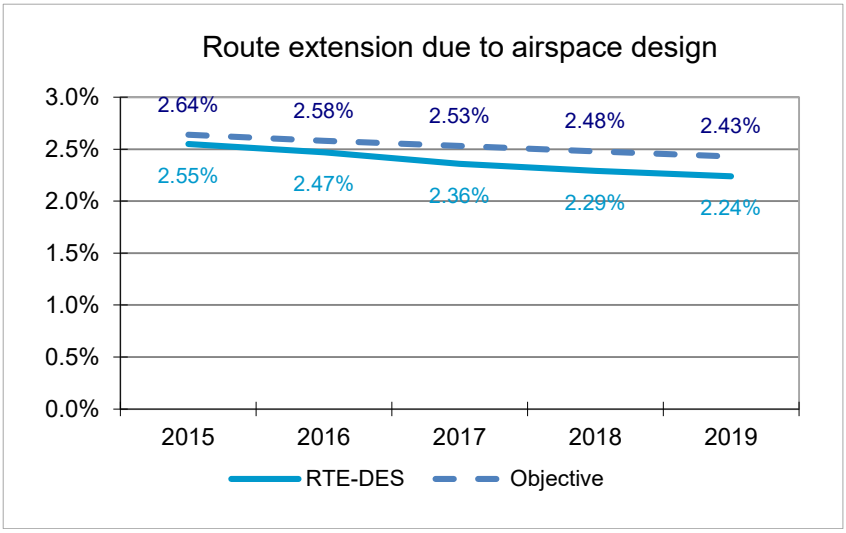
Exchange of seamless and up to date flight and ATFM Data

While the previous areas of improvement imply changes or modifications in data models or services integration, this area of improvement emphasizes the need to keep the network updated with the most relevant information concerning flight plan/trajectory management and ATFCM. This will involve flight plan updates, ATC configurations, sector capacities, and flight and airborne updates. The NM has put in place processes that support the validation activities and the operational deployment of such exchange of information from/to local tools. The NM encourages stakeholders to continue enriching the network view for the interest of local and network actors.

Airspace structure continued to evolve as it meets the needs of both civil and military users, drawing on an advanced flexible use of airspace concept to reconcile these needs. Network operations was integrated through cooperative traffic management, optimising traffic delivery to sectors and airports through allocation of entry/exit times for airspace and airports.

2.2. Development and harmonisation of airspace projects based on network priorities including cross-border airspace design initiatives;

The implementation of the European Network Improvement Plan (ERNIP) was successful in RP2. The implementation of approximately 1000 packages of airspace improvements over RP2 was instrumental in reaching the objectives as captured in the airspace design indicator RTE-DES. By the end of 2017, NM already met the objective for the entire RP2.



As confirmed by the Annex I of the new NF IR 2019/123, ERNIP will continue to provide the framework for the development and harmonisation of airspace projects during RP3, based on the agreed CDM processes.

As the low value of the airspace design indicator shows, there is not a lot of space left to improve the airspace design, especially at local level. This is why NM will prioritise cross-border initiatives, notably for the Free Route (FRA) implementation. Free Route Airspace covers both airspace design and airspace utilisation, allowing airspace users to freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) way points, without reference to the ATS route network, subject to airspace availability.

NM will tackle sustainable flight operations. NM will focus on improving fuel burn to address emissions (CO2) and contribute to the de-carbonisation of air travel. NM will develop tools to monitor and take improvement actions on the un-environmental flight operations. NM will work with operational partners to improve the network's influence on fuel burn.

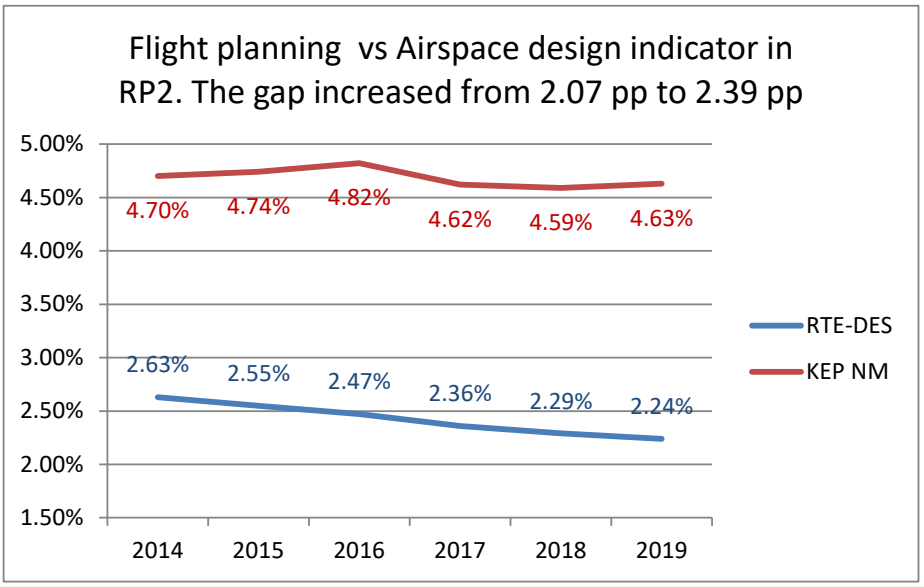
In **RP3** NM will continue to support **the full implementation of Free Route Airspace** and Performance Based Navigation (PBN), considering a network-minded approach to airspace availability and utilisation in order to meet the required operational performance targets. Seamless airspace structures will be required to enable progress with the overall operational performance and with addressing both civil and military airspace users' requirements.

NM will support the implementation of FRA and PBN by improving the airspace data structure. The inclusion of the conditions of usage (FRA environment, PBN equipped) in the airspace entity itself will be supported by a better categorisation of the environment entities such significant points, Standard Arrival Routes (STAR), Standard Instrumental Departures (SID). This will drastically reduce the number of restrictions used to accommodate the traffic during flight planning negotiation.

The implementation of the airspace and route design projects will contribute to the improvement of the design indicator and the KEP with 0.25 pp over RP3 (see 3.3.1.2 for more details).

2.3. Reducing inefficient use of route network and available airspace;

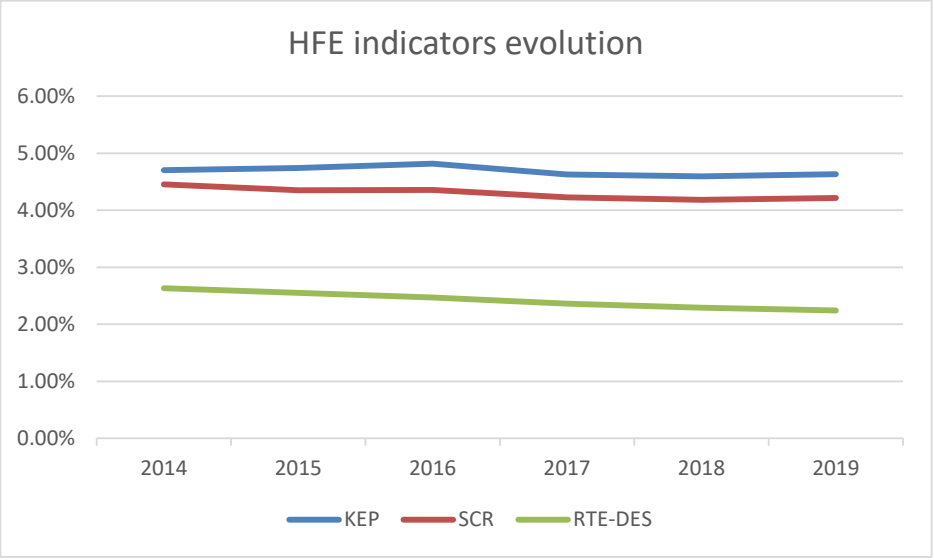
There is little point in improving the airspace design if its utilisation is poor. While the airspace design indicator improved continuously during RP2, the flight planning and actual trajectory indicators were less successful, widening the gap between what the airspace design has to offer and what the airspace users were able to use (ATC and airspace restrictions) and what they actually used in flight planning (difference in route charges, awareness of the optimum route).



The evolution of the last filed flight plan indicator KEP had an uneven evolution during RP2.

This is explained by:

- restrictions due to crisis situations, industrial action and capacity constrains (which makes the difference between RTE-DES and SCR in the graph below)
- the insufficient utilisation of the available airspace structures due to flight planning systems limitations (which makes the difference between SCR and KEP in the graph below).



SCR stands for the Shortest Constraint Route and considers restrictions published in the RAD and the status of conditional routes at the time of the last filed flight plan. SCR is calculated by the path-finding algorithm of the NM system and represents the shortest route available at that time, route that can be filed with the flight planning system. In RP3 this will be a new EU-wide performance indicator for monitoring.

The restrictions above also impacted negatively the actual trajectory indicator KEA. They were compensated by the improvements in the airspace structures and procedures enabled by the implementation of Free Route Airspace.

While approximately 1200 restrictions have been suspended during the COVID crisis, the need to re-introduce some of them needs to be further addressed. This will be done through the new RAD structure that was approved through the Network CDM process and will be implemented as from May 2022.

Free Route Airspace and cross-border FRA will continue to be the main drivers towards the improvement in FE indicators in RP3. NM will fully support the ANSPs and FABs in the deployment of cross-border free route airspace and in further optimising the actual flights to meet the average horizontal en route flight efficiency of the actual trajectory (KEA) indicator.

The NM Flight Efficiency (FE) Initiative already started several actions in RP2, which will be further developed in RP3.

NM will continue to work with the Computer Flight Plan Service Providers and the Aircraft Operators to ensure that the systems used for flight planning take fully into consideration the opportunities offered by the network. In addition, NM will engage in direct actions with the Computer Flight Plan Service providers and the Aircraft Operators to ensure that mandatory functionalities related to Free Route Airspace, Flexible Use of Airspace, dynamic RAD, utilization of the options provided by the NM systems (e.g. GRRT) become available as standard functionalities as they form part of the package of European airspace structures and utilization rules.

The achievement of the performance target in the last filed flight plan requires cooperation between the users and the computer flight plan service providers. Airspace users need the appropriate tools and assistance to enable achievement of this objective. NM produced Guidance Material for the Computer Flight Plan Service Providers [6] to support further improvements of the flight planning systems.

NM supports the airlines to improve their flight planning. The group re-routing tool (GRRT) will continue to provide better opportunity not only for refiling shorter and more efficient routes but also to allow airlines to identify possible inefficiencies in their flight planning system. The Re-Routing Proposals (RRPs) for flight efficiency will be provided to the airlines that opt-in for this service.

NM will work with the interested parties to simplify and reduce the RAD restrictions. More details under 3.3.1.2.1.

The utilisation of the route network requires a better management of ATC restrictions. The flight restriction model and the traffic volume model will be merged into a single model thus allowing the improvement of the operational processes followed by NM, ANSP, AO and CFSP stakeholders in all ATFCM phases.

The optimisation of the use of the available route options will contribute to up to 0.34 pp to the improvement of KEP over RP3 (see 3.3.1.2 for more details).

2.4. Development of enhanced airspace management and air traffic flow and capacity management processes;

The following paragraphs describe the NM added value in the areas of airspace management and air traffic flow and capacity management. The operational procedures related to those evolutions as well as the required NM system support are planned for gradual implementation over RP3. They are aligned with the requirements of the Common Projects IR 2013/409[9] and their full implementation is expected to contribute to the achievement of the Union-wide targets. Nevertheless, implementation by the operational stakeholders of their related actions remains key and this will be monitored through the Network Operations Plan and the European Route Network Improvement Plan that will also contain, whenever necessary, remedial local and network measures.

2.4.1 Airspace Management (ASM) and Advanced FUA evolution aims to improve existing ASM/ATFCM processes by putting more emphasis on the better utilisation of existing ASM processes, enhancing performance-driven ASM/ATFCM processes, introducing more dynamic and flexible ASM/ATFCM/ATS processes and providing for safe, efficient and accurate information/data flows.

NM will further develop operational procedures and NM system support for the ASM processes to improve the harmonisation of FUA application and to enhance FUA procedures towards a closer integration with the ATFCM procedures. This will be done at pre-tactical level through the AUP/UUP process up to the day of operation. Those will represent important evolutions during RP3 opening for more dynamicity in network management as from RP4.

NM will develop/update procedures, as part of the ASM Handbook, to identify the ASM scenarios associated to existing ATFCM re-routing scenarios. It will analyse the ASM impact on the most used ATFCM re-routing scenarios with the goal of having a more efficient utilisation of ATFCM scenarios. Those procedures will be enabled by evolutions of the NM systems.

The procedures and the related system support will look in both directions that will enable a better utilization of the airspace and capacity available:

- Trigger a CDM process to adapt Restricted Airspaces (RSAs) allocation for the alignment with ATFCM scenarios - getting benefits from the availability provided by the ASM process;
- Verify the possibility to take benefits from the allocation/updates of RSAs to facilitate the implementation of ATFCM scenarios - pro-active role, providing advices for the possible final RSAs allocation.

ASM and ATFCM will be brought closer by integrating in the ATFCM scenarios repository information of ASM airspace structures relevant for the ATFCM scenarios implementation (limited to ATFCM re-routing scenarios). NM will implement and publish new ATFCM scenarios on the NOP Portal, according to the updated availability of CDRs/areas and associated FUA/EU restrictions, including UUP updates.

Dynamic Airspace Management (DAM) implementation will establish processes exploiting the airspace in a dynamic manner as close as practical to the time of operations to better accommodate users' requirements in accordance with ever evolving network operations. The dynamic airspace structure planning will provide:

[9] COMMISSION IMPLEMENTING REGULATION (EU) No 409/2013 of 3 May 2013 on the definition of common projects, the establishment of governance and the identification of incentives supporting the implementation of the European Air Traffic Management Master Plan

- greater choice of routes by including route options supplemented by suitable alternatives as a function of modularity of airspace reservation or restriction;
- greater flexibility to respond to short notice military operational requirements for existing or additional portion of airspace;
- provision of proactive route activation/airspace reservation or restriction allocation through a CDM process to accommodate short-term changes in routeings and civil traffic demand in coordination with airspace reservation or restriction requests, adjusted to match the military training and operational profile.

Availability and use of the Conditional Routes

Flight efficiency requires a route network design that offers the most direct routing opportunities to airspace users and the active commitment of the users to fully exploit the available network. NM provides additional direct flight efficiency benefits via automated notification of opportunities for airspace users, to take advantage of the updated situation in the daily airspace use plan (AUP).

NM will work to improve the civil/military CDM processes in areas where military mission effectiveness is constrained or availability and effective usage of the CDR1/2 network is unnecessarily restricted.

Following the new airspace design developments in RP2, notably the implementation of FRA, NM has revised the definition of the indicators for monitoring rate of planning (RAI) and rate of usage (RAU) of conditional routes (CDR). The revised indicators are capturing better the airspace users' usage of all opportunities made available following the release of the reserved/segregated airspaces, as per paragraph 4.2 (f) and (g) in Section 3 of Annex I of Performance IR 2019/317.

The implementation of the ASM and Advanced FUA will contribute, together with RAD improvements and other similar initiatives, to the reduction of the gap between the horizontal flight efficiency indicators related to the shortest constraint route and the airspace design, with the objective of improving KEP with 0.31 pp over RP3 (see 3.3.1.2 for more details).

2.4.2 Development of Air Traffic Flow and Capacity Management (ATFCM) processes

NM will deploy over RP3 ATFCM processes to improve performance across the whole pan-European network. It will provide full support to its stakeholders, FABs, ANSPs, AOs, Airports and CFSPs, to achieve and improve their capacity performance, taking into account the network impact and bringing more agility in adapting the required capacity to the demand and in making a better use of the available capacity.

ATFCM processes will evolve to support the management of complete traffic flow in the network context and in a collaborative manner. RP3 will see the transition to a flow-centric ATFM approach, whereby the flights are considered within a flow and network context rather than as segmented portions of its trajectory.

This section summarises the main components of the ATFCM processes and their expected evolutions during RP3. The RP3 evolution is strongly related to the projects and transversal actions described in section 2.1.

A detailed description of the steps to be implemented over RP3 is included in the High Level Network Operational Framework 2020-2029 and in the Cooperative Traffic Management implementation roadmap presented and agreed by NDOP and NDTECH. They are aligned with the requirements of the Common Projects IR 2013/409 and their full implementation is expected to contribute to the achievement of the Union-wide targets.

Nevertheless, implementation by the operational stakeholders of their related actions remains key and this will be monitored through the Network Operations Plan and the European Route Network Improvement Plan that will also contain, whenever necessary, remedial local and network measures

The **Network Operations Plan (NOP)** is and will continue to be the basis for a recognised capacity planning process that identifies actions and activities at local and European network level needed to improve capacity. A number of measures addressing the causes of constraints are proposed as the basis of an action plan at ANSP, FAB and network level, aimed at delivering the required performance.

Severe capacity and staffing constraints require novel ways to address them. It was certainly the case in 2018 and 2019. The response is to address the issues at the network and regional level through coordinated initiatives involving multi-disciplinary approach while at the same time use the new instruments put in place during the COVID crisis, in particular the Weekly Seasonal Rolling NOP. These will continue to be used as major enablers in managing the delivery of capacity and environmental/flight efficiency operational improvements, through:

- Provision of weekly updates of the 6-8 weeks traffic outlook;
- Detailed evaluation of the 6-8 weeks opening schemes and supporting sector configurations to enable early identification of capacity constraints;
- Elaboration of agreed measures (adaptation of the sector opening schemes and configurations, application of scenarios, re-routing proposals, etc) to address identified imbalances between demand and the capacity planned to be offered;
- Weekly monitoring of the implementation of the agreed measures

Further initiatives provide for:

- network-orientated traffic re-routing measures,
- specific sector opening schemes and rostering,
- CDM Process for management of en-route weather,
- harmonization of FUA application and enhanced FUA procedures,
- network CDM process to optimise ATFM regulations,
- addressing structural airspace bottlenecks,
- ANSPs to work with social partners to avoid strikes or to provide improved notification to airlines and NM.

This approach will continue to be deployed during RP3.

The NM will adapt the planning process to respond to the Report on the Future of the SES [7]. NM will define the capacity requirements to satisfy demand across the network based on the traffic forecast and the local and network performance targets, in close cooperation with the ANSPs and airspace users. In addition, the NOPs will contain an impact assessment once the local en-route ATFM delay targets have been approved by the European Commission as part of the local Performance Plans. The impact assessment will reflect how those local targets impact on the achievement of the Union-wide targets.

The new initiatives planned to be implemented through the **Cooperative Traffic Management (CTM)** (based on the roadmap agreed by NDOP and NDTECH) address the interface between ATFCM and tactical capacity management and intend to reduce the gap between planning and execution phases. NM will tackle a number of projects in RP3 to optimize the delivery of traffic through a cooperative approach between Network, ATC, Flight operations and Airports:

- Flight Plan Predictability: improve traffic predictability by improved adherence to the last filed flight plan, while recognizing the continued need for (managed) flexibility.
- The Short Term ATFCM Measures (STAM) based on occupancy counts (including mandatory cherry picking), to enable, in a harmonised way, the application of targeted ATFCM measures (coordinated throughout European airspace) on the day of operations.
- Target Times Operations aim to improve the delivery of traffic and to reduce the shortcomings of Calculated Take-Off Time (CTOT)

- Support to (extended) Arrival Sequencing to offer effective support to ATC's arrival sequencing processes
- User driven prioritisation to support Airspace Users to optimise departure sequences for flights affected by network constraints.

- Network Impact Assessment and Simulation Tools addressing the following improvements:
  - Create an advanced digital repository of Demand Capacity Balancing (DCB) measures
  - Create digital access to DCB measures impact assessment
  - Create automated mechanisms to detect the influence between coexisting local DCB measures
  - Create the mechanisms to ensure automated coordination between influencing local DCB measures candidates
  - Analyse the application of better network measures by integrating groups of connected local measures.

.

Airport and TMA integration in the network progressed during RP2. By the end of 2020 the Airport-CDM implementation, which facilitates the integration of major airports into the network and delivers more accurate departure time information (DPI), 30 airports achieved full implementation covering 38.5% of departures. In addition, 24 airports implemented Advanced Tower, which is a cost effective means of enabling smaller airports to become connected to the Network Manager Operations Centre (NMOC). Together they are covering 48% of departures in the NM area. NM will continue to support the A-CDM and Advanced Tower implementation by both extending the implementation to other airports and improve the use of DPI information in the ATFCM system and procedures. NM will monitor the A-CDM airport contribution to the improvement of network predictability.

European separation standard for aircraft wake turbulence (RECAT-EU) minima is fully operational now and will be an operational concepts whose implementation will continue to provide capacity at busy airports in the network. The NM will support its stakeholders to advance the full integration between the Airport Operations Plan (AOP) and NOP.

The section 2.1 above elaborates the changes NM initiated for the **evolution of the ATFCM processes and systems** aimed at addressing the interdependencies between different major projects that will deliver the performance improvements expected in RP3 and RP4. It will reinforce the Network capabilities and will increase the further integration and operational performance of the European ATM Network.

It involves the enhancement and integration of the flight planning, flow management and airport-CDM systems. It will support the move towards a consolidated flight view and flight status, moving to an enhanced trajectory rich in relevant operational information.

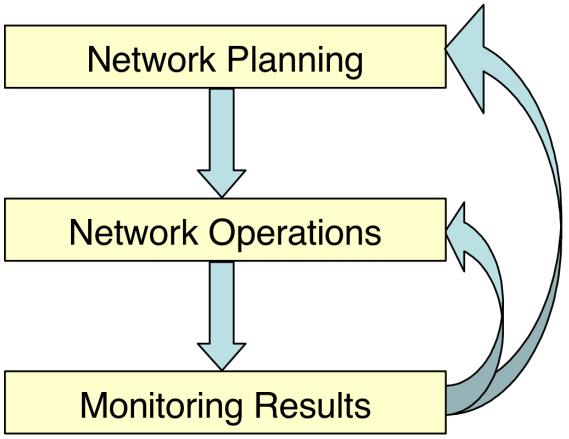
NM will continue to develop the **network tools to support stakeholders** in reducing delay and improve capacity while taking into account the network effect. The individual flight delay reduction or flight efficiency improvements will be supported by the NM re-routing tools, which include essential decision making factors such as ATFM delay, miles to fly, estimated flying time, as well as a combination of historical database and an optimization algorithm to find coherent alternatives from flight planning and network capacity perspective. The NM will further enhance these rerouting tools to address performance, usability, success rate of the alternatives found through vertical and horizontal rerouting improvements and expanding the operational intelligence of the historical database.

Collaboration for strategic flow projects, in case of major capacity crises like it was the case in 2018 and 2019 (NM/4ACC/11ANSPs or the eNM/ANSPs Summer 2019 measures) requires measures that shift the traffic to other areas and potentially generating ATFM delay

to these on-loading ACCs (while decreasing the overall network delay). It is expected that such drastic measures might not be required anymore as gradual capacity delivery is being addressed through the actions included in the weekly rolling Seasonal NOP. Nevertheless, if such cases will appear, the extra delays generated by the on-loaded ACCs, will be dealt with through the CDM process for ATFM delay attribution, which will be formally included in the already existing post-ops performance adjustment process. The impact on the route extension and on vertical flight efficiency will be also monitored. Such measures will be applied only if absolutely necessary. Full priority will be given to the early identification of such demand/capacity unbalancing situations to be able to address them without the need to significantly shift traffic flows.

2.5. Harmonised capacity planning and measurement of operational performance;

NM consolidates and coordinates the activities of the network to continuously improve network performance. NM's planning, operations and continuous monitoring activities are closely interconnected to ensure that network performance is achieved.



The development of the NOP, together with the implementation of cooperative decision making processes and improved information management will ensure better use of the capacity available on the network and improved management of both planned and unplanned events and constraints. The preparation of the NOP is done in the framework of the Cooperative Decision Making (CDM) Processes of the Network Manager, as endorsed by the Network Management Board following the positive opinion of the Single Sky Committee.

The seasonal part (summer/winter) of the Network Operations Plan is hosted on the NM's Network Operations Portal. A seasonal part of the Network Operations Plan is also developed every year to address the Transition Plan for Major Projects in Europe. Equally, the weekly and daily Network Operations Plans are electronically hosted on the Network Operations Portal of the Network Manager.

NM will also continue the production of the weekly Seasonal Rolling NOP providing a detailed traffic and capacity outlook for the next 6 weeks and addressing any possible further measures to eliminate demand and capacity unbalances.

In addition to NOP, the European Route Network Improvement Plan ensures full coherency of the airspace structure at the interface areas, covering many of the States that have an interface with those in the scope of NPP (including amongst others Belarus, Egypt, Iceland, Jordan, Kazakhstan, Lebanon and the Russian Federation).

The measurement of the operational performance, both at network and local level, provides a harmonised view through the use of consistent and validated data and tools. NM updated the reporting of consistent and validated data through interactive reporting tool (updated NM interactive reporting facility, ATFCM Statistics, ATFM compliance data). Past performance results provide an input to the capacity planning process for the next cycle. The commitments made in the NOP are measured during the operations to identify gaps, both pro-actively (e.g. traffic risk analysis) and reactively (e.g. sector planned vs sectors actually delivered). This will provide a solid foundation for measuring the harmonised operational performance against

targets and objectives both at the network level (NPP) and local level (National or FAB performance plans).

The weekly Enlarged NDOP Coordination Cell is set up as a weekly executive meeting to provide NDOP members with an update of the performance of the network for the previous week, analyse and assess the updated traffic demand and the measures included in the weekly Seasonal Rolling NOP as well as any recurring issues with the performance and the implementation of the capacity mitigation measures.

The Enlarged NDOP Coordination Cell will share possible remedial measures following network performance assessment and discuss their implementation with the NDOP members.

The meeting is chaired by Director NM, is supported by executive staff in NM and is run with the involvement of the members of NDOP.

2.6. Supporting the resolution of air traffic controller shortages across the network;

Staff constraints across the network remains a major factor in preventing the performance targets being achieved. Action plans are defined to mitigate these constraints when staff shortages are foreseen to impact performance in the coming season(s). To this effect, a dedicated group has been formed with COOs of the ANSPs to address ANSPs resilience. This group addresses, amongst other things ANSP Recovery Plans to bring back skill levels and ANSP rostering best practices. These topics are also included in the Operational Excellence Programme launched at the end of 2020.

NM has well documented OPS strike procedures needed to manage strikes at network level. Furthermore, there are specific procedures for the countries most affected by ATM strikes, which will be further developed to cover the specificities for each country.

NM in cooperation with NDOP identified a number of best practices in the European ATM network on controller/sector mobility: such as, optimum opening schemes, cross-border sectorisation, and joint operations planning.

The Operational Excellence Programme will help in addressing best practices in this area.

2.7. Strengthening technical area coordination including at FAB level and addressing technical interoperability among air navigation service providers' systems and in particular with the Network Manager's systems;

The NM Interoperability Strategy defines the high-level actions addressing the various aspect of interoperability: standardisation (SWIM), implementation of open data (e.g. B2B), security of the digital services. During RP3 the Strategy will be updated to fill any gaps identified for the integration of NM systems and procedures with those of NM operational partners.

Other new developments that are currently started will have an effect on RP3. They cover the following main areas:

- AOP/NOP integration;
- Further ACDM evolutions
- AFUA Process Improvements
- Predictability evolutions (sector intruders and yo-yo flights)

- NM airspace model data evolution
- Flight Efficiency –GRRT enhancements
- CASA occupancies
- Cooperative Traffic Management/ATFM improvements for more dynamic operations
- Temporary sector delegations between neighbouring ACC/UAC
- Stepped implementation of FF-ICE Release 1
- OAT flight plan
- Finalisation of n-CONECT implementation

The implementation of the iNM system will define a common target ATM architecture applicable to all industrial actors (ATM/ATC/CNS/Airport service providers and manufacturers of ATC/ATS systems/avionics, etc.).

The actions, programmes and plans agreed with the operational stakeholders will help in accelerating the decarbonisation of the European ATM network and the delivery of additional capacity. The benefits estimated for the end of the decade are:

- approximately 1000 million NMs, i.e. the equivalent of 6 million tons of fuel saved, or reduced emissions of 20 million tons; this represents a reduction by 2% of the European average route flown resulting from airspace design improvements;
- up to 20% reduction of ATFM delays resulting from direct and indirect actions of NM representing more than 10 million minutes of delay.

These benefits address both operational and system support evolutions that NM will undertake. A major contributor to these achievemnts will be the implementation of iNM.

NM working together with ANSPs, SJU, European Organisation for Civil Aviation Equipment (EUROCAE) and EASA, will identify the network ATM infrastructure requirements needed to achieve the performance targets.

As required by the Article 7.3.(g) of NFIR 2019/123, NM will monitor the performance of the infrastructure relevant for the execution of the network functions: ground and space based navigation system in support of the implementation and operation of navigation applications, surveillance interrogators and avionics, datalink communications, airborne collision avoidance systems, airborne altimetry.

2.8. Support to Network Safety and the implementation, monitoring and improvement of local safety performance.

NM supports ANSPs and other NM stakeholders to manage existing hazards and anticipate new safety threats, in order to keep the Network safe. It aims to arrive at a common approach to tackling new safety risks based on identified hotspots and trends in the Network.

The actions and objectives identified in the NPP are in line with NSP strategic objective 6.

Network Operational Safety Risks

During RP2 NM established and reviewed the Top 5 Operational safety risks. The activity of identification of operational safety hazards at network level in cooperation with operational stakeholders and of assessment of the associated network safety risk will continue during RP3 in line with NF IR 2019/123 requirements 7.2.(e).

The latest large scale exercise using safety data sample was undertaken with ANSPs in 2020 to re-prioritise the operational network risks. Based on the conclusions of the incident data analysis, the prioritisation was:

- the top 5 safety priorities: blind spot, airborne collision avoidance system resolution advisory (ACAS RA) not followed, flight without a transponder or with a dysfunctional one, sudden, high energy runway conflict and controller detection of potential runway conflict and,
- to monitor the risk associated with: airspace infringement, controller workload, inadequate ATC coordination, VFR flights in TMA/CTR airspace, events that could have been prevented by stop bars, events where vehicle participated in the incident, ATC planning and traffic synchronisation/entry procedures, adverse weather avoidance, availability and use of SMGCS, and low level go around.

The results are being reported to EASA.

The Operational Studies are/will be developed/updated for identified top risks, which will enable the sharing of lessons learned from incidents and the facilitation of best practices implementation.

Improving Safety Management

NM will support the ANSP in improving their safety management and meet their target for the effectiveness of the safety management KPI.

The NM activities in support of the above include:

- Ensuring the availability of complementary Safety Tools to allow the implementation of an integrated safety management system:
  - Automatic Safety Monitoring Tool (ASMT) to ensure improvements to safety performance monitoring, also in support of the relevant local safety indicator (Annex I, Section 2 para 1.2.(e) of Performance IR 2019/317)
  - Aerospace Performance Factor (APF) to allow ANSPs to compile aggregated data from various sources which provides a more holistic view of historical safety data which aids future trend analysis
  - Toolkit for ATM Occurrence Investigation (TOKAI) provides dedicated software for each step of the investigation process
- Developing and implementing ANSP Safety culture measurement and improvement;
- Maintenance and development of the **SKYbrary** Toolkits - various toolkits consisting of learning notes, video tutorials etc covering safety improvement initiatives such as level bust, runway incursion, air ground communications, airspace infringements, human performance and unstablised approaches.
- NM, working together with partners across the aviation and legal/judicial industries, intends to develop, facilitate and implement a **Just Culture** environment to support improved incident reporting and data sharing in ATM. The work is centred around three activity strands:
  - Implementation of a Model Just Culture Policy in 90% of ANSPs by 2023.
  - Delivery of Just Culture Prosecution Expert Courses (2 - 4 per year).
  - Delivery of Regional Just Culture Roadshows/workshops (3 per year) for ANSPs/FABs.

The NM will also continue to work with its partners from beyond the NM area to extend the Standard of Safety Management System (SMS) Excellence.

Safety Occurrences Reporting and Monitoring

NM supported during RP2 the reporting, investigation and risk assessment of the safety occurrences, including runway incursions and separation minima infringement, notably in support of the KPI Severity Classification: Application of the Risk Analysis Tool (RAT)

Methodology. This enabled the definition of new safety indicators for monitoring at both EU wide and local level for the rate of runway incursions and separation minima infringement.

NM will support the monitoring of these new indicators during RP3:

- Ensure the continued development of TOKAI and Risk Analysis Tool (RAT) to answer the users' requirements and prioritisation (as expressed by the Change Control Board);
- Supporting the deployment and usage of TOKAI and RAT in the ANSPs
- Harmonised and consistent exposure data is used for the monitoring of the safety performance indicators;

The measures are further detailed in the NOP - Safety Requirements and Support to Network Safety sections.

3. PERFORMANCE TARGETS, OBJECTIVES AND MEASURES

NM's performance is presented below per key performance area and network function. Where performance initiatives are presented, relevant NM objectives are stated.

There is also a reference to the Network Operations Plan (NOP) where information on expected benefits and deployment plans are presented. This will also serve as a "live" update of the actions in this plan, as NOP will reflect throughout RP3 the actions foreseen for the achievements of the performance targets and objective.

Monitoring of the KPIs, objectives and initiatives is done through internal and external processes (e.g. Network and NM performance monitoring, NOP reporting) and are presented to governance bodies as necessary (see Chapter 4)

3.1. Safety performance of the Network Manager

3.1.1. Performance target for the Network Manager on effectiveness of safety management.

NM will apply the questionnaire for the measurement of the effectiveness of safety management (EoSM) as defined for the ATS providers and continue regular coordination with EASA for the adaptation of the questionnaire if necessary and for the validation of the yearly results.

The NM target for 2024 is to achieve at least Level C in the safety management objectives (MOs) 'safety culture', 'safety policy and objectives', 'safety assurance', and 'safety promotion' and Level D in the safety management objective 'safety risk management' for its own Safety Management System in line with the RP3 EU-wide targets for the level of the effectiveness of safety management of the NM (EoSM).

The annual values set for the EoSM key performance indicator are:

	2020	2021	2022	2023	2024
EoSM: Effectiveness of Safety Management	Level C or above in 20% of MOs, i.e. safety promotion + safety policy and objectives Level B safety risk management + safety culture + safety assurance	Level C or above in 40% of MOs, i.e. safety promotion + safety policy and objectives + safety risk management Level B safety culture + safety assurance	Level C or above in 60% of MOs, i.e. safety promotion + safety policy and objectives + safety culture+ safety risk management Level B safety assurance	Level C or above in 80% of MOs, , i.e. safety promotion + safety policy and objectives + safety culture + safety assurance + safety risk management	At least Level D in safety risk management and Level C in the other MOs

The methodology for assessing the safety maturity levels is more stringent in RP3, therefore there is no direct comparison possible to the levels achieved in RP2. This is based on the Decision (EU) 2019/903 stating: *"…the framework used to measure the levels of the effectiveness of safety management is more stringent than in the second*

reference period, which is reflected in the approach taken to set the Union-wide performance targets in the key performance area of safety for RP3"

3.1.2. Description of the measures that the Network Manager puts in place to achieve this target.

NM will use the latest standards and best practices developed by NM in cooperation with its stakeholders, like Standard of SMS Excellence, in the implementation of its own SMS, to achieve the highest possible maturity for each safety management objective. It will build on a balanced quick wins, costs, technologies and resources available

NM will measure the effectiveness of its own SMS and improvement plans will be defined to catch-up with the expected output. It identifies actions where the measurement is showing a gap and addresses the EASA findings. It also designates champions from different divisions to promote the actions taken. The iterative approach and cooperation with EASA in regard of the audits will allow a continuous improvement of areas needing catching up.

The new NM organisation will bring synergies of the resources (both staff and technologies) that will support the SMS improvements.

In that regards, there are specific measures that will comprise inter-alia the following activities, processes and best practices:

- For Safety promotion Management Objective:

  Internal safety training adapted to the safety responsibility of the individual,

  Feed-back is used to improve training and

  SKYbrary (www.skybrary.aero) platform will be used actively for the safety promotion to cover all aspects of operational safety as well as safety management

- For Safety policy and objectives Management Objective

  Enhanced and periodic process for safety policy review

  Integration with the Eurocontrol Agency Safety Culture policy and rules of application (RoA45)

  Establishment of the just culture committee

  Internal Safety Reviews will ensure the adequate accountability with assurance that safety improvements actions across the NM are prioritized and coordinated effectively

- For Safety Assurance Management Objective

  Establishment of an integrated safety performance monitoring and measurement through safety dashboards

  Safety reporting, investigation separated from operations and integrated with the performance monitoring

Adoption of modern tools such as eTOKAI (Tool Kit for ATM Occurrence Investigation) to store data and exchange it with EASA and feed Business intelligence tools and dashboards

Safety surveys and audits (internal and external) will be used in the continual improvement of the SMS

- For Safety Culture Management Objective

  Safety Culture transformational journey will start with a reorganisation of NM Directorate

  NM will adopt an intelligent and effective organisational safety culture programme based on Asset Based Community Development (ABCD) framework - ABCD is an approach to community development that focuses on revealing assets, including people, places, artefacts, means of communication and exchange, etc. While the classical safety culture approach focuses primarily on needs, the ABCD approach focuses primarily on assets. Combining the two presents an opportunity to understand and improve how we think about work and how we do work.

- For Safety Risk Management Objective

  NM will build on its existing risk register and will establish an Integrated Risk Management approach by

  - combining reactive, pro-active and where possible predictive measures
  - align safety risks with other risks from business, quality and (cyber) security measures
  - Have a regular risk review process at the senior management level to address the risks and their respective mitigations

These specific measures will be reviewed on a yearly basis and adaptation implemented if needed in accordance with the measurement of the effectiveness of NM SMS and EASA findings.

3.1.3. Description of the measures that the Network Manager puts in place to address ATFM over-deliveries.

During RP2 NM implemented several changes in the ATFM system to allow a more in-depth analysis of the ATFM over-deliveries (OVD) indicator for monitoring. The impact on OVD of time and airspace deviations can now be quantified. The time predictability can be traced to ground vs airborne deviations. The airspace un-anticipated traffic can be traced to the airspace where the deviation started.

The RP2 monitoring also allowed NM to adjust the OVD indicator to better reflect the real operational issues.

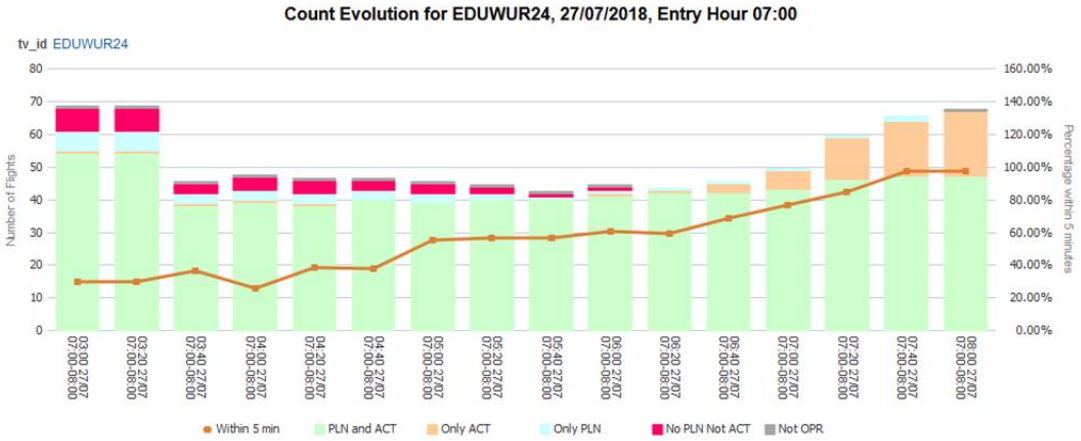
NM worked with FABEC to improve the classification of the un-anticipated flights and develop a method to identify the airspace un-anticipated flights that, although geographically are crossing the regulated sector, from an operational perspective are not under the control of that sector (non-operational un-anticipated traffic). The objective is to avoid “false positives”, i.e. situations when an over-delivery seems to have occurred while in reality there was none. This categorisation will be implemented in the NM reporting system during RP3.

RP2 indicator included the short duration slices at the end of regulation (some could be as short as 10 minutes). They disproportionately affected the OVD indicator and as such

overestimating the time deviation impact on OVD indicator (small time changes for the flights that are pushed by the regulation beyond the regulation end will move them back in these short slices - they could easily create an “over-delivery” in a slice of 10 minutes). The impact of removing these slices is 1.5pp overall (1.9pp for en-route regulations, 0.9pp for aerodrome regulations), based on 2015-2018 results.

NM will use in RP3 new techniques built on the “big data” new tools to allow the dynamic analysis of the OVD, showing the development of an OVD, how and when the different contributing factors kicked in. The analysis will allow NM and the stakeholders to look at the reconstructed traffic volumes count evolution (see example below), either for a specific date and time or aggregated over a period; it will enable the identification of the TVs with high volatility and analyse the causes of volatility, over or under-deliveries as well as the time predictability leading to OVD.

This is part of the wider NM initiatives to increase network stability by improving the time predictability and reduce airspace volatility.



The Flight Plan Predictability project will improve traffic predictability through reduction of unanticipated traffic. The vertical flight level adherence is one of the contributing factors. CTM programme will continue the actions to improve the level of adherence to requested flight level. The removal of un-necessary RADs will help by reducing the gap between the planned and actual flight level flown.

The automatic IFPS YoYo flight plans (where the change of cruising flight level is done in a way that flight will have to initially descend and after that climb in the cruising phase) detection and follow up has already started in RP2 by addressing the flight plans showing large flight level differences. It will continue in RP3 addressing various aspects like awareness, airspace restrictions and system changes leading to rejection of such flight plans.

Better CDM processes for managing weather will help reduce OVD by

- lowering volatility and as such having less un-anticipated traffic
- providing an extended time between the regulation activation and regulation start (and as such avoid the OVD in the time interval immediately after the regulation starts, especially when the regulated rate is below the nominal capacity)

The Flight Efficiency task Force will work on improving the inefficient flight plans and in doing so it will also decrease the likelihood of having a different flown route, which in turn will push the flight in other airspaces than planned, another contributor to OVD

3.2. Cost-efficiency performance of the Network Manager

3.2.1. Description of the measures that the Network Manager puts in place to improve its cost-efficiency.

The COVID-19 pandemic had a big impact on the aviation industry in 2020 and 2021, which will continue in the rest of RP3. The volatility will be very high and it will be very complex to manage the network flows during the traffic recovery.

NM intends to keep its cost aligned with the requirements of the SES performance scheme established for RP 3. It will use for the remaining of RP3 the budget levels agreed for 2022-2026 that will include new tasks and the large investment plan for NM systems modernisation and the measures taken following the COVID-19 pandemic. This will significantly complement the already achieved cost-effectiveness and productivity improvements for the existing network functions and associated tasks.

NM will continue to present a transparent work programme and budget to the operational stakeholders in the NMB. For the provision of common network support services, NM will duly justify their development and execution, supported by cost-benefit analyses. Where EUROCONTROL already performs those tasks, NM governance will scrutinise their integration into the NM responsibilities and inclusion in the NM work programme and budget.

NM is constantly reviewing methods and organisation for delivering operations and services to meet the performance targets in a cost efficient manner. It is therefore regularly proposing to the governing bodies a number of business improvement initiatives to achieve that goal.

NM had already started or contributed to a number of key operational and technical Business Initiatives that will deliver cost benefits in RP3.

In addition, the NM took significant cost containment and productivity improvement measures to address the aviation crisis brought about by COVID-19 This included:

- The launch of the Airspace Re-structuring and Operational Excellence Programmes, as agreed by NMB. It is taking place through significant improvements in productivity inside NM without additional resources. They are addressing key network requirements like scalability and resilience.
- The launch of the NM system modernisation programme (iNM) that will replace the current NM's operational systems, which is at the end of its life cycle. iNM is based on modern technology and agile development methodologies capable of incrementally coping with increasing operational demands and address sustainable flight operations. It will drive for a change to a Digital Transformation with support from industry, enabling NM to be much more agile towards internal and external stakeholders. The iNM programme will be covered by three contracts: Digital Products, Support and Building Extension at Haren. The three contracts are essential in order to enable the EUROCONTROL Network Manager to implement a new digital architecture and apply modern software development and deployment methodologies, allowing it in a timely manner to deliver necessary capabilities and meet its effectiveness, efficiency, security, safety and time-to-market requirements.
- Safeguard the investments in future digital assets by including the NM System modernisation programme, the implementation of the obligations stemming from the Pilot Common Project, the Common Project One and the Tools for Common Network Support Services without an impact on the cost efficiency targets. This will bring enormous challenges to simultaneously deliver the ongoing maintenance of the legacy systems and the delivery of the new digital products within a constant budget/cost base without introducing a spike of 15% in the planned resources during the transition period. Those are part of a synchronised development plan where any delay would not enable the foreseen efficiency gains, as there are significant interdependencies between various

projects (IT infrastructure contract, the investment plan for iNM, etc.) that will lead to more efficient utilisation resources. Any delay will jeopardise the expected efficiency gains in 2025.

- Reorganisation of the setup and governance of the IT. This removed duplication of effort in overheads and process or quality management. It removed the duplication of effort for data warehouses and data centres. It also allowed to financially engineer a new Infrastructure Contract leading to internal efficiencies.
- Streamlining of the budget to ensure the performance of all the tasks of the Network Manager and of its support to the Network Functions to the levels specified in the NFIR 2019/123.
- Continue the application of the Agency's staff replacement policy. Staff numbers of the Network Manager will decrease whilst the NM is engaged in a fundamental digital transformation process which requires the recruitment of new profiles to enable successful implementation. The NM is at the beginning of RP3 well below the staffing targets set by the 2/3 replacement policy. This will create an increasing pressure and complexity between the additional work (e.g. weekly Seasonal Rolling NOP, Airspace Restructuring Programme, Operational Excellence Programme, the iNM evolutions, the new IT infrastructure contract) and the resources available to perform the work. Considering the significant number of retirements in NM over the next 5 years and the current staffing gap (recruitment below 2/3) the NM will put in place a recruitment plan to ensure the full delivery of the activities and tasks of the Network Manager with a high level of productivity, while maintaining the 2/3 recruitment rules.
- Boost the NDOP/NDTECH/NMB involvement in the execution without an impact on the cost base. A revision of the overall NM working arrangements has been implemented and progress will continue in addressing operational stakeholder's requests for an efficient and smooth Network CDM Process with the participation of all involved parties. In this context, the NDOP and NDTECH will lead all activities related to the execution of NM tasks and support to Network Functions.
- Large parts of the operating expenditure in the budget of the Network Manager remained constant in nominal terms for the full planning period. To achieve this the Network Manager is implementing efficiencies, aligned with inflation for each year of the planning period. For example, the Network Manager engaged in robust negotiations for contract renewals either through re-tendering or through negotiated extensions that were successfully concluded (e.g. EAD).

In 2020, the savings realised by the Network Manager represented 5.2% of the Network Manager budget.

The magnitude of the saving for the period 2022-2024 amounts to 8.7 million euros.

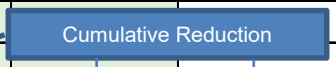
Other **Business Initiatives** that will improve the business delivery of NM functions and services to stakeholders in a cost efficient manner are:

- NM's Expenditure Review Panel (ERP) scrutinises all expenditure. It reviews all contracts and procurement plans against the business needs and strategic alignment to ensure operating costs are minimised;
- The NM has reviewed the internal governance of the investment credits, which are now centrally managed by a CAPEX Committee. This ensures alignment of the investment priorities with the NM investment plan.
- NM staffing plan addresses the replacement policy for staff that will retire from NM as part of Agency Staffing Strategy. The objective is to ensure that NM's replacement policy aligns to strategic priorities and finds synergies and/or savings instead of replacing staff like-for-like. The predicted impact is a reduction of costs as per the table below.

Cumulative Staff Cost Savings

In the period 2015 – 2025, NMD will implement cumulative savings of €44.309K related to reductions of non-OPS staff and €64.755K related to reductions of OPS staff in the budget, with a cumulative staff savings implemented amount to approximately 110 M€.

Year	Reduction in Work Programme	Reduction OPS Reorg	Total Cumulative Reduction FTE	Cumulative Savings in Work Programme	Cumulative Savings in OPS Reorg	Restructuring Art 41 Cost	Saving in EURO total
2015							
2016	-4			846	0		846
2017	-8	-34	-42	1.693	7.195	-3.129	5.759
2018	-12,18	-34	-46,18	2.578	7.195	-2.763	7.010
2019	-16	-34	-50	3.385	7.195	-2.170	8.410
2020	-18	-34	-52	3.809	7.195	-1.406	9.598
2021	-21	-34	-55	4.444	7.195	-827	10.812
2022	-26	-34	-60	5.502	7.195	-651	12.046
2023	-32	-34	-66	6.772	7.195	-409	13.558
2024	-36,1	-34	-70,1	7.640	7.195	-322	14.513
2025	-36,1	-34	-70,1	7.640	7.195	-140	14.695
				44.309	64.755	-11.817	97.247



Medium Term Recruitment Plan

The table below presents the medium term recruitment plan scenario that considers the achieved and planned productivity gains, the staffing policy, the foreseen retirements and the current staffing situation of the Network Manager

	2021	2022	2023	2024	2025
Budget Reduction (2/3 replacements)		-5	-6	-4	0
Expected Additional Departures	8	20	36	40	39
Below Target Now	16				
Recruitment plan	24	15	30	36	39

The combined medium term envelope is around 145 recruitments in the period 2021 to 2025. This is a result of the combination of the current staff shortfall, the staffing policy and retiring staff.

3.2.2. NM Cost Evolution.

NM Cost evolution in RP3 will be aligned with the strategic context brought by the COVID-19 pandemic: cautious to address the current crisis and forward looking to ensure the required scalability and support when the traffic returns.

The NM cost base for RP3 consists of the following segments:

- the NM activities covered by the previous Network Functions IR 2011/677 as amended; the activities covered here do not significantly change compared to the RP2 period
- changes required for the implementation of the updated NFIR 2019/123; these include activities moved from other directorates within EUROCONTROL
- new requests for the NM work programme
- the Long Term Investment Plan (LTIP), which will allow NM to evolve its systems through the implementation of iNM programme based on updated architecture, take advantage of the latest technologies and be ready to accommodate concepts and systems arising from SESAR R&D. It will also include tools for new Common Network Support Services.

The tables below were at the time of writing of this document, based on a cost base not yet endorsed by the NMB. The the final version of this document will include the tables that are based on the cost base that is endorsed by the NMB.

The table below showing the summary cost including all NM budget segments is the currently proposed cost base for the activities covered by the NF-IR..

	K€	K€	K€	K€	K€
Type of Exp/ receipts	2020	2021	2022	2023	2024
Staff Remuneration	93.705	81.812	85.884	85.377	83.108
Contract Staff paid by operating	2.126	2.157	2.202	2.204	2.205
Art 41	1406	827	651	409	322
ETS distribution	2484	807	223	0	0
Staff related expenditure	4.666	3.907	4.102	4.082	4.082
External Effort	26.497	22.925	23.329	23.636	22.853
Operating	28.945	31.600	25.238	25.435	25.546
Depreciation Inv ABP 2021-2025	521	540	543	4.867	9.051
Cost of capital Inv ABP 2021-2025	274	816	1.818	2.703	3.223
Depreciation Investments 2020	801	694	669	865	1.061
Depreciation Past Investments before 2020	153	604	1.255	1.237	1.163
Cost of capital Past Investments	133	89	111	98	106
Staff Receipts (Acc.Ins + Special Levy)	-1.251	-1.228	-1.378	-1.456	-1.494
Existing agreements (before UPP)	-4.372	-3.946	-2.538	-2.566	-2.586
Tax Compensation & Ancillary Benefits	17.003	16.520	15.071	16.403	17.602
Sales of services UPP	-1050	-600	-1.050	-1.050	-1.050
Sales of services UPP Indirect Costs	-315	-180	-315	-315	-315
IT Cost Allocation	35.624	34.961	30.152	29.068	28.688
Grand Total	**207.350**	**192.305**	**185.967**	**190.997**	**193.565**

The cost categories in the tables are:

Cost Category	Definition
Staff Remuneration	The remuneration of Agency Staff
Contract Staff paid by operating	The remuneration of staff sourced as Contract Staff rather than 'contractors'
Art. 41	The cost of the redundancy scheme following the Ops Room reorganisation a number of years ago.
ETS Distribution	The cost of the early retirement scheme a number of years ago.
Staff Related Expenditures	Expenditure for Training and Missions
External Effort	Expenditure for external effort on contracts
Other Operating	All other operating expenditure.
Depreciations Inv ABP Y0;Y+5	Depreciation for the investments in the future years
Cost of Capital Inv ABP Y0; Y+5	Cost of capital for the investments in the future years
Depreciation Investments Y0	Depreciation of investments in the current year
Depreciation Past Investments Prior Years	Depreciation of investments in the previous years
Cost of Capital Past Investments	Cost of capital for the investments in the previous years
Staff Receipts (Acc.Ins + Special Levy)	Receipts on staff remuneration. This the staff contribution to the accident insurance and a special levy.
Signed Agreements	Revenue from agreements.
Indirect Costs charged to other Pillars	Costs that are charged to other parts of the Agency (e.g. IT costs to CRCO).
Tax Compensation & Ancillary Benefits	Tax Compensation & Ancillary Benefits on pensions.
UPP Revenues	Revenue generated from User Pays Principle Contracts
UPP Indirect Costs	Revenue generated from User Pays Principle Contracts. Indirect costs charged to the users.

While taking into consideration that the scope of the activity of the Network Manager changed between 2019 and 2020, the table below indicates the comparison and the main changes between the 2019 budget and the evolutions afterwards.

	2019	2020	2021	2022
Approved Cost Base	183.515	212.275	157.344	155.815
Changes		From DECMA +6.8M€ From NS +37.7M€ New activities +8M€ LTIP +1.2M€ Pensions -18.4M€ Internal Tax -4.2M€	IT Cost allocation: +34.6M€ Indirect costs : +20.5M€	No structural changes.
Compare previous baseline		181.175	212.444	155.815

3.2.3. NM Cost Efficiency in RP3

Further to the measures described in 3.2.1 above, NM confirms its commitment to address further cost-efficiency measures in RP3. These measures will be integrated in the budget for the period 2022-2026 and will address effects resulting from:

- Reorganisation of the Network Manager;
- Further identification of synergies between various activities;
- Continuous improvement in project management;
- Consolidation and increased efficiency in projects implementation;
- Resources allocation and planning.

While it is not possible to precisely quantify them now, all these measures will be gradually taken into account in future NM budgets.

The tables below shows the NM cost base in nominal and real terms (2017 = 100).

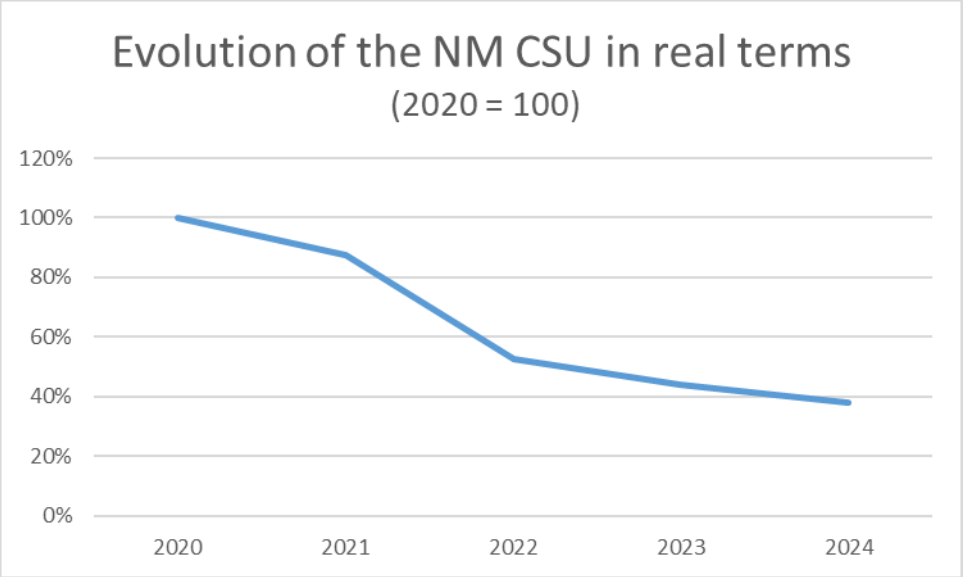
	2020	2021	2022	2023	2024
Nominal	207.350	192.305	185.967	190.997	193.565
Real	197.358	179.484	170.049	171.039	169.757

The evolution in real terms of the NM Cost per Service Unit (CSU) in the NM Area (the indicator for monitoring in the area of cost efficiency) is presented below. The data is based on Based on the May 2021 EUROCONTROL Forecast, with Actuals for 2020.

	2020	2021	2022	2023	2024
Nominal/SU	2,85	2,54	1,56	1,33	1,18
Real/SU	2,71	2,37	1,43	1,19	1,03

The evolution in real terms of the NM CSU shows a continuous reduction during RP3.

	2020	2021	2022	2023	2024
Evolution (Real) Y/Y	100%	87%	60%	83%	86%
Evolution (Real) (2020 = 100)	100%	87%	53%	44%	38%



3.3. Performance targets and objectives specific to each network function

3.3.1.European Route Network Design (ERND) function

The EC highlights that 90% of flight CO2 emissions are in the departure, en-route and arrival phases. NM activities are directed at containing such CO2 emissions.

Indeed the Airspace Restructuring programme is focussed on optimising trajectories and delivering estimated average savings of between 240 and 450 kg of CO2 per flight.

The main strategic projects for the achievement of the RP3 route network design and flight efficiency target are the full implementation of Free Route Airspace (including cross-border FRA) and of the Advanced Flexible Use of Airspace (A-FUA). They are a catalyst for optimising airspace configuration and design, in line with Airspace Reconfiguration Programme as included in the ERNIP Part 2 – ARN version 2021-2030.

NM will support the stakeholders to address in RP3 the vertical flight efficiency, both in the TMA airspace through the Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO) deployment and en-route by closely monitoring the adherence to the

requested flight level, which will enable NM and the air operator to optimise the vertical profile.

The targets and objectives for the environment area will be achieved through the implementation of the following initiatives:

- Development and implementation of the airspace changes included in the ERNIP Part 2 – ARN version 2021-2030 (including FRA and FUA evolutions)
- RAD re-organisation measures;
- Increased cooperation with the Computer Flight Plan Service Providers (CFSPs) on the evolution of their own systems based on the guidelines material published by NM;
- Implementation of the actions agreed as part of the NM Flight Efficiency Task Force
- Implementation of other initiatives, e.g. CCO/CDO and PBN.

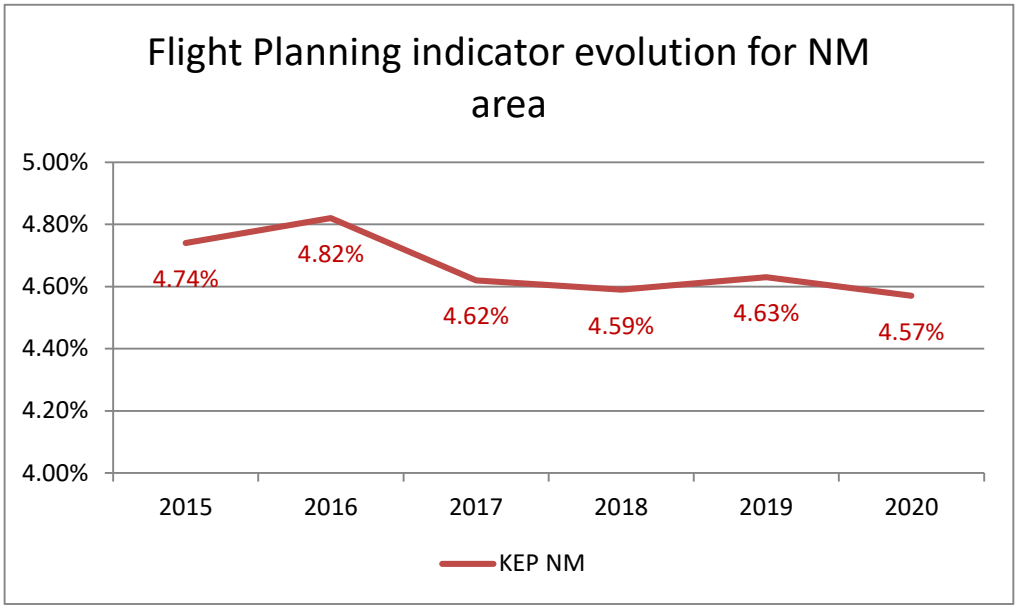
All those initiatives are described in detail in the sections 2.2, 2.3, 2.4 and in the sections below. More details are also available through the ERNIP Part 2 – ARN version 2021-2030, ERNIP Part 3 – ASM procedures and ERNIP Part 4 – RAD User Manual.

3.3.1.1. Performance targets for the key performance indicator set out in point 3.1 in Section 3 of Annex I

Performance IR 2019/317 defines in 3.1 of section 3 of Annex I as the en route flight efficiency KPI for NM the en route flight efficiency improvement generated by the European Route Network Design function related to the last filed flight plan trajectory, expressed as a percentage point of the year-on-year variation of the en route flight efficiency of the last filed flight plan trajectory. This KPI will be referenced in this document as KEP. It is also sometimes described as the average horizontal en route flight efficiency of the last filed flight plan trajectory.

The graph below shows the evolution of the KEP indicator in RP2. The KEP indicator was negatively impacted by the disruptions in the network that were active throughout RP2. The Ukraine ban started in November 2015 adding more than 7.7 million nautical miles to the flight plans route extension. The crises in Ukraine, the Middle East, and south Mediterranean produced inefficiencies throughout RP2 and will continue to do so. The strikes' impact reached 3.6 million nautical miles during 2016-2018.

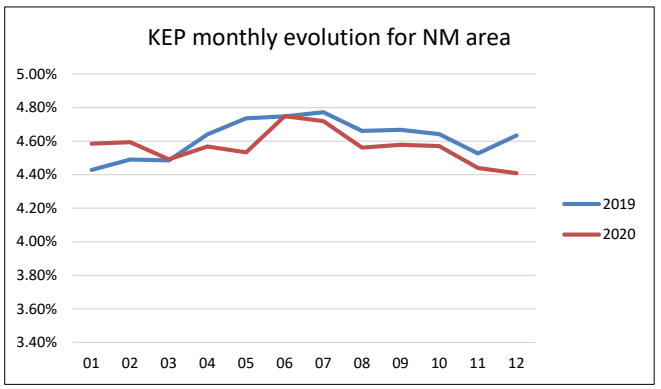
The key factor in the improvement in the KEP indicator is the implementation of Free Route Airspace projects, which now cover the majority of European airspace. As of 2017, it managed to mitigate all the inefficiencies indicated above and improve the indicator. The severe capacity constraints in 2018 and 2019 as well as the higher impact from strikes slowed the improvement.

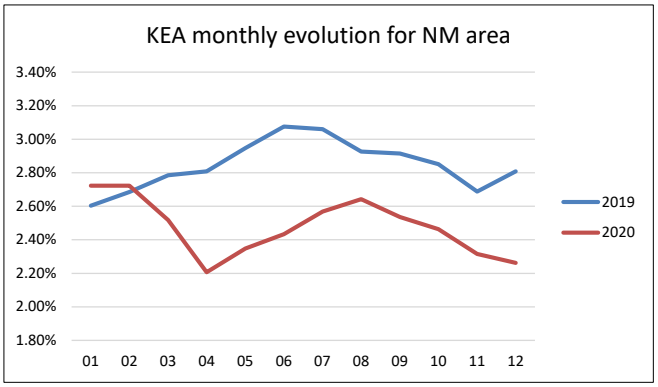


In 2020, KEP realised less than half of the opportunities opened by the lifting of restrictions following the drop in traffic due to the COVID-19 pandemic from April onwards. This is why the flight plan indicator KEP performed more poorly than the actual trajectory indicator KEA.

Less than 20% of the re-routes proposed by NM are taken into consideration by the AOs and CFSPs. NM will continue to work with the Computer Flight Plan Service Providers and the Aircraft Operators to ensure that the systems used for flight planning take fully into consideration the opportunities offered by the network. In addition, NM will engage in direct actions with the Computer Flight Plan Service providers and the Aircraft Operators to ensure that mandatory functionalities related to Free Route Airspace, Flexible Use of Airspace, dynamic RAD, utilization of the options provided by the NM systems (e.g. GRRT) become available as standard functionalities as they form part of the package of European airspace structures and utilization rules.

This is visible in the graphs below, that shows how much more the actual trajectory improved in 2020 in comparison with the flight plan trajectory (although the two graphs below have different absolute scales, the relative scale showing the difference between the 2019 and 2020 is the same).





Further improvements are also expected with respect to the Computer Flight Plan Service Providers to better take into account the opportunities offered in terms of environment/flight efficiency by the European network.

The target setting took into account:

- the continued disruptions in the network
- the limited margin for improvements in airspace design - the RTE-DES indicator reached 2.24% in 2019
- the updated RP3 target setting for the KEA indicator in the Article 2 of the Commission Implementing Decision 2021/891 as follows:
    - KEA target for end RP3 is 0.2 pp less than RP2 target; for KEP the 0.2 pp improvements only applies by 2024 (KEA target achieves 2.4 already in 2023 and remains flat in 2024)
    - applying the same logic, as the RP2 SES KEP target was 4.1%, the KEP SES target for RP3 will be 4.1%-0.2pp=3.9%;
    - the KEP difference between SES and NM areas was on average 0.1pp for 2016-2018 interval; therefore NM KEP target for RP3 is 3.9%-0.12pp=3.78%)
    - In order to further reduce the gap between KEP and KEA in RP3, an additional 0.05 pp KEP reduction in RP3 is considered, taking into consideration possible further improvements expected from CFSPs and AOs as included in the Flight Efficiency Initiative of NM, which bring the final KEP target to 3.73%. Overall NPP foresees to reduce the gap between the KEP and KEA by 0.47pp between 2018 (actual values) and the 2024 targets, which is in line with the RP2 target reduction. The reduction by 0.05 pp of KEP is based on the current difference between the KEP and the SCR and the capabilities of the CFSPs (as discussed with AOs and CFSPs in various fora) to make further system changes until 2024. Further details are included in the paragraph 3.3.1.2.
- The RP2 end value of the KEP is much higher than foreseen in the previous edition, due to the poor evolution of KEP in 2019. Moreover, the flight planning in 2020 performed less than expected considerating the lifting of restrictions due to fall in traffic. These lead to a change in the intermediate annual values for the 2021-2023 interval. It makes it much harder to reach the RP3 target, without the full participation of CFSPs and AOs in the Flight Efficiency Initiative of NM.

The annual values set for the KEP indicator for NM area are.

	2020	2021	2022	2023	2024
KEP NM area	-	4.36%	4.15%	3.94%	3.73%
	-	0.21pp reduction	0.21pp reduction	0.21pp reduction	0.21pp reduction

NPP defines an additional performance indicator to measure the effectiveness of the airspace structure - **the route extension due to airspace design indicator (RTE-DES)**. The measures defined in 2.2 should allow further improvement of this indicator during RP3 from the 2019 value of 2.24%. The NM objective is to reach a further reduction of 0.25pp from the 2019 reference value (an average of 0.05pp per year in RP3)

NM will support the States to improve the KEA performance to achieve the EU-wide target for KEA indicator in line with the EU Decision (2.37% in 2021, 2.37% in 2022, 2.40% in 2023 and 2.40% in 2024). The measures indicated in the sections 2.2, 2.3 and 2.4 will support the ANSPs in achieving their local target and will contribute to the

achievement of the Union-wide target for the environment. The changes from the assumptions considered in the NPP will be reflected in NOP and ERNIP, which will describe the detailed plans and actions both at local (ANSP, FAB) and network level required to achieve the environment performance targets.

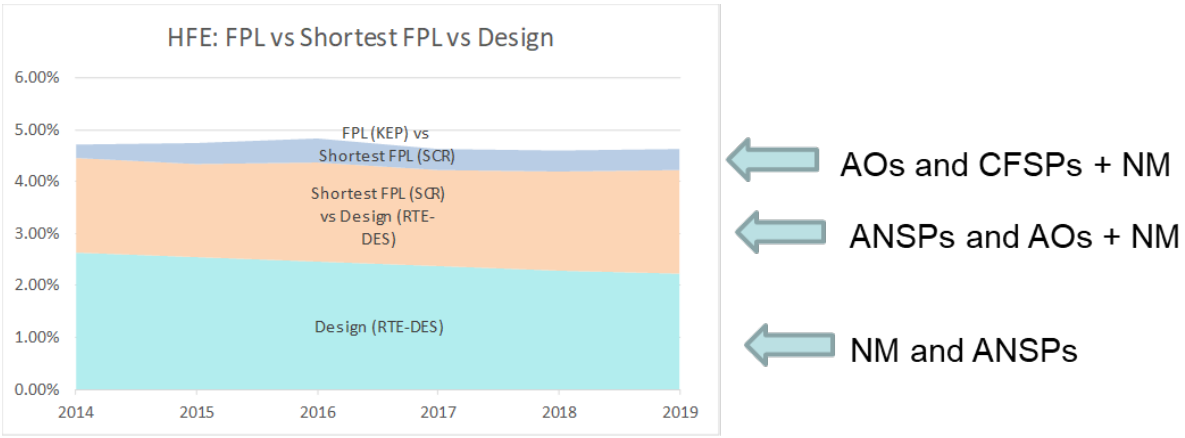
If the return of the traffic after the COVID19 crisis is not followed by a similar capacity evolution, there is a high risk that the KEA and KEP would increase between 0.1-0.2 percentage points per year in an attempt by airspace users to find options across the network. This will also have a high detrimental effect on traffic volatility and predictability and, in turn, an even higher increase in ATFM delays

During RP3 NM performance evolution in the area of flight efficiency will be defined and monitored to support the achievement of the performance targets and ERNIP Part 2 ARN Version 2021-2030 implementation taking into account the environment impact.

3.3.1.2.Description and explanation of the measures aimed at achieving the performance targets for the ERND function:

The NM contributes to the design of an efficient airspace structure, creates the conditions for a better utilisation of the airspace design by the operational stakeholders, including civil/military cooperation, and support the air operators and computerised flight plan service providers in the optimisation of their flight plans.

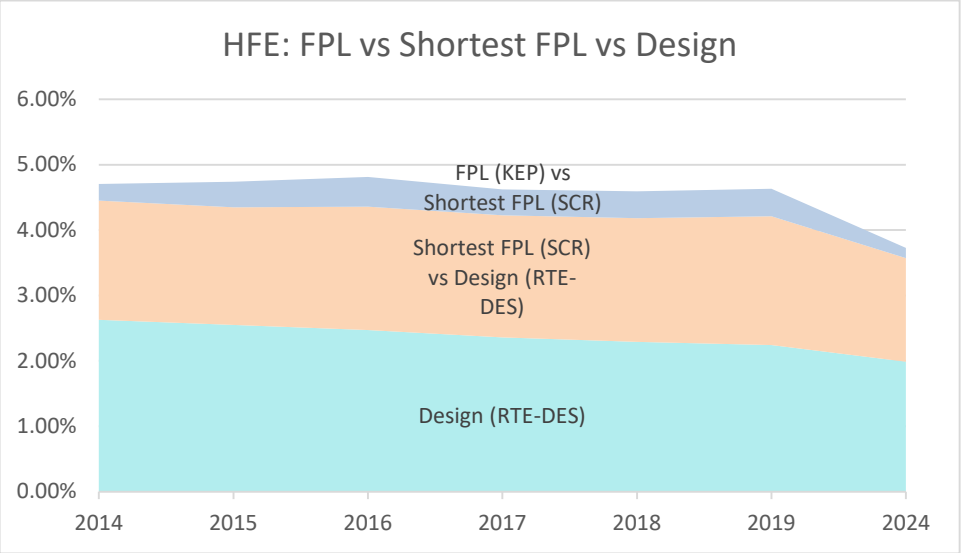
Section 2.3 and the graph below show the relative contribution of different factors that, on top of what airspace design has to offer, are contributing to the flight efficiency performance of the European network.



The KEP reduction between 2019 (4.63%) and 2024 target (3.73%) will be divided between the areas in the graph above as follows:

- 0.25pp: airspace design improvements brought by the planned reduction of the RTE-DES (all reflected in the FPL uptake)
- 0.34pp: the 2019 gap between the KEP and SCR is reduced by 80% (there is a limit here, as not all SCR improvements are eligible because the sum of the additional route charges may exceed the fuel burn reduction savings due to the shorter route improvement); this also includes the additional 0.05 pp reduction related to CFSPs improvements;
- 0.31pp: Further improvements of 0.39pp due to RAD and FUA (and 80% of these improvements are reflected in FPLs)

The evolution of the above improvements in RP3 are reflected in the graph below.



The measures detailed in section 2.3 and below are required to meet the performance target. They describe the NM actions in this regard, but will be also dependent on the airspace users' flight planning choices.

The measures to further reduce the additional distance due to airspace design (the light blue area in the graph above) are detailed in 3.3.1.2.1 below.

To reduce the gap between the flight plan and the shortest available route (SCR) the NM will work with the airlines and CFSPs. NM will work with the ANSPs to reduce the route restrictions so that the gap between the SCR and the route design structure will decrease in RP3 (the KEP RP3 target includes this factor). These measures are detailed in the section 3.3.1.2.2 below.

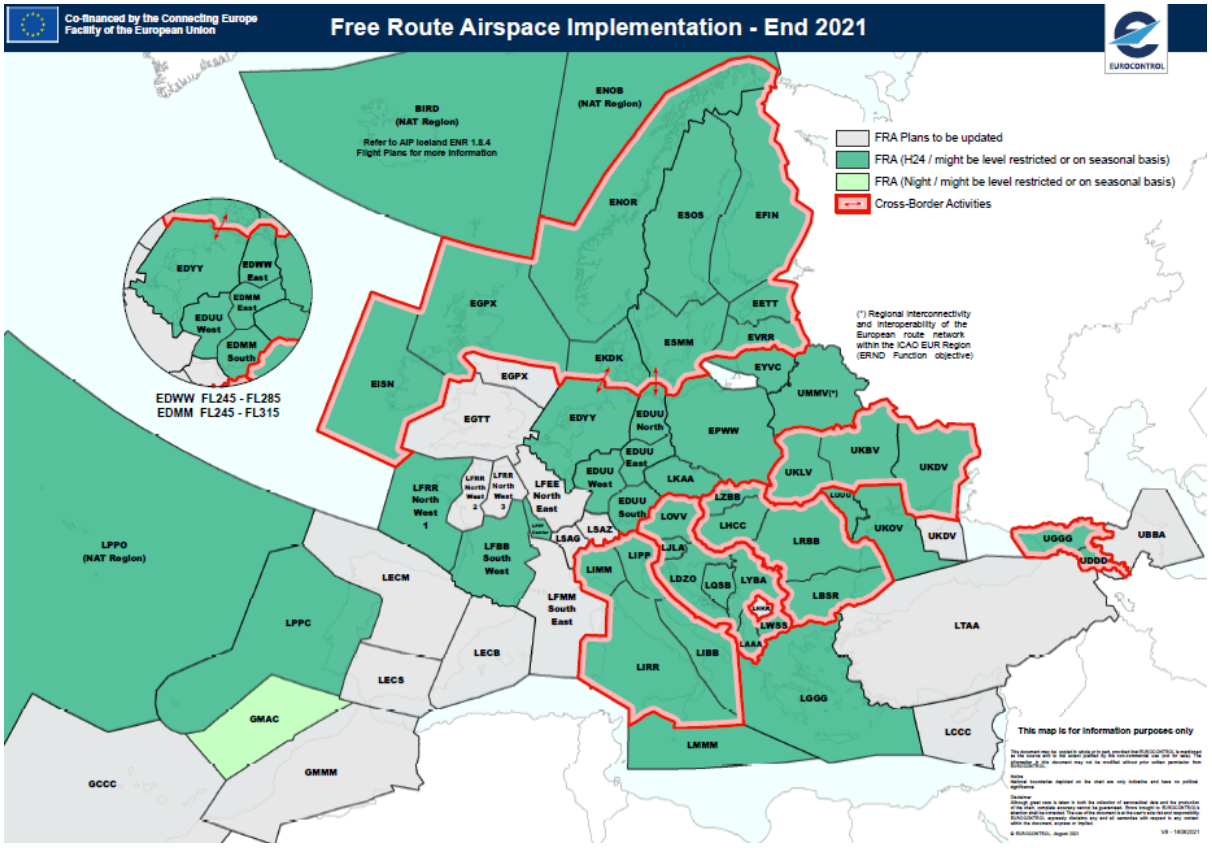
The impact of the crisis situations on the KEP evolution in RP3 will continue to be strong and it is likely to get worse. The on-going issue with Ukraine-Russia ban will most likely continue throughout RP3. Based on preliminary data, the Belarus ban imposed in May 2021 will have a similar impact (which is too early to be included in the above figures). Other similar crises could impact in the future the environmental performance area. NM will work with all the parties involved to minimise the impact of these situations and support a swift return to normal operations once the crisis is averted.

There are other elements that are having an impact on the KEP, such as the airport/TMA arrival procedures that are partially captured in the KEP. As KEP is supposed to capture the en-route part of the trajectory, a technical solution will be sought to correctly capture only this part of the trajectory for these flights.

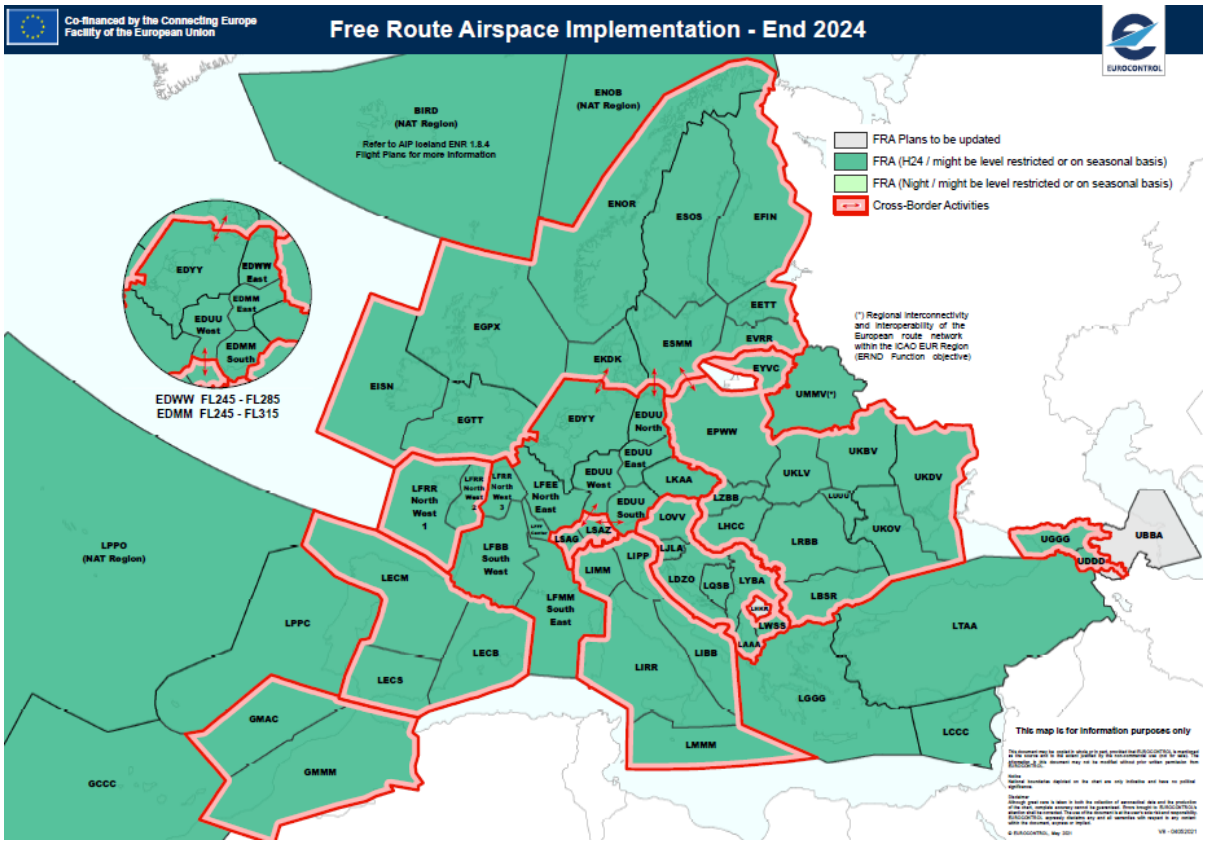
3.3.1.2.1.Measures related to the design of an efficient airspace structure;

NM will coordinate the airspace design in close cooperation with States and ANSPs to ensure that the European airspace can accommodate additional capacity needs over RP3.

The cross-border airspace design initiatives will provide direct flight efficiency benefits for the reduction of the route extension, notably full and harmonised implementation of Free Route Airspace (FRA). By the end of 2021 almost all ACCs would have achieved full 24hrs FRA implementation. Cross-border FRA was implemented in 2018 by many countries in all parts of the European network



The Free Route Airspace implementation will continue to provide tangible gains for the performance of airspace design in RP3.



NM will review the **RAD restrictions** with the participation of all the interested parties, based on the findings of the decisions taken through the Network CDM process on RAD restructuring that will be implemented as from Spring 2022. Following the fall in

traffic since mid-March 2020, NM worked with the ANSPs and removed 1,200 further RAD restrictions to improve flight planning options. During RP3, once the traffic picks up, NM's goal is to avoid reintroducing most of these restrictions, with the support of aircraft operators, air navigation service providers and others, to drive the change to a more sustainable and efficient network management.

FRA implementations also led to further RAD simplification in the FRA areas where ATS route network was withdrawn.

Other design initiatives such as airspace solution for most penalised city pairs in Europe, further developments of the night route network, further developments of the Advanced Flexible Use of Airspace, including CDR harmonisation initiatives will continue to provide flight efficiency benefits.

The NM will use the DES indicator to monitor the effectiveness of the airspace changes.

3.3.1.2.2.Measures related to a better airspace utilisation by the operational stakeholders and the optimisation of the flights;

The KEP indicator based on the last filed flight plan captures, on top of the route and airspace design network, a series of inefficiencies stemming from ATC restrictions, military activity, awareness of the best plannable route, and route charges.

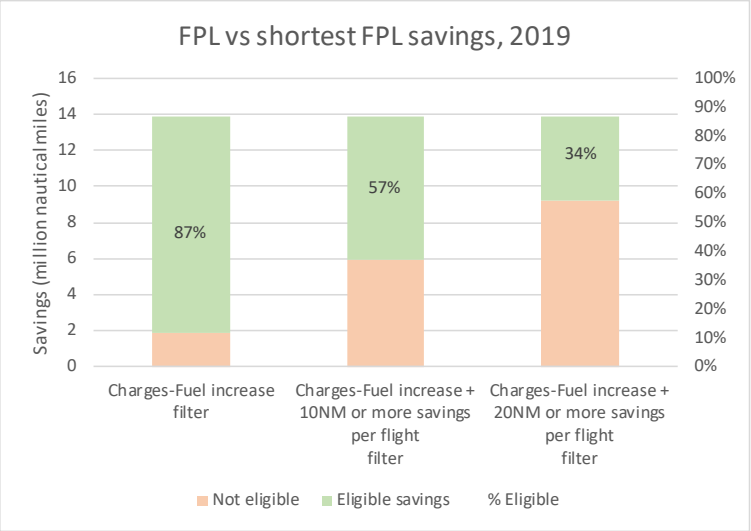
The airspace users (or computerised flight plan service providers on their behalf) are responsible for filing the flight plans with IFPS system and therefore the flight planning choices will have a direct impact on the RP3 results of KEP.

NM will support flight planning improvements in the strategic phase by providing a tool to allow all AOs and CFSPs to compare their flight plans with the best filed flight plan accepted by IFPS and to detect new implemented routes, CDRs available during similar periods of time. The NM will provide guidance material for CFSPs to support the improvement of the flight plans filed on behalf of the air operators.

For flights where SCR route is shorter than FPL[10], not all are eligible if we consider other criteria that influence the AO decision to file the shorter route. While the SCR route is shorter, the route charges could go up. Even if we factor in the price of fuel saved on the shorter route, 13% of the flights will cost more on the SCR route.

There is also a cost for the airline to take up an opportunity, therefore it will only re-file if the saving per flight is bigger than a certain distance. The graph shows the flights eligible when this distance is 10 and 20 nautical miles savings. In the case of the latter, only 34% of the flights will meet the additional cost criteria. This is why it is paramount that the flight planning service files directly the shortest route available, so that no potentially costly changes have to be made later on – this emphasise the importance of the NM work with the AOs and CFSPs in improving the flight planning.

[10] Intra NM + Adjacent area flights are considered, circular flights excluded, SCR profile generated, fuel and charges data available, entire trajectory considered (around 1.5 million flights in 2019); Fuel price: 75 EUR/ barrel (IATA) = 0.47 EUR/litre=0.597 EUR/kg



NM established the **Flight Efficiency task force** to support the air operators improve the flight planning, to take full advantage of the opportunities opened by the removal of RAD restrictions following the lower traffic levels due to COVID-19 pandemic.

NM will support better utilisation of CDRs and airspace openings through the deployment of ASM solutions - see section 2.4 for details.

NM initiatives as part of the **Flight Efficiency task force** to improve flight planning in the pre-tactical and tactical phases and optimise the individual flights will include:

- The opportunity Group Re-Routing Tool (GRRT) will provide better flight plan proposals that will be optimised using airline specific parameters (distance, route charges, flying time, ATFM delay).
- Re-routing proposals (RRPs) for flight efficiency will be provided to the airlines that opt-in for this service.
- Further development of the NM re-routing tools to address performance, usability, and success rate of the alternatives found through vertical and horizontal rerouting improvements will support the above.
- Network impact assessments resulting in re-routing proposals based on CDR2 routes with the direct involvement of military and airline liaison officers
- Further developments to address the most penalised city pairs
- Tactical RAD relaxations, not only during disruptions, but also during the night or during periods with low demand

3.3.1.3.Other flight efficiency initiatives.

Flight efficiency at airports and in TMA airspace will focus on improvements to TMA operations, notably Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO) and PBN deployment.

Deployment of PBN and optimised CCO and CDO throughout Europe will be beneficial to all European ATM system stakeholders and will help the network to address the environmental challenges it faces.

The PBN and CCO and CDO deployment will be supported by a dedicated team that works with stakeholders (ANSPs, aircraft manufacturers and aviation industry associations such as International Air Transport Association (IATA), European Regional Airlines Organisation (ERA), Airports Council International (ACI) and Civil Air Navigation Services Organisation (CANSO)) to measure and maximise the benefits achievable in the current ATM framework. The team also supports the facilitation of a more advanced PBN and CCO and CDO concept that will result from deploying future ATM tools and procedures.

NM will monitor vertical flights adherence to the requested flight level (RFL) from the flight plan as part of the traffic predictability projects. The monitoring will point out inefficiencies in the planning or the actual vertical profile and allow NM and the air operators to optimise the en-route vertical profile.

3.3.2.Air Traffic Flow Management (ATFM) function;

3.3.2.1.Performance targets for each relevant key performance indicator set out in point 4.1 in Section 3 of Annex I;

The Performance IR 2019/317 defines in Annex I section 3 paragraph 4.1 the NM key performance indicators for the capacity area as the **percentage of en-route and airport ATFM delay savings** from the CDM network procedures and NMOC actions, over the total year-on-year en-route and airport ATFM delay respectively. The method through which the delay savings are measured is detailed below and has been independently audited and also confirmed by the NMB.

NM delays savings are calculated for RRPs and slot optimisation. These actions are focused on individual flight improvements.

Rerouting Proposals (RRPs)

NM sends RRPs to reduce ATFM delay or route length, and sometimes for flight time reduction. An RRP is considered for delay savings if it proposes a delay reduction. Where the “proposed delay reduction” equals the “effective delay reduction”, it is considered as an accepted RRP. The corresponding delay reduction is counted as reduction achieved by NM. RRPs for route length reduction or flight time reduction are excluded from the scope.

NM applies additional validation criteria on the RRPs:
- there is a response to the RRP from the airline in terms of a FPL or CHG message;
- only the last RRP is used when there are multiple RRPs for the same flight;
- the flight plan remains outside the TV for which the RRP was sent (for the last filed FPL);
- only RRPs that are sent 3 hours (or less) in advance of the EOBT

Slot list optimisation

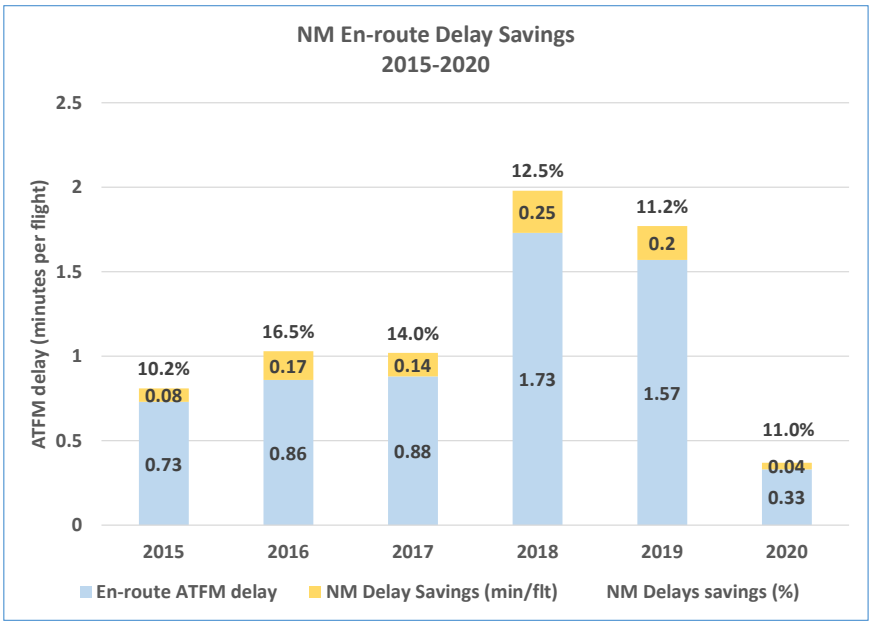
There are three specific NM actions that improve the (calculated/approved take off time) CTOT of a flight: Force CTOT, Force SLOT, and Override Slot. For each of these manual flight actions, except when a flight is no longer regulated after the action (no new CTOT), Only the delay savings that are reflected in the final delay are counted.

While there is a slight difference with the way in which the definition is provided for in the Performance IR 2019/317, the method is generally accepted as no methodology has been defined for the total year-on-year en-route ATFM delay savings.

En-route delay savings

During RP2 the en-route delay savings were considered from direct actions in NMOC (i.e. force Calculated Time Over (CTO)/CTOT and override slot) and re-routings proposals (RRPs) followed by airlines. The graph below shows the result of these actions in RP2. Considering only the actions above, NM met the 10% objective for every year of RP2, even for 2018 when the en-route ATFM delay doubled and the NMOC actions had to keep up with it. That was confirmed in 2019, when the ATFM delay was also very high.

The low traffic and ATFM delay levels following the COVID-19 pandemic may influence the way NMOC is doing the delay savings. In 2020, despite the difficult conditions, the NM continued to take action to reduce the ATFM delay, both before and during the pandemic, resulting in 11% delay savings. These results confirmed the original 10% target for RP3.



Both the high and low delays situations pose their own challenges. The high delays requires a large amount of delay savings – actions are targeting the flights with big delay, which is what helps the airspace users the most. Low delays reduces the opportunity to do delay savings on individual flights with big delays, which requires to do more actions to save the same amount of delays.

However, NMOC actions on individual flights is not the only way by which NMOC delivers delay savings. Capacity optimisation covers the pre-tactical and a part of the tactical operations. It involves a CDM process with the FMPs to fine tune the available capacities according to the latest known demand. The outcome of the Capacity optimisation process is an improved sector configuration, fined-tuned measures (regulations) such as increased rates, shortened periods or even cancelled regulations. The demand optimisation by means of lateral or level-capping re-routing scenarios or via the re-route proposals also could bring significant delay savings. To the extent possible, NM will try to quantify these delays savings during RP3. These delay savings will not change the current methodology of calculating the NM delay savings, as explained above, unless these measures will replace the actions (RRPs and slot optimisation) currently used to calculate the NM delay savings.

NM will use several initiatives that will provide additional capacity benefits and as such reducing delays (see details in section 2.4 and 3.3.2.2 below):

- Weekend delays

- Individual flight penalties
- Increase ATFCM measures efficiency
- Mitigation of Weather generated delays
- Reduction of first rotation delays.

It is expected that, based on existing methods of measuring the delay reduction of NM actions (RRPs and slot optimisations) will add up to achieve the NM RP3 target of delivering additional operational benefits of 10% en-route delay savings. The percentage will be measured as the NM en-route delay savings over the total network en-route delay.

The expected ATFM en-route delays, reflected also in the updated EU-wide targets, will be lower than pre-pandemic forecast. This situation will bring its own challenges in meeting the target, as explained above.

The annual values set for the NM en-route delay saving indicator are:

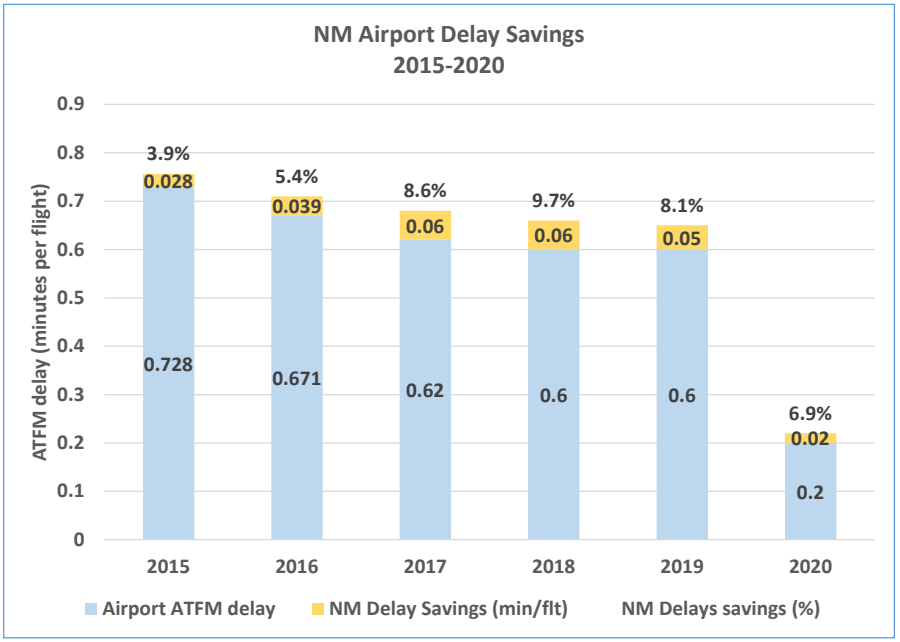
	2020	2021	2022	2023	2024
Percentage of NM en-route ATFM delay savings	10%	10%	10%	10%	10%

The additional benefits coming from the NPP cannot be achieved without the strong involvement and commitment of all operational actors through the NM CDM.

Airport delay savings

During RP2 the airport delay savings were considered from direct actions in NMOC (i.e. force CTO/CTOT and override slot). The graph below shows the result of these actions in RP2 and 2020.

They will remain the main contributors to airport delay savings during RP3. As the airport capacity may cause significant delays during peak periods in the future, the NM will address this area with priority (preliminary results shows the NMOC airport delay savings at more than 9% by end July 2021).



In addition a number of actions will have an effect on the reduction of airport delays. A summary of these actions is presented below (see details in section 2.4 and 3.3.2.2 below):

- Mitigation of Weather generated delays - the SMART Weather Regulation Task Force will issue harmonised operational best practices that facilitate the handling of adverse weather in a collaborative manner whilst minimising the disruption to airport and network operations. The collaborative best practices for handling of adverse weather at European aerodromes were issued in 2021.
- Airport area actions:
    - Reduction of first rotation delays and improvement of airport slot usage
    - NM will continue to support the implementation of A-CDM and Advanced Tower
    - Integration of AOP-NOP
    - Target Time of Arrival deployment
    - RECAT-EU and Time Based Separation deployment

The annual values set for the NM airport delay saving indicator are:

	2020	2021	2022	2023	2024
Percentage of NM airport ATFM delay savings	5%	5%	5%	5%	5%

The airport ATFM delay savings are calculated only from the slot optimisation actions, as there are no RRPs possible for the aerodrome regulations. In addition, the nature of the ATFM regulations at airports (weather, structural capacity constraints) does not offer the same opportunities for pre-tactical and tactical interventions from NM like the en-route part. For these reasons there is a lower level for the airport delay savings.

3.3.2.2.Description and explanation of the measures aimed at achieving the performance targets for the ATFM function

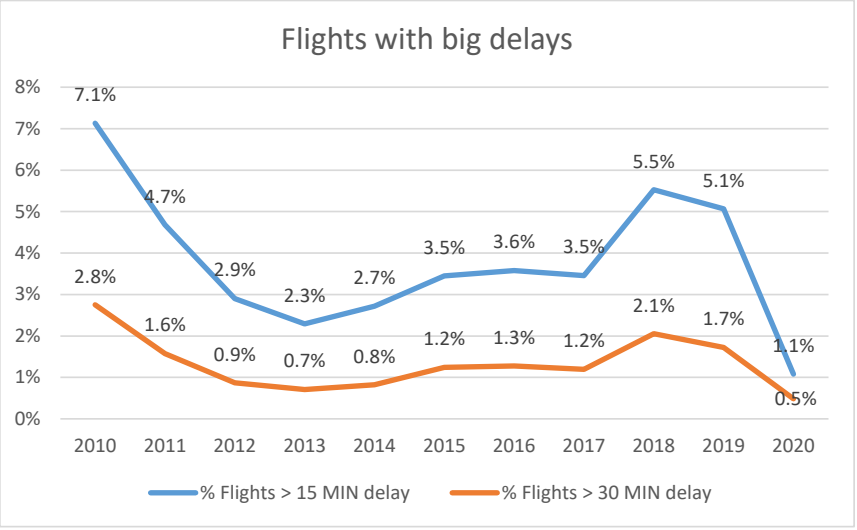
The measures detailed in section 2.4 and below are required to meet the performance targets in the capacity performance area, not only for the NM but also for the network. The 2020 NOP will further describe the measures contributing towards achieving the Union-wide targets for capacity.

3.3.2.2.1.Initiatives and actions for reducing the ATFM delay including weekend delays, weather generated delays, minimising individual flight penalties, ATFM efficiency, reactionary delays, over deliveries

NM will monitor during RP3 the indicators defined below. They represent the indicators for monitoring defined in paragraphs 4.2 (a) to (d) in Section 3 of Annex I of Performance IR 2019/317. The issues identified during monitoring that affect the performance of the network functions will be addressed with NM operational stakeholders. They may be escalated to the attention of the NM governing bodies in line with the NF IR 2019/123.

Minimising flights with big ATFM delays (over 15 minutes)

After remaining relatively stable in the first years of RP2 at around 1.2-1.3%, the proportion of flights with more than 30 minutes of ATFM delays increased by 71.5% in 2018, in line with the overall increase in delays. The main contributors are weather, capacity/staffing, and industrial action related regulations. With the reduction of ATFM delay due to COVID-19 pandemic, it is expected to have lower values in the first years of RP3, which was the case in 2020.



The percentage would have been significantly higher without the NMOC actions for delay savings that targeted flights with big delays, which brought on average 102 flights a day from a delay higher than 30 minutes to a delay below 30 minutes.

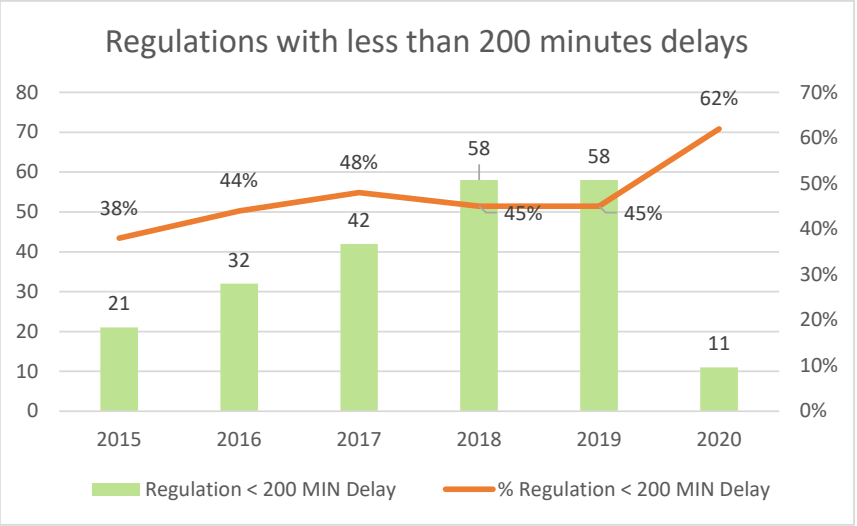
The stats show that when the network is severely disrupted by weather, strikes and severe capacity constraints, the number and proportion of flights with big delays are increasing fast.

In addition to the other actions to bring down the ATFM delay, the NMOC actions like force CTO, force CTOT and override slot will specifically address the flights with big delays, and as such reducing their number and proportion within total flights.

ATFM efficiency

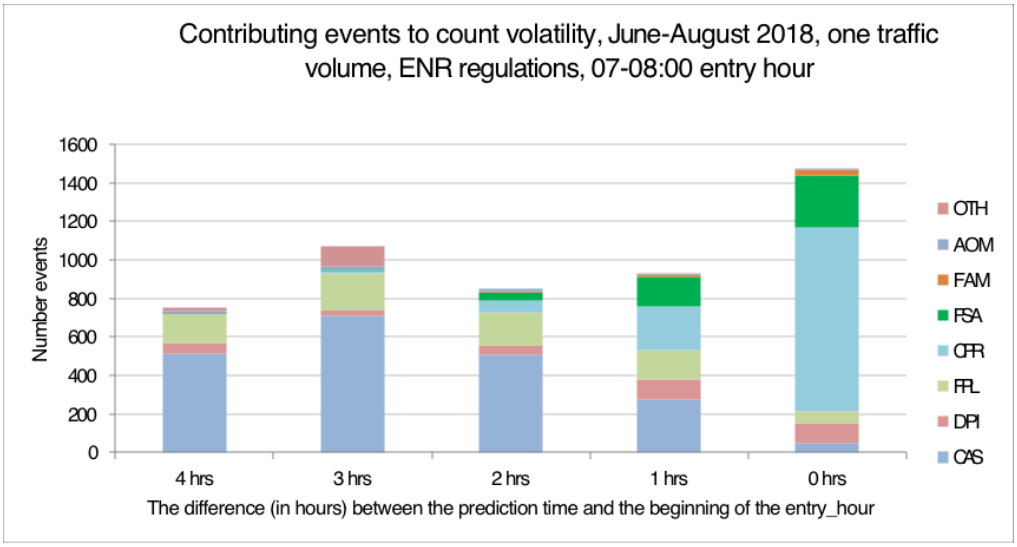
The optimisation of ATFM regulations is one of the measures foreseen to tackle the traffic predictability and volatility, which in the end could release additional buffer capacity. This will also means the reduction of ATFM regulation in situations where other measures can be used (STAM, cherry picking).

One of the indicators NM monitored during RP2 was the **number of regulations that produced less than 200 minutes of delay**, as a proxy for the efficiency of ATFM regulations. The number of such regulations largely increased with the number of overall regulations applied, but the years when ANSPs reported the highest volatility, 2017 to 2019, saw also the highest percentage of such regulation. At the beginning of RP3, the number of such regulations decreased, while their proportion increased, reflecting the reduced delays for the ATFM regulations applied.



When a high number of ATFM measures are applied and when they are frequently changed (e.g. deep modifications) in a short time period, a high number of slot revisions are sent for the same flight. It causes uncertainties on the departure time for the AO and volatility of the traffic demand in sectors at ACCs (jumping CTOTs). NM will work with the FMPs to reduce the number of regulation changes, and optimise the regulations applied.

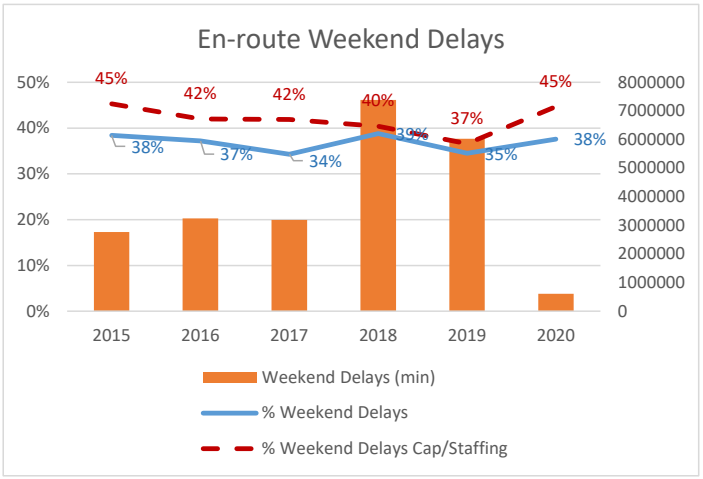
NM will provide tools to FMP to investigate the causes of volatility and un-predictability and trace them back to the events causing it (example in the graph below).



ATFM Weekend delays

A number of factors, notably how many ATC strikes takes place during the weekend, influences the proportion of weekend delays in total en-route delays. The repeated weekend strikes during the spring/early summer 2018 pushed the proportion of weekend delays to at 39%, the highest value in RP1 and RP2

To overcome this effect, a more appropriate measure will be the proportion of weekend delays caused by the ATC capacity and staffing reasons, which will be monitored in parallel during RP3. On this measure, the network proportion of en-route weekend delays decreased steadily during RP2. The 2pp reduction of capacity/staffing weekend delays proportion in 2018 amounted to 93000 minutes delays, which further decreased in 2019. In 2020, the proportion of weekend delays increased, reflecting both the bigger proportion of industrial action delays that took place in the weekend (21% in 2020 vs 10% in 2019) and the increase in the proportion of capacity / staffing delays during the weekend.



The NM will continue to work with the ACCs concerned and local FMPs to match the airspace and sector configuration with the traffic demand and complexity. This will be a cooperative action between NM and ANSPs starting from the capacity planning phase (number of sectors committed in NOP) into operations. NM will use the traffic risk tool to determine the areas where the traffic demand is exceeding the sectors planned or made available and will provide the tool to monitor live the traffic versus number of sectors open.

Frist Rotation delays reduction and Reactionary delays

NM will target morning delays which have more impact than afternoon and evening delays on airline operations as observed through the reactionary delays. The intention is to work collaboratively with airlines, ANSPs and airports to reduce the impact of first rotation regulations and improve the predictability of the operations during the afternoon. Measures include a network-wide agreement to prioritise resources to improve the punctuality of the first rotation, promoting the use of the NM Scheduling Indicators for Airlines, actions taken by the night shift to prepare the first rotation and a focus on flights arriving significantly ahead of schedule.

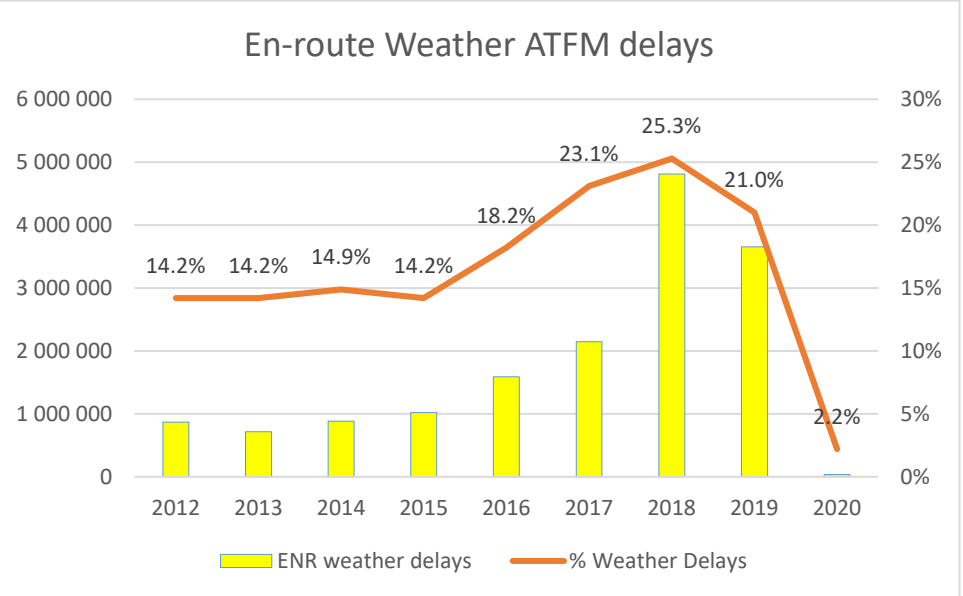
The First Rotation Hours Optimisation Trial (FROT), addressed recurring ATFM arrival regulations in Zurich. The trial was successful, achieving a reduction in Zurich aerodrome capacity arrival ATFM delay (which in 2018 reduced by 27% over 2017). Moreover, the flight planning better matched the arrival airport slot.

During RP3 NM will target airports/ ACCs where the analysis shows there is significant potential delay reduction (capacity/staffing) that will have a multiplier benefit for reactionary delays.

Managing weather

En-route weather delays continued to increase in RP2 both in absolute number (from 1.0 million minutes in 2015 to 4.8 million minutes in 2018) and in the proportion of weather in total en-route delays. 2018 registered both the highest amount and proportion of weather delays. Larger areas are impacted by bad weather generating a very high amount of weather delay, exacerbated by a structural lack of capacity in some areas. There were very few weather delays in 2020.

NM organised a Weather Forum in May 2018, to examine ways of collaboration and agree a way forward to improve management of weather so that operational and business planning at network level becomes part of day-to-day activity. This concluded in an action plan to put in place a new concept of operations for the management of weather induced capacity reductions. Those actions were also included in the NM Action Plan for Summer 2019.



A better handling of the situation during times where large areas are impacted by weather requires a more network-oriented approach. A single view forecast and a set of defined triggers will kick-off the collaborative coordination between NM and impacted ANSPs. It will outline the expected impact of the weather on operations, timings of potential capacity reductions and subsequent increases in recovery, impact on staffing/configurations, possible re-routings and any other potential issues. The En-route Summer Weather Cross-border Initiative will help develop the practical arrangements for a more collaborative approach.

This will be addressed through the preparation of new network CDM procedures for the management of en-route weather with the definition of roles and responsibilities and with a more NM-oriented decision making on en-route weather management.

Over-deliveries

The indicator and changes in the OVD indicator are explained in details in the section 3.1.3. The reduction of the duration when a traffic volume is over-delivered and its magnitude has a direct effect on capacity, as repeated occurrences of OVD will end up in providing a buffer to “accommodate” them without having a safety impact on the provision of air traffic service.

Therefore the measures foreseen in section 3.1.3 will also address the capacity aspects, by reducing or eliminating the need for capacity buffers.

The analysis of OVD is intimately related to the analysis of network predictability and volatility. High volatility will often end up in over-delivery in one traffic volume (due to un-anticipated traffic) and under-delivery in another (expected traffic not showing up).

NM will provide tools to analyse and investigate the over-deliveries and under-deliveries in connection with the network predictability and volatility. It will work with the ANSPs, AOs and CFPSP to implement measures derived from the analysis to lower the over-deliveries occurrences and their impact.

3.3.2.2.2.Military dimension of the plan.

Military authorities are an important CDM partner of NM influencing all performance areas due to their different role and type of operation. Effective CDM processes have allowed airspace design projects to take due account of military airspace needs, facilitated the introduction of better and targeted conditional routes and enabled more efficient utilisation of military use airspace and the ATM route network. They are all facilitated by the implementation of the Advanced Flexible Use of Airspace Strategic Project.

The development of enhanced airspace managements in RP3, notably the further integration between ASM and ATFM, is addressed in section 2.4.1.

Availability and use of the Conditional Routes

NM will work to improve the civil/military CDM processes in areas where military mission effectiveness is constrained or availability and effective usage of the CDR1/2 network is unnecessarily restricted.

NM will monitor the RAI and RAU indicators throughout RP3. The indicators are defined in details in the ASM Handbook Section 7.

NM aims to improve the RAI and RAU indicators by 5% over RP3 (baseline 2019)

Booking procedures

NM will support its military stakeholders in improving the effectiveness of booking procedures for FUA, as per paragraph 4.2 (e) in Section 3 of Annex I of Performance IR 2019/317, as this can benefit the capacity available in the network.

3.3.2.3.Other capacity initiatives.

NM activated the airport function within the NMOC, which provided tactical support at airports having capacity issues, like for the Greek islands airport. This will continue in RP3.

The RECAT-EU implementation will continue to provide capacity at busy airports in the network.

3.3.3.Coordination of scarce resources functions:

3.3.3.1.Coordination of radio frequencies function:

3.3.3.1.1.Description of the support to network capacity;

The Radio Frequency Function (RFF) contributes to network capacity by ensuring the availability of aeronautical radio frequencies for the provision of Air Traffic Services. Interference free radio frequencies are required by communication, surveillance and navigation systems in order to deliver the ATM capacity planned by airspace design.

The RFF contributes also to safety by supporting the mitigation of the impact of radio interferences.

3.3.3.1.2.Description of specific objectives.

The NM performance indicators for the RFF functions in RP3 are:

- Number of Radio Interferences; this indicator measures the number of reported radio frequency interferences that have not been resolved six months after the first report;.
- Number of Unsatisfied Requests; this indicator reports the number of unsatisfied radio frequency requests at a specific moment in time.
- Average Time to Satisfy a Request; this indicator reports the average time required to satisfy a frequency request at a specific moment in time (plus the minimum and maximum time required)

The NM objectives for RP3 are:

- to prevent the increase of the number of Unsatisfied Requests; during 2020 there were no unsatisfied requests from the complete European area;
- to prevent the increase time to satisfy frequency requests; this KPI is calculated for congested areas only; for 2020 the average time for satisfying a request was 47 days

3.3.3.2.Coordination of radar transponder codes function:

3.3.3.2.1.Description of the support to network safety;

The **Transponder Code Function (TCF)** contributes to improving safety by seeking to eliminate Secondary Surveillance Radar (SSR) transponder code conflicts and consequently reducing flight correlation errors while ensuring unique aircraft identification. At the same time TCF aims to reduce the overall number of code changes and as such contribute to the reduction of controllers' and pilot's workload related to these tasks.

One of the main enablers for TCF is the Centralised Code Assignment and Management System (CCAMS), a pan-European solution to overcome the current and future shortages of the SSR codes used by Air Traffic Control for radar services. CCAMS provides a unique SSR code to each flight operating in the countries using the service.

By the end of 2020 nineteen States implemented CCAMS namely: Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Denmark, Estonia, Finland, Ireland, Lithuania, Moldova, Montenegro, Poland, Portugal, Norway, Serbia, Sweden, Ukraine and the United Kingdom.

The TCF performance indicators and the associated objectives have been developed and agreed in cooperation with the NM operational stakeholders.

3.3.3.2.2.Description of specific objectives.

TCF safety related performance indicators

The performance indicators addressing the safety of SSR transponder codes usage are related to systemic errors, and are to be interpreted in close conjunction with the process of SSR transponder code allocation to States. The two performance indicators that will be monitored in this context are:

- The number of reported code conflicts generated by the SSR transponder code allocations to States;
- The number of reported unplanned shortfalls (e.g. Code shortages) generated by the SSR transponder code allocations to States.

The NM objective is to ensure that for RP3 the code allocation to States does not induce any negative effects for operations:

- to eliminate code conflicts generated by SSR transponder codes allocations to States.
- to eliminate unplanned shortfalls (e.g. code shortages) generated by SSR transponder codes allocations to States.

In 2020, there were no code conflicts generated by SSR transponder codes allocations to States and no cases of codes shortages were detected by the monitoring tools.

NM is responsible for the operation of CCAMS and the correct assignment of SSR transponder codes on behalf of CCAMS users. CCAMS is required to assign codes in accordance to the SSR transponder codes allocated for its use by States, and reflected in the Code Allocation List (CAL). Any deviation has the potential to generate a code conflict in one of the CCAMS States, or in a third party's area of responsibility.

The NM objective for RP3 is to ensure that CCAMS does not assign any wrong SSR transponder code for CCAMS managed flights.

TCF efficiency related indicators

The efficiency of SSR transponder code allocations to States is reflected in the number of code changes. The NM aims at reducing constantly the daily number of required code changes by optimising the code allocations. The same objective is supported by deployment of technology in support of code management (e.g. Mode S, CCAMS, etc.).

The NM objective in RP3 is to further reduce, in partnership with operational stakeholders, the daily number of required code changes (19.5% in 2020).

4. IMPLEMENTATION OF THE NETWORK PERFORMANCE PLAN

This chapter describes the measures that the Network Manager puts in place in regard of the NPP implementation.

4.1. Monitoring of and reporting on the implementation of the Network Performance Plan;

Article 37 of Performance IR 2019/317 describes the independent monitoring of the NPP implementation. In this task the Commission will be assisted by the PRB, as per article 3(k) of the Performance IR 2019/317. NM will facilitate this monitoring to ensure that NM performance can be independently monitored and verified.

The NM will report annually the results of the monitoring of the KPIs and related targets to the EC and NM governing bodies, usually as part of the NM Annual Report. In addition, NM will report its performance and the results of KPIs monitoring to each NMB meeting.

The NM has developed during RP2 several dashboards that allow the daily, weekly, monthly, seasonally and annually monitoring of a number of NPP indicators. This will allow a more flexible monitoring of those indicators.

In addition reports are produced that will present the status of the key performance indicators and where appropriate the other objectives from the NPP. NM internal procedures will set the monitoring frequency of the individual indicators.

The effectiveness of safety management of NM is measured by conducting the relevant survey assessing the implementation of the different SMS management objectives. The Safety Improvement Sub Group will facilitate the ongoing maintenance and deliverables from the NM 'Top 5' safety risks initiative.

The NM SMS is continuously monitored as indicated in the NM SMS Manual.

The Cost efficiency indicator will be monitored annually.

4.2. Measures to address the situation where targets are not reached during the reference period;

Network and NM operational performance is assessed through the Enlarged NDOP Coordination Cell and internal Performance Steering Committee. It will address the divergences from NPP and associated KPIs and will take corrective actions.

Through the CDM process, the relevant groups, NDOP and NMB will monitor the implementation of the actions.

The Cost efficiency indicator will be presented to NMB together with the status of the actions to manage NM costs and to meet the cost target.

The monitoring of Scarce Resources indicators will be presented to the relevant groups as per the related CDM processes. Any significant issues will be presented to NMB. The Crisis management updates will be presented annually to the NMB.

Overall, NM will implement and apply the new mechanisms specified for remedial actions in the article 10 of NF IR 2019/123, including the register of the operational actions and remedial measures that operational stakeholders have not implemented.

4.3. Coordination with the national supervisory authorities.

As per article 10.2 of the NF IR 2019/123, NM will inform Member States and the national supervisory authorities responsible for the oversight of the operational stakeholder concerned by the remedial measures, about the content of the measures and about any aspect related to changes in operational performance.

NM will continue to coordinate with NSA in the framework of the post ops performance adjustment process. This coordination will include the changes to the process, escalation and reporting on the adjustment process.

Appendix I. List of NM performance indicators for RP3 as per Performance IR 2019/317, Annex I, Section 3

NM key performance indicators				Target
SAF	KPI	EOSM	The level of the effectiveness of safety management of the Network Manager	Improving its own SMS to reach at least Level C in the safety management objectives 'safety culture', 'safety policy and objectives', 'safety assurance', and 'safety promotion' and at least Level D in the safety management objective 'safety risk management'
ENV	KPI	KEP	En route flight efficiency improvement generated by the European Route Network Design function related to the last filed flight plan trajectory, expressed as a percentage point of the year-on-year variation of the en route flight efficiency of the last filed flight plan trajectory	Achieve 3.73% for NM area for KEP indicator by 2024
CAP	KPI	E-DLA-S	The percentage of en route ATFM delay savings	Deliver additional operational benefits in terms of en-route delay savings of 10% of total en-route delay
	KPI	A-DLA-S	The percentage of arrival ATFM delay savings	Deliver additional operational benefits in terms of en-route delay savings of 5% of total airport delay

NM indicators for monitoring			
	PI	OVD	The ATFM over-deliveries above the capacity limits of a sector declared by the air navigation service provider where ATFM regulations are imposed
	PI	B-DLA	The annual percentage of IFR flights with ATFM delay above 15 minutes
	PI	S-DLA	The average, over a calendar year, of the daily number of ATFM regulations that each produces less than 200 minutes of delay
	PI	W-DLA	The average, over a calendar year, of en route ATFM weekend delay expressed in minutes of delay per flight
	PI	F-DLA	The annual percentage of first rotation delay due to capacity and staffing for a pre-selection of area control centers/airports with the most significant potential delay reduction as identified annually by the Network Manager
	PI	FUA	The effective use of reserved or segregated airspace
	PI	RAI	The rate of planning via available airspace structures
	PI	RAU	The rate of using available airspace structures
	PI	DUC	The unit cost for the execution of the tasks of the Network Manager

Appendix II. List of additional NM performance indicators for RP3

NM has defined a number of additional performance indicators (API) to monitor, analyse and take corrective actions in regard of the NM and network performance. It will also support effective management and oversight from NM governing bodies in regard of monitoring performance.

NM indicators for flight efficiency and capacity			
	API	RTE-DES	The route extension due to airspace design indicator
	API	SCR	The route extension of the shortest constraint route
	API	VFA	Vertical flights adherence to the requested flight level (RFL) from the flight plan
	API	VOL	Volatility indicator (general, time and airspace volatility for traffic volume count)
	API	CDM-DPI	A-CDM coverage of departure time information as % of network departures
NM indicators for the scarce resources functions			
	API	RFF-RFI	Number of reported radio frequency interferences that have not been resolved six months after the first report
	API	RFF-UFR	Number of unsatisfied radio frequency requests at a specific moment in time
	API	RFF-AFR	Average time required to satisfy a frequency request at a specific moment in time (plus the minimum and maximum time required)
	API	TCF-CCS	The number of reported code conflicts generated by the SSR transponder code allocations to States
	API	TCF-CS	The number of reported unplanned shortfalls (e.g. code shortages) generated by the SSR transponder code allocations to States
	API	TCF-CCH	The efficiency of SSR transponder code allocations to States reflected in the number of code changes
	API	TCF-WTC	Number of wrong SSR transponder code for CCAMS managed flights

Glossary

AAS	Airspace Architecture Study
ACC	Area Control Centre
ACI	Airports Council International
A-CDM	Airport Collaborative Decision Making
A-FUA	Advance Flexible Use of Airspace
ANSP	Air Navigation Service Provider
AOP	Airport Operations Plan
ASM	Airspace Management
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATFM	Air Traffic Flow Management
ATFCM	Air Traffic Flow and Capacity Management
ATM	Air Traffic Management
AUP/UUP	Airspace Use Plan/ Updated (Airspace) Use Plan
B2B	Business-to-Business
CAM	Cost Allocation Methodology
CANSO	Civil Air Navigation Services Organisation
CCAMS	Centralised Code Assignment and Management System
CCO	Continuous Climb Operations
CDM	Cooperative Decision Making
CDO	Continuous Descent Operations
CDR	Conditional Route
CFSP	Computerised Flight plan Service Provider
CNS	Communication, Navigation & Surveillance
CTM	Cooperative Traffic Management
CTO	Calculated Time Over
CTOT	Calculated Take-Off Time
DCB	Demand Capacity Balancing
DPI	Departure Planning Information
EASA	European Aviation Safety Agency
EC	European Commission

ECAC	European Civil Aviation Conference
EOBT	Estimated Off-Block Time
EoSM	Effectiveness of Safety Management
ERA	European Regional Airlines Organisation
ERND	European Route Network Design
ERNIP	European Route Network Improvement Plan
ETFMS	Enhanced Technical Flow Management Service
EUROCAE	European Organisation for Civil Aviation Equipment
EUROCONTROL	European Organisation for the Safety of Air Navigation
EU	European Union
FAB	Functional Airspace Blocks
FE	Flight Efficiency
FF-ICE	Flight and Flow Information for a Collaborative Environment
FMP	Flow Management Position
FRA	Free-Route Airspace
FUA	Flexible Use of Airspace
FUTARS	Future System Architecture Study
GRRT	Group Rerouting Tool
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IFPS	Integrated Initial Flight Plan Processing System
iNM	integrated Network Manager system
KEA	The average horizontal en route flight efficiency of the actual trajectory
KEP	The average horizontal en route flight efficiency of the last filed flight plan trajectory
KPI	Key Performance Indicator
NDOP	Network Directors of Operations
NDTECH	Network Directors of Technology
NM	Network Manager
NMB	Network Management Board
NMOC	Network Manager Operations Centre
NPP	Network Performance Plan
NOP	Network Operations Plan
NSA	National Supervisory Authorities

NSP	Network Strategy Plan
OVD	Over-deliveries
PBN	Performance Based Navigation
PIM	Performance Indicator for Monitoring
RAD	Route Availability Document
RAI	Rate of Aircraft Interested in CDR or Reserved/ Restricted Airspace
RAT	Risk Analysis Tool
RAU	Rate of Actual Use of CDR or Reserved/ Restricted Airspace
RECAT-EU	European separation standard for aircraft wake turbulence
RFF	Radio Frequency Function
RP2	Reference Period 2 (2015-2019)
RP3	Reference Period 3 (2020-2024)
RRP	Re-Route Proposal
RSA	Restricted Airspace
RTE-DES	Route Extension Due to Airspace Design
SCC	NM Summer Coordination Cell
SCR	Shortest Constraint Route
SES	Single European Sky
SESAR	Single European Sky ATM Research
SJU	SESAR Joint Undertaking
SMS	Safety Management System
SSR	Secondary Surveillance Radar
STAM	Short-Term ATFCM Measures
SWIM	System-Wide Information Management
TCF	Transponder Code Function
TMA	Terminal Control Area
TOKAI	Toolkit for ATM Occurrence Investigation

Reports' Reference Tables

[1]	SESAR Joint Undertaking, A proposal for the future architecture of the European airspace, 2019
[2]	EUROCONTROL Five-Year Forecast 2020-2024. European Flight Movements and Service Units. Three Scenarios for Recovery from COVID-19 , November 2020
[3]	EUROCONTROL Challenges of Growth, European Aviation in 2040, October 2018
[4]	Network Manager, Network Strategy Plan 2020-2029, v 0.6, 2019

[5]	Network Manager, High Level Network Operational Framework 2029, March 2020
[6]	Network Manager, NM Flight Planning Requirements - Guidelines, December 2018
[7]	Wise Persons Group Report on the Future of the SES, April 2019

EUROCONTROL

SUPPORTING EUROPEAN AVIATION

www.eurocontrol.int