EUROCONTROL

Network Manager Annual Report 2019

SUPPORTING EUROPEAN AVIATION

FOUNDING MEMBER SESAR JOINT UNDERTAKING

NETWORK MANAGER

FOREWORD BY THE CHAIRMAN OF THE NETWORK MANAGEMENT BOARD, SIMON HOCQUARD

Dear colleagues,

It is my pleasure to introduce the Network Manager Annual Report for 2019.

Before reviewing the past twelve months, it is important to acknowledge that this year is unlike any we have experienced before in aviation, and I hope it's one we won't have to witness again. The unprecedented COVID-19 crisis has brought our industry to its knees, but I firmly believe that recovery will come, and soon. As I write this, we have seen four full weeks of global traffic increases, which I hope is a positive sign for the rest of the year.

The consequences of this crisis have been felt across the entire aviation industry from airlines and airports to ANSPs and the entire supply chain. For many it has sadly spelt drastic declines in revenues. But as we seek to reduce costs in response to revenue shortfalls, we must do so with an eye to the future. We need to make sure that the deep cuts we make now do not result in capacity crunches in the years to come. And so, I encourage the entire industry to take the right strategic decisions now for the benefit of an improved network in the future.

Reflecting on 2019, I would like to take the opportunity to say a few words about the Network Management Board's (NMB) role and achievements. Firstly, my profound thanks to all my colleagues for their role in the NMB successfully closing its mandate for Reference Period 2.

This required a considerable amount of hard work including preparing for the revised NF Implementing Rule entering into force and making sure that the necessary endorsements were achieved on items such as the Network strategy plan 2020-2029, the NM work programme 2020-2024, and the Network performance plan.

From an operational perspective, the NMB was also instrumental in the approval of the implementation of the Eurocontrol/NM action plan for eNM Summer 2019 measures, and arranging the participation of our stakeholders in the operations excellence programme.

We also provided significant input into the planned modernisation of the NM system (iNM) - one of the many subjects that has benefitted from the ever-improving coordination and communication with NM this year.

Finally, when the recovery comes, I strongly believe that all our operational stakeholders, with the support of NM, will show once again our ability to conquer any challenges that come our way and to build a better future together.

MESSAGE FROM THE DIRECTOR NETWORK MANAGEMENT, IACOPO PRISSINOTTI/ EXECUTIVE SUMMARY

It is with mixed feelings that I introduce the Network Manager Annual Report for 2019. On the one hand we were successful in mitigating the capacity crisis through the excellent cooperation among all operational stakeholders of the eNM/S2019 action plan; on the other hand we are currently facing a very different and extraordinary crisis, COVID-19, with profound effects on aviation.

What is common for both crises is that cooperation in full partnership spirit among all operational stakeholders supported by NM is the way forward. At the same time, we must recognise that the current crisis puts even higher requirements on all of us to transform.

Looking back at 2019.

NM implemented in 2019 a new organisational structure to respond better to the revised NF Regulation. The new structure was built to support a high-performing, agile and scalable operational network.

We saw the launch of significant business improvement initiatives with the Airspace Re-structuring programme, the Operational Excellence programme and the review of the NM Long Term Investment Plan (LTIP). As the main ingredient of the latter, the integrated Network Manager – iNM - programme is designed to move NM's legacy systems towards digital products based on an open digital platform. These business initiatives, even if at this point in time tend to be overshadowed by the current crisis and crisis mitigation actions, are crucial to the post crisis transformation.

En-route ATFM delay improved in 2019 to 1.57 min/flt, 9% decrease over 2018. This was due to the positive effect of the EUROCONTROL/NM Action Plan (eNM/S19) implementation developed in partnership with operational stakeholders, and to the decrease in weather and disruption delays. There was less volatility in the network during the summer season. Despite the improvement, the achieved en-route ATFM delay was well above the target of 0.5 min/flt.

Capacity and staffing issues in some ACCs were still the main bottlenecks in the network. Karlsruhe and Marseille UACs had capacity shortage for the last two years. Vienna and Budapest ACCs struggled with recurrent staffing issues throughout the summer.

External factors such as airspace restrictions and volatile geo-political situations continued to create disruptions in the network.

Departures from the airports in the network increased by 0.6% in 2019. While total airport ATFM delay increased by 1.7%, the average delay per flight remained stable at 0.60 minutes per flight due to the relative increase in traffic.

The traffic increase slowed down in 2019, especially towards the end of the year that saw a traffic decrease in the last three months. Despite this slowdown, 2019 traffic showed another record traffic level, increasing by 0.9% over 2018, reaching over 11.1 million flights.

The integration of airports into the network continued in 2019 through the Airport Collaborative Decision Making (A-CDM) programme. Lisbon airport became a fully implemented CDM airport, making 27 A-CDM airports connected to and exchanging data with NMOC, covering 35% of the departures in the NM area.

There were a number of system implementations in 2019, notably the new ATM system in Bucuresti ACC, ATM system upgrades in Beograd ACC and Zurich ACC. There was no major network impact from these events.

The New Istanbul airport became operational on 05 April 2019 with no generated ATFM delay.

Notable is also that NM together with the European Aviation Crisis Coordination Cell (EACCC) organised the 2019 European wide crisis management exercise on the topic Pandemics. This tabletop exercise simulated the EACCC coordination and communication of the European response in case of a Pandemic crisis.

To conclude, the partnership that we have built in the thriving traffic situation of 2019 has grown to unprecedented levels of cooperation and thrust for the recovery. We now need to leverage further to achieve effective decision making through the evolution of the CDM process and to redefine the priorities according to scalability, environment and cost effectiveness, based on the COVID-19 outcome.

TABLE OF CONTENTS

1. NETWORK MANAGER BUSINESS EVOLUTION

1.1 BACKGROUND

The European Union established the Network Manager[1] (NM) under the Single European Sky (SES) II package agreed in 2009 to perform the tasks necessary for the execution of the network functions. NM coordinates the various network functions in order to develop consistent short and long-term optimisation solutions to have seamless European airspace, better managed at network level, compliant with the performance objectives.

The NM's strategic objectives are outlined in the Network Strategy Plan (NSP). The NSP and the Network Vision for the second reference period (RP2) and beyond were approved by the EC Decision No 4660 in July 2014.

NM's own performance targets and objectives are described in the Network Performance Plan (NPP). The current NPP covers the RP2 of the SES performance scheme (2015-2019), and was formally approved by the Commission Implementing Decision (EU) 2016/1373 of 11 August 2016.

NM works closely with airlines, air navigation service providers, civil/military airspace users and airport operators to create the operational partnerships needed to achieve the SES performance targets for all States included in the pan European 'network' [2].

This is NM's[3] annual report covering its activities in 2019.

NM regulatory framework evolution

The year 2019 was the year that NM made the transition towards the next decade: new SES implementing rules for the network functions and performance updated the tasks and responsibilities of the NM, which entered into force in January 2020. The European Commission re-appointed EUROCONTROL to carry out these tasks for 2020-2029. EASA certified NM as the provider of the network functions in line with revised Network Functions (NF) and Oversight Regulations.

2019 is also the year that NM changed leadership, since July 2019 Iacopo Prissinotti is the new Director NM.

The revised rules for the air traffic management (ATM) network functions (revised NF regulation) are defined in Regulation (EU) 2019/123 of 24 January 2019. The new Regulation combines the provisions of both the previous NF Regulation (Commission Regulation (EU) No 677/2011) and the ATFM Regulation (Commission Regulation (EU) No 255/2010). It also includes new provisions such as monitoring of the performance of the network infrastructure, provision of tools, processes and consistent data, including flight plan processing, European data management systems and aeronautical information relevant for the execution of the network functions. The Cooperative Decision Making (CDM) processes provide for more robust procedures and an escalation process in case of lack of commitment by operational stakeholders.

The **performance and charging scheme for RP3** (2020-2024) is defined in Commission Implementing Regulation (EU) 2019/317 of 11 February 2019. It defines the arrangements for the SES performance activities, with specific provision for NM both in terms of its own performance requirements as well as supporting the Commission and States in implementing the scheme. In the framework of this regulation, NM developed the Network Performance Plan for RP3, which includes a set of (key) performance indicators specific for the network functions. NM consulted on the new NPP with NM stakeholders and staff associations. The NPP was endorsed by NMB at the end of September 2019. The NPP for RP3 was submitted to the European Commission and PRB in line with the Performance Regulation RP3 requirements.

EUROCONTROL started the process of renewed appointment as Network Manager for RP3 and RP4 (2020-2029) in July 2018 in a response to an invitation by the European Commission. The Commission Implementing Decision (EU) 2019/709 of 6 May 2019 on the appointment of the Network Manager for air traffic management (ATM) network functions of the single European sky concludes the process of appointment of EUROCONTROL as NM.

NM Certification

It is another fundamental pillar that NM has achieved during 2019.

The certification process started in July 2018, when NM submitted its application for certification to EASA in the framework of the Regulation (EU) 2017/373. A combined initial certification and continued oversight programme was proposed and carried out by EASA in 2019. The process was completed in November 2019 when EASA issued the Service Provider Certificate to EUROCONTROL.

1 Commission Regulation (EU) 677/2011 of 07 July 2011 laying down detailed rules for the implementation of air traffic management (ATM) network functions (NF regulation)

2 States include: EU Member States, non-Member States that are members of EUROCONTROL or have concluded an agreement with the Union on the implementation of the Single European Sky or are participating in a functional airspace block.

3 As requested by article 20 of NF regulation

1.2 BUSINESS IMPROVEMENT INITIATIVES

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.

Airspace Re-structuring programme aims to develop an optimised airspace structure. It includes the design of an optimum airspace structure, Free Route Airspace (FRA) with a route network below FRA, the definition of optimum sectorisation (including cross-border sectorisation) and identifying the operational resources needed to deliver the required network performance. The airspace projects will include cross-border FRA and consider long-term military and other national requirements.

NM will put in place an **Operational Excellence programme** to identify and implement best in class operations and deliver minimum common operational capabilities among all stakeholders. The process is planned to be finalised by mid-2020. Quick win projects will be identified and implemented as from 2020/2021.

NM developed the **Long Term Investment Plan** (LTIP), to provide an outlook of activities, their impact on the cost-base, as well as the benefit for users. Risks inherent to major investments were addressed and mitigations identified. NMB endorsed the LTIP in June 2019. The main role of LTIP was to deploy a new NM platform with an open architecture that delivers performant and efficient services meeting the business needs of NM stakeholders. In order to implement the LTIP, NM launched in July 2019 a modernisation programme.

The **integrated Network Manager** – **iNM** - project is designed to move NM's legacy systems towards digital products based on an open digital platform. Through it, NM aims to stay at the forefront of the ATM environment. While the programme will span ten years until 2029, it involves the incremental renewal of all NM's main operational systems, putting in place a service-oriented architecture in which new components will run in parallel with legacy systems, with the first deliverables expected in 2023. NM organised an iNM industry day in December 2019 presenting the technical, operational and business requirements to the industry. NM published the call for tender in February 2020.

The proposal for the future Airspace Architecture of the European airspace (known as **Airspace Architecture Study** - AAS) was released on 5 March 2019. It defines how Europe's airspace architecture should look in the medium to long-term (2025-2035), and what practical steps would need to be taken to make it a reality. NM provided its contribution on all operational aspects related to the study, notably airspace design, operational excellence and operational performance evaluations.

EASA
European Union Aviation Safety Agency

SERVICE PROVIDER CERTIFICATE

REFERENCE: EASA.AOA.NF.001

Pursuant to Implementing Regulation (EU) 2017/373 and subject to the conditions specified below, the European Union Aviation Safety Agency hereby certifies

EUROCONTROL
Rue de la Fusée 96
1130 Brussels
Belgium

as a service provider with the privileges, as listed in the attached service provision conditions.

CONDITIONS:

This certificate is issued subject to the conditions and the scope of providing services and functions as listed in the attached service provision conditions.

This certificate is valid whilst the certified service provider remains in compliance with Implementing Regulation (EU) 2017/373 and the other applicable regulations and, when relevant, with the procedures in the service provider's documentation.

Subject to compliance with the foregoing conditions, this certificate shall remain valid unless the certificate has been surrendered, limited, suspended or revoked.

Date of issue: 27 NOVEMBER 2019

For the European Union Aviation Safety Agency,

Patrick KY
Executive Director

EASA Form 157 – Issue 4 © European Union Aviation Safety Agency. All rights reserved. ISO9001 Certified. Page 1 of 2
Proprietary document. Copies are not controlled. Confirm revision status through the EASA-Internet/Intranet.

The European Commission thereafter requested SJU, NM and EUROCONTROL to develop a transition plan addressing the operational and technical dimension of the AAS. NM focused on addressing the full cross-border FRA implementation, the airspace restructuring and operational excellence parts of the transition plan. Hotspots to be addressed in the short-medium term have been identified. The transition plan was presented to the High Level SES Conference in September 2019.

Other **Business Initiatives** were progressed during 2019 to improve the business delivery of NM functions and services to stakeholders.

- The review of the IT setup and governance of IT continued and a structure was put in place within NM to ensure meeting the stringent operational requirements and enabling synergies in the future.

- All activities now covered by the revised NF Regulation are now integrated in the NM work programme and budget. These were previously in the Network Services and DECMA work programmes.
- NM managed the challenging situation in relation to the migration to the New Pan-European Network Service (NewPENS) where, due to delays in migration, transition costs were higher than expected.

The NM Human Resources Policy aims to improve the knowledge, skills and capabilities of staff, harnessing their talent to help them achieve their potential. NM renewed its focus on the development of its staff. NM launched a series of initiatives to develop further the managers' skills, empowering them to become change leaders. NM created a pool of high potentials to enable the transformation of NM towards an even more collaborative and change oriented organisation.

1.3 NM RISK MANAGEMENT

Identifying and mitigating risks on the European ATM network is one of NM's highest priorities. The NM Risk Management process covers risks to the NM work programme delivery and to NM business continuity, including those derived from network performance, safety and crisis risks. NM business risks are regularly reported to meetings of NDOP and NMB.

The full loss of the flight plan service (IFPS) is a high-impact risk. Following the NM system outage of 3 April 2018, NM conducted a full review of the back-up solutions needed to ensure the continuity of service, and identified the need to improve resilience at two levels: the communication links between NM and the aviation world; and at the level of the IFPS system itself. The following mitigation measures are in the process of being implemented:

- (MUAC ANg1 messaging gateway) is in the process of being implemented and connected to the COM centres that allow the exchange of flight plans and other messages between NM and the aircraft operators, airports and ANSPs. A critical mass of COM centres will be connected to this gateway by October 2021. This new communication link will improve the resilience by taking over the workload if the other communication links become unavailable.
- The iNM Call for Tender will specify the required additional continuity needs at the application level.

A paper dedicated to this risk was submitted to NMB/27.

The Cyber Security risk refers to a partial or complete unavailability of NM services due to a cyberattack. As part of the NM Security Management System, NM deployed its Security Operations Centre (NM SOC) on 3 December 2019.

The risk to miss the certification of NM by EASA was managed throughout the year until the certification was announced by EASA at the meeting of the Provisional Council on 28 November 2019.

2. GOVERNANCE MATTERS

2.1 GOVERNING BODIES AND ARRANGEMENTS - NM SUPERVISION

The Network Management Board (NMB) was established to adopt measures related to the governance of the network functions and to monitor their performance. In light of the adoption of Regulation (EU) 2019/123, in addition to the regular tasks, the NMB took several strategic actions and decisions to ensure timely compliance with this revised Regulation as of 1 January 2020.

The NMB held regular meetings in April, June and December 2019. NMB/24 in April 2019 acknowledged the positive opinion by the Single sky committee on the proposal by the European Commission for the next appointment of Eurocontrol as Network Manager for the years 2020-2029. NMB/24 approved the EUROCONTROL NM/ANSPs action plan for Summer 2019 and supported the Vision and the Strategic Objectives of the Network Strategy Plan 2020-2029. NMB/24 approved an ATFM delay attribution procedure as part of the cooperative decision making processes.

As part of the monitoring of the implementation of the Eurocontrol NM/ANSPs Summer action plan, NMB supported the summer weekly coordination call with operational stakeholders catering for the tactical needs of the network. The regular coordination also provided for a quick escalation process. NMB also empowered the Network Directors of Operations to ensure operational leadership for the network and to implement the operational excellence and airspace restructuring projects.

Implementing its regular programme, the NMB approved a number of key strategic deliverables including: the NM Work Programme, the Annual Report 2018 and endorsed the 2020 budget, and the NM Long Term Investment Plan, the Network Strategy Plan 2020-2029 and the Network Performance Plan for RP3. To ensure compliance with the revised NF Regulation, the Board adopted an updated Cooperative Decision Making document, covering the new tasks assigned to the Network Manager, revised Rules of procedure for the NMB and updated terms of reference of the NDOP. As 2019 was the last year of the previous mandate of the NM and the NMB, the appointment of the chairperson and the members and their alternates of the NMB for 2020-2024 was decided through Commission implementing Decision 2019/2168 of 17 December 2019.

In 2019, the Network Directors of Operations (NDOP) selected Mr. Xavier Benavent Navarro from the Spanish ANSP as its new chair, and NMB approved. NDOP focused both on the mitigation of the capacity issues through the progression of the Eurocontrol NM/ANSPs action plan for Summer 2020 and on the planned structural changes with the Operational Excellence and Airspace Restructuring programmes. NDOP would be the driving force for the implementation of these two programmes.

NDOP supported the strategic decision-making by the NMB on operational matters and enabled inter alia the decisions on Network Strategy Plan, the monitoring of the ATM infrastructure and the common network support services to be provided by Eurocontrol NM. NDOP also supported the implementation of the update of the NM cooperative decision-making with the approval of the revised and streamlined terms of reference for the technical teams (NETOPS, Safety, and Airport Operations in 2019).

NMB supported the establishment of the Network Directors of Technology and Infrastructure working group (NDTECH), under NMB governance. The first preparatory meeting of the group took place in February 2020 inter alia to prepare draft terms of reference for NDTECH for approval by the NMB.

The NM CDM and associated teams (NETOPS, AOT, AIM/SWIM, Safety, CNS Infrastructure) provided expert input and coordination within the scope of the NM functions. These teams are open to experts from all NM's stakeholders and are tasked with developing and reviewing specific technical and operational NM proposals at expert level. They are supported by appropriate expert substructures. NM started the development of a common portal and calendar of all groups and teams forming the NM CDM process, that became operational in early 2020.

Stakeholder Cooperation

The 22nd **NM User Forum** held on 30-31 January 2019 had one major issue to tackle: how to manage summer 2019 together. The lessons learned from the difficult operational situation in 2018 were used to design a wide range of solutions and mitigation measures to manage summer 2019 better. The participants also discussed how to do better weather management based on the collaboration between ANSPs and the Network Manager. Improving network predictability and reducing volatility was also presented.

The **Network Cooperative Decision Making** (CDM) were revised to make them compliant with the requirements of the revised NF Regulation 2019/123. A first draft of the amended network CDM processes document were presented to NDOP and NMB at the end of 2019.

These processes will cover all the current topics included in the Network CDM plus the new tasks assigned to the NM through the revised NF Regulation. The update of the working arrangements and their terms of reference will happen in stages: first the consultation on the said arrangements before proceeding to the approval process via the appropriate bodies.

According to the continuous oversight programme, the European Aviation Safety Agency (EASA) conducted three NM oversight audits from April to September 2019. These audits focussed on the Certification of the Agency as Network Manager. NM responded to the identified areas for improvements through dedicated action plans, which were overseen by EASA to confirm their appropriateness and sufficiency, to identify and mitigate the existing risks. At the end of this work no findings remained open. An unscheduled EASA audit for the NewPENS was performed on 25-27 November 2019, no findings were raised.

To date, EASA has not identified any significant NM non-compliance (i.e. level I finding) with applicable requirements or organisational procedures and manuals in their continued oversight programme. In 2019, EASA issued "Letters of Acceptance" for the deployment of two key NM releases. The condition on testing on the operational platform raised in 2018 is still applicable. In total around twenty eight safety-related changes were notified to EASA for the continuous improvement of the NM functional system, most of them went through EASA review and exchanges on NM safety and technical documents.

NM also actively contributed to the EASA Eurocontrol Roadmap execution in 2019.

During RP2 NM continuously improved the safety management system (SMS) implementation and maturity, as confirmed by EASA review. A new safety maturity measurement took place in February 2020 and the results show that target was achieved (to be validated by EASA).

2.2 NM BUDGET

NM and the dedicated NMB Task Force prepared the 2019 budget and the multi-annual Work Programme in line with the requirements of the amended NF Regulation and reflected in the relevant NM CDM process. The Single Sky Committee (SSC) gave its positive opinion on the 2019 NM budget during SSC/70. At its ad-hoc session on 25 October 2018, the Network Management Board agreed that the endorsement process for the 2019 NM budget would be handled in a written procedure. NMB authorised the Chairman to endorse the budget after fulfilment of the two conditions set at NMB/22 and following a positive opinion from SSC/70. Once the Chairman had endorsed the budget, the PC/50 was informed to approve the Agency budget, including Part IX. The 2019 NM budget was therefore formally endorsed by the NMB Chairman through a letter sent to all NMB Members on 28 November 2018. The approved NM budget for 2019 is 183,515K€.

The budget covers all activities falling under the Network Manager[4]. It excludes the activities carried out by the NM Directorate which are not covered by the network management functions and parts of the transversal activities that are conducted for the benefit of other EUROCONTROL Agency activities.

2.3 INVESTMENT, EXPENDITURE AND REVENUES

The approved NM budget for 2019 is well within the cost efficiency target included in the NM performance plan. The approved NM cost base for 2019 is 183,515M€, which is lower than foreseen in the NPP (223.56M€). This is the result of savings and cost reductions made in the previous years. Hence, NM will meet the cost efficiency target for 2019 by staying within its approved budget.

The 2019 annual accounts of the Network Manager were certified by external accountants. The tables below show the budgetary outturn, cost base and contributions compared with the plan. The 2019 execution is at 181.66M€, 1.85M€ below the approved cost base.

NM took measures during the execution of the budget in 2019 to stay within the approved Cost Base. Especially the delay in the implementation of the New-PENS leading to a longer and more costly transition from the current PENS had to be addressed. The staff costs did not exceed the planned costs.

The cost per service unit was 1.06€, 4 cents lower than 2018, a 4% reduction.

[4] It includes activities from the amended NF regulation, notably safety management; EAD activities were taken out from NM budget since 2014 as they are not included in the NF regulation.

DESCRIPTION OF EXPENDITURE AND RECEIPTS	BUDGET PART IX	OUTTURN PART IX	UNUSED PART IX	% OUTTURN PART IX
LAND & BUILDING EQUIPMENT & SOFTWARE	4,515,000	4,040,796	474,204	89.5%
TOTAL CAPITAL EXPENDITURE	**4,515,000**	**4,040,796**	**474,204**	**89.5%**
STAFF	89,686,000	86,891,376	2,794,624	96.9%
ETS	2,155,000	2,167,347	-12,347	
PBO			0	
OTHER OPERATING COST	34,840,000	35,584,882	-744,882	102.1%
COST OF CAPITAL: INTERESTS PAID TO BANKS	93,000	2,706	90,294	2.9%
DEPRECIATION	602,000	316,950	285,050	52.6%
INDIRECT COST CHARGED	27,689,000	26,531,600	1,157,400	95.8%
ALLOCATION OF PAST CHARGED TO PART IX	20,313,000	20,313,000	0	100%
COMPENSATION FOR NATIONAL TAX	12,883,000	14,199,581	-1,316,581	110.2%
TOTAL OPERATING EXPENDITURE	**188,261,000**	**186,007,442**	**2,253,558**	**98.8%**
STAFF CONTRIBUTIONS	-1,173,000	-1,023,708	-149,292	87.3%
SALE OF ASSETS			0	
SALES OF SERVICES AND GRANTS	-708,182	-430,535	-277,647	60.8%
RECEIPTS FROM MOROCCO & ISRAEL	-2,864,818	-2,864,818	0	100%
FINANCIAL RECEIPTS	0	-24,667	24,667	100%
TOTAL RECEIPTS	**-4,746,000**	**-4,343,728**	**-402,272**	**91.5%**
COSTBASE	**183,515,000**	**181,663,714**	**1,851,286**	**99.0%**
INTERNAL TAX	-26,166,000	-25,308,755	-857,245	96.7%
TOTAL CONTRIBUTIONS	**157,349,000**	**156,354,959**	**994,041**	**99.4%**

3. NM ACHIEVEMENTS IN 2019

The performance targets and objectives are captured in the **Network Performance Plan** (NPP). Full 2019 results were presented to NMB and are part of a separate document "Report on the Implementation of the NPP and NSP".

Network Capacity

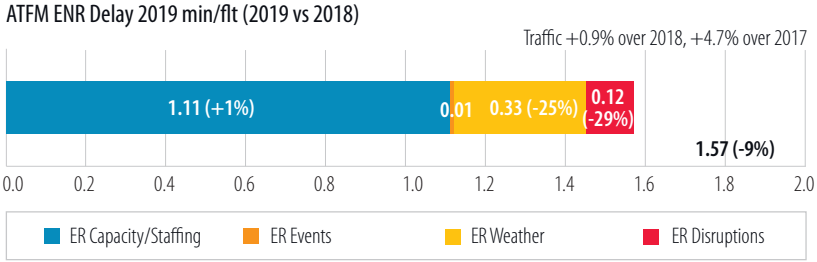
The main performance indicator is the en-route ATFM delay measured in minutes per flight.
En-route ATFM delay improved in 2019 to 1.57 min/flt, 9% decrease over 2018. This was due to the positive effect of the EUROCONTROL/NM Action Plan (eNM/S19) implementation, and to the decrease in weather and disruption delays. The eNM/S19 Action Plan was developed and implemented in close cooperation between NM and affected ANSPs, using the NM CDM process. There was less volatility in the network during the summer season. Despite the improvement, the achieved en-route ATFM delay is well over the target of 0.5 min/flt.

Capacity and staffing issues in some ACCs were still the main bottlenecks in the network. Karlsruhe and Marseille UACs had capacity shortage for the last two years. Vienna and Budapest ACCs struggled with recurrent staffing issues throughout the summer.

External factors such as airspace restrictions and volatile geo-political situations continued to create disruptions in the network.

The traffic increase slowed down in 2019, especially towards the end of the year that saw a traffic decrease in the last three months. Despite this slowdown, 2019 traffic showed another record traffic level, increasing by 0.9% over 2018, reaching over 11.1 million flights.

More details in Chapter 4, section Operations Planning.



NM's contribution to delay savings

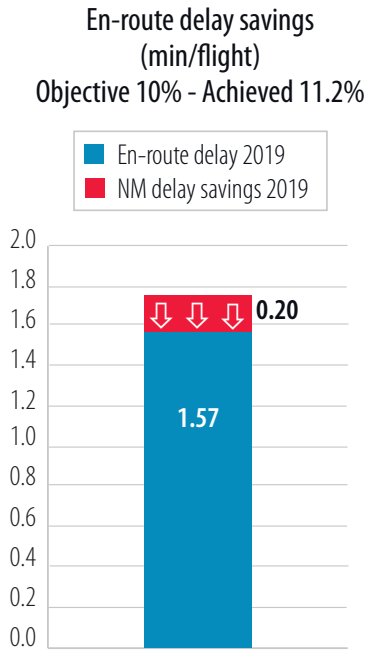
The NPP defines a range of indicators so that stakeholders understand NM's added value for ATM network performance. The main objective for NM is to reduce the total en-route ATFM delays by 10%.

NM delivered on its commitment to reduce both en-route and airport delays.

In 2019, en-route delay savings exceeded 2,200,000 minutes from direct actions in NM Operations Centre (NMOC) (1,930,000 min) and re-routings proposals (RRPs) proposed and followed by airlines (270,000 min). Together these are equivalent to 0.2 min/flt – without this, the delay in 2019 would have been 1.77 min/flt. This equates to 11.2% of the annual network en-route delay, meeting the 10% objective.

During RP2 period NMOC delivered 8.4 million minutes of en-route delay savings.

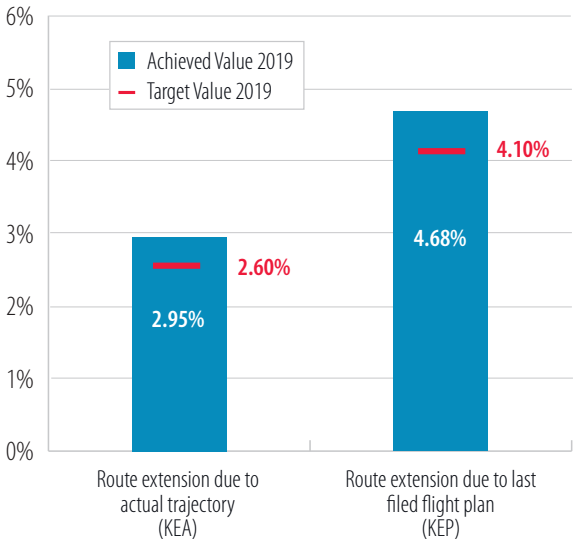
Delay savings were calculated conservatively, only taking into account RRPs and NMOC direct action (i.e. force CTO/CTOT and override slot).



Environment - Flight Efficiency

The NPP has two environment targets. The corresponding indicators are based on route extension from an optimum defined by the great circle distance, one due to the actual flown route (KEA) and the other due to the last filed flight plan (KEP).

The flight plan indicator KEP for SES slightly improved in 2019 reaching 4.68% in 2019, a reduction of 0.04pp over 2018. It is however still above the target of 4.1%. On the other hand, the KEP for NM area showed an increase of 0.04pp, reaching 4.63% in 2019. This is due to inefficiencies at the interface of NM area with neighbouring States caused by the on-going crises in Ukraine, the Middle East, and south Mediterranean. Some new arrival trajectories in the terminal area influenced the results. These trajectories sit outside of the 40 nautical miles circle defining the limit of en-route part of trajectories and as such are captured in the KEP indicator.



The actual trajectory indicator KEA deteriorated in 2019. The SES value of 2.95% was above the target of 2.6%. Some of the change over 2018 was due to technical issues that impacted the quality of the radar plots received. The extension of the flight profile used to calculate KEA to cover NM area revealed the inefficiencies of a number of flights avoiding restricted airspaces outside NM area.

In addition, operational issues related to lack of capacity, weather and industrial actions also affected negatively KEP and KEA in 2019.

The impact of strikes amounted to around 0.7 million nautical miles (less than 2018 value) while the Ukraine crisis amounted to over 2.2 million nautical miles lost in 2019.

The eNM/S19 measures (re-routes and flight level caps) had an impact on fuel burn on the city pair routes affected by the measures. The routes impacted by re-routing measures (3% of the daily traffic in the network) resulted in an additional flight length per flight of 1.62 nautical miles and an average increase of 10.5 kg fuel/flt compared to 2017. Those affected by flight-level restrictions (4% of the traffic) had a slightly higher increase of 11.6 kg/flt. These figures may also capture some of the other factors affecting flight efficiency on those city pairs, i.e. they are an approximation of the effect of the Route Availability Document (RAD) restrictions. The overall environmental impact of the eNM/S19 initiative is estimated to be at 16 thousand tonnes of additional CO2. A scenario with no NM measures for the summer 2019 would generate 4.01 min/flt in the network and would ultimately have a much higher environmental impact of around 8.8 million tonnes of CO2.

On the other hand, fewer industrial actions than 2018 and the continued implementation of Free Route Airspace (FRA) had a positive impact on flight efficiency.

The improvements in airspace design show that the airspace structure and the procedures implemented allow an efficient use of the airspace. At the same time, they indicate that there is a shift in traffic due to differences in user route charges that impact both flight efficiency and traffic predictability. Until 2019, the route charges for the provision of air navigation services were calculated from the planned route, which is the basis for KEP. This will change in 2020 from the flight plan to actual trajectory, which is the basis for KEA. This can trigger a change in the airline behaviour and can influence the dynamic of KEP vs KEA.

The NM supported the airlines to optimise their flights from a flight efficiency perspective. The group re-routing tool (GRRT) provided better opportunities not only for refiling shorter and more efficient routes but also to allow airlines to identify possible inefficiencies in their flight planning. Re-routing proposals (RRPs) for flight efficiency were provided to the airlines that opt-in for this service.

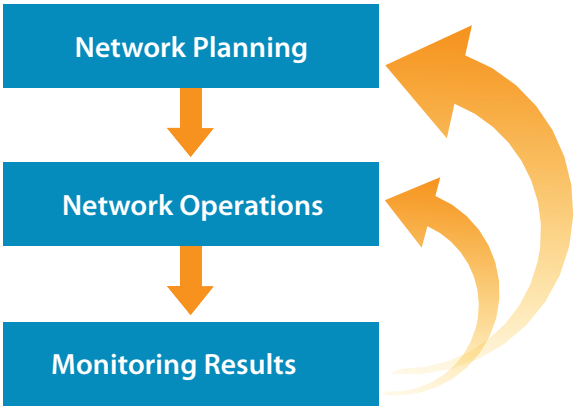
The NM combined GRRT and RRP mechanism delivered savings of more than 60,000 nautical miles in 2019. While the combined proposals made exceeded the 5% objective of the NM flight efficiency savings, due to low acceptance rate the confirmed route changes matching the proposals were much lower than the objective.

Full coverage of the Network Performance is addressed in the Network Operations Report 2019[5].

[5] Published at https://www.eurocontrol.int/publication/annual-network-operations-report-2019

4. NM AREAS OF ACTION

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.



NM safeguards the general interest of the network and applies its network focus when analysing the real operational issues.

Monitoring and reporting

NM presented regular, timely and accurate reports on the overall performance of the network to NDOP and NMB throughout 2019.

A continuous monitoring of results against targets and/or objectives triggered remedial action by the internal NM Performance Steering Committee, when required.

One of the innovations introduced this summer was the weekly Summer Coordination Cell organised with ANSPs and airspace user directors of operations. This considerably helped the effectiveness of the proposed measures.

NM published regular Network Operations reports to stakeholders. The NM interactive reporting tool, ATFCM statistics and ATFM compliance data support NM stakeholders in their analysis of operational, performance and ATFM compliance tasks.

NM collected and provided ATM performance data to the EC and the Performance Review Body (PRB) in the framework of the Performance Regulation.

NM implemented in 2019 new tools to enable its stakeholders to monitor and analyse the operational performance.

The **network dynamic operational analysis tool - Dynamo** uses big data technology to enable the flow management staff to analyse the dynamic and root causes of the issues impacting the ATFM measures: over and under-deliveries, volatility.

The **network operations real time indicator tool (NORTI)** provides live updates on key performance indicators of the network (ACC capacity- sectors, airline punctuality, ATFM and schedule delay, traffic), with focus on both capacity and demand.

It provides a dynamic view of the impact of network events (ATM and non-ATM) on the daily operations of ACCs, airlines and airport operators.

Network Planning

Operations Planning

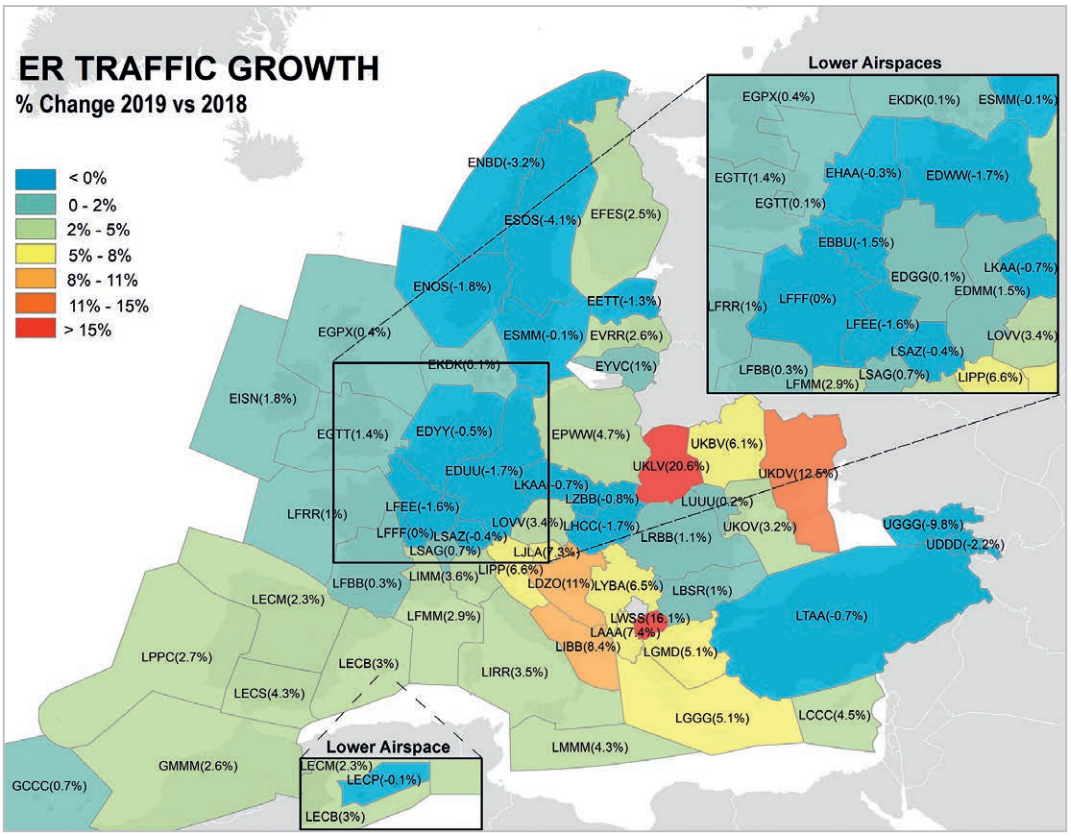
The Network Operations Plan (NOP) implements the Network Strategy Plan on an operational level and is a key NM deliverable. The NOP 2019-2024 provides a short to medium-term outlook of how the ATM network will operate, including expected performance at network and local level. NMB approved the NOP on 27 June 2019.

NM produced traffic forecasts in February and September 2019 in support of operational planning. It quantified the capacity of the network, identified individual ACCs' needs and provided operational performance forecasts for delivering the ATFM function. This was done in close cooperation with ANSPs, which gave further input to the operational measures identified.

EUROCONTROL/NM Action Plan was the main package of measures to mitigate the issues in bottleneck areas during summer 2019. Enhanced NM/ANSPs Network Measures for Summer 2019 continued the previous year NM/4ACCs initiative, enlarged to other ANSPs to address their expected problems. It focused on Karlsruhe UAC, MUAC, French ACCs/Spanish ACCs interfaces, as well as at some interfaces in Central Europe. The large set of ATFM measures were aimed at reducing summer delays by removing traffic from congested areas, either by rerouting or level-capping flights. The traffic re-routing objective of the initiative was well achieved and airlines were spared much of the disruption of the previous summer.

The Action Plan also addressed the sector opening schemes and rostering, management of en-route weather, harmonisation of FUA application and enhanced FUA procedures, optimisation of ATFM regulations, and structural airspace bottlenecks.

NM estimates a scenario with no NM measures for the summer would have generated 4.01 min/flt in the network.

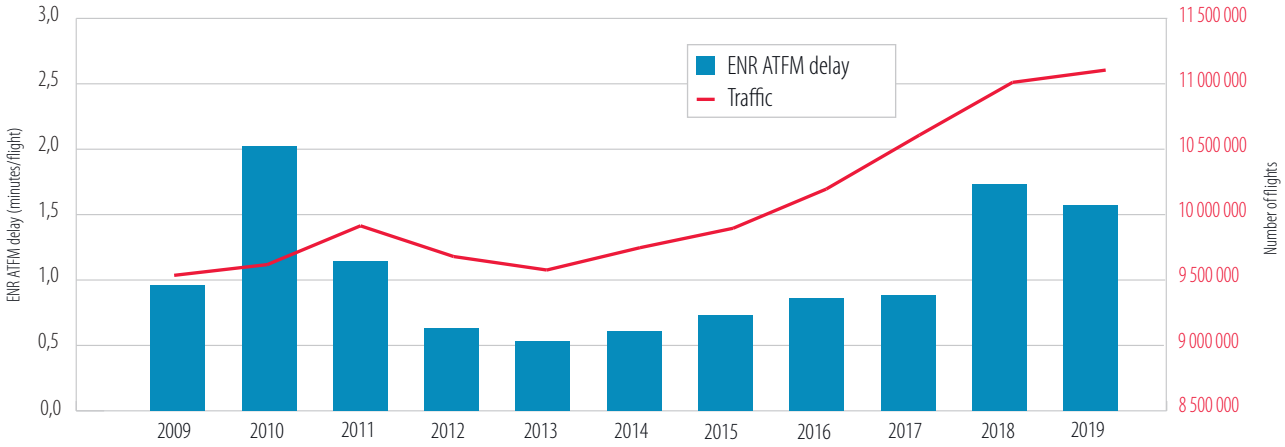


NM developed an action plan that proposed additional local measures for Austria, Belgium, Cyprus, Czech Republic, Maastricht UAC, France (Bordeaux, Brest, Reims and Marseille ACCs), Germany (Bremen ACC, Karlsruhe UAC, Langen ACC), Greece, Hungary, Slovakia, Spain (Barcelona ACC), Sweden (Malmo ACC), and Switzerland (Zurich ACC).

Network traffic increased by 0.9% in 2019, which was below the low forecast of February 2019 (1.2%), driven by a more moderate economic growth, unexpected events such as the grounding of the B737 MAX, the decline of some domestic flows in Nordic States, the fall-off of touristic flows towards South-West Europe. Towards the end of the year, a number of airline failures also pushed the traffic down. ACCs in southern Europe and west Balkans registered the highest growth during 2019.

The en-route ATFM delay in 2019 was 1.57 min/flt (all reasons included), which was below the NOP's annual

Traffic and ENR ATFM delay



delay forecast of 2.46 min/flt (including industrial action and technical disruption). However, this delay forecast does not include the effects of the network orientated ATFM and weather related measures as included in the EUROCONTROL/NM Action plan. It does not include either the effects of the daily activities of the NMOC aimed at delay reductions. As expected, all those measures would bring the delay below the 2 min/flt.

In addition fewer weather and industrial action delays made the difference to the 1.57 min/flt.

Fourteen ACCs had higher delays than forecast (only capacity, staffing, events and weather reasons). Fifty seven ACCs recorded fewer delays than forecast. The main differences are in the chart below.

In 2019 the effective capacity indicator increased by 2.3% over the whole European ATM network, when compared to 2018 (3% for the summer season).

Major ATM changes

NM prepared a **transition plan for major projects** as part of the NOP and continuously updated the plan during 2019.

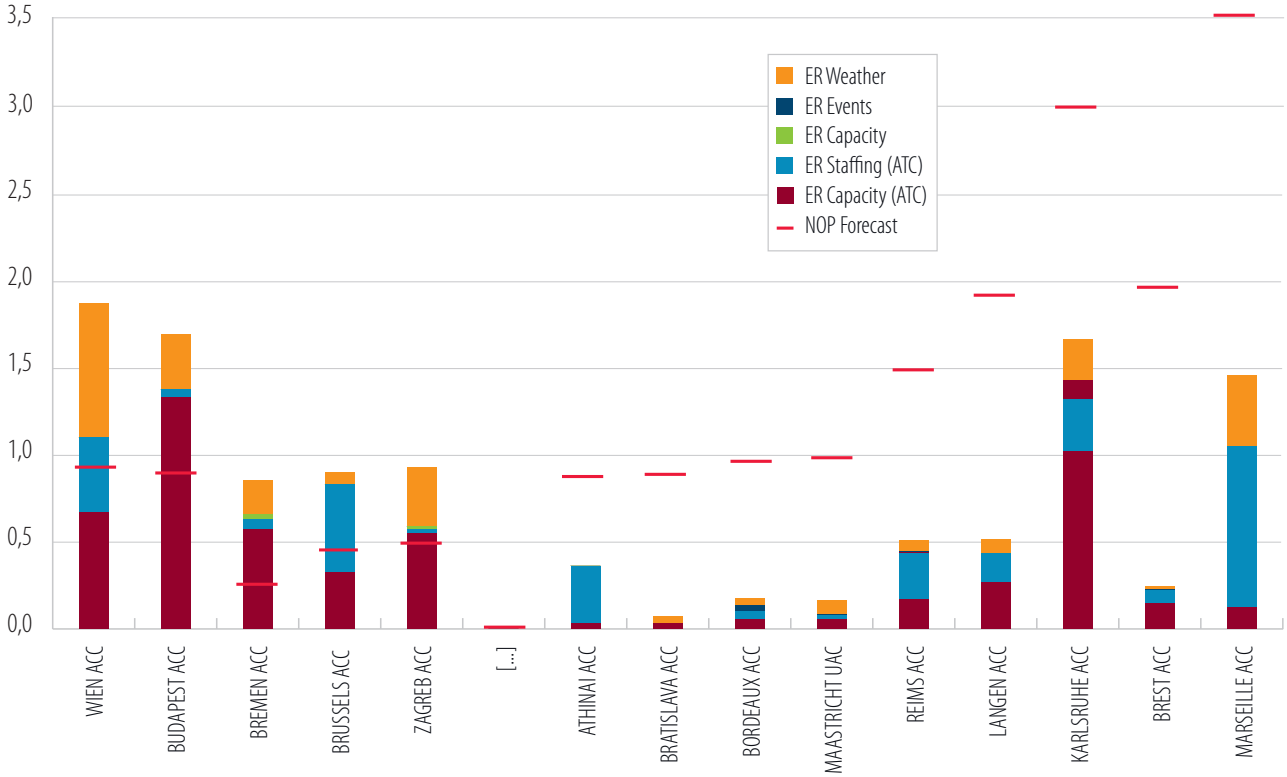
There were a number of system implementations in 2019, notably the new ATM system in Bucuresti ACC, ATM system upgrades in Beograd ACC and Zurich ACC. There was no major network impact from these events. Events accounted for 0.01 min/flt, the lowest in RP2.

The New Istanbul airport became operational on 05 April 2019 with no generated ATFM delay.

Functional Airspace Blocks

NM has established cooperation with all the FABs to facilitate harmonised developments, operational interconnectivity between the FABs and within the FABs and

2019 En-route Delays, Achieved vs Forecast
Capacity, staffing, events and weather reasons



at European network level. NM experts continued to be involved in several FAB working groups to facilitate the development of plans and their implementation. This was particularly relevant with the implementation of the FRA initiatives within or between all FABs and the launching of the Airspace Re-structuring project.

Route Network Design

The European Route Network Design (ERND) function facilitates, within the European Route Network Improvement Plan (ERNIP), the development of an airspace structure offering the required level of safety, capacity, flexibility, responsiveness, environmental performance and seamless provision of expeditious air navigation services. The ERNIP is part of the NOP, and is a key NM deliverable. The NMB approved several updates to various ERNIP parts.

NM's ERND function was executed in close cooperation with States and ANSPs to ensure that the European airspace can accommodate additional capacity needs. More than 156 airspace improvement packages were developed and implemented in the twelve months prior to summer 2019. This helped ensure that the airspace design performance indicator achieved its objective. Thirthy nine ACCs achieved full 24hrs FRA implementation (see map below).

Cross-border FRA was implemented in 2019 by countries in northern Europe, southeast, and central southeast Europe as well between the Danish-Swedish FAB, MUAC and north-eastern part of DFS's free route airspace in Germany.

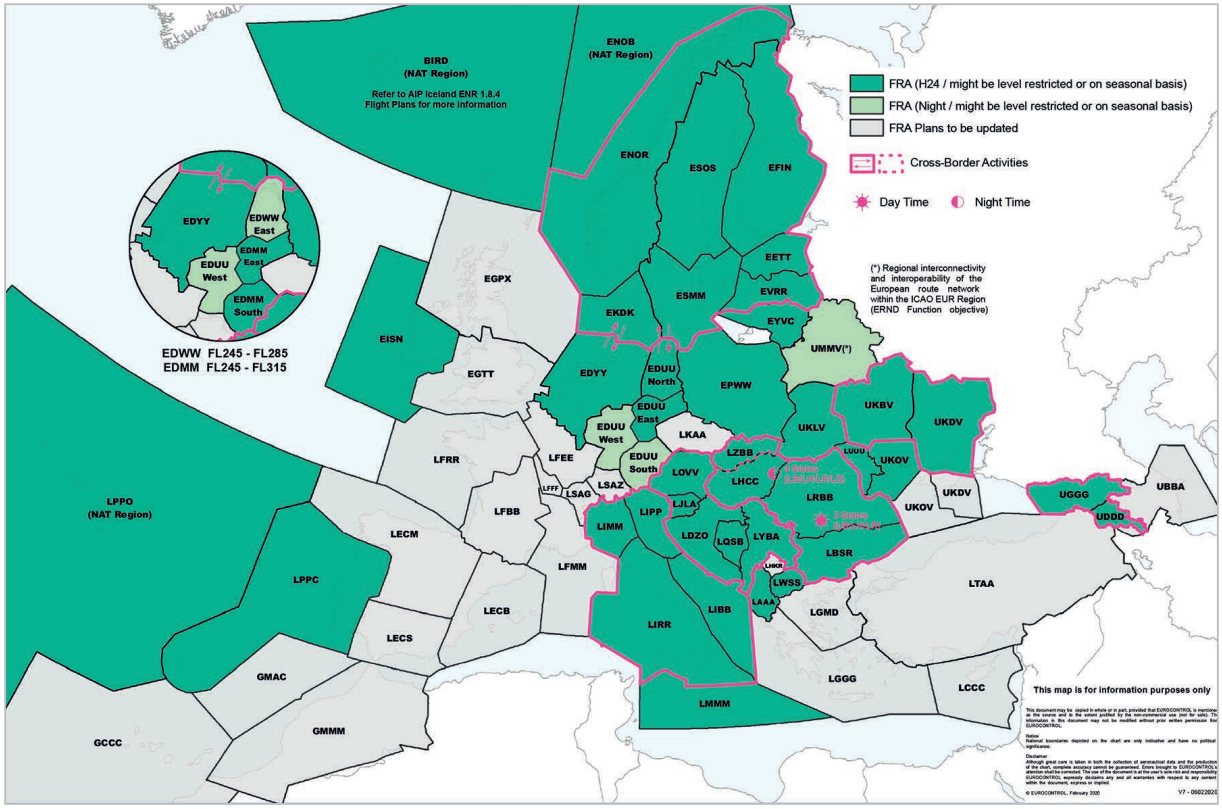
Network Operations

The NM Operations Centre (NMOC) delivers core operational services across several domains. NMOC's main function is network flow and capacity management but it addresses a number of other functions such as flight planning operations, ATM access gateway, the airport function, and crisis and contingency management.

NMOC concentrates on anticipating problem areas and providing network solutions using CDM processes and its mature network flow management procedures.

In the preparation of the summer season, NM implemented in May 2019 several changes to improve the effectiveness of e-Helpdesk service: access for Tower (TWR) and Flow Management Position (FMP) users, prioritisation, and automatic processing. This enabled NMOC to digitalize 130 phone calls per day. Moreover the average time taken to treat a request halved in 2019 vs 2018 and waiting times on the phone decreased by 27%.

Free Route Airspace Implementation - End 2019



On average NMOC received 1017 e-Helpdesk requests per day, with a peak of 3118 requests on 27 July.

NM worked in close cooperation with the ANSPs to deliver delay savings throughout the year. It includes direct actions (i.e. force CTO/CTOT, override slot, and re-routing proposals) from NMOC staff, which exceeded 2,200,000 minutes for en-route and 580,000 airport delay savings. NMOC also supported FMPs with their own direct delay savings actions. Delays were also saved by other cooperative capacity optimisation techniques and pre-tactical planning, but these savings are not currently quantified. NMOC worked with the operational stakeholders to improve the planning of ATFM regulations, leading to fewer rectifications and less volatility in the network.

At the Weather Forum in May 2018 an agreement was made that NM should organise a network level procedure combining a single view weather forecast for the network and collaboration to ensure better planning and management of convective weather.

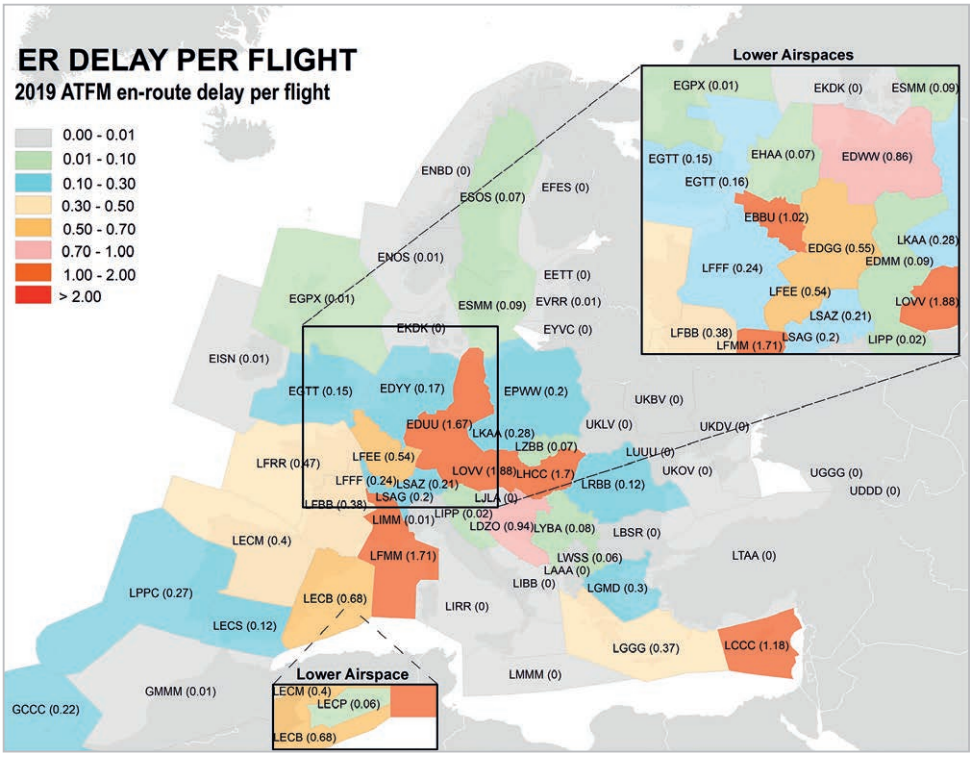
A short trial held in summer 2018 was enlarged and improved for summer 2019 to four ANSPs covering Benelux, Germany, southeast UK and eastern France. The participating meteorological providers, organised by European Meteorological Services Network (EUMETNET), produced a single view forecast of convective activity. This forecast allowed initial collaboration at D-1 to improve situational awareness amongst participants and implement some basic planning: re-routing, changes to military activity and some staff redeployment. D-1 activity was followed up on the operational day with further collaboration to confirm or adapt plans as required.

Feedback from participants showed an increase in situational awareness and confidence. A reduction in the amount of weather delay and volatility of allocated delay was recorded. Although this could be attributed to a general reduction of weather delay across the network during summer 2019, it should be noted that the reduction in delay and volatility was greater in the area where the network level procedure was applied.

Further enhancements are expected in summer 2020, including an expanded coverage and a greater emphasis on tactical operations. It is also anticipated that aircraft operators will become more involved during next summer.

The map below presents the 2019 en-route ATFM delays (min/flt) for all the ACCs within the NM area (represented by the ICAO four letter code).

Karlsruhe, Marseille, Vienna and Budapest ACCs combined caused 47% of all en-route ATFM delays. Karlsruhe and Marseille UACs experienced continued capacity shortage. Vienna and Budapest ACCs had recurrent staffing issues throughout the summer.



Airports

Departures from the airports in the network increased by 0.6% in 2019. While total airport ATFM delay increased by 1.7%, to a daily average of 18,317 minutes, the average delay per flight remained stable at 0.60 minutes per flight due to the relative increase in traffic. Airport capacity and weather contributed with 71% of the total airport delays.

The integration of airports into the network continued in 2019 through the **Airport Collaborative Decision Making (A-CDM)** programme. Lisbon airport became a fully implemented CDM airport, making 27 A-CDM airports connected to and exchanging data with NMOC, covering 35% of the departures in the NM area. In 2019, Tenerife North and Valencia airports connected to NM as Advanced ATC Tower airports, making 25 airports in total, covering close to 10.5% of departures in the NM area. NM now receives departure planning information for almost 46% of departures in the NM area.

During RP2, 13 airports connected to NM as A-CDM airports (more than 13% of the departure traffic) and 19 airports connected as Advance ATC Tower airport (9.5% of the traffic).

The summer 2019 was once again challenging for Greek airports. Due to the long-standing nature of the problems at the Greek island airports, NM activated the airport function within the NMOC, which provided tactical support on hot-spot airports.

The **First Rotation Hours Optimisation Trial** (FROT), addressing recurring ATFM aerodrome capacity arrival regulations in Zurich airport during wave three (from 10:40 to 13:15) continued in 2019. Compared to 2018 the total ATFM delay minutes due to Zurich aerodrome capacity regulations during wave three increased by 27% but remained 37% below the baseline year of 2016. The feedback from SWISS Airlines showed that an improved management of ATFM arrival delays contributed to an improved passenger connectivity during wave three. However, more flights were flight planned to arrive more than 15 minutes ahead of the airport arrival slot.

The **Runway Throughput Solution Package** supports stakeholders in selecting and deploying the most beneficial operational solution and associated level of automation.

RECAT-EU, the European Wake Turbulence Distance Separation Minima, developed by EUROCONTROL and

accepted by EASA, is fully operated at Paris-Charles de Gaulle and London-Heathrow and partially operated at Leipzig-Halle and Toulouse-Blagnac, delivering up to 10% runway throughput increase, while also increasing operational performance and resilience.

Time-Based Separation (TBS) in operations at London-Heathrow offers a solution to mitigate the headwind causing delays and flight cancellations; it also enables a more consistent separation delivery performance thanks to **optimum runway separation delivery** (ORD) prediction capability.

The deployment of TBS-ORD is ongoing at several European airports in compliance with the Pilot Common Projects (PCP) Regulation. To complete the solution package, ROCAT (categories of aircraft types defined per runway occupancy time) and EAP (enhanced approach procedures) enable runway capacity, environment and flight efficiency gains in both peak and night operations at airports.

The diversion capabilities information provision, part of the Enhanced Information Exchange (EIE) process, allows the NMOC to request the diversion capabilities of airports in the tactical phase of operations. Such requests were launched 15 times by the NMOC in 2019, while the emergency reporting process was not required.

On request of Airports Council International (ACI) EUROPE, NM has taken the lead in three projects for AOP-NOP connection under the Central European Facilities (CEF) calls 2015/2016/2017, all three of them were successfully awarded. However, it was identified that the concepts required further validation and development for operational maturity, which is leading to some delay. Following the reorganisation of NM in 2019 and the integration of the airport units within the Agency, preparations have been put in place with the airport partners to restart the three projects in 2020 at full pace.

Special Events

The Network Manager cooperated closely with the North Atlantic Treaty Organization (NATO) and military authorities from several States in the preparation and coordination of several large scale military exercises. These preparations meant that such exercises led to a minimal impact on network operational performance.

Industrial Action

There were fewer industrial action delays in 2019. There were 827,000 minutes of direct en-route delays from industrial action plus 68,000 minutes of indirect delays in the neighbouring ACCs due to on-loaded traffic. This represented 5.1% of en-route delays, down from 7.7% in 2018. Flights planning to avoid affected areas added 700,000 nautical miles to their trajectories. France contributed most of this delay, followed by Belgium and Italy. NM undertook specific actions to manage disruptions and mitigate their effect. In doing so it collaborated with ANSPs, military authorities and airspace users.

Network Crisis Management

The European Aviation Crisis Coordination Cell (EACCC) held two meetings in 2019: April and October.

EACCC maintains the Risk Register listing the risks for ATM in Europe that could lead to an aviation network crisis as well as the risk assessment and their associated mitigations.

EACCC members review and endorse the Risk Register at each formal meeting. The Risk Register is shared with the States Focal Points via the EACCC website to be used for:

- Local preparedness - guidance on where to concentrate resources
- Network preparedness - inform EACCC of raised risk

During RP2, EACCC reached a higher level of maturity and further strengthened its effectiveness. In this period, EACCC was activated once, in March 2016, in response to the Brussels terrorist attacks. Each year EACCC was involved in at least one crisis management exercise. Regular EACCC meetings and annual workshops with State Focal Points were held traditionally in Brussels in June. In addition, a regional workshop with State Focal Points was organised in Belgrade, Serbia, in November 2016. In order to strengthen links between crisis management and communication experts, an event 'Communicating in Aviation Crisis' was held in Podgorica, Montenegro, in April 2018.

State Focal Points (SFPs)

The EACCC has taken several initiatives to support the preparedness of SFPs on national crisis management issues and the readiness at national level to provide good support to the EACCC. To that effect several actions have been undertaken.

SFPs Workshop
The annual workshop for EACCC State Focal Points (SFPs) took place on 18 and 19 June 2019 at EUROCONTROL Headquarters, bringing together Aviation Crisis

Management State Focal Points from 20 States, members of the EACCC and of the Aircraft Operator Aviation Crisis Coordination Cell (AOCCC). The workshop focussed on elaborating an amendment to the EACCC Rules of Procedure as well as on reviewing the EACCC risk register.

SFPs Training
In support of SFP preparedness one-day training sessions focusing on the role of EACCC in general and the role and tasks of SFPs in particular are held. In 2019, two such training session took place (March and June).

Disruptions and crises

In 2019 a number of disruptions impacted the European network that did not require activation of the EACCC. During these events NM was in close contact with the operational stakeholders directly concerned to ensure appropriate mitigations could be put in place.

Crisis exercise

Pandemics
The EACCC organised the crisis manager exercise on 26-27 February 2019: EACCC19 PANDEMICS. This table-top exercise simulated the EACCC coordination and communication of the European response in case of a Pandemic crisis.

The exercise was attended by 70 participants including members of EACCC, the 15 participating States and their ANSPs, aircraft operators, airport operators, EC European Centre for Disease Prevention and Control (ECDC), DG Sante, and Secretariat General/External Relations/Crisis Unit, expert organisations (IATA, ICAO, WHO) and the Network Manager Operations Centre. The exercise tool support was provided by the EC Joint Research Centre.

The main lessons learned from this exercise were as follows:

- Exercise objectives were achieved due to good preparation by all participants and strong network and relationship between health and aviation experts.
- The EACCC factsheet used as a primary means in Pandemic crises was considered relevant in terms of content and distribution means.
- EACCC SFPs need to establish contact with their national IHR and CAPSCA (if existing) focal points to ensure early information exchange in case of a Pandemic.
- States should ensure that information about their designated airports under the international Health Regulation (IHR) are published in their aeronautical publications and updated via NOTAM as appropriate.
- Although entry screening of passengers by the workshop was not considered to be a good mitigation from health perspective, it might still be used based on political considerations. The procedures to run departure checks vary between States and what to do with suspected cases is not clear. The legal basis for screening and quarantine is not defined.
- Media is likely to have a significant influence on events in case of Pandemic both towards the public and to the political decisions made. A communication strategy was therefore considered essential.
- Guidance of which passenger data should be available from airlines to health authorities would be beneficial.

Given the COVID-19 pandemic in 2020, the exercise could not have been more timely.

Volcanic Ash
Europe regularly exercises the impact of volcanic ash on the European ATM network. These exercises (VOLCEX) are normally held yearly under the hospice of ICAO EUR/NAT office in Paris co-lead with the Eurocontrol Network Manager. The 2019 exercise, VOLCEX19, took place 20 November 2019 with active involvement of the EACCC through teleconferences.

The ICAO Volcanic Ash Contingency Plan for the European and North Atlantic region (NAT/EUR VACP) was significantly updated in 2016, reflecting the Safety Risk Assessment approach (SRA) taken by the EU following the events back in 2010.

This approach is based on ANSPs and Regulators allowing aircraft operators to decide where to flight plan and fly in situations with predicted Volcanic Ash. Whilst no aircraft operator will fly in areas with high concentration levels of ash, there are different forecasts of concentration levels and of the location where ash could be during a volcanic eruption. The SRA approach therefore transfers the responsibility and decision on where/if to fly to the aircraft operators.

However, despite the ICAO VACP update in 2016, all European States have still not fully implemented the SRA approach adopted by ICAO. Given the fact that there are regular volcanic eruptions in Europe and considering the likely impact on the European aviation network, it is important that the SRA approach is effectively implemented by all European States.

It is equally important to underline also that even if the SRA approach is fully implemented by all States, certain volcanoes still have the potential to cause major disruption to the European ATM network. For example, the

conclusion of the VOLCEX19 exercise was that 2,000 flights would be rerouted and 7,700 flights would be cancelled for one single day of exercise (to be compared with approximately 28,000 flights per day).

Operations under difficult network conditions

Network and local operations continued to be affected by extraordinary events in Ukraine, Syria, Libya, Iraq with heightened tension in the area of the Hormuz strait added. NM worked with airlines, ANSPs, ICAO and the adjacent regions to find mitigating solutions for these disruptions for both the planning and operational perspective. Notably, major efforts were made by Turkey to continuously adapt to changing operating conditions at the Eastern interfaces and by Cyprus that has experienced intensive military activity within Nicosia FIR.

Developments in operations and infrastructure

The main vehicle delivering new or updated key functionalities for the NM operational system is the NM system release. NM Releases 23 and 23.5 were implemented in 2019 including changes related to the evolution of existing business services, but also to the introduction of new business services and new technologies.

Building on last year's changes, several new developments took place to implement into operations the extended DPI concept. They also improved the existing collaboration processes with A-CDM airports: CTOT extension request via ATC DPIs, CTOT re-allocation, flight activation in NM systems.

Collaborative Traffic Management (CTM) developments improved the network cherry pick procedure, extended the flight arrival information included into NM Business-to-Business (B2B) services, supported the coordination between the FMP and aircraft operators (AO) on proposed Short-Term ATFCM Measures (STAM). NM System is able now to detect filed flight plans containing large flight level differences (the so-called Yo-Yo profile). Information on these flight plans will be available to AOs concerned and FMPs through the flight list, that can be used by AOs and FMP in CDM process in order to agree on follow-up actions. The goal is to increase the level of predictability in tactical operations.

Several improvements were implemented for the ASM function, notably in the area of CDR expansion and the management of FUA restriction grouping and complex restrictions.

The Flight Activation Monitoring (FAM) has further reduced the time limit that triggers the suspension of a flight that is not reported as airborne (down to 20 minutes). This change will improve network predictability and reinforce the compliance of flights with route and airspace availability.

The flight efficiency area saw several developments in support to Flight Plan and Flight Data Evolution, in order to provide filing of Flight and Flow Information for a Collaborative Environment (FF-ICE) flight plans in Flight Information Exchange Model (FIXM) format. The alternative re-routing tool available to AOs was improved to allow the easy selection of ATFM regulation, airspace or point they would like to avoid.

Changes were implemented to improve the effectiveness of the e-Helpdesk service: access for TWR and FMP users, prioritisation, and automatic processing.

A new IFPS function is able now to detect and reject duplicate flight plans, which helps to have a more accurate picture of the traffic demand.

The implementation of the n-CONECT project in 2019 continued with the first operational version of the RAD@n-CONECT application, which enabled the coordination of the update of the RAD document. This included the design and changes to the RAD restrictions, as well as measuring the impact of the proposed restrictions. The national and local RAD Coordinators training for the new application took place and a transition phase is foreseen until the next release (NM24.0). The new Airspace application provides airspace data to National RAD Coordinators and a new map component. The preparation of the collaboration tools and interfaces (with FMP and AO) took place.

For the new AO interface the stakeholder consultation took place on 05 June 2019; two other design Webex meetings were conducted. The stakeholder consultation for FLOW application took place on 08 October 2019. n-CONECT B2B services were further delayed due to lack of development resources.

The MIRROR tool improves the situational awareness of the user by combining the commercial flight schedule with NM system data. The tool is in testing by the AOLO (Aircraft Operator Liaison Officers) in NMOC. This allows the user to better assess the knock-on effects of network events on the daily flight schedule of an airline or airport.

The implementation of the big data infrastructure continued in 2019.

NM Infrastructure Monitoring

Revised NF Regulation requires NM to monitor the performance of the infrastructure relevant for the execution of the network functions. NM reinforced its efforts to carry out pre-operational and post-operational monitoring of specific infrastructure services. The objective is to identify operational (and technical) problems for subsequent analysis. NM did preparatory work towards the delivery of these new NM services by January 2020. The steps being taken to Initial Service Delivery (IOC) are:

- adoption of service specification,
- documentation of safety and security related aspects as necessary,
- processes development and adaptation,
- working arrangements and CDM adaptations.

Some services will require additional developments before full operational capability can be achieved.

5. NETWORK SAFETY

NM has a safety approach to network operations built around a harmonised ATM network safety management system (SMS) and ensuring a 'just culture' within the ATM network. NM and stakeholders have developed and deployed SMS best practices, operational safety improvement tools and methods, and learning and sharing of safety knowledge across the network. They have also promoted 'just culture' as a key enabler for improving European aviation safety.

2019 NM Top 5 SAFMAP study - Geographical representativeness

One of the main activities of NM in the network safety domain is the identification of the operational safety hazards at network level and the assessment of the associated safety risk. The 'Top 5' process identifies those operational hazards that have network-wide commonality and require network-wide consolidation of knowledge by all actors because of the low probabilities of occurrence, spread of the knowledge and sensitivity of the detailed information needed.

During 2019 a new exercise was undertaken with ANSPs (see map), within the context of NM safety prioritisation process, to re-prioritise the operational network risks, with Safety Functions Maps (SAFMAPS) barrier models maintained by NM. Based on the conclusions of the incident data analysis, the prioritisation was:

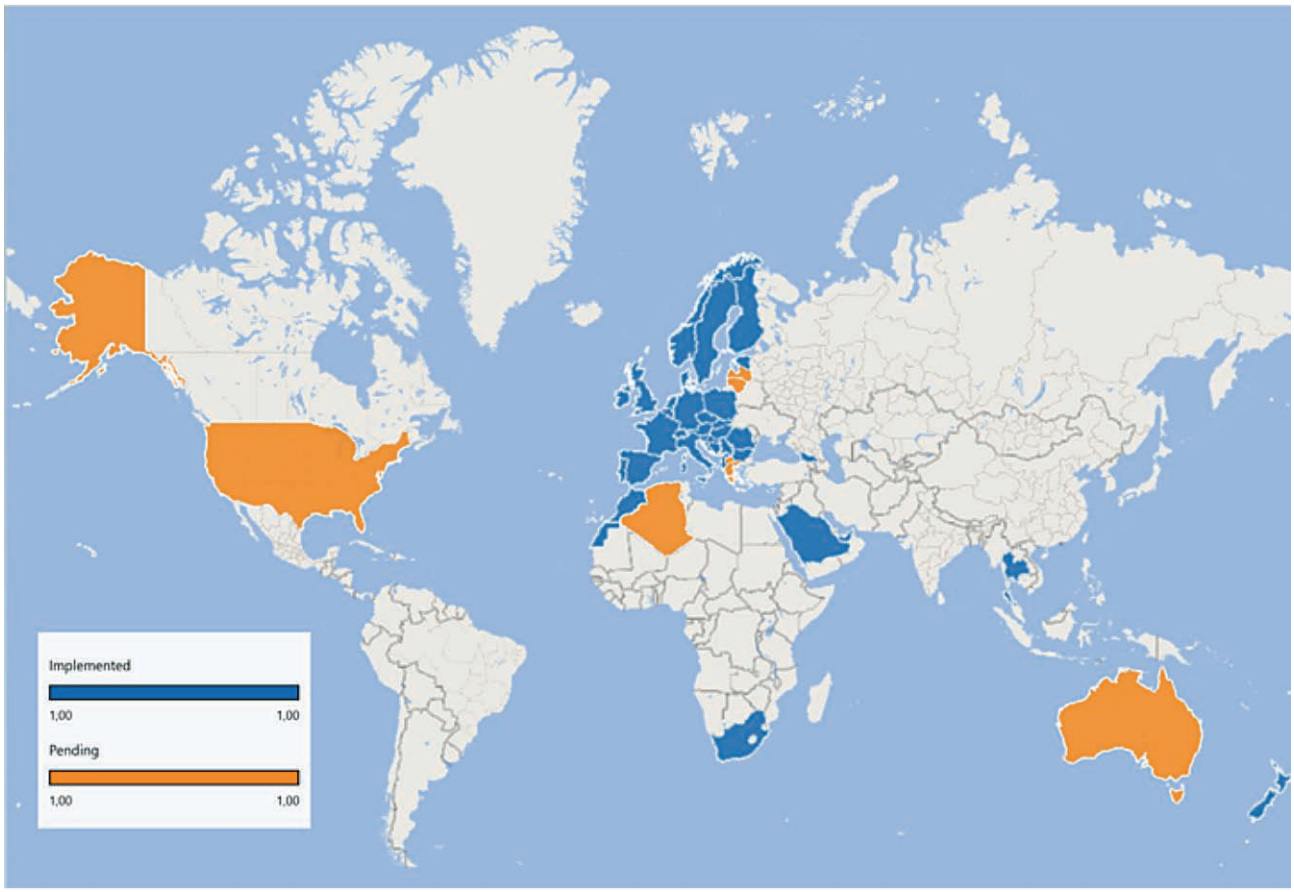
- the top 5 safety priorities: Controller Blind Spot, Airborne Collision Avoidance System Resolution Advisory (ACAS RA) not followed, Flight without transponder or with a dysfunctional one, Sudden, high energy runway conflict and Controller detection of potential runway conflict and,
- to monitor the risk associated with: Controller workload, Inter-sector and inter-unit coordination, Adverse weather avoidance, ATC planning and traffic synchronisation, The availability and use of controlled airspace infringement alerting, and analyse further its potential in airspace infringement risk reduction, Low-level go-around conflicts with previous departing aircraft, VFR flights in TMA/CTR airspace, Vehicles participation in runway incursion incidents, Events that cold have been prevented by stop-bars, and The availability and use of SMGCS and analyse further its potential in runway collision prevention.

NM contributed operational safety improvements, including the NM Top 5 safety priorities in the network, to EASA ATM Collaborative Analysis Group (CAG) and, where appropriate, to:

- General Aviation CAG for airspace infringements,
- Commercial Air Transport CAG for runway incursions and runway excursions action plans,
- Human Factors CAG for broader human performance and human factors issues, and
- Network of Analysts group for taxonomy alignment and broader operational safety issues.

Overall NM and EASA cooperation in safety improvement is focusing on the ATM input into EASA European Plan for Aviation Safety (EPAS).

NM provided support to its stakeholders in the context of Performance Regulation and RP2 safety KPIs and safety targets. The web version of the NM Risk Assessment Tool (RAT) supports the severity assessment of ATM safety occurrences. The RAT tool is part of a wider suite of tools called eTOKAI - the Tool-kit for ATM occurrence investigation. eTOKAI is a web-based application, which helps



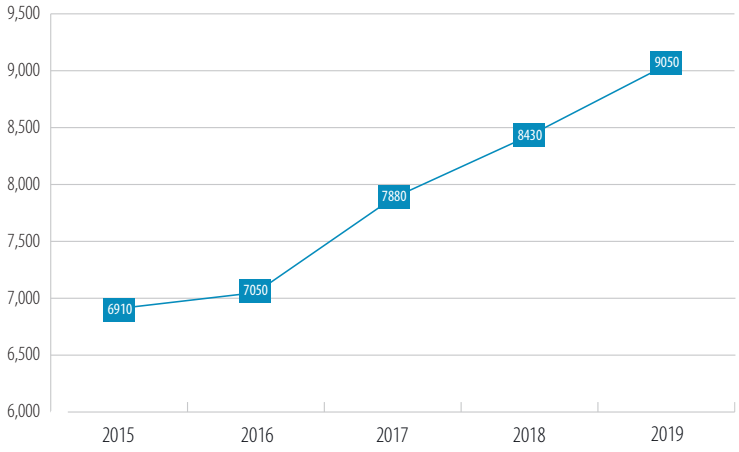
TOKAI/RAT implementation

ANSPs manage the entire safety occurrence investigation process: notification, investigation, storage, analysis and reporting, and in doing so ensure compliance with EU Regulation 376/2014 on reporting occurrences in civil aviation and with the Performance Regulation. The data is fully compatible with the EC taxonomy as used in ECCAIRS tool, enabling the exchange of safety occurrence data.

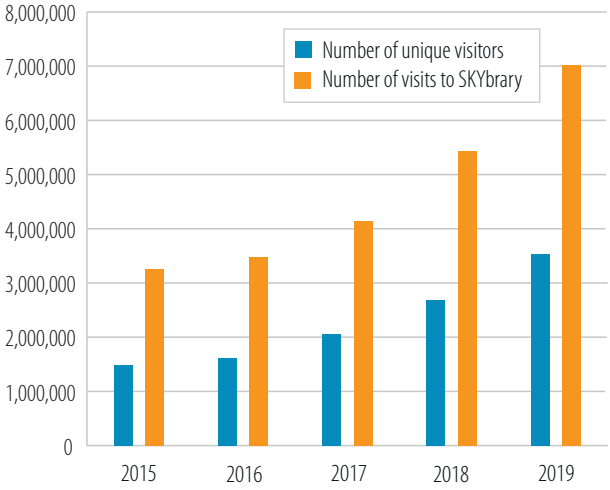
TOKAI is a one-stop-shop for complying with these regulations and the development is steered by users. At the beginning of RP2 there were just a handful of ANSPs using the application. Presently there are more than 80 ANSPs using eTOKAI (see map). While no two installations, two templates or reports are alike, eTOKAI ensures that all these local requirements are integrated seamlessly. In addition, the large usage of the tool brings an unprecedented level of harmonization of taxonomies and commonalities between investigations with an ongoing sharing of experience in using the tool.

SKYbrary is a web-based electronic repository of safety knowledge related to ATM and aviation safety that allows risk identification and management based on gathering, sharing and learning from safety knowledge acquired by aviation organisations. It continued to thrive in 2019 with more than 5.8 million visits (see charts opposite). The SKYbrary content grew in 2019 by another 7% by means of developing new risk articles and SKYclips, and integrating other safety deliverables in the operational risks categories, including NM 'Top 5' risks, and on the bookshelf. The new SKYclips are short animation videos that cover a wide range of operational aviation safety topics and deliver key messages to the front line operators – pilots, controllers and vehicle drivers at airports.

SKYbrary content growth



SKYbrary user community growth



Just Culture (JC) enables improved reporting and lesson learning, which are important for improving safety – it is also a safety KPI in the Performance Regulation.

The Just Culture achievements during 2019 and during full RP2 include:

- Adoption of a new Just Culture Model Policy for prosecution for aviation and railways.
- two just culture 'expert' courses each year were run in association with International Federation of Air Traffic Controllers' Associations (IFATCA) and European Cockpit Association (ECA) that aim to produce a pool of aviation 'experts' who can interface with national judiciary. At the end of 2019 a total of 252 experts (amongst which 65 ATCOs, 47 pilots, 99 judiciary and 41 observes/organisers/moderators) have successfully undertook the Prosecutor Expert Course.
- Two just culture "expert" courses run in association with ERA (European Union Agency for Railway) to adopt the same approach as in aviation for railways.
- Three to four regional roadshows or workshops were held annually to 'show and sell' the Just Culture Model Policy and the 'expert' course.
- Annual Just Culture Conferences "Continuing to learn from each other" brought in average 150 experts every year from judiciary, aviation, railway, maritime and health care.
- Deployment of the Just Culture climate questionnaire to gauge the implementation of Just Culture at organisation (ANSP) and national (Civil Aviation Authorities and judicial) level in conjunction with SMS Standard of Excellence.
- A first Just Culture repository and knowledge centre is available on Skybrary
- NM continued to improve the just culture as part of its internal SMS covering all staff, including those working in NM's operational areas.

The "Experience Sharing to Enhance SMS (ES2)" programme covered a range of SMS related topics: best practice in NM safety management tools, human factors and system safety thinking, and just culture and judiciary system. ES2 2019 events covered topics such as: CEO Safety Conference (May 2019 – Copenhagen – 97 participants), 373 Regulation WS (Brussels – January 2019 - 65 participants), Bi-annual System Thinking and Human Factors Conference (Madrid – October 2019 – 150 people in attendance). During RP2, more than 1500 experts and decision makers have been attending Operational Safety, Safety Management, Human Factors, System thinking events. Materials and content from all ES2 events are available on SKYbrary.

HindSight is a magazine produced by the Operational Safety Group of the Safety Team. Its main function is to share the experiences of controllers who have been involved in ATM-related safety occurrences, to broaden their experience of problems encountered and solutions available, and hence enable all ATCOs to be better prepared should they encounter similar occurrences themselves. Around 8,000 copies of each issue are circulated globally annually to air traffic controllers, aircraft operators, airlines, user associations, aerodromes, heads of ACCs, and working groups. In the last two years, the magazine addressed various subjects such as goal conflicts and trade-offs, changing to adapt and adapting to change, competency and expertise, safety at the interfaces - collaboration at work.

6. SCARCE RESOURCES

The Radio Frequency Function (RFF) and Transponder Code Function (TCF) were established in 2012. The NMB approved the CDM arrangements that govern both functions.

Radio Frequency Function

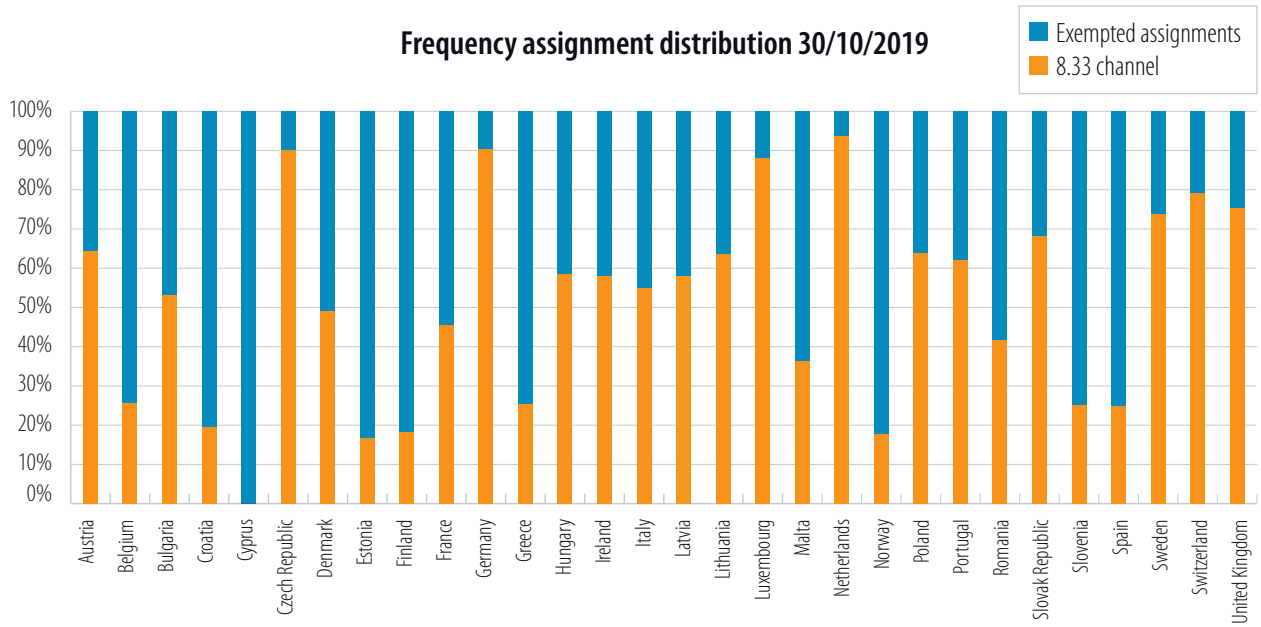
One of the main objectives of the RFF is to prevent shortage of frequencies of the European aeronautical radio spectrum through improvements in frequency management.

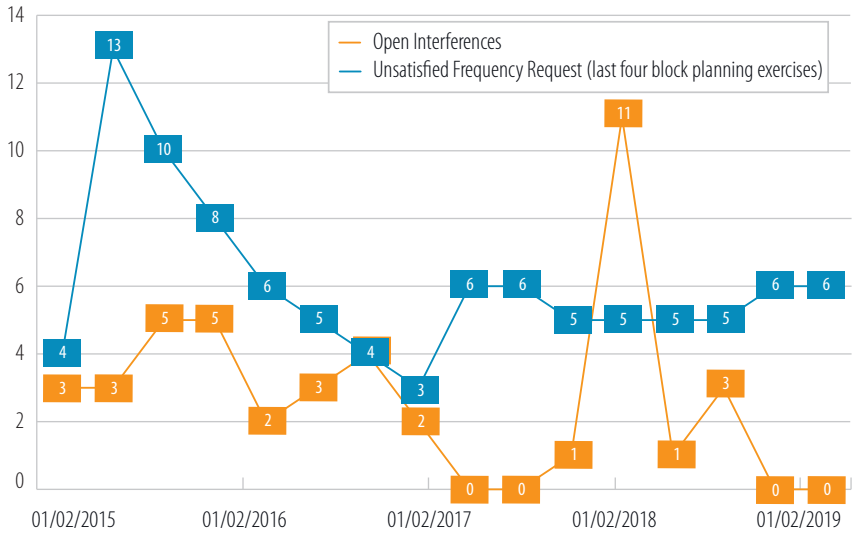
The continuous implementation of 8.33 kHz below flight level FL195 has enabled NM to satisfy again all requests for new aeronautical voice frequencies in Europe in 2019. Despite the considerable increase in frequency demand, this high satisfaction rate confirms the NM assessment of the benefits of the 8.33kHz channel spacing deployment below FL195.

The following chart provides the number of 8.33kHz spaced channels vs. 25kHz frequency assignments (i.e. exempted assignments) in each EU member state.

The NM Radio Frequency Function (RFF) has launched activities to maximise the benefit from the 8.33 kHz conversions to ensure they enable the satisfaction of all frequency requests for many years to come. This will be achieved via the development of new software tools supporting enhanced frequency management procedures agreed by the Radio Frequency Function group (RAFT).

In 2019, the Radio Frequency Function has continued to provide support to the National Frequency Managers by coordinating monitoring activities, by contributing to the resolution of reported radio interferences and by performing local studies to satisfy complex frequency requests.





Evolution of interference cases and unsatisfied frequency demand in the RP2 period

Transponder Code Function

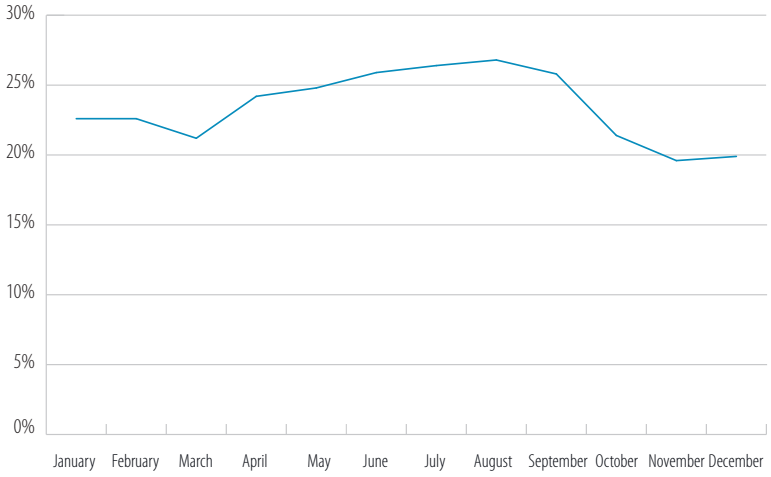
The introduction or extension of multiple technologies continued to contribute to the optimisation of the transponder codes usage in Europe. NM objective, as part of TCF, is to provide enough codes to the users, to cope with increasing air traffic and changes in traffic flows, and avoid allocating wrong or conflicting transponder codes. The transponder codes are used for aircraft identification.

The Centralised Code Assignment and Management System (CCAMS) entered into operation in February 2012. By the end of 2019 one more State joined CCAMS, raising the number of States that implemented CCAMS to eighteen, namely: Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Denmark, Estonia, Finland, Ireland, Lithuania, Moldova, Montenegro, Poland, Portugal, Norway, Serbia, Sweden, Ukraine and the United Kingdom. It should be noted that CCAMS also benefits non-CCAMS States as it reduces the number of code changes due to crossing different participating areas (see the graph; these figures are based on the current radar data provision to NM that have the SSR code included).

Approximately 60.23% of the daily flights receive an SSR code from CCAMS.

No cases of wrong codes assigned by CCAMS were detected by the monitoring tools and reported by the operational users. On average 22 code conflicts were detected daily for the NM area (there were 29 such code conflicts in 2018).

Average daily number of code changes
Percentage of total flights 2019



Another technology that contributed to the optimisation of the code usage was the Mode S radar technology that supported the capability to use the downlinked aircraft identification, which continued to progress in 2019. Approximately 16.03% of the daily flights used the conspicuity code A1000, an increase from 2018 (13.65%).

In coordination with the ICAO Paris Office, the Code Allocation List (CAL) for the complete ICAO EUR Region was produced and published in preparation for the summer season 2019. Two cases of codes shortages were detected by the monitoring tools in 2019.

7. NETWORK STRATEGY PLAN

The Network Strategy Plan (NSP) for RP2 defines the guiding principles for network operation and its medium to long-term perspective. It forms part of the Single European Sky planning process and aims at driving ATM operational improvements from a network perspective and in a structured way.

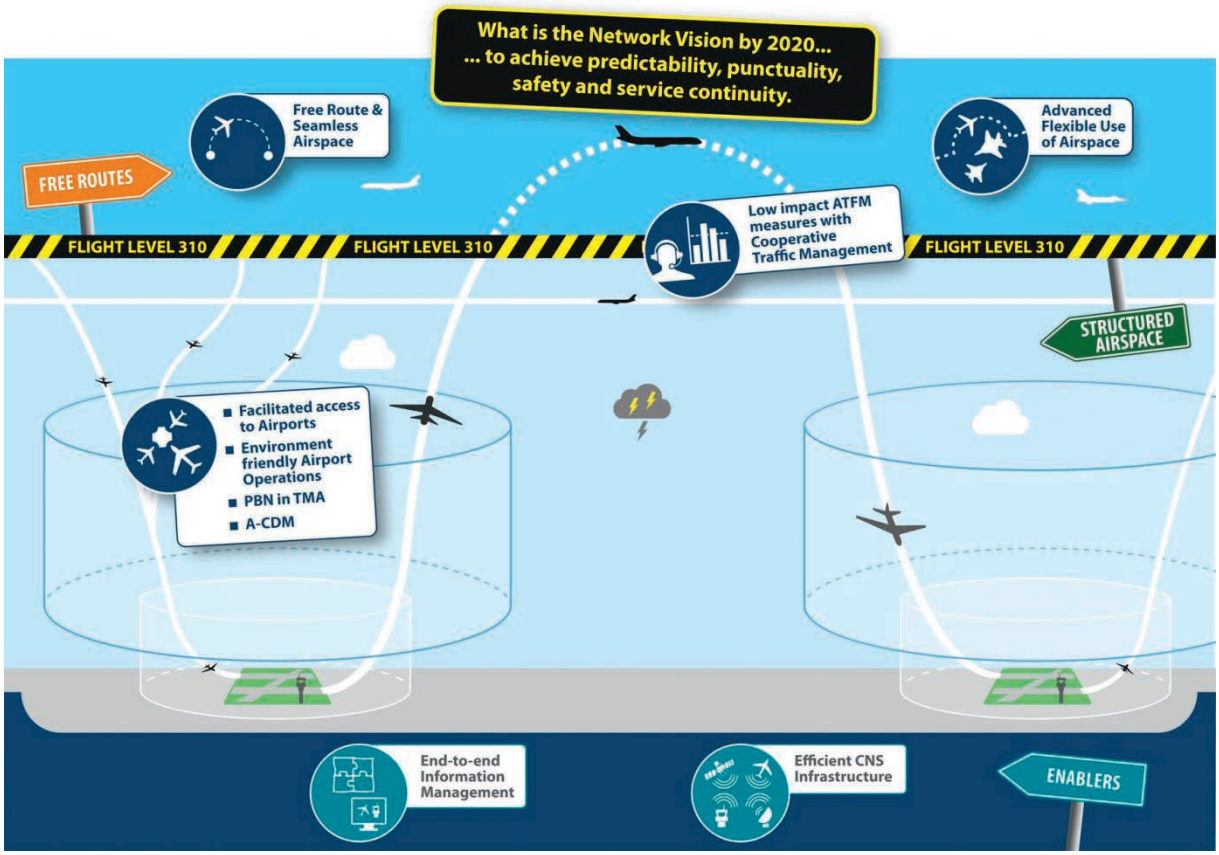
In RP2, the NSP was implemented through two types of action:

- developments coordinated via NM's Strategic Projects, when significant technological improvements are required;
- action taking place in the context of network functions, addressing performance flaws and operational improvements through these functions.

The monitoring of the NSP execution is reported as part of the NM Annual Report process. A full report on the progress of the NSP milestones is part of the **Report on the Implementation of the NPP and NSP 2019**, which is a companion document to this report.

The major achievements from NSP implementation in 2019 are summarised in the respective paragraphs of chapter 4 and the report mentioned above and include:

- Continuation of the development of a new airspace data management application, as well as the RAD management application for both internal and external users
- The deployment of Free Route Airspace – the main driver for improvements in flight efficiency and airspace defragmentation – continued: in 2019 resulted in either partial or full implementation at 55 ACCs across Europe. There are increasing trends for ACCs to conduct cross border operations and to lower the base level of FRA to the maximum extent possible as it was the case for countries in northern Europe, southeast, and central southeast Europe.
- Further steps were made in 2019 to support the airspace users: NM has supported individual AOs in analysing vertical adherence to improve their operations and minimise gap between planned and actual trajectories. Further, NM supported AOs in their local adherence awareness campaigns with material and advice.
- Important implementation steps were made towards a more dynamic system supporting ATFCM Measure



coordination based on NM B2B services , the operational use of Target Times.

- The first FF-ICE-1 services in pre-departure via B2B have been deployed, opening the door for operational trials and assessment by CFSPs and ANSPs.
- Cooperation with Airport operators: in 2019, one more A-CDM was connected to the Network Manager, with Lisbon airport using the B2B services. As Stockholm had disconnected for an extended period, the total number remains at 27. In conjunction, two Advanced Towers were implemented in 2019 and connected to the Network Manager raising the total number to 25. Up to 12 more are candidates for 2020.
- Expanded cooperation in crisis management: ongoing activities in 2019 with expert organisations, through conduct of the exercise PANDEMICS19, further follow up of the exercise NUCLEAR 14 and preparation of the EACCC20 exercise that will re-enact the Ejafjattlajokul volcanic ash outbreak of 2010 in the 2020 environment.
- "Just Culture" in European ATM was promoted and enhanced through expert courses, regional roadshows/workshops, Just Culture Conference.
- The NM work programme addressing the Sustainable Network CNS Infrastructure has delivered all its planned deliverables in partnership with the CNS Team. The Six sub-projects addressing the agreed priorities, 8.33 deployment, Voice over IP deployment, sustainability of 1030/1090, surveillance modernisation, Global Navigation Satellite System (GNSS) infra management support, and Terrestrial navigation optimisation, were all supported by mixed stakeholders/NM expert groups and were satisfactorily completed.

Contribution to the SESAR Deployment

NM continued throughout the year contributing to the SESAR Deployment in line with the relevant regulations and the Cooperative Arrangements (CA) signed between NM and the SESAR Deployment Manager (SDM). In particular, NM contributed to:

- update of the Deployment Programme (DP-2019);
- provision of inputs to the PCP review and CP1 draft;
- provision of prefilled SDM monitoring templates for AF3/AF4 with the data collected via NM cooperative arrangements;
- coordination related to the SDM monitoring exercise;
- assessment of performance contribution for finalised and on-going projects;
- drafting the ADS-B implementation plan and associated Cost benefit Analysis.

INEA/CEF funded projects

In October 2019 Innovation and Networks Executive Agency (INEA) announced the work programme for CEF 2019 call. NM will participate in one multi-stakeholder project concerning the Flight Object Interoperability. It is expected that the project approval to be done by Q2 2020.

The execution of CEF2015/CEF2016/CEF2017 was carried out as follows:

- CEF2014: NM projects have been completed.
- CEF2015 and CEF2016: the execution is in progress. Some projects have been de-scoped (e.g. Digital NOTAM and Full DAC).
- CEF2017: the five awarded projects proposed by NM have been initiated in 2019.

The execution of a number of projects under CEF2015/CEF2016/CEF2017 is carried out with some adaptations of project timescale, deliverables and funding as agreed with SDM.

Contribution to the SESAR Research and Validation activities

NM provided support to the SESAR 2020 wave 1 Industrial Research programme:

- Contributions to ATM Master Plan update campaign (mainly as operational stakeholders).
- NM has contributed to the development and the review of the Operational Service and Environment Description (OSED) of several projects in relation to Optimised Network Services, FRA, 4D Trajectory Management and integration Airport Operations to the Network Management.
- NM has been involved in the validation exercises on these topics.
- Support to SESAR 2020 transversal activities

Concerning the Very Large Scale demonstrations (VLDs), NM, acting as project leader, had a strong involvement in the "Network Collaborative Management" project (PJ24) for the coordination and the execution of six operational demonstrations. The value of the produced validation results have been largely recognised.

NM has also actively contributed to VLD "Arrival Management extended to en-route airspace" (PJ25). Successful results and performance gains identified in the VLD projects will guide the deployment activities supporting the CTM project, in particular the coordination workflow of STAM measures and the application of Target Times measures.

8. COVID CRISIS AND CHALLENGES FOR THE FUTURE

In 2019, EC has reappointed EUROCONTROL as Network Manager for the next two reference periods. The appointment was finalised when EASA certified EUROCONTROL as Service Provider for the ATM Network Functions in November 2019. At the start of 2020, NMB has endorsed NM's draft NSP and NPP and NM was set to start their implementation. NM's Airspace Re-structuring and Operational Excellence programmes have started with the actions foreseen for the years to come. NM's operational focus was to tackle the network capacity and predictability, and staffing issues predicted for summer 2020 through coordinated stakeholder actions.

NM's way forward was well defined when the COVID-19 pandemic changed everything in the industry. The challenge for the near future is to support industry operations as passenger and traffic levels recover in the coming years. NM will review and will tailor the work programme accordingly in partnership with the operational stakeholders.

Crisis Management

The unprecedented disruption caused by the COVID-19 pandemic as a first step triggered coordinated measures from NM, States, ANSPs and all aviation stakeholders to ensure business continuity and a business continuity plan was developed and shared. EACCC has been activated with regular teleconferences held where EACCC and State Focal Points are continuously informed through regular updates of COVID-19 Factsheet. NM has planned and implemented further coordinated measures through the NOP Recovery Plan, as agreed by the NMB and supported by the Ad-hoc Enlarged NDOP Recovery Cell teleconferences, to ensure that the network would be ready for the recovery phase. Operational stakeholders have been kept up to date on the latest developments of COVID-19 related to passenger, airport and airspace restrictions through the NOTAM summary table published on the NOP Portal. 1200 RAD measures have been addressed through excellent cooperation with all ANSPs, thus supporting optimisation of airspace users flown routes with potential savings up to 26,000 nautical miles per day.

NM will assess how well the crisis procedures worked during the COVID-19 period and agree possible changes with the crisis management partners.

Planning the network operations

NM in partnership with all the operational stakeholders and States, has prepared and updated regularly the Network Operations Plan – 2020 Recovery Plan. It covers a rolling four to six week period and it consolidates data from airlines, area control centres (ACCs), airports and States into one unique plan that will be updated by NM on a weekly basis. The aim is to ensure a safe and smooth recovery phase for all operational stakeholders, enabling network actors to ramp up progressively their activities as traffic returns.

Shaping the NM organisation

NM implemented in 2019 a new organisational structure to respond better to the revised NF Regulation. The new

structure was built to support a high-performing, agile and scalable operational network, implement advanced operations, drive the technology evolution, and prepare for the additional responsibilities connected to the NFIR 2019/123.

Shaping the future network

EC approved the **Network Strategy Plan** for the air traffic management network functions of the single European sky for the period 2020-2029 on 17 December 2019 through the Commission Implementing Decision (EU) 2019/2167.

The strategic objectives of the NSP will guide the network long-term development with the ultimate objective of achieving the performance targets for the network functions in all EU Member States and in third countries contributing to the pan-European dimension of the SES. NSP strives to achieve a European ATM network serving European aviation and passengers in a safe, secure, predictable, operationally efficient, environmentally friendly and cost-efficient manner through close cooperation with all operational stakeholders.

NMB developed the **High Level Network Operational Framework** in line with the content and direction of the NSP 2020-2029, as high level operational target of the activities towards implementation of the NSP. NM started the consultation of the document with NETOPS group. The NDOP and NMB consultation will follow, with the aim to be approved by Q2 2020.

NMB endorsed the **NPP**, which will now follow the EC process for assessment and approval. NPP defines the target and objectives for the network function in RP3. They will form the performance baseline for the NM actions in the coming years.

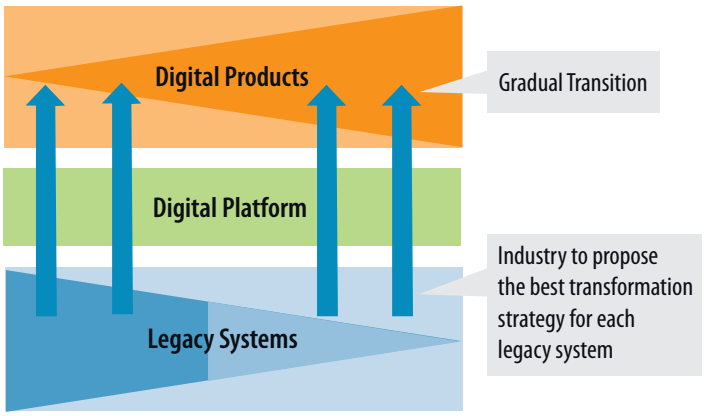
The final content of the **Airspace Re-structuring programme**, **as well as the** proposals put forward through the **Operational Excellence programme**, is in the course of being discussed in the NM working arrangements taking into account the COVID-19. A joint NDOP/NDTECH workshop will be planned in September to streamline the outcome.

The expected traffic and available resources in the coming years will affect both the goals and ambition in the initiatives above. NM together with the operational stakeholders will review them in 2020 and will bring proposals to the Governance bodies.

Transform the technical systems

NM launched a system modernisation programme that will deliver the integrated Network Management system (iNM). The 10-year programme is an incremental implementation of iNM that will lead to a digital transformation implementing modern and proven technical solutions. The call for tender (CfT) was published in February 2020 and contracts with selected industrial partners should be signed by mid 2021.

NM is committed to iNM as a key digital enabler for future network operations and will ensure it remains a priority in the work programme.



Develop partnerships

NM expects the EC/SJU to review the SESAR initiatives. NM's current intentions are outlined below and will be adjusted as necessary in the coming months.

SESAR 2020 programme

In the context of the S2020 wave 2 industrial research programme, NM will continue to contribute to the development and the validation of concepts and evolutions affecting NM remits and expected evolutions to NM roles and responsibilities. This will include topics like Advanced Demand Capacity Balancing processes and tools, Airspace Management including Dynamic Airspace Configuration, 4D Trajectory Management including the flight planning aspects in the FF-ICE context and the use of Extended Projected Profile (EPP) data, Enhanced Network Traffic prediction and shared assessment of traffic complexity, Collaborative Network performance Management. NM also contributes to SESAR transversal activities. In the context of SESAR 2020 wave 2 scope of work, NM indicated the priorities and expected contribution.

SESAR Deployment and INEA/CEF projects

The support to SESAR deployment will continue in the forthcoming period through:

- contributions in drafting the content of Common Project 1 (CP1);
- SESAR deployment programme updates;
- SESAR deployment monitoring activities;
- performance contributions and CBA analyses.

In addition, the execution of 25 NM-led projects lead by NM contained in different CEF calls will continue in the next 2-3 years. Many of these projects are multi-stakeholders that will contribute to achieve the PCP/CP1 objectives for NM and participating network actors.

ANNEX I GLOSSARY

Amended NF regulation	Commission Implementing Regulation (EU) No 2014/970 of 12 September 2014 amending Regulation (EU) No 2011/677 laying down detailed rules for the implementation of air traffic management (ATM) network functions
ATFM regulation	Commission Regulation (EU) No 2010/255 of 25 March 2010 laying down common rules on air traffic flow management
Common Projects regulation	Commission Implementing Regulation (EU) 2013/409 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
Common requirements and Oversight regulation	Commission Implementing Regulation (EU) No 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034, (EU) No 1035 and (EU) 2016/1377 and amending Regulation (EU) No 2011/677
NF Regulation	Commission Regulation (EU) 2011/677 of 07 July 2011 laying down detailed rules for the implementation of air traffic management (ATM) network functions
Performance regulation	Commission Regulation (EU) No 2013/390 of 3 May 2013 laying down a performance scheme for air navigation services and network functions
Performance Regulation RP3	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 2013/390 and (EU) No 2013/391
Pilot Common Project (PCP) regulation	Commission Implementing Regulation (EU) 2014/716 of 27 June 2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan
Revised NF Regulation	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 2011/677

ACC	Area Control Centre
A-CDM	Airport Collaborative Decision Making
AIM	Aeronautical Information Management
ANSP	Air Navigation Service Provider
AO	Aircraft Operator
AOP	Airport Operations Plan
ATC	Air Traffic Control
ATS	Air Traffic Service
ATCO	Air Traffic Controller
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
B2B	Business-to-Business
CAM	Cost Allocation Methodology
CCAMS	Centralised Code Assignment and Management System
CDM	Cooperative Decision Making

CEF	Central European Facilities
CFSP	Computerised Flight plan Service Provider
CNS	Communication, Navigation & Surveillance
CTM	Collaborative Traffic Management
CTOT	Calculated Take-Off Time
DPI	Departure Planning Information
EACCC	European Aviation Crisis Coordination Cell
EAD	European AIS Database
EASA	European Aviation Safety Agency
EC	European Commission
eNM/S19	EUROCONTROL/NM Action Plan for Summer 2019
ERNIP	European Route Network Improvement Plan
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
GRRT	Group Rerouting Tool
ICAO	International Civil Aviation Organisation
iNM	integrated Network Manager system
IFPS	Integrated Initial Flight Plan Processing 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
LTIP	Long Term Investment Plan
MUAC	EUROCONTROL Maastricht Upper Area Control Centre
n-CONECT	Network-Common Enhanced Collaborative ATM
NDOP	Network Directors of Operations Forum
NETOPS	Network Operations Team
NewPENS	New Pan-European Network Service
NM	Network Manager
NMB	Network Management Board
NMOC	Network Manager Operations Centre
NPP	Network Manager Performance Plan for RP2

NOP	Network Operations Plan
NSP	Network Strategy Plan
RAD	Route Availability Document
RFF	Radio Frequency Function
RP2	Reference Period 2 (2015-2019)
RP3	Reference Period 3 (2020-2024)
RRP	Re-Route Proposal
SAFIRE	Spectrum and Frequencies Information Resource
SDM	SESAR Deployment Manager
SES	Single European Sky
SESAR	Single European Sky ATM Research
SMS	Safety Management System
SSC	Single Sky Committee
SSR	Secondary Surveillance Radar
SWIM	System-Wide Information Management
TCF	Transponder Code Function
TMA	Terminal Control Area
TWR	Tower Control Unit
UAC	Upper Area Control Centre
VLD	Very Large-Scale Demonstrations

Approved NMB July 2020

EUROCONTROL

SUPPORTING EUROPEAN AVIATION

www.eurocontrol.int