EUROCONTROL

Introducing the EUROCONTROL Network Manager Operations Centre

SUPPORTING EUROPEAN AVIATION

FOUNDING MEMBER SESAR JOINT UNDERTAKING

NETWORK MANAGER

The EUROCONTROL Network Manager Operations Centre, NMOC, evolved from the Central Flow Management Unit, which began tactical operations in 1995. Today, it plays a pivotal role in managing, streamlining and improving air traffic operations in Europe, with a strong network-minded approach.

NMOC is run for the benefit of EUROCONTROL's 41 Member States and its two Comprehensive Agreement States, Israel and Morocco. The European Commission reappointed EUROCONTROL as Europe's Network Manager until 2029.

At NMOC, we aim to make the best possible use of the airspace capacity that is available. We do this by collaborating with civil and military airspace users, aviation organisations and states in Europe and beyond.

We exchange information with countries across the ICAO European region and beyond to improve traffic flows from the regional to the global level, enhance traffic predictability and increase network capacity.

One single flow management system over Europe

NMOC is a unique centre worldwide where dedicated experts work with airspace users, airport authorities, air navigation service providers and many partners, to make sure that an average of 30,000 flights take off and reach their destination safely, every day of the year.

41 Members and 2 Comprehensive States

- ***2018: 11 million flights***
- ***2018 daily traffic peak: 37,101 flights on 7 September 2018***
- ***mid-2019 daily traffic peak: 37,228 flights on 28 June 2019***

Numbers for 2018

1 *Billed airspace users who fly at least once a year in the NM area of operation*
2 *Airports in the NM network with more than 10 flights a day*
3 *Flow management positions in the NM's ATFCM area*
4 *Users with active tokens and certificates*

Network Operations

NMOC supports the entire network in smoothing traffic flows and reducing delays.

It aims to:

- ensure **safety**
- meet the Single European Sky performance **targets**
- optimise airspace **capacity** in the network
- optimise traffic **flows**
- minimise flight **delays**
- improve **flight efficiency**
- minimise aviation's **environmental impact**
- coordinate responses to network **disruptions** and **crises**
- plan for high **predictability**
- **communicate** on the actual traffic situation, giving flight positions
- **simplify** flight plan handing, giving B2B access to the systems.

NMOC's key functions

NMOC runs three major operational services:

1. Airspace Data Management
2. Flight Planning Services
3. Air Traffic Flow and Capacity Management

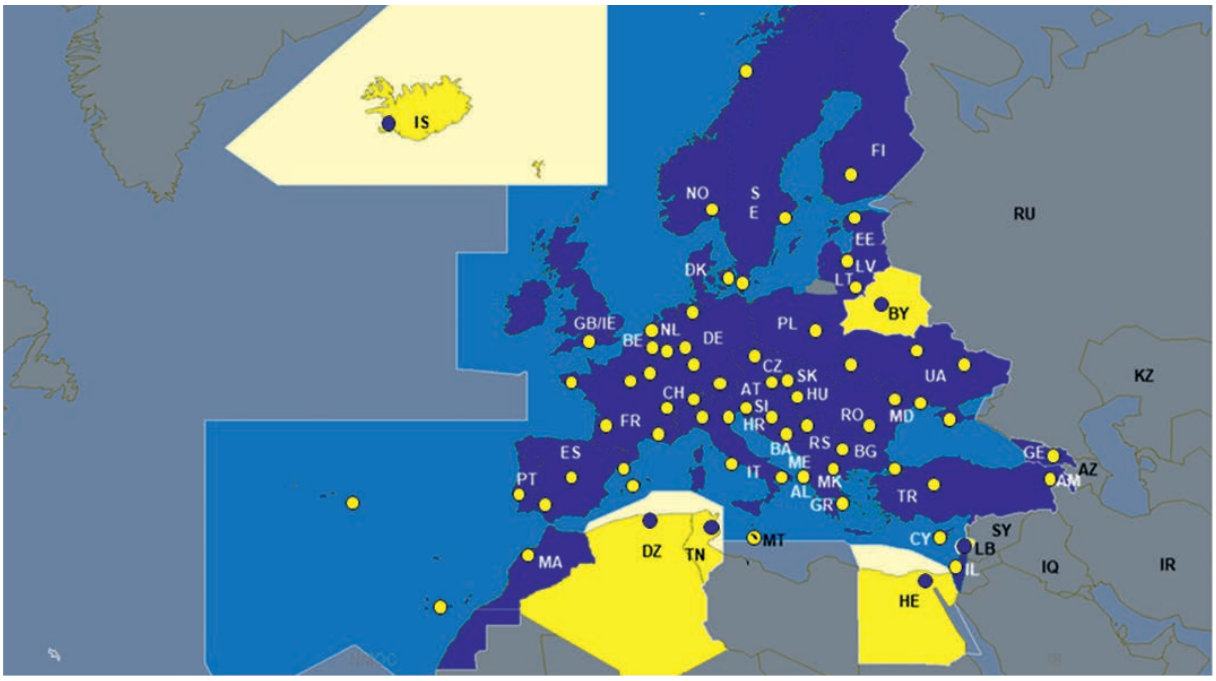
A Systems Operations Team constantly monitors all NMOC's systems and data.

NMOC Coordination with Flow Management Positions (FMPs)

The **FMPs are the major interface between** Air traffic Control (**ATC**) and the Network Manager Operations Centre (**NMOC**) established in the States within, and adjacent to, the ECAC area. They provide a vital flow of information to Network Operations and are the main source of local knowledge.

The NMOC coordinates with FMPs from the 41 EUROCONTROL Member States and 2 Comprehensive States comprising 60 FMPs (NM's ATFCM area) and is directly responsible for ATFM.

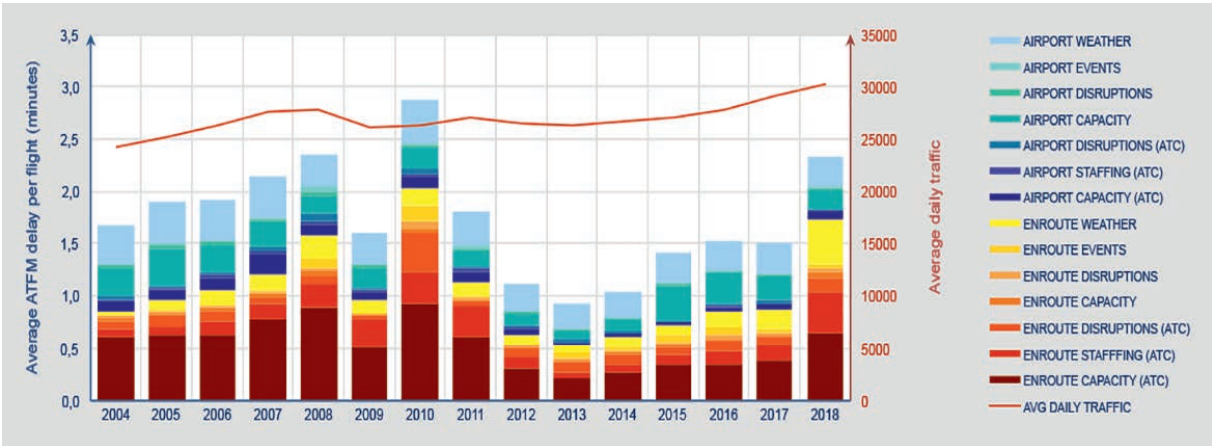
NMOC works as well as with 6 FMPs from Adjacent countries (Island, Belarus, Lebanon, Algeria, Tunisia, Egypt) whereby any flight departing from this area and entering the ATFM area may be subject to ATFM measures.



NMOC Coordination with FMPs

Traffic and delays

While NMOC works on improving the overall ATM performance in Europe and beyond, preventing delays is essential. It involves many actors, hence the importance of a strong collaborative process of the NMOC with all involved partners. The average European Air Traffic Flow Management (ATFM) delay is composed of various en route and airport delays, as shown in the graph below, demonstrating the **complexity of the Network**.



Average ATFM delay per flight

Map of the Operations Centre

The Operations Centre is organised into various domains of expertise to connect the European aviation network and to help deliver improved performance.

- airspace data management
- flight planning services*
- short-term strategic and pre-tactical air traffic flow management operations
- tactical flow management operations
- aircraft operator liaison officers; military liaison officers
- real-time systems operations & monitoring system operations
- the operations management

** This service is also delivered in the Operations Room in our centre based in Brétigny-sur-Orge in France.*

AD - AIRSPACE DATA MANAGEMENT

AD is responsible for **maintaining** and **pre-validating airspace data**. All states send their data to the NMOC and it is used to create a four-dimensional model of the airspace.

The airspace data system contains static and dynamic data.

Examples:

- **Static:** air traffic control centres and the layout of air routes.
- **Dynamic:** sector configurations/capacities, use of routes; which are notified through NOTAMs (NOtices To AirMen); Airspace Use Plan (AUP), Updated airspace Use Plan (UUP), etc.

The airspace data management team is involved in various tasks:

Aeronautical Infrastructure (official ICAO published and EAD/AnnexXV)

Staff dealing with the aeronautical infrastructure **collect, implement and/or maintain information** on:

- airways
- routes
- standard instrument departures and arrivals (SIDs & STARs)
- conditional routes (CDRs)
- aerodromes data
- route availability documents (RAD)
- profile tuning restrictions
- related data that appears in the states' aeronautical information publications.

Operational airspace data

The AD team works closely with the operational airspace structure team that **designs and creates operational airspace** and **sectorisations**, as agreed with states and air navigation service providers..

Airspace user addressing management

The AD team supports the airspace users in the setup and maintenance of addressing parameters related to NM services. They deal with the Operational Reply Messages (ORMs) and the Computer Assisted Slot Allocation (CASA) system.

ANSPs addressing management

The AD team maintains the addressing parameters for the Initial Integrated Flight Plan Processing System (IFPS) and for the Computer Assisted Slot Allocation (CASA) system.

Operational pre-validation and network impact assessment

Working closely with air navigation service providers and national authorities, with airspace users and Computerised Flight Plan Service Providers (CFSPs), the team **assesses the impact of major airspace changes** on the network. They look at military exercises and, for example, major sporting events which generate a lot of extra traffic, such as the Olympic Games, Grand Prix races or football tournaments.

Centralised Airspace Data Function (CADF)/Airspace Management (ASM)

Staff dealing with the Centralised Airspace Data Function give day-to-day support to stakeholders. They manage the Airspace Use Plan and its updates in close coordination with Airspace Management Cells and national authorities.

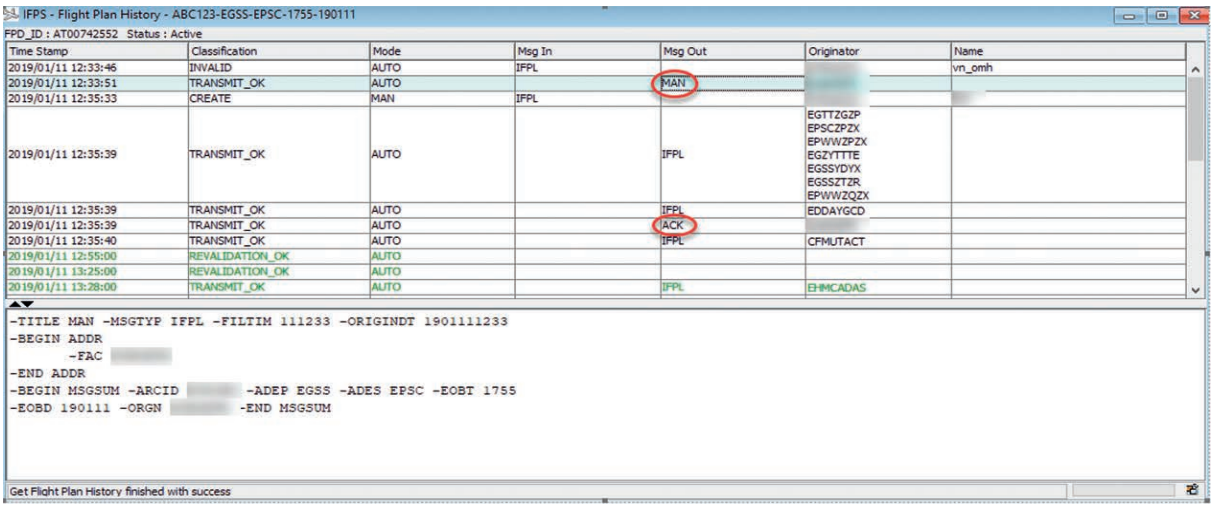
FP - FLIGHT PLANNING SERVICES

NMOC operates a **centralised system** for **flight plan processing and distribution services**: the Initial Integrated Flight Plan Processing System (IFPS).

The IFPS receives, collates, checks and redistributes flight plan data for all flights flying entirely or partially under Instrument Flight Rules (IFR) as General Air Traffic (GAT – that is, non-military flights) in the NM's area of responsibility. It relates to flights, entering, overflying or departing that part of the ICAO EUR Region [International Civil Aviation Organization] (ICAO) known as the IFPS Zone (IFPZ).

Detailed flight plans for all European flights have to be sent to the NMOC.

An **average of 30,000 flights** a day – and some 96,000 associated messages – have to be checked for compliance with all format and data conventions as well as for compliance with airspace restrictions. Inconsistencies have to be dealt with manually.



A Flight Plan history

NMOC sends a copy of every accepted/corrected flight plan to all the ATC units that will deal with the flight in question.

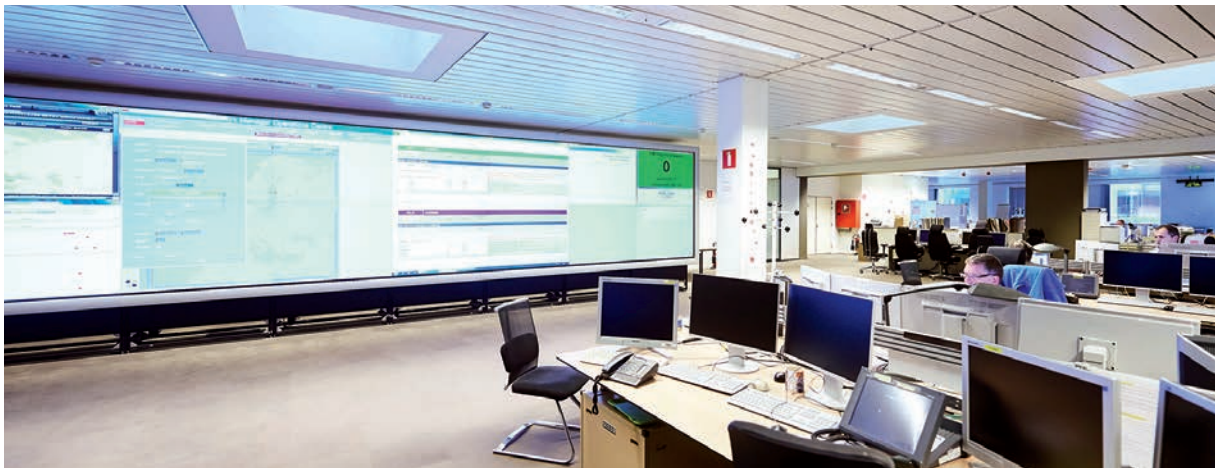
The IFPS has **two units**, one in Brussels, Belgium, and the other in Brétigny-sur-Orge, France. They can act as contingency sites for each other, should either have problems.

➤ Integrated Initial Flight Plan Processing Systems or IFPS:

- The IFPS does the **reception, initial processing** and **distribution** of flight plan data for our 41 Member States and two Comprehensive Agreement States, as well as for some neighbouring states.
- IFPS provides the Enhanced Tactical Flow Management System (ETFMS) with a copy of flight plan data.
- It gives air navigation service providers flight plan data that can be automatically processed.
- The Flight Planning service gives real-time assistance in flight planning, 24/7, for airspace users.

➤ Flight Efficiency Support:

Flight Efficiency Support runs the flight efficiency programme and helps airspace users plan more efficiently so that they can **reduce their aircraft's environmental impact**.



➤ Call Sign Management Cell (CSMC):

The Call Sign Management Cell participates actively in raising awareness about similar call signs used by aircrafts operating in the same area and on the same radio frequency. They assist in the reduction processes and help airspace users with the Call Sign Similarity Tool that detects and **de-conflicts call sign similarities in the airlines' schedules**. It is potentially dangerous for aircraft flying in the same airspace to have similar call signs because controllers' messages would be confusing: pilots would find it hard to tell if the message was for their aircraft or another one.

➤ SAFA,SACA, ACC3, TCO

The Network Manager Operations Centre supports the European Commission's - **Safety Assessment of Foreign Aircraft** (SAFA) - Programme by telling national authorities about flights which have been banned in the European Union, or which are due for ramp inspections.

It also supports two more programmes: the **Safety Assessment of Community Aircraft** (SACA), and the **Air Cargo or Mail Carrier operating into the European Union from a Third Country** Airport (ACC3).

As part of our close cooperation with the European Commission and the European Aviation Safety Agency (EASA), we also inform state authorities about potentially unsafe aircraft from third countries which do not have "**Third Country Operator Authorisation**" (TCO), that they can be prevented from entering European airspace.

FM - AIR TRAFFIC FLOW AND CAPACITY MANAGEMENT (ATFCM)

ATFCM is used to **optimise capacity** in the network. It **minimises the impact of constraints** and **balances demand**. It makes sure that there are **no excessive traffic loads** on air traffic control centres or at airports.

ATFCM also underpins **safety** and helps with **flight efficiency**, mitigating aviation's impact on the **environment**.

This service is divided into four phases:

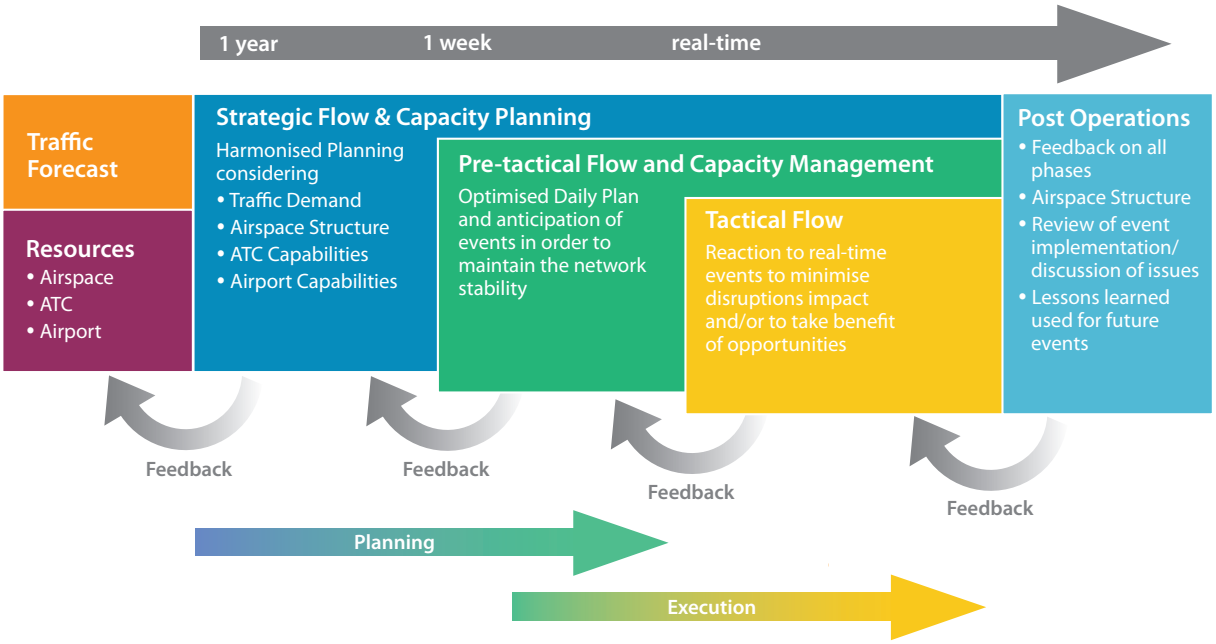
1. strategic
2. pre-tactical
3. tactical
4. post-operations reporting and performance measurement.

In the **strategic** phase, NMOC works with the strategic operations planning team to avoid imbalances between capacity and demand for events taking place in a week or more in the future. The teams estimates i.a. the impact that large-scale military exercises or major events could have on air traffic.

In the **pre-tactical** phase, the **best possible ATFCM plan** for operations on the following day is produced. This is done in close collaboration with NMOC partners, such as ATC centres and airspace users.

In the **tactical** phase, NMOC **monitors** and **updates** the ATFCM Plan (made the day before) according to the current situation. Real-time traffic demand is balanced with the capacity available.

Post-operations reporting involves **analysis** and **measurement** of the network's performance, with a special focus on **route extension** and **delay**.



Overview of ATFCM phases

Short-term Strategic and Pre-tactical Flow Management Operations

The **pre-tactical team** manages the short-term strategic and pre-tactical air traffic **flow** and **capacity management measures**, which are planned six days before a flight.

- They make sure that there is enough **capacity** for the forecast demand.
- They manage demand so as to **minimise delay** and **cost**.
- They **publish** the agreed **plan** for the day of operations having gone through a Collaborative Decision-Making process. The computerised ETFMS supports this function, using the Predict, Tact and Simex systems.
- They **simulate network events** which could have an impact on the network to see how great the disruption could be – and they work out how to mitigate the impact. Network events range from major sporting events, industrial action, new systems at air traffic control centres to large-scale military exercises.
- They **work proactively** with Air Traffic Control Centres, the Aircraft Operator Liaison Officers and the Military Liaison Officers to create a network plan together in advance of the day of operation; they discuss issues which might affect the network and find out how to mitigate their impact.
- They **share** the plan with the airspace users, airports and Air Traffic Control Centres via ATFCM Notification Message (ANM) and Initial Network Plan (INP) and via the Network Operations Portal.

Daily Network Plan

- The ATFCM Daily Plan (ADP) is a set of tactical ATFCM measures that will be in force in European airspace on the following day. It enhances the civil and military coordination process at the European Network level.
- People working on the Daily Plan optimise available capacity to meet forecast demand.

Traffic Count Display – Traffic Volume - Sectors

➤ Network Events

- The Network Events team studies all **network events that might affect the network**. These include major sporting events, industrial action, new systems at air traffic control centres and large-scale military exercises. They then make sure that the information is sent to everyone who might be affected.
- The team **mitigates** the potential **impact** by making sure that measures are drawn up, coordinated and then implemented.

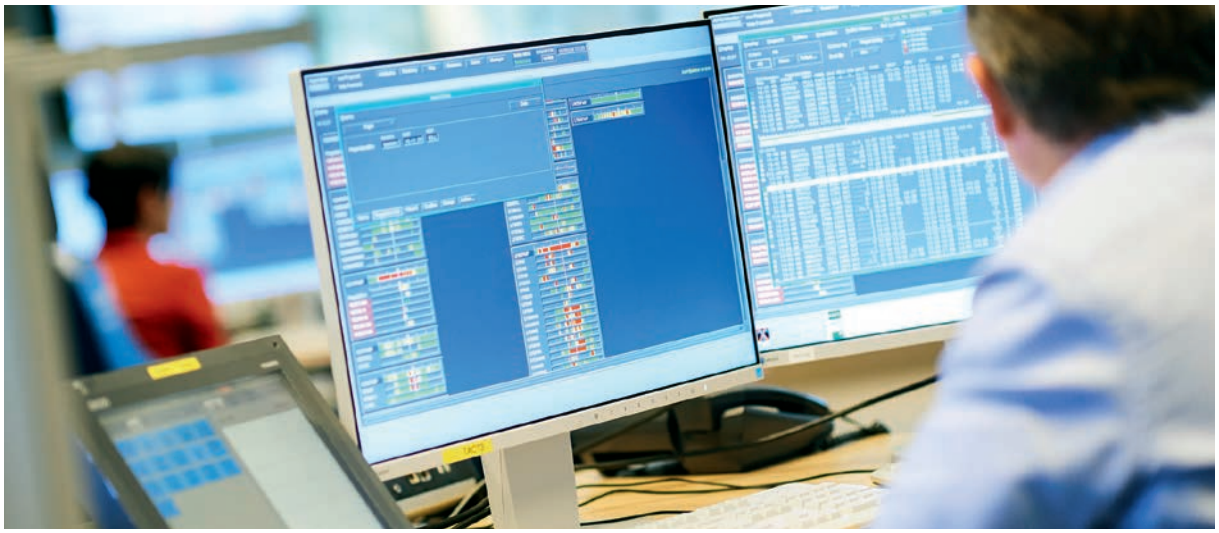
➤ Tactical Flow Management Operations

In Tactical Flow Management Operations, the team optimises capacity and demand balancing in **real time**.

They update the Daily Plan constantly during the day of operations through further CDM processes. Tactical briefings and conferences are scheduled depending on the traffic patterns and their intensity applicable to the area.

To help them do this, there is a computerised Enhanced Tactical Flow Management system known as ETFMS, which includes a Computer Assisted Slot Allocation system or CASA.

- They monitor the traffic load and the available capacity for the day of operations. In doing this, they interact with the **Flow Management Positions**, which are based in the Area Control Centres all over Europe, so that they can maximise the best use of capacity across Europe.
- They are responsible for **delay management**. This means that when aircraft are affected by a regulation, they can offer alternatives – such as rerouting. This helps to reduce delay.
- They monitor the overall tactical air traffic flow and capacity management situation to make sure that all the air traffic flow and capacity measures are **compatible**.
- They publish the most up-to-date information there is to all stakeholders and airspace users by constantly updating the Headline News on the **NOP Portal** and other means.
- They **coordinate** with stakeholders and airspace users and share information so that capacity versus demand is optimised.
  This covers for example:
  - the route network - dealing with rerouting and level capping
  - sector configurations
  - ATFCM regulations
  - flight efficiency.
- The NMOC assists permanently the airspace users, flow management units and towers with critical ATFCM problems via the **E-Helpdesk**.

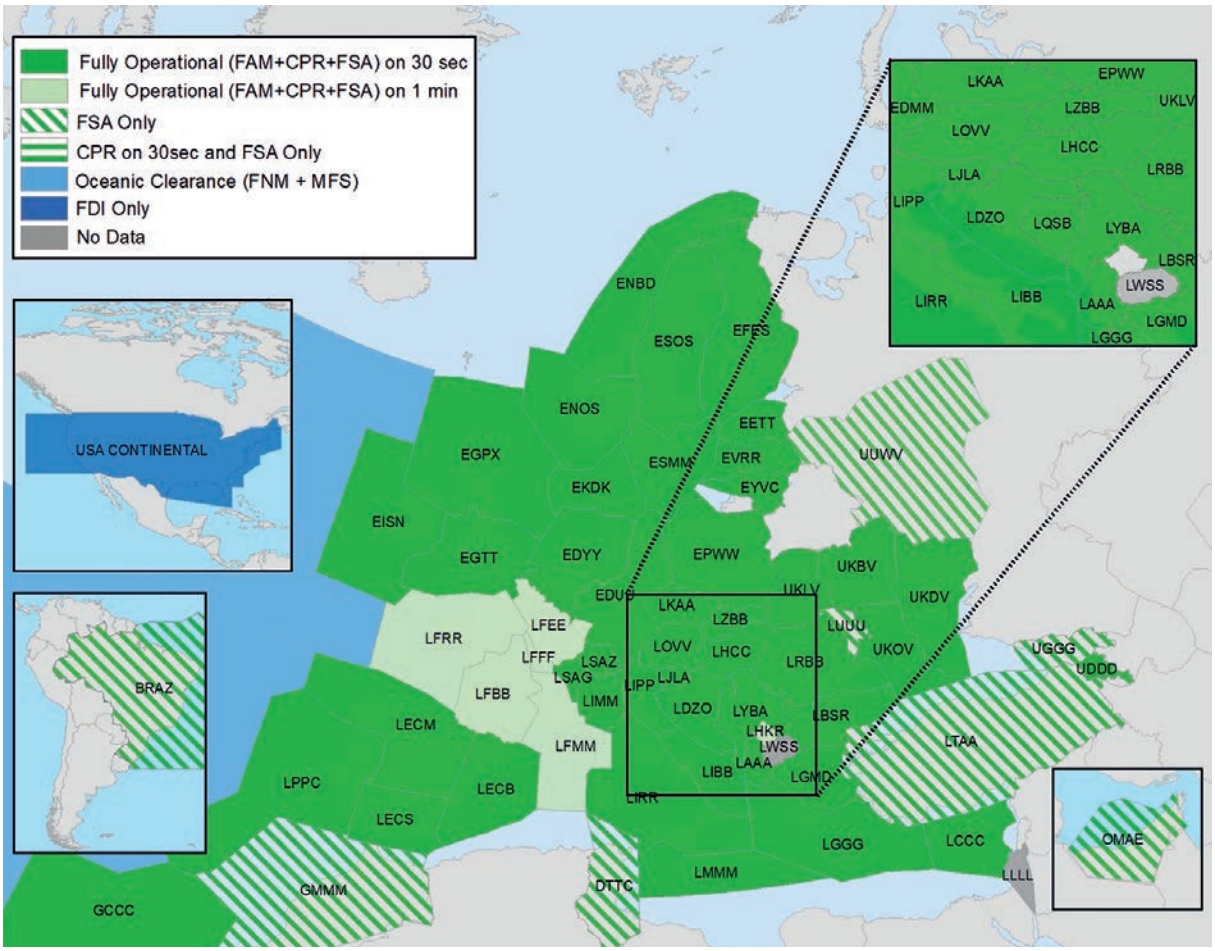


Status Display - Traffic Monitoring - Loads - Reroutings - Regulations

Airborne flight updates of internal and out of area traffic into Europe

The collection and integration of real time data updates in the Enhanced Tactical Flow Management system (ETFMS) results in a **more accurate assessment of the air traffic situation** for both the **NMOC** and the Flow Management Positions (**FMPs**) at the Area Control Centers. It enables the NMOC to a make a better use of the available capacity - i.e. improved traffic count predications, reduction of lost slots, smoother flow of traffic delivery, less bunching and fewer overdeliveries.

In practical terms, this means that aircraft still on the ground will be able to benefit from this improved knowledge of the position of airborne flights.



*Integration of real time flight data updates for a more accurate assessment of the air traffic situation – operational status March 2019**

It supplies all operational stakeholders with the same enhanced tactical data, regardless of national boundaries, language or equipment. Furthermore, this facilitates improvements in flight management from the pre-planning stage until the flight's arrival, thus contributing to the Gate to Gate concept.

* *It concerns i.a. first system activation data (FSA), correlated position reports (CPRs), flight activation monitoring (FAM), US Federal Aviation Authority (FAA) departure planning information (FDI) and so more.*

NMOC ROLES OF STAFF

NMOC's staff play a number of highly specialised roles in different positions in the operational environment. This comprises OPS management, supervisors, specialists and many other along the various OPS domains.

Operations Manager (OM)

The Operations Manager gives clear leadership in the operations room in operational and staffing matters.

This comprises:

- maximise available capacity and its use
- minimise constraints on airspace users
- improve flight efficiency globally and individually
- make sure that flight plan and airspace data are accurate
- espect and promote good safety practices.

➤ The Operations Manager manages the day-to-day operations.

➤ The team optimises daily operational service delivery, following the Network Manager Performance Plan for the best possible performance.
They implement the operational plan for the day, anticipating and minimising local and network delays. In doing this, they make sure that there is a **constant** and **balanced improvement** in performance for flight efficiency, capacity and emissions.

➤ The Operations Manager is the **focal point for crisis management** in the European air traffic flow management arena.

➤ The team runs NM **teleconferences** and they hold **operational briefings**.

Aircraft Operator Liaison Officers (AOLO)

The Aircraft Operator Liaison Officers are the **main point of contact** with **aircraft operators** for any air traffic flow and capacity measure.

➤ They help the pre-tactical team to prepare the daily pre-tactical plan.
➤ They take part in daily tactical operations and **focus** especially on **rerouting**.
➤ They keep a close eye on the **weather**; they look at forecasts and report on the weather's possible impact on the network.

Military Liaison Officers (MILO)

The Military Liaison Officers run the civil and military coordination process on a dayto-day basis. Their aim is to improve flight efficiency and to increase **military mission effectiveness**.

- They collect, harmonise and publish national information about major **military exercises/events** to include in the Network Operations Plan.
- They make sure that these events can be smoothly integrated into the network and they mitigate the **potential impact** of these events by coordinating the implementation of **appropriate measures**.
- They help **optimise airspace allocation** and carry out **network impact assessments** using data from the Airspace Use Plan and its updates.
- They help states maximise their **military mission effectiveness**.
- They underpin **civil-military coordination** in times of **crisis**.

The CSO team - Customer technical Service desk and Operations

The CSO team monitors **around the clock** the NM applications, infrastructure, networks and systems that **ensure the continuous availability of ATFM service data processing and data communication facilities**.

They run the technical help desk.

- They are in charge of recovery and contingency procedures. They coordinate **incident handling** processes.
- The CSO team are the **single point of contact** for all operational technical incidents and problems for both internal and connected end-users.
- The technical help desk is staffed by highly-qualified technicians, to guarantee that NMOC's operational services are **available 24/7**.

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