AIR TRAFFIC CRISIS MANAGEMENT IN EUROPEAN AIRSPACE – THE LEGAL CONTEXT AND THE EXPERIENCE OF THE NETWORK MANAGER

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Abstract

The article looks at the genesis and evolution of Network Manager (NM) activities in terms of responding to disturbances and crisis situations and mitigating their effects on the European air traffic management network. The objective of these activities, carried out in coordination with the operational stakeholders and other relevant stakeholders, is to ensure the maximum continuity and safety of air navigation services for aircraft operators and airports. The review, analysis and evaluation of how to respond to extraordinary and unforeseen events that have a negative impact on the functioning of the air transport sector in Europe covers the period 2010-2019.

Key words: air traffic disruption and crisis situations, European air traffic management network, network functions, network manager, air navigation service providers.

Introduction

The European Air Traffic Management Network (EATMN) consists of systems and procedures: Airspace Management (ASM)[1], Air Traffic Flow Management (ATFM)[2]

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1 Airspace Management (ASM), a planning function with the primary objective of maximising the use of available airspace through dynamic time-sharing and, on an ad hoc basis, the segregation of airspace between different categories of airspace users based on short-term needs.

2 Air Traffic Flow Management (ATFM) - a function established to ensure safe, orderly and efficient air traffic flow. It comprises a set of rules and procedures designed to make optimum use of available air traffic control (ATC) capacity and to ensure that the volume of traffic corresponds to that declared by the relevant air navigation service providers. It should also facilitate emergency response. Centralised ATFM in Europe is implemented by the Network Manager (NM) in the airspace of 43 countries.

and Air Navigation Services (ANS)[3]. This network, together with the airports and airspace available for air navigation, provides an air transport infrastructure to meet the needs and requirements of both civil aviation (air carriers, general aviation) and government (military, law enforcement, etc.). Thirty-eight national Air Navigation Service Providers (ANSPs) operate in the airspace of the Member States that form the European ATM network[4]. The provision of air traffic services (ATS) is organised in the framework of sixty-seven Area Control Centres (ACCs), whose operating areas are mainly located in national Flight Information Regions (FIR/UIRs)[5]. The air traffic management process is carried out in partnership with Eurocontrol and with its significant expert and training support[6]. Since 1995, the organisation has been managing air traffic flows throughout European airspace on behalf of Member States. Among other functions, Eurocontrol also acts as Network Manager (NM) and assists the European Commission (EC) and the Performance Review Body (PRB) in the implementation of the performance and charging system. Despite the fragmentation of the European ATM system, the implementation of key network management functions and related tasks by a single organisation - the Network Manager - allows for continuous evolution, rationalisation and improvement of performance of all parties involved in aviation operations[7]. The Network Manager's responsibilities also include the coordination of crisis response management in the European ATM network.

The issue of civil aviation crisis management is often addressed in various international organisations and is also a subject of research. To date, a number of studies and normative documents of the International Civil Aviation Organisation (ICAO), Eurocontrol and NATO, issued in particular after the events of 11 September 2001, can be identified in this thematic area[8]. However, these literature sources do not address certain problems and research aspects directly related to the activities of the Network Manager, which can be reduced to the following questions: *How are the issues of crisis management in the European ATM network regulated by aviation legislation? What is the distribution of competences in disruption and crisis*

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3 Air Navigation Services (ANS) consists of Air Traffic Services (ATS), Communications, Navigation, Surveillance (CNS), Aeronautical Information Service (AIS) and Meteorology (MET).
4 This network includes: EU Member States, non-EU Member States which are members of Eurocontrol or which have concluded an agreement with the Union on the implementation of the Single European Sky (SES) or participate in a functional airspace block (FAB).
5 Flight Information Region (FIR) is an airspace of defined dimensions within which flight information and alert services are provided. UIR - Upper Flight Information Region.
6 The European Organisation for the Safety of Air Navigation Eurocontrol is an intergovernmental organisation established by the Convention on Cooperation for the Safety of Air Navigation, signed in Brussels on 13 December 1960. Eurocontrol's objective is to promote safe, efficient and environmentally friendly general air traffic operations (GAT) throughout the ICAO European region.
7 The parties involved in operational activities are: civil and military airspace users, civil and military air navigation service providers and airport operators.
8 Selected items in this area, used by the author in this paper, are shown in the bibliography.

management between the Network Manager and other stakeholders? What measures can be used to mitigate the effects of potential disruptions and crises in air traffic and what determines the effectiveness of these measures? How has the Network Manager's performance evolved in light of the lessons learned from past crisis situations in European airspace? Answers to these questions can be provided by analysing selected EU aviation legislation and NM/Eurocontrol publications from the research area concerned. The objective of this study is to present selected legal and operational aspects of risk management and coordination of the European ATM network crisis response activities by the Network Manager.

Characterisation of safety risks in the European ATM network

With a steady increase in the number of air operations (3% on average per year)[9], maintaining a high level of safety and ensuring the smooth operation of the European ATM network is becoming an increasing concern for all parties involved in aviation operations. The dynamic growth of air traffic with relatively rigid air traffic control (ATC) capacity has resulted in capacity constraints for both airspace and airports. These result in delays on the ground and in the air, increased costs for air carriers, discomfort for passengers and an increased likelihood of situations threatening flight safety[10]. In addition to the difficulties in ensuring the smooth operation and continuity of air navigation services resulting from an increasingly complex traffic situation[11], the ATM network is exposed to a number of other undesirable events which may endanger its normal operation. Such occurrences can vary in size, cause, nature and effect (see Table 1).

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9 This rate of growth in air traffic in Europe means that it will double every 15 years. In 2019, more than 11 million General Air Traffic (GAT) flights took place in European airspace according to IFR regulations.

10 In 2019, in European airspace, the average delay in en-route air traffic flow management (ATFM) related to air navigation services was 1.57 minutes per flight. It should be noted that the average en-route ATFM delay rate, established under the performance scheme as a Union-wide capacity target parameter, is between 2020 and 2021 a maximum and a minimum of 0.9 minutes per flight. See Commission Implementing Decision (EU) 2019/903 of 29 May 2019 laying down EU-wide performance targets for the air traffic management network for the third reference period starting on 1 January 2020 and ending on 31 December 2024. (OJ EU L 144, 3.6.2019, p. 49).

11 The demand for air traffic is variable, both predictable and unpredictable. Fluctuations in traffic volumes are beyond the influence of the ATM system and adversely affect the processes that make up its operation. A large number of air operations result in excessive airspace congestion and delays to a significant number of flights. The projected increase in air traffic increases the risk of further deterioration in the delay situation, referred to as a capacity crunch.

Table 1

Areas of risk in air traffic management, its causes and effects

Areas of risk	Events that are sources of danger or factors contributing to their occurrence	Results
Loss of ability to provide services independent of Air Navigation Service Providers (ANSPs)	Closure of airspace above an area of armed conflict, closure or destruction of runways and/or taxiways, terrorist attack on critical infrastructure of ATM system, high concentration volcanic ash cloud, weather in space.	Lack or limitation of access to airspace and air navigation services, paralysis or serious disturbance of air traffic.
Inability to provide safe air traffic services dependent on the air navigation service provider (ANSP)	Technical failure of ATM/CNS systems or equipment, operational personnel errors, insufficient number of operational personnel or unavailability of personnel (strike action), inadequate coordination of operational activities in the event of failure or hazard in air traffic.	Achieve a situation endangering air traffic safety, the possibility of an incident or accident due to the ATM system, airspace capacity limitations, and delays in air traffic.
Unavailability of infrastructure necessary to provide NM and/or ANSP services on a seamless basis	Cyber-attack on databases, power supplies, telecommunications, etc.; seizure of control of an ATM system; sabotage; unauthorised access to and interference with the system; serious failure of surveillance, communications, air traffic flow management systems; power failure for a significant number of CNS/ATM equipment and systems; intentional or accidental radio frequency interference; failure to detect a critical defect in the equipment/system during testing.	Partial or complete failure of the pan-European ATFCM (NMOC) function, discontinuity of service provision, severe disruption of information flows, traffic delays, reduction of ATM network efficiency.
Failure to ensure an effective and efficient safety management system (SMS) within the air navigation service provider (ANSP)	Low quality of the ATM/CNS event monitoring and reporting system, low quality of event analysis, incomplete information, inadequate risk assessment, lack of tools to support investigations, failure to implement recommendations from event investigation, failure to take into account the experience of past events, lack of qualified staff.	A high level of risk of a flight event caused by the ATM system as a consequence of low performance of the safety management system in the air navigation service provider.
Failure to ensure effective action in an emergency situation	Outdated documentation of crisis management planning and organisation (contingency plans and procedures), lack of crisis scenarios, unprepared personnel due to insufficient number of crisis exercises, inadequate crisis management, uncoordinated and chaotic actions in a crisis situation, ineffective information action in a crisis situation, failure to define persons responsible for communication in a crisis situation.	Long recovery period, air traffic safety risk, ATM network inefficiencies, airspace capacity reduction, air traffic delays.

Source: Own study.

The things that cause minor disruption to air traffic (e.g. adverse weather conditions, minor technical system failures, staff problems, protest actions by air traffic control staff) occur on a regular basis and are dealt with under standard operating procedures. Other events such as natural disasters (e.g. volcanic eruptions, space weather), armed conflicts in Europe and adjacent regions (Ukraine, Syria, Libya etc.) or man-made disasters (terrorist or cyber-attacks) can lead to serious disorganisation of the European ATM network and cause serious damage to its resources (hardware, software, data, information, services). Due to the potential consequences, the response to such incidents is implemented through specific crisis management procedures.

Today, ensuring cybersecurity is crucial for the safety of air traffic management systems and the European aviation infrastructure as a whole. This situation is the result of the growing dependence of the air transport sector on technologies based on digital data processing which, despite many safeguards, are still vulnerable to attacks and other threats in cyberspace against civil aviation information infrastructure elements. Although cyber threats are limited to the information resources of a given aviation organisation (Network Manager, air navigation service provider, airline, airport), due to the integration of the digital sphere with the physical sphere (aircraft, air traffic control authority, etc.), their effects may be disruption of various critical infrastructure components or total paralysis of air traffic. The next generation of ATM systems, resulting from fast-growing digitisation, will use new technologies (e.g. Artificial Intelligence), which will involve new types of threats, in particular in the field of cybersecurity.

The unpredictable nature of many different types of disruptions means that they may turn into a crisis situation - a state of inability to provide safe air navigation services in several European countries. Crisis situations have medium and long-term consequences, causing a serious and unexpected loss of capacity in the European ATM network, an imbalance between network capacity and demand or serious disruption of information flow in one or more parts of the network. In such cases, a rapid and coordinated response by the Network Manager is essential to minimise any negative impact of the crisis situation and to maintain safe, seamless and efficient air navigation in the ICAO European region.

The likelihood of different types of hazards materialising depends on the human factor, the vulnerability (unit, system or network) to the hazard, the natural forces and location of the ATM system infrastructure. The human factor may lead to unintentional errors or intentional acts, causing damage to technical equipment and temporary loss of service provision. In contrast, the vulnerability (lack of resilience)[12] of an ATM system to a specific threat increases the risk of causing unwanted consequences of an

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12 The resilience of the ATM system to threats is the result of appropriate organisational and technical solutions and system security that provide an acceptable level of protection against threats identified in the risk assessment (estimation) process.

incident or incident[13]. On the other hand, natural forces such as weather conditions dangerous for aviation (e.g. hurricanes, ice, fogs, extreme temperatures) or natural disasters (fires, floods, volcanic eruptions, earthquakes, etc.) linked to the location of the ATM system's technical infrastructure have an impact on the magnitude of the potential impact of the threat.

The possibility of disruption and crisis situations forces aviation authorities and organisations to develop and implement appropriate organisational and technical solutions to ensure that a high level of civil aviation safety is maintained. In the case of threats whose negative effects may be very high (catastrophic) but are unlikely to occur, contingency plans are developed and forces and means are maintained to minimise potential losses (effects). If the probability of some disturbing events occurring is very high, but their adverse effects are assessed as negligible or insignificant, a monitoring system is created to detect the appearance of a specific threat and signal the tendency to accumulate the related risks.

ATM network management within a single European sky legal framework

The issue of crisis management by the Network Manager is part of the wider context of the EU aviation legislation on the Single European Sky (SES)[14]. Centralised network functions at supranational level, the European ATM network, are already provided for in Regulation (EC) No. 551/2004 on the organisation and use of airspace[15], which is part of the first package of SES legislation. In 2009, the conferral of network management functions on Eurocontrol was included in Regulation (EC) No. 1070/2009 of the European Parliament and of the Council (SES II package)[16]. The detailed legal arrangements for network functions as services provided to and within the European air traffic management network were subsequently adopted by means of the European Commission implementing rules. So far, three Regulations have come into force, published in 2011, 2014 and 2019 respectively.

Regulation (EU) No. 677/2011 established the Network Manager, set out the procedure for the designation of the organisation, its functions and the tasks to

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13 Risk is understood here as the possibility of an adverse effect resulting from an incident or event. Risks can be estimated by considering the probability of an event that may lead to losses (adverse impacts), the consequences or effects it may cause and vulnerability (lack of resilience) to the threat.

14 The SES (Single European Sky) legislative programme is of utmost importance in view of the significant fragmentation of the air traffic management system in Europe and the need for operational coordination and adaptation of the ATM system to the increasingly complex traffic situation in European airspace.

15 See Articles 6 and 9 of Regulation (EC) No. 551/2004.

16 See Article 6 of Regulation (EC) No. 1070/2009 - Network design and management.

support its performance[17]. The network functions are included: ATFM, European Route Network Design and management of scarce resources such as radio frequencies and secondary radar (SSR) transponder codes. The Regulation established that the network functions are intended to improve the overall performance of the ATM network and, therefore, their implementation should be subject to specific performance targets[18]. One of the tasks assigned to the Network Manager to support the performance of these functions is network crisis management. The Network Manager has been required to comply with various legal requirements, including those which are subject to certification by the European Union Aviation Safety Agency (EASA), which for Eurocontrol is the competent authority for certification, oversight and enforcement[19]. This regulatory approach by the Union legislator is justified by the nature and pan-European scale of the services and services provided by the ATM Network Manager.

The subsequent Commission Regulation (EU) No. 970/2014 introduced partial changes to the existing provisions, in particular as regards the tasks, governance and budget of the Network Manager[20]. The need for better regulation in this respect was identified by the Commission as a result of a review of the performance of network functions. To ensure proper management of the performance of the network functions, it was decided inter alia to establish a Network Management Board. An important change was also the extension of the tasks of the Network Manager to the detection of operational security risks at network level and the assessment of related risks with regard to network security.

The last of the Commission implementing acts for the network functions, Regulation (EU) 2019/123, establishes revised common rules for the performance of the network functions taking into account the experience gained from their implementation since 2011 and the results of the Commission's 2017 review of the governance, financial arrangements and cost-effectiveness of the network

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17 Commission Regulation (EU) No. 677/2011 of 7 July 2011 laying down detailed rules for the implementation of air traffic management (ATM) network functions and amending Regulation (EU) No. 691/2010 (OJ L 185, 15.7.2011, p. 1).

18 EU-wide performance targets for the key areas of safety, environment, capacity and cost-efficiency were first set in Commission Regulation (EU) No. 691/2010 of 29 July 2010 laying down a performance scheme for air navigation services and network functions (OJ L 201, 3.8.2010, p. 1).

19 These issues are currently governed in detail by two legal acts: Commission Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for bodies providing ATM/ANS and other network functions for air traffic management and surveillance (OJ L 62, 8.3.2017, p. 1) and Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency (OJ L 212, 22.8.2018, p. 1).

20 Commission Implementing Regulation (EU) No. 970/2014 of 12 September 2014 amending Regulation (EU) No. 677/2011 laying down detailed rules for the implementation of air traffic management (ATM) network functions (OJ L 272, 13.9.2014, p. 11).

functions[21]. It concluded that the Network Manager would benefit from strengthening the governance structure and increasing its independence. The revised Regulation on the network functions has given Eurocontrol, in its role as Network Manager, new tasks such as monitoring the communication, navigation and surveillance (CNS) infrastructure and providing tools, processes and consistent data, which include flight plan processing, European flight data management systems and aeronautical information relevant to the execution of the network functions. It should be emphasised that the network functions and other tasks of the Network Manager are carried out in the framework of the Collaborative Decision-Making (CDM) process, based on continuous interaction and consultation with States, operational stakeholders and, where appropriate, other actors, thereby contributing to the smooth functioning of the network.

Genesis of crisis management in the European ATM network

The current governance of the European ATM network in crisis situations was significantly affected by the events related to the eruption of the Eyjafjallajökull volcano in Iceland in April 2010[22]. This eruption resulted in a volcanic ash cloud over Europe, closing airspace in most countries of the continent and creating serious difficulties for air transport. In response to this situation, Eurocontrol established three types of flight zones in European airspace on the basis of information from the Volcanic Ash Advisory Centre (VACC) in London at the time:

– Limited No-Fly Zone (NFZ), which is an airspace with defined horizontal and vertical boundaries, containing a safety buffer, where flights are prohibited due to the presence of high concentrations of volcanic ash clouds. The source of information on the location of this zone was the Eurocontrol Central Flow Management Unit (CFMU)[23];

– with flight restrictions (Low Contaminated Area - LCA), which is an airspace with defined horizontal and vertical boundaries defined by the SIGMET telegram[24],

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21 Commission Implementing Regulation (EU) 2019/123 of 24 January 2019 laying down detailed rules for the implementation of air traffic management (ATM) network functions and repealing Commission Regulation (EU) No. 677/2011 (OJ L 28, 31.1.2019, p. 1). The provisions of this Regulation shall apply from 1 January 2020.

22 The Eyjafjallajökull volcano eruption is a series of volcanic eruptions initiated on 14 April 2010, located in the area and under a small glacier in southern Iceland.

23 Currently the Network Manager Operations Centre (NMOC).

24 SIGMET - weather information providing in open text, using existing abbreviations, a concise description of specific, occurring and/or predicted significant meteorological phenomena along the route of flight that may affect the safety of aircraft, as well as a picture of their development in time and space. In FIR Warsaw, the Institute of Meteorology and Water Management (IMGW) is responsible for issuing SIGMET defining the coordinates and height ranges of possible volcanic ash occurrence.

where low-concentration volcanic ash can occur. Flights in this area may have been conducted under the responsibility of the air operator, ensuring separation from the volcanic ash cloud[25];

– Non-Contaminated Airspace (NCA), as an airspace where there are no flight restrictions due to the presence of volcanic ash.

A video conference of EU Transport Ministers was held on 19 April 2010 to discuss the need to coordinate actions to reduce the nuisance to air transport resulting from the flight restrictions introduced and to gradually restore normal air traffic. Eurocontrol's activities (concerning the establishment of three flight zones) were welcomed and the organisation was instructed to continue to coordinate work on the establishment of a crisis management system for similar cases. National air navigation service providers, having received information from the CFMU concerning the no-fly zone (NFZ) and the SIGMET message, were required to issue NOTAM messages[26].

The need for action plans for aviation emergencies was also articulated in a report by the then Vice-President of the European Commission and Commissioner for Transport, Siim Kallas, of 24 April 2010. In addition, an extraordinary EU Council meeting was held on 4 May 2010, which adopted conclusions on the European Union's response to the consequences for air transport of the volcanic ash cloud[27]. They pointed to the need for the immediate establishment of a central crisis cell to take over the coordination functions of the management of countermeasures taken at different levels of decision making (local, regional and network) to ensure a rapid response to possible future crises affecting air transport.

Following the lessons learned from the volcanic eruption in Iceland in April and May 2010, the European Aviation Crisis Coordination Cell (EACCC) was established by decision of the Directors General of the European Commission's Directorate-General for Mobility and Transport (DG MOVE) and Eurocontrol on 19 May 2010. Its establishment was subsequently formalised in Article 18 of Commission Regulation (EU) No 677/2011 on network functions. This Regulation defined a 'network crisis situation' as a condition in which air navigation services cannot be provided at the required level and leads to a significant reduction in network capacity, or a significant imbalance between network capacity and demand, or a serious disruption of information flow in one or more parts of the network as a result of an extraordinary and unforeseen situation. As mandated by Article 3 of that Regulation, the Commission nominated Eurocontrol as an impartial and competent organisation

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25 In practice, the national civil aviation authorities decided to maintain restrictions or resume air traffic.

26 NOTAM - a message distributed by telecommunication means, containing information on the establishment, status or change of aeronautical facilities, services, procedures, as well as on the danger, the prompt knowledge of which is essential for personnel involved in flight operations. In Poland, NOTAM messages are exchanged by the Aeronautical Information Service (AIS), which is a special body of the Polish Air Navigation Services Agency.

27 See: Council conclusions on the EU response to the consequences of the volcanic ash cloud for air transport, 6269/10, Brussels, 04.05.2010.

to carry out the function of Network Manager (NM) in pursuit of the objective of effective network management[28]. The Network Manager was formally established in July 2011. This organisation has been entrusted with the task of ensuring the smooth operation of the European ATM network under all circumstances, including in crisis situations which may cause serious disruption to air transport in Europe.

The role of the Network Manager and the European Aviation Crisis Coordination Cell in ATM network crisis management

As already mentioned, in addition to performing key network functions (such as ATFM and European Route Network Design), the competence of the Network Manager includes coordinating and supporting the management of ATM network crisis situations. This, in addition to actions aimed at anticipating and mitigating capacity problems (e.g. summer delays), has made it possible to respond in a prompt and harmonised manner at network level to incidents that threaten the smooth functioning of air transport in Europe.

The ATM crisis management process distinguishes between four phases: warning, disruption management, crisis management and recovery. In the first phase, information is received about an event that may lead to possible serious disturbances in air traffic management requiring the activation of crisis management mechanisms. To this end, the Network Manager Operation Centre (NMOC) continuously monitors the network, maintaining its readiness to implement a comprehensive set of operational measures[29]. The second phase is the management of disruptions which have a serious impact on the European aviation network and which may degenerate into a crisis. In this phase, the ATM Network Manager should cooperate with the national focal points (and other stakeholders) and apply the most appropriate measures to mitigate the effects of the incident. Continuous monitoring and updates should also be made available to stakeholders on a regular basis through the Network Operation Portal (NOP) or teleconferences.

In the event of an extraordinary event (e.g. outbreak of armed conflict, terrorist attack or unavailability of one or more major air navigation service providers)

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28 Commission Decision C(2011), 4130 of July 2011 on the nomination of Eurocontrol as Network Manager for the first and second performance scheme reference period (2012-2019). For the next two reference periods (RP3 and RP4), i.e. until the end of 2029, Eurocontrol was nominated by EC Decision 2019/709. The designation of Eurocontrol as Network Manager allowed the Single European Sky (SES) area to be extended beyond the EU borders to cover more than 40 countries.
29 NMOC procedures are described in detail in the Network Operations Handbook, which includes both the ATFCM Operations Manual and the ATFCM Users Manual: https://www.eurocontrol.int/publication-type/network-operationshandbook. The central coordinating function for crisis management is the Current Operations Manager, while the optimisation of civil-military coordination during a crisis is provided by the Military Liaison Officer.

resulting in a significant reduction of air traffic management (ATM) capacity and unusually long delays in air traffic flow management (ATFM), the Network Manager announces a crisis as the third phase of the crisis management process and activates the European Aviation Crisis Coordination Cell (EACCC). The objective of its activation is to ensure a quick and effective response to the crisis by coordinating actions and helping to collect, analyse and disseminate all relevant information about the incident.

During a crisis involving several countries, an appropriate coordination mechanism is established to facilitate the exchange of information with the relevant national contact points. This assists States in responding to the crisis and provides them with relevant information to ensure a harmonised decision-making process. The main tasks of the Network Manager in this phase are to develop proposals and coordinate the implementation of measures to mitigate the effects of the crisis and to provide relevant and consistent information to the aviation community in close cooperation with other aviation stakeholders. The Network Manager should also coordinate external communication to ensure coherent communication. Indeed, the availability of accurate, timely and consistent data is crucial for effective crisis management. To this end, procedures should be established to allow an appropriate flow of crisis-related information from all possible sources to support crisis management activities. In the last phase, the normal functioning of the ATM network should be restored and the impact of the crisis assessed.

In order to ensure a quick and efficient response to various emergencies in the European ATM network, all stakeholders should be made aware of the crisis management procedures and responsibilities on an ongoing basis. With regard to NM, the crisis management responsibilities established by EU law have changed significantly over the last decade (see Table 2).

Table 2

Evolution of the Network Manager's crisis management responsibilities in light of the Commission implementing rules for ATM network functions

Article 19 of Commission Regulation (EU) No 677/2011	Article 20 of the implementing Regulation Commission (EU) 2019/123
1. the Network Manager, together with the EACCC members, is responsible for the commissioning and deactivation of the EACCC.	
2. the Network Manager, with the support of the EACCC, is responsible for:	Network Manager, with the support of the EACCC if necessary:
(a) the coordination of crisis response management in the network, in accordance with the rules of procedure of the EACCC, including close cooperation with the relevant structures in the Member States;	(a) coordinate the response to crisis situations within the network, in close cooperation with the relevant structures in the Member States;

Article 19 of Commission Regulation (EU) No 677/2011	Article 20 of the implementing Regulation Commission (EU) 2019/123
(b) supporting the launch and coordination of contingency plans at Member State level;	(b) support the launching and coordination of contingency plans at Member State level, in particular through the network of national contact points;
(c) preparing network level remedies to ensure an immediate response to such network crises in order to safeguard and ensure the continuity and security of network operation. To this end, the Network Manager should:	(c) prepare mitigation measures at network level to ensure an immediate response to a network crisis in order to protect the network and ensure continuity and security of operation. To this end, the Network Manager should be independent:
• monitor the network situation in terms of emergency situations 24 hours a day;	• monitor the situation in terms of network crisis situations 24 hours a day;
• ensure effective information management and communication by providing accurate, timely and consistent data to support the application of risk management policies and procedures to decision making;	• ensure effective information management and communication through the dissemination of accurate, timely and consistent data to assist Member States and parties involved in operational activities in taking decisions on how to restore the network to normal operation after a network crisis or mitigate its impact on the network;
• facilitate structured collection and centralised storage of this data;	• facilitate organised collection and centralised storage of this data;
(d) indicating, where appropriate, to the Commission, the Agency or the Member States the possibility of additional support to mitigate the crisis, including through cooperation with operators of other modes of transport that can identify and implement intermodal solutions;	(d) indicate, where appropriate, to the Commission, the Agency or the Member States any possibilities for additional support to mitigate the network crisis, including through cooperation with operators of other modes of transport that can identify and implement intermodal solutions;
(e) monitoring and reporting on the restoration of the network and its stability.	(e) monitor and report to the EACCC on the restoration of the network to normal operation;
	(f) organise, facilitate and implement an agreed programme of network crisis simulation exercises involving Member States and parties involved in operational activities in the context of anticipating real network crises;
	(g) develop, implement and monitor the work programme and the risk register.

Source: Own study.

The amendments introduced by Commission Regulation (EU) 2019/123 concern the possibility for NM to benefit from the support of the EACCC only when necessary, to support crisis management at Member State level through the State Focal Points (SFPs), to carry out independent continuous monitoring of the network to detect crises and to manage related information to support the decision-making processes of all parties involved. The obligation for the Network Manager to report to the EACCC on the restoration of the network to normal operation is

also an important development. In addition, the new provisions require the NM to organise and conduct crisis simulation exercises (together with Member States and operational stakeholders) and to develop, implement and monitor a work programme and risk register.

The European Aviation Crisis Coordination Cell was established to assist the Network Manager in coordinating the management of responses to network crises affecting aviation, in close cooperation with the relevant structures in each country. The EACCC brings together all relevant political and operational stakeholders to ensure that the situation is assessed on the basis of available information and to formulate a coordinated response to the event. Under Regulation (EU) No. 677/2011, this body was composed of individual representatives of: the EU Member State holding the Presidency of the European Council[30], the Commission, the European Aviation Safety Agency (EASA), Eurocontrol, military authorities, air navigation service providers, airports and airspace users. Now that the provisions of Regulation (EU) 2019/123 have come into force, there is one representative each among the permanent members of the EACCC:

(a) a Member State authorised to do so by all Member States;
(b) the European Commission;
(c) European Union Aviation Safety Agency (EASA);
(d) Eurocontrol;
(e) Network Manager;
(f) military (at the request of the European Defence Agency (EDA);
(g) Air navigation service providers (at the request of the European representative body);
(h) airport operators (at the request of the European representative body);
(i) airspace users (at the request of the European representative body).

The members of the EACCC and their alternates should be appointed by the Commission following proposals made by the relevant institutions and organisations. Each Member State should designate a State Focal Point (SFP) and an alternate to the EACCC and facilitate their access to relevant information from the national crisis management structures, which is not limited to the field of aviation alone. The State Focal Points should carry out their duties in accordance with the rules of procedure of the EACCC[31]. It should cooperate with the network of central national contact points and carry out preparatory exercises to respond to a real emergency within the network in order to limit its effects. Depending on the need and nature of a specific crisis situation, the EACCC may involve experts in its work to help it develop a response to the crisis management. It should be the responsibility of the Network Manager to provide the resources necessary for the establishment and operation of

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30 The representative of Poland, as the country holding the Presidency, was a member of the EACCC in 2011.
31 The Rules of Procedures (RoP) of the EACCC were first approved by the Network Management Board in 2012 after the positive opinion of the Single Sky Committee (SSC).

the EACCC. The Network Manager may address the Chair of the EACCC after consulting the Commission.

The EACCC's interaction with the national focal points will ensure effective crisis management. The State Focal Points are intended to facilitate the involvement of relevant local authorities at an early stage of a potential crisis. The President of the EACCC contacts the SFPs, who are responsible for properly addressing and supporting the proposed policies and actions. The national contact point is obliged to liaise with the Network Manager in case it considers that an incident in its territory may be a crisis[32]. In such a situation, the NM should consult and discuss with the SFP the need to alert the EACCC. In air traffic flow and sector capacity management (ATFCM)[33], the Network Manager and other authorised users may use an interactive tool to visualise the impact of the crisis on air traffic and on available European air traffic network capacity (EVITA)[34].

It is not intended to replace any official sources of information, but should be used to support decision making in a crisis situation by identifying which flights, airports or airspaces in Europe are affected by a particular crisis. If a volcanic ash cloud appears, EVITA will display the NOP portal on a map:

– Volcanic ash concentration data received from VAAC London or VAAC Toulouse;

– the coordinates of the hazardous areas, as reported by States through NOTAM;

– sectors, airports and flights affected by ash concentration data or hazard areas, or areas locally identified by aircraft operators, which will assist in re-routing, avoiding areas affected by volcanic ash.

Currently, EVITA is mainly intended for training and exercise purposes, which is a certain limitation of the use of this tool. During a real crisis (e.g. volcanic eruption) EVITA should be used in conjunction with other official aviation information sources (e.g. NOTAM, SIGMET etc.). It should also be noted that the information made available by this tool only concerns the area of responsibility of IFPS/NM[35].

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32 In Poland, the role of the National Contact Point is played by employees of the Aviation Department of the Ministry of Infrastructure, appointed by the minister responsible for transport. So far, the cooperation between EACCC and SFP from Poland has included: conducting exercises on a cyber-attack on ATM systems (29-30 May 2013); conducting exercises on nuclear contamination in the airspace (19-20 November 2014); conducting exercises on a terrorist attack at two European airports (2-3 February 2016) and exchange of information in connection with the terrorist attacks in Brussels, which took place on 22 March 2016.

33 The acronym ATFCM means the extension of ATFM functions to ACC sector capacity management and air traffic optimisation.

34 EVITA (European crisis Visualisation Interactive Tool for ATFCM) is available on the Network Operations Portal (NOP) for all users registered on this portal.

35 The area where the Integrated Initial Flight Plan Processing System (IFPS), which is part of ATFCM in Europe, is responsible for the distribution of flight plans (FPL) and other messages to ATC units.

European experience in ATM network crisis management

Disruption and crisis situations in the European ATM network are often unpredictable, but should not be left to chance. Therefore, international, European and national civil aviation organisations are taking a number of measures to minimise the risk of various adverse events and limit the severity of their consequences. In preparation for responding to a real threat to the safety of NM and EACCC networks, they organise conferences[36], workshops and cyclical exercises on civil aviation crisis management. The exercises are part of a process of continuous improvement of the network manager's activities, aimed at identifying gaps and addressing areas that require improvement in risk and crisis management. During the exercises, certain event scenarios are simulated, which take into account various causes of air traffic emergencies, from natural to man-made disasters. Regardless of the specific scenario, the objectives of the exercises include:

– to verify the response of organisations and entities involved in aviation activities and responsible for ensuring safety in the event of a threat, including the way decisions are made, crisis management procedures are implemented, additional security measures are put in place and risk analysis is carried out;

– to test communication and coordination between the EACCC and the national focal points;

– to ensure that participating States are able to check internal crisis management procedures and their links with crisis management processes of other States covered by ATM network activities;

– to test the effectiveness of the EACCC as a communication support cell between States and institutions in the event of an emergency.

The Network Manager, acting in coordination with air navigation service providers, aircraft users, airport managers and military authorities, should respond to incidents of disruption using measures appropriate to the air traffic flow management process[37]. ATFM measures mainly aim at ensuring the safety of operations and preventing an excessive increase in demand for air traffic in relation to the declared air traffic control (ATC) capacity for ACC sectors and aerodromes. They should use as much of the capacity of the European ATM network as possible to optimise its efficiency and minimise the adverse impact on aircraft operators. In addition, ATFM measures also support network management if there is a critical event. The following

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36 NM's annual conferences allow all ATM actors to share operational experience with their partners and jointly develop solutions for better network performance. The main topics of these meetings are improving flight efficiency, common air traffic management, network disruption response and airport collaborative decision-making programmes (A-CDM).

37 ATFM measure means actions taken for air traffic flow management and capacity management. They consist in the allocation of slots or re-routing in order to bypass areas (ACC sectors) under restrictions due to congestion. Users shall be notified of the introduction of ATFM measures by means of the appropriate messages (ANM or AIM). This information is also available on the NMOC website: https://www.public.nm.eurocontrol.int/PUBPORTAL/gateway/spec/ index.html.

section of this study provides an overview of the main activities carried out by the Network Manager in the field of air traffic disruption and crisis management since its establishment.

In 2011, the European ATM network suffered less from both planned events (e.g. deployment of new systems) and unplanned events (weather, technical failures). There were fewer strikes and those that took place had less impact on the network than in 2010 thanks to better coordination of network activities. The delays related to these events were within the limits of NM expectations. Two local disruptions (the closure of Libya's airspace and the Greek crisis) that were unmanageable by the ATM system itself had a significant impact on traffic and capacity. The most unpredictable crisis situation was the Greek crisis, which caused significant delays on flight routes between September and October 2011. There were no delays in 2011, such as those that occurred in 2010 during the volcanic ash crisis, summer protests by ATC staff and interruptions to airports after heavy snowfall. Delays at airports caused by adverse weather conditions and demand exceeding agreed airport capacity limits, especially in the Greek islands during the summer, also contributed to sub-optimal network operations. NM therefore recommended that attention be paid to improving staff flexibility in ATC units, addressing their mobility between ATC or ANSP units and mitigating the effects of disruption by improving contingency arrangements.

In addition, a significant number of improvements in the route network were introduced in 2011 to improve the efficiency of the airspace structure. In the development of the Network Operations Plan (NOP) 2012-2014, the Network Manager considered the following projects:

– Improvement of the air traffic planning and monitoring process for delays due to special events (e.g. EURO 2012);

– Developing new contingency procedures;

– Reviewing traffic forecasts and sharing changes with partners;

– Implementing the ATFM delay management process at airports;

– Identifying the impact of human resources on capacity and taking mitigation actions;

– Continuing airport integration into the network by improving planning processes and further investigating the causes of demand that exceed agreed airport capacity limits;

– Developing procedures for Collaborative Decision-Making (CDM) by stakeholders, covering both management and operations.

In 2012, The European Aviation Crisis Coordination Cell (EACCC) was formally established in a new configuration, in line with the provisions of Regulation 677/2011. The EACCC has been very dynamic from the outset. It held three meetings during the year and played a key role in the implementation of the Safety Risk Assessment (SRA) approach to volcanic ash event management across Europe. In addition, in April 2012, the EACCC participated in ICAO VOLCEX 12/01 and, in May this year, in the first Aviation Crisis Management Workshop held in Brussels. An important stage in the development of the EACCC was the approval

of its rules of procedure by the NMB in November 2012. Although the EACCC has not been launched even once, the NM has successfully handled a number of events that may have turned into a crisis. The Network Manager units contributed to the detailed traffic planning during EURO 2012 (in Poland and Ukraine) and the Olympic Games in London. This was done in close cooperation with the relevant stakeholders and aircraft operators. Activities included changes in airspace, airport capacity simulations, staff exchanges, and coordination of slots or landings. The preparations were successful and the increased traffic was handled without delay. Further improvement of the capacity to react in disruption and crisis situations was to be achieved by implementing harmonised procedures across Europe in support of the safety risk assessment method.

In 2013, NM and EACCC improved crisis management procedures in the framework of many different projects. In April 2013, the Network Manager was the leader of the cyclical ICAO exercise on the crisis situation caused by volcanic eruption (VOLCEX 13/01). The exercise involved a significant number of NMOC operational staff, demonstrating the ability to maintain a high level of preparedness to respond to this type of threat to air traffic. During VOLCEX 13/01 a risk-based safety management process (SRA) was implemented. In May 2013, NM organised, together with the EACCC, an exercise on a cyber-attack on ATM systems (Cyber 13). The exercise identified a number of actions both at network and national level necessary to enhance preparedness to respond to such aviation threats. More than 20 organisations (airlines, ANSPs, states, military, European agencies, railways) participated in the exercise and worked closely with NM to contribute to the achievement of the objectives.

In June 2013, NM together with EACCC, organised a crisis management workshop. Their main objective was to establish closer links between the NM/EACCC and the National Contact Points, which are key actors in linking national crisis management arrangements with the NM/EACCC. In the same month, the procedures for operational cooperation between the NM/EACCC and the European Commission's Emergency Response Coordination Centre (ERCC) (managed by DG ECHO)[38] were published, which laid down the basis for cooperation between these centres in different crisis situations. In August 2013, NM started developing a risk assessment bulletin on ATM disruptions resulting from natural hazards to enable its aviation partners to assess the risk of possible major disruptions and crises. After a trial period, its implementation was scheduled for 2014. Summarising the NM's crisis management activities in 2013, the NM managed a number of disruptions with the potential to evolve into a crisis (twice in connection with the controller protests in June and October), so that none of these events required the activation of the EACCC.

In 2014, the Network Manager, with the active support of the EACCC, demonstrated its effectiveness in coordinating an appropriate response to extraordinary events such as the shooting down of the Malaysian MH 17 in Ukrainian

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38 DG ECHO - Directorate General for Humanitarian Aid and Civil Protection.

airspace, the outbreak of Ebola, the activation of the Icelandic volcano Bárðarbunga, the rocket attacks on Ben Gurion Airport in Tel Aviv and armed confrontations in Libya and Syria. The spread of the Ebola virus in West Africa posed a serious cross-border health threat and required a coordinated response from many public health organisations, such as the World Health Organisation (WHO) at global level and DG SANTE[39] at EU level. The aviation community, through the EACCC and the network of national focal points for aviation crisis management, played a supporting role in this international action. NM/EACCC continued to participate regularly in ICAO volcanic ash exercises (VOLCEX), the last of which took place in April 2014. The EACCC organised a crisis management workshop in June. The main objective was to establish even closer contacts between the NM/EACCC and the national focal points, which are key actors linking national crisis management structures with the NM and EACCC.

On 17 July 2014, at approximately 15.00 UTC, the Network Manager, having received a request for information from KLM regarding the passenger aircraft Boeing 777 flight number MH 17 of Malaysia Airlines, received confirmation from the Ukrainian air navigation service provider that the aircraft had disappeared from their radar screens. Sometime later, the media confirmed that the aircraft had crashed in eastern Ukraine[40]. The NM decided to enter crisis mode and the EACCC was immediately activated and met four times by teleconference in support of the associated mitigation measures. The Network Manager's Operations Centre (NMOC) managed the operational response and supported the EACCC in resolving network disruption issues. The active participation of ANSPs from neighbouring countries has made it possible to quickly identify safe and secure re-routing solutions. This event revealed the need for an urgent review of the procedures to be followed in the event of potential threats to aviation safety when flying over conflict zones. In this respect, the Director of the Network Management Directory (NMD), together with representatives of EU Member States and EASA, participated in the ICAO Task Force dealing with civil aviation and national security issues arising from the MH 17 aircraft crash. The Task Force confirmed the principles of state responsibility in sovereign or delegated airspace and the right of states to protect their citizens flying over other states. It also supported the proposal to create a system for sharing reliable risk assessments for aviation in conflict zones[41]. Such a system would enable aircraft operators to make more informed decisions about operating in or near these

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39 DG SANTE - the Commission's directorate responsible for the implementation of EU food safety and health policy and for monitoring the implementation of EU legislation in these areas.

40 On the basis of the results of the international investigation team, it was established that the plane was shot down by a guided ground-to-air Buk missile, which belonged to the 53rd Airborne Missile Brigade from Kursk of the Russian Federation armed forces.

41 Currently, these issues are standardised in the ICAO DOC 10084, RISK ASSESSMENT MANUAL FOR CIVIL AIRCRAFT OPERATIONS OVER OR NEAR CONFLICT ZONES, ed. 2, Montreal 2018.

zones. From 21 November 2014, NM started to provide information on a trial basis on conflict zones in and around Europe on the crisis management portal (restricted).

In August 2014, it showed signs of the eruption of Bárðarbunga volcano. As a result, NM has increased its level of preparedness to coordinate management in case of a volcanic ash release into the atmosphere. The Chairman of the EACCC held a teleconference with the members of the EACCC, the VAAC London and the national focal points in Norway, Sweden, Denmark, the United Kingdom, Ireland and Iceland. In November 2014, the Network Manager, supported by the EACCC, organised a crisis management exercise called Nuclear 14. This exercise simulated a nuclear incident in Europe, testing how States, aircraft operators and other stakeholders will react and cooperate during such an emergency. 30 organisations (airlines, air navigation service providers, states, military, European agencies, railways) took part in the exercise and thus helped the NM and EACCC to ensure its success. The exercise showed that more efforts are needed to assess and predict the extent of the risks posed by radioactive particles in the airspace and to provide guidance to States in this regard. The next steps are to consolidate the feedback and agree on further actions to identify priority actions that will provide a better basis for decision makers in the event of an actual event. The NM once again demonstrated its ability to fulfil its role as an indispensable actor in coordinating the management of disruption and crisis situations directly or indirectly affecting European aviation.

After a turbulent 2014, 2015 was a period of consolidation of various activities aimed at better preparation for dealing with crisis situations. In June 2015, the process of amending the EACCC Rules of Procedure was completed in order to align them with the new Regulation (EC) No. 970/2014, add the EACCC Work Plan and add the role of the EACCC Communication Contact Point. Three EACCC meetings were held during the year: in February, June and October. The main topics of discussion included: the follow-up to the MH 17 downing of the Malaysian aircraft, the development of information exchange with regard to conflict zones and the adoption and monitoring of the EACCC annual work plan. In June, more than 50 representatives took part in the EACCC workshop, starting with the State Focal Points, airlines, ICAO, EU and EACCC members. The main topic of the workshop was the shooting down of MH 17 over Ukraine and the lessons learned from it.

In 2015, the European ATM network was negatively affected by many extraordinary events. In addition to the disruption of the conflict zone in Ukraine, there were also events such as the Germanwings plane crash in March, the fire at Terminal 3 at Rome Fiumicino Airport, the power failure at Belgocontrol (both in May), and the radar failure at ACC Stockholm due to the November 2015 space weather. Although none of these events required the EACCC to be activated, NM remained in close contact with the State Focal Points, directly concerned operations and EACCC members to ensure that appropriate countermeasures could be put in place in case of an escalation of the situation.

The EACCC discussed the results of the Nuclear 14 emergency exercise held in November 2014 and identified a number of follow-up actions. The need for a contamination map to support decision-making in the event of a nuclear accident

was identified as a key short-term action. The EACCC request was considered through the relevant ICAO bodies, which resulted in agreement that some preliminary guidance would be provided by the end of 2016. Exercise Security Incident 15, originally scheduled for November 2015, was postponed to February 2016 due to the announcement by the Belgian authorities of the highest (on a scale from 1 to 4) level 4 terrorist threat in Brussels.

To sum up, in 2015, many extraordinary events caused by the difficult situation in Ukraine, Syria, Libya, Iraq, Egypt and other countries were a burden on the operations both at local and network level. The Network Manager played a key role in finding and agreeing with stakeholders on solutions to mitigate the effects of these emergencies. In addition, response scenarios were developed for different types of major crises. This was done jointly with airlines, air navigation service providers, ICAO and neighbouring regions, both from a planning and operational point of view.

2016 was also marked by a number of events which had an adverse impact on the network and had direct consequences for aircraft operators in terms of reduced flight efficiency. The most important of these were:

– Deployment of new technical ATM systems in the Prestwick and Langen ACC control centres, which reduced network efficiency;

– Closure of Brussels airport due to the terrorist attack on 22 March 2016, which reduced network efficiency;

– Power supply (emergency) failure at the Polish Air Navigation Agency (PANSA) during the technical inspections on 16-17 December 2016. As a result of this failure, radar imaging was lost for about 30 minutes, most of the radio stations stopped working, and there were problems with telephone communication. This resulted in the temporary closure of FIR Warsaw.

In response to these events, the activities of the Network Manager in 2016 were aimed at reducing network delays through the ATFCM process, minimising the adverse impact of large events and changes in ATM systems, mitigating the impact of ATC staff strikes on network performance, improving flight efficiency through improved airspace design and use and integrating airports into the network.

In 2017, many events affected the European ATM network, but the resulting disruption did not require the activation of the EACCC. During these situations, NM was in close contact with operational stakeholders to ensure that appropriate mitigation measures could be implemented. The network and local operations continued to be affected by exceptional events in Ukraine, Syria, Libya, Iraq and Egypt. The Network Manager worked with airlines, air navigation service providers, ICAO and neighbouring regions to find solutions to mitigate the effects of these disruptions from both a planning and operational perspective. Turkey, in particular, made significant efforts to adapt its route structure to facilitate the smooth flow of air traffic affected by the disruption at the interface with Iran and Iraq and the related further adjustments made in Bulgaria, Romania, Hungary, Slovakia and Poland.

On 1 and 2 February 2017, the EACCC organised the Power 17 crisis management exercise. This exercise simulated a network crisis resulting from a large-scale blackout in several European countries and the management of the response in cooperation

with Member States and aviation stakeholders. Feedback from participants showed that the exercise helped to raise awareness on how to deal with the crisis, the effects of which went well beyond the aviation sector. In addition, the EACCC held three meetings: in March, June and September. As part of its activities, the unit maintained a risk register, listing the ATM risks in Europe that could cause an aviation network crisis, as well as a risk assessment and associated mitigation measures[42].

The next edition of the EACCC workshop took place at Eurocontrol headquarters in Brussels on 14 June 2017. The workshop was attended by 45 participants, most of whom were representatives of the State Focal Points from 23 countries, as well as representatives of the European Commission, the EU Computer Emergency Response Team for the EU (EU-CERT), the EU Network and Information Security Agency (ENISA) and EACCC members. Two main topics were discussed during the workshop: the growing role of State Focal Points and cyber security in the context of the organisation of the next EACCC exercise.

There were also a number of disruptions to the functioning of the European ATM network in 2018, which did not, however, require the EACCC to be launched. During these situations, NM was in close contact with the operational stakeholders directly concerned to ensure that appropriate mitigation measures could be implemented. On 13-14 March 2018, The EACCC organised a crisis management exercise: EACCC18 Coordination ATM/Cyber. This exercise simulated a network crisis resulting from a pan-European cyber-attack on radar data processing systems and the management of the response to this crisis in cooperation with Member States and aviation stakeholders. The exercise was attended by 80 participants, including members of the EACCC, 17 participating States and their ANSPs, aircraft operators, the EU Computer Emergency Response Team (CERT-EU), who also represented EASA and the European Centre for Cybersecurity in Aviation (ECCSA), which provided support for the exercise tools, and the EU Network and Information Security Agency (ENISA), which supported the preparation of the exercise scenario.

On 3 April 2018, a technical failure of the Enhanced Tactical Flow Management System (ETFMS) occurred at NMOC, primarily affecting ATFM operational services and the Centralised Code Assignment and Management System (CCAMS). Due to the interruption of this system, fallback procedures were introduced to reduce the capacity of the ACC sectors and the number of take-offs from European airports. While the restrictions imposed have ensured a safe level of traffic throughout the European ATM network, they have reduced its capacity by about 10 percent. In order to prevent a recurrence of such a failure, the NM teams took a number of measures which were presented to the EC, EASA, NMB and the Eurocontrol Standing Committee in a report on technical problems related to the failure.

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42 The risk register was reviewed and approved at each formal EACCC meeting. The risk register was made available to the national focal points via the EACCC website in order to prepare adequate resources at local level and maintain the network's readiness to respond to higher risks.

In 2018 The EACCC held three meetings in March, June and November. The annual EACCC workshop for State Focal Points (SFPs) took place on 14 June 2018 at Eurocontrol's premises in Brussels. The workshop was attended by more than 40 participants, most of them State Focal Points from 22 States, the European Commission, ICAO EUR/NAT, an ICAO representative from Montreal and EACCC members. The workshop focused on the revised implementing rules for network functions (Regulation 970/2014) and their impact on the Crisis Management Focal Points and on crisis management exercises. Network operations continued to be affected by exceptional events in Ukraine, Syria, Libya, Iraq and Egypt. NM worked with airlines, air navigation service providers, ICAO and adjacent regions to find solutions to mitigate these disruptions, both from a planning and operational perspective. Turkey, in particular, made significant efforts to continuously adapt to the changing operational conditions in the Eastern neighbouring areas and Cyprus, which has experienced intensive military operations within the FIR Nicosia.

The conclusions of the analysis of air traffic disruptions and crises during the period under review suggest that the most unfavourable effects on the operation of the ATM network are caused by:

− local armed conflicts and geopolitical instability (currently: Syria, Turkey, Iraq, Iran, eastern Ukraine, Egypt, and Libya);

− volcanic eruptions or difficult weather conditions, persisting over a large area of the continent;

− major changes to the functioning of air traffic control systems (e.g. Brest, Langen, Munich, Bordeaux, Zurich, and Warsaw);

− cyclical strikes of air traffic controllers and other workers in the air transport sector;

− failures of air traffic communication, navigation and surveillance (CNS) equipment or systems constituting the ATM technical infrastructure.

The studies carried out show that, based on the lessons learned from each crisis event, the Network Manager took a number of organisational, technical and training measures to mitigate the consequences of the various unforeseen events causing disruption to the European ATM system. Multilateral cooperation between all stakeholders was an important facilitator in responding to these incidents. While the Network Manager can apply various countermeasures to minimise disruption, he cannot resolve a serious crisis situation on his own. The general conclusion drawn from the assessment of NM activities in a crisis context is that further changes to the centralised management of the European ATM network are necessary in view of the forecast growth of air traffic and potential threats to air navigation safety. This could be achieved by developing a new operational concept, taking into account the new architecture of European airspace, allowing for better management of European airspace at network level and introducing converging technical and procedural solutions. A comprehensive, fully harmonised approach by civil and military aviation authorities is necessary to ensure that these changes have a positive impact throughout the network, while ensuring effective crisis management.

Conclusions

The air traffic management network is crucial for the smooth functioning of air transport in Europe. One of the challenges to ensure the safety and continuity of air navigation services in the European ATM network is to increase its resilience to any possible disruption and crisis situation. This challenge can be addressed through continuous threat monitoring, risk management and crisis management training. All actions taken by ICAO and European and national civil aviation organisations in this area should ensure that the adverse effects of air traffic crises are minimised and that the capacity of the network to provide services is rapidly restored to an acceptable level of safety. The numerous emergencies in the European ATM network over the last decade, caused by exceptional and unforeseeable events, have highlighted the need to have a central authority to ensure the effective coordination of countermeasures taken at different levels of decision making, enabling a swift response to safety risks to air operations. A key role in this respect has been successfully performed by the Network Manager (NM) with the support of the European Aviation Crisis Coordination Cell (EACCC) and in close cooperation with all stakeholders. Thanks to the experience gained and the continuous adaptation to changing external conditions, the Network Manager, the EACCC and the relevant structures in the Member States are now better equipped to deal with possible future disruptions and crises in civil aviation. Nevertheless, there is a need to further improve the rules, procedures and tools to support the crisis management process. The Network Manager should also support stakeholders in the implementation of new technologies and operational procedures that enhance the safety and efficiency of the European air traffic management network in any, including emergency, condition of its operation.

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