

ICAO Crisis Management Framework

CHAPTER 1 - INTRODUCTION

1.1 Background

ICAO 12th Air Navigation Conference (AN-Conf/12) in Montréal in 2012 issued recommendation 4/8 "Crisis Coordination Arrangements and Contingency Plans" stating that ICAO should consider how crisis coordination arrangements for potentially disruptive events, similar to that used for volcanic eruptions, could be established on a regional basis; and also the regional offices continue to support the development, promulgation, maintenance of contingency plans, including the holding of practical exercises, in preparedness for potentially disruptive events, including those events that may adversely impact aviation safety.

Consequently, the EANPG took an initiative to establish a standardised crisis management framework based on a common concept for the management of crisis situations affecting aviation within the EUR Region, regardless of the type. This concept will include crisis coordination arrangements and crisis management principles, a non-exhaustive list of possible threat types, the four different phases of escalation of crisis and the requirement for pan/intra-regional coordination. It will take account of crisis management arrangements that exist in a number of States at national and regional level and without prejudice to the existing States' and EU arrangements. The concept could also be considered by other ICAO Regions, especially in areas where the ICAO Planning and Implementation Regional Groups (PIRGs) established Regional Contingency Plans.

A comprehensive framework for crisis management has been established in a part of the EUR region in the context of the EU Single European Sky policy through the European Aviation Crisis Coordination Cell (EACCC) supported by the Network Manager, based on EC Regulation 677/2011.

At the global level ICAO has established an internal Emergency and Incident Response (EIR) Process to coordinate the flow of information between ICAO headquarters and other interested parties within the aviation industry and, where appropriate, United Nations (UN) headquarters. The EIR process is of a strategic nature and was not established to assume control over the operational management of incidents.

1.2 Scope and objectives

This crisis management framework covers the ICAO EUR region. It supports crisis management arrangements at the national (e.g. State), sub-regional (e.g. EACCC scope), and regional level (e.g. EUR Region).

The framework:

- is built on EACCC arrangements and experience,
- aims to be in line with global ICAO provisions and be used as a basis for pan/intra-regional cooperation,
- is built on existing national and international crisis management arrangements in the EUR Region,
- aims to propose guidance for States - to help States in enhancing the level of preparedness to threat scenarios,
- aims to harmonise crisis management approach across the whole European Region.

1.3 Principles

The following principles apply:

- Arrangements intend to address crisis management in an all-hazard-approach and including all relevant stakeholders.
- Without prejudice to a State's sovereignty and for those States subject to the EU framework for crisis management, a coordination mechanism should be established to improve communication flows and facilitate harmonised decision making across the network in order to manage the impact effectively.
- The response to the crisis should be proportionate to the type of threat, its extent, and circumstances; for instance, it would be worth exploring where else the safety risk assessment methodology (SRA) could be applied more widely.
- Data/information sets and sources to support crisis management arrangements should be identified.
- Communication policy should be established to ensure that sharing of consistent information is coordinated.
- Procedure should be established for crisis escalation, recovery, and return to normal.
- Post-crisis evaluation procedures should be established.
- Arrangements should address principles related to decision making in crisis events (e.g. Safety Risk Assessment (SRA) approach in volcanic ash events).
- Arrangements should include the civil/military coordination and cooperation aspects.

- Arrangements should also cover scenarios where more than one United Nations Agency is involved in the crisis management.

1.4 Document maintenance

This document has been developed by the CRISIS Management Framework Working Group under the auspices of EANPG COG and has been adopted by EANPG following a recommendation by the COG. The document is published as an ICAO EUR Document on the ICAO EUR/NAT Office website.

The core document will be kept under regular review by the EANPG COG and will be updated as required. The Secretariat of the ICAO EUR/NAT Regional Office will maintain Annexes.

CHAPTER 2 - ATM CRISIS MANAGEMENT PROCESS

2.1 Crisis Management Phases

This chapter covers phases in ATM Crisis Management that may be applied on a national, sub regional, or regional level, in case of a disruptive event.

2.1.1 Pre-alert

Information is received on an event, which may lead to a possible major disruption to ATM, requiring activation of the crisis management arrangements.

2.1.2 Disruption

Major ATM disruption that impacts the ATM operations and which may escalate to a crisis.

2.1.3 Crisis

State of inability to provide air navigation service at required level resulting in a major loss of capacity, or a major imbalance between capacity and demand, or a major failure in the information flow following an unusual and unforeseen situation.

2.1.4 Recovery

In the recovery phase, the operation will go back to normal, and an evaluation of the impact will be finalised.

2.2 Preparation

2.2.1 Building Procedures

The following steps should be considered:

- Establishing contacts covering:
 - Crisis Management Staff
 - Information Sources
- Defining operational instructions covering:
 - Roles
 - Responsibilities
 - Initiation of procedures
 - Actions
- Making available tools in support of crisis management:
 - Tele/video-conferencing
 - Contingency plans
 - Information resources
 - Library of information on crisis topics
 - Web portal – sites

2.2.2 Allocating Resources

The following resources should be allocated:

- Budget
- People
 - Crisis Management staff
 - Support Staff
- Facilities
 - Crisis rooms
 - Equipment (PCs, TV, cabinets, tables, chairs, etc.)
 - Communication Facilities (telephones, etc.)

2.2.3 Building Partnerships

Building partnerships with relevant stakeholders at national, regional and beyond national and regional boundaries is an essential step in the preparation for an effective crisis management.

2.2.3.1 National Network

At the national level consideration should be given to establishing partnerships should be established with:

- a) Relevant stakeholders (non-exhaustive list)
 - Aircraft operators (both commercial and non-commercial) including operators of State aircraft
 - Air Navigation Service Providers at aerodromes, in the Terminal Areas and in the Area Control Centres,
 - Airport operators,
 - Military,
 - Appropriate Ministries,
 - Civil Aviation Authority and/or appropriate National (Supervisory) Authorities
 - etc.

- b) Knowledge centres/Agencies

Knowledge centres/Agencies should be supporting national aviation crisis management with expertise in their specific field.

2.2.3.2 Regional Network

In addition to partnerships established at the national level, consideration should be given to building partnerships at the regional level involving:

- a) Relevant stakeholders (non-exhaustive list)
 - Air Navigation Service Providers at aerodromes, in the Terminal Areas and in the Area Control Centres,
 - Aircraft operators,
 - Airport operators,
 - Civil Aviation Authorities and/or National Supervisory Authorities
 - EACCC,
 - EASA,
 - EU Council of Ministers,
 - European Commission,
 - ICAO EUR/NAT Regional Office,
 - International organisations, e.g. IATA, ACI, CANSO, etc.
 - Main ATM Centre (MATMC),
 - Military,

- Network Manager (NM),
- etc.

b) Knowledge centres/Agencies

Knowledge centres/Agencies should be supporting aviation crisis management with expertise in their specific field, for example (non-exhaustive list):

- EC Emergency Response Coordination Centre (ERCC) managed by DG ECHO with its expertise in management of events requirement humanitarian aid or involving civil protection activities,
- Manufacturing industry
- Volcanic Ash Advisory Centres (VAAC) in London and Toulouse in the event of volcanic ash episodes,
- Other United Nations Agencies (e.g. World Health Organisation, International Atomic Energy Agency, etc.) which have a responsibility to deal with crisis management,
- etc.

c) Crisis Focal Points

A network of Aviation Crisis State Focal Points has been established in the framework of EACCC.

States in the EUR region outside the EACCC context should consider establishing the appropriate liaison at the national level to serve as the focal point in aviation crisis management.

c1. EACCC model

Role of EACCC Crisis Focal Points includes the following:

In broad terms, the State Focal Point is the individual(s) who will act as the conduit between the NM/EACCC and his/her State. Patently that individual needs to be suitably senior to command authority, and suitably experienced (in aviation preferably, but in Crisis Management if not) to engage at short notice – and likely without time to have received comprehensive briefing on the issue – with the EACCC.

It is undeniable that such an individual will not have all the answers to hand, but should have developed a national sub-structure of appropriate initial points of

contact able to provide timely and accurate information into the EACCC decision-making process.

There is no definitive qualification for individuals in this position, but as a starting point, they should consider that in the times of crisis they should:

- Ensure that the NM/EACCC is notified of major disruptions and crises in his/her own State, or region;
- Share known and forecast information with the NM/EACCC;
- Understand his/her national position (e.g. in respect of safety risk assessment in volcanic ash events);
- Ensure that conclusions of the assessment of the network impact of actions generated at the national level are shared with the NM/EACCC;
- Provide a link with internal structure at the national level and, where appropriate coordinate response and mitigating actions at the national level in accordance with national procedures;
- Participate to the teleconferences of the EACCC;
- Be available for contact by NM/EACCC;
- Liaise with other, non-aviation, modes of transport at the national level in accordance with national procedures;
- Provide a link to enable consistent messaging in media lines at the national level.

Furthermore, as the work of the NM and the EACCC moves along in times of 'non-crisis', the State Focal Point should:

- Provide feedback to the NM in its follow up of actions/lessons learned from previous crises and exercises;
- Be aware of measures to be taken at the national level in the event of a crisis;
- Contribute to, and when required participate in, NM/EACCC organised exercises;
- Contribute to, and when required participate in, NM/EACCC organised workshops on procedures, tools and communication;
- Establish and maintain relations with relevant expert organisations at the national level (e.g. nuclear experts), that could provide information sources/portals;
- Establish and maintain relations with military at the national level;
- Ensure the EACCC has up-to-date contact details;
- Develop an informal national network for consultation on potential next major disruption/crisis.

c2. Others

This paragraph will be amended with input provided by States outside the NM/EACCC area and be updated in later editions.

2.2.3.3 Inter-Regional Network

As crisis often spills over the boundaries of States or Regions, in addition to partnerships established at the national and regional level, it is essential to establish close cooperation with key stakeholders beyond the boundaries of the Region, in this particular case beyond ICAO EUR Region.

a) Relevant stakeholders

Relevant aviation stakeholders outside ICAO EUR Region include, for example (non-exhaustive list):

- FAA and NAV Canada in North America,
- ISAVIA in Iceland,
- adjacent ICAO Regional Offices (mainly ASIA/PAC, MID and AFI), ASECNA in Africa, etc.

b) Knowledge centres/Agencies

Knowledge centres/Agencies outside ICAO EUR Region include, for example (non-exhaustive list):

- in USA: NOAA, NASA, etc.
- Other United Nations Agencies (e.g. World Health Organisation, etc.)
- etc.

2.2.4 Exercises/Training

Exercises should be seen as part of the continuous enhancement process, in order to identify gaps and address areas for improvement of the crisis management process. All involved stakeholders should be up to date with the crisis management procedures and their responsibilities.

Training and exercise programme in support of crisis management should be established covering, i.a.:

- Procedures
- Communication, internal and external
- Tools

2.3 Response Process

2.3.1 Information Gathering

The availability of accurate, timely and consistent data is critical to effective crisis management. To this effect procedures shall be established in order to allow for the appropriate flow of information relating to the crisis from all possible sources to sustain the crisis management activities.

Information may be gathered from, i.a.:

- Industry/ATM stakeholders
- Knowledge Centres
- Subject matter experts

2.3.2 Communication

Communication in support of crisis management should be established at:

- Crisis management operational level
- General public level.

Harmonised information dissemination needs to be ensured.

2.3.3 Decision Making

2.3.3.1 National perspective

National crisis management arrangements should ensure that proper coordination of (mitigating) measures can be carried out among the relevant stakeholders. Therefore, appropriate mechanisms should be established at a national level in support of decision making involving the State Focal Point. This is relevant in establishing an appropriate response, such as impact assessments, relevant legal framework information, operational data gathering, activation of contingency plans, etc.

2.3.3.2 Coordination on international level (harmonisation)

In times of crisis, when impact of the network involves several states, an appropriate coordination mechanism should be established to facilitate information exchange involving the relevant State Focal Points. This will assist states in the crisis

response measures, and provide them with relevant information to ensure harmonised decision making.

2.4 Evaluation

2.4.1 Lessons Learned

Lessons learned evaluation should be carried out for any crisis event.

2.4.2 Action Plan

Outputs of the evaluation should be incorporated into an action plan with appropriate monitoring and follow up.

CHAPTER 3 - SCENARIO ANALYSIS

This chapter includes a number of scenarios that may lead to an aviation crisis. Each scenario contains a generic description, impact analysis, and decision making principles.

'Impact analysis' describes possible impact in terms of safety, capacity, cost and environment on:

- aircraft
- airspace
- aerodrome
- flight operations
- ANSP
- persons
- cargo

'Decision making principles' provide guidance on aviation or non-aviation stakeholders' response in managing the crisis.

1. Floods

a. Description

Flooding which may impact airport and/or ATC service infrastructure, directly as well as indirectly, i.e. access, power supplies, telecom, etc.

b. Impact analysis

Impact on aerodrome (s)

- aerodrome unavailable for flight ops
- reduced capacity
- infrastructure: building, equipment, access

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight re-scheduling
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs workload
- infrastructure: building, equipment, access, communications

Impact on persons

- flight crew workload
- passenger handling
- ground personnel workload

Impact on cargo

- live stock
- goods (including dangerous goods)

c. Decision making

- State (non-aviation) authorities, airport authority and/or ANSP decide on the airport unavailability for flight operations or reduced capacity
- State (non-aviation) authority and/or ANSP decide on air navigation service provision limitation (airspace unavailability or reduced capacity for flight operations)
- Aircraft Operators will follow NOTAM and any additional instructions issued by responsible authorities

2. Earthquake

a. Description

Earthquakes which may impact airport or ATC service infrastructure, directly as well as indirectly, i.e. access, power supplies, telecom, etc.

b. Impact analysis

Impact on aircraft

- damage of aircraft on ground

Impact on aerodrome

- aerodrome unavailable for flight ops
- reduced capacity
- infrastructure: building, equipment, access

Impact on flight operations

- flight cancellation
- flight diversion

- flight re-scheduling
 - flight delay
- Impact on ANSP
- people: ATCOs workload
 - infrastructure: building, equipment, access
 - communications
- Impact on persons
- flight crew workload
 - passenger handling
 - ground personnel health
 - ground personnel workload
- Impact on cargo
- live stock
 - goods (including dangerous goods)
- c. Decision making
- State (non-aviation) authorities, airport authority and/or ANSP decide on the airport unavailability for flight operations or reduced capacity
 - State (non-aviation) authorities and/or ANSP decide on air navigation service provision limitation (airspace unavailability or reduced capacity for flight operations)
 - Aircraft Operators will follow NOTAM and any additional instructions issued by responsible authorities

3. Volcanic Ash

a. Description

Volcanic ash dispersion contaminating parts of airspace and possibly covering airports.

b. Impact analysis

Impact on aircraft

- immediate safety of an aircraft:

- "the malfunction or failure of one or more engines leading not only to reduction, or complete loss, of thrust but also to failures of electrical, pneumatic and hydraulic systems. Volcanic ash contains particles whose melting point is below modern turbine engine burner temperature; these then fuse in the turbine section reducing the throat area and efficiency leading to engine surge and possibly flame-out;"
- the blockage of pitot and static sensors resulting in unreliable airspeed indications and erroneous warnings;

- windscreens can be rendered partially or completely opaque; and
- contamination of cabin air requiring Flight crew use of oxygen masks.

- the longer term safety and costs affecting the operation of aircraft:

- the erosion of external aircraft components;
- reduced electronic cooling efficiency and, since volcanic ash readily absorbs water, potential short circuits leading to a wide range of aircraft system failures and/or anomalous behaviour;
- flight crew manoeuvring for volcanic cloud avoidance may potentially conflict with other aircraft in the vicinity;
- deposits of volcanic ash on a runway resulting in a degradation of braking performance, especially if the volcanic ash is wet; in extreme cases, this can lead to runway closure; and
- the aircraft ventilation and pressurization systems can become heavily contaminated. In particular, cleaning or replacement may be required in response to air cycle machine contamination and abrasion to rotating components, ozone converter contamination and air filter congestion.
- contamination

Impact on airspace

- airspace unavailable for flight ops
- reduced capacity

Impact on aerodrome

(due to volcanic ash deposits on aerodrome surfaces: runway, taxiways, apron)

- aerodrome unavailable for flight ops
- reduced capacity

Impact on flight operations

- flight cancellation
- flight re routing
- flight diversion
- flight re-scheduling
- flight delay

Impact on ANSP

- ATCOs workload

Impact on persons

- flight crew health

- flight crew workload
 - passenger health
 - passenger handling
 - ground personnel health
 - ground personnel workload
- Impact on cargo
- live stock
 - goods (including dangerous goods)
- c. Decision making
- Aircraft Operators will make flight operational decisions based on SRA/SMS approach in accordance with their SRA/SMS qualifications granted by their national authorities.
 - State authorities may close airspace in the immediate vicinity of the volcano

4. Nuclear Event

a. Description

Nuclear accident resulting in nuclear emissions (e.g. nuclear powerplant) impacting flight operations in the EUR region.

b. Impact analysis

Impact on aircraft

- contamination

Impact on airspace

- airspace unavailable for flight ops
- reduced capacity

Impact on aerodrome

- aerodrome unavailable for flight ops
- reduced capacity (e.g. due to decontamination)
- infrastructure: access

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight re-scheduling
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs workload
- infrastructure: access

Impact on persons

- flight crew workload

- flight crew health
- passenger health
- passenger handling
- ground personnel workload
- ground personnel health

Impact on cargo

- live stock health
- goods contamination

c. Support to decision making

- State (non-aviation) authorities (e.g. health authorities) may decide on the airport unavailability for flight operations
- State authorities, airport authority and/or ANSP decide on the airport's reduced capacity
- State (non-aviation) authorities (e.g. health authorities) may make a decision impacting air navigation service provision ability (resulting in airspace unavailability or reduced capacity for flight operations)
- Aircraft Operators will follow NOTAM and any additional instructions issued by responsible authorities

5. Armed Conflict

a. Description

Part of airspace is not available for civil traffic, special corridors may be established.

b. Impact analysis

Impact on aircraft

- immediate safety of an aircraft: an aircraft may be targeted
- damage: an aircraft may get damaged

Impact on airspace

- airspace unavailable for flight ops
- reduced capacity (due to military restrictions)

Impact on aerodrome

- aerodrome unavailable for flight ops
- reduced capacity (e.g. due to military ops)
- infrastructure: building, equipment, access

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight re-scheduling
- flight diversion

- flight delay
- Impact on ANSP
- people: ATCOs workload
 - infrastructure: building, equipment, access
 - communications
- Impact on persons
- flight crew workload
 - flight crew health
 - passenger health
 - passenger handling
 - ground personnel workload
 - ground personnel health
- Impact on cargo
- live stock
 - goods (including dangerous goods)
- c. Decision making
- State authorities, airport authority and/or ANSP may decide on the airport's reduced capacity
 - Appropriate (non-aviation) authorities may decide on the airport unavailability for flight operations
 - State authorities and/or ANSP may decide on air navigation service provision limitation (airspace/ATS route unavailability or reduced capacity for flight operations)
 - Appropriate (non-aviation) authorities may make a decision impacting air navigation service provision ability (resulting in airspace unavailability or reduced capacity for flight operations)
 - Aircraft Operators will follow NOTAM and any additional instructions issued by responsible authorities

6. Hazardous Chemicals Event

a. Description

An accident/incident resulting in emissions of hazardous chemicals (e.g. chemical powerplant) impacting flight operations.

b. Impact analysis

Impact on aircraft

- immediate safety of an aircraft:

- windscreens can be rendered partially or completely opaque
- reduced visibility
- contamination of cabin air requiring flight crew use of oxygen masks.

- the longer term safety and costs affecting the operation of aircraft:

- flight crew manoeuvring for area of severe smoke emission avoidance may potentially conflict with other aircraft in the vicinity;
- the aircraft ventilation and pressurization systems can become heavily contaminated.
- contamination by chemical spills.

Impact on airspace

- airspace unavailable for flight ops
- reduced capacity

Impact on aerodrome

- aerodrome unavailable for flight ops
- reduced capacity (e.g. due to inspections required)
- infrastructure: access

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight re-scheduling
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs workload
- infrastructure: access

Impact on persons

- flight crew workload
- flight crew health
- passenger health
- passenger handling
- ground personnel workload
- ground personnel health

Impact on cargo

- live stock health
- goods contamination (including dangerous goods)

c. Decision making

- State (non-aviation) authorities (e.g. environmental & health authorities) may decide on the airport unavailability for flight operations
- State authorities, airport authority and/or ANSP decide on the airport's reduced capacity
- State (non-aviation) authorities (e.g. environmental & health authorities) may make a decision impacting air navigation

service provision ability (resulting in airspace unavailability or reduced capacity for flight operations)

- Aircraft Operators will follow NOTAM and any additional instructions issued by responsible authorities

7. Fire

a. Description

Fire(s) with substantial smoke production impacting flight operations.

b. Impact analysis

Impact on aircraft

- immediate safety of an aircraft:

- reduced visibility due to smoke
- smoke contamination affecting cabin air requiring flight crew use of oxygen masks.

- the longer term safety and costs affecting the operation of aircraft:

- the aircraft ventilation and pressurization systems can become heavily contaminated.

Impact on airspace

- airspace unavailable for flight ops
- reduced capacity

Impact on aerodrome

- aerodrome unavailable for flight ops
- reduced capacity
- infrastructure: access

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight re-scheduling
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs workload
- infrastructure: access

Impact on persons

- flight crew workload
- flight crew health
- passenger health
- passenger handling

- ground personnel workload
 - ground personnel health
- Impact on cargo
- live stock health
 - goods (including dangerous goods)
- c. Support to decision making
- State (non-aviation) authorities, airport authorities and/or ANSP may decide on reduced capacity or on the airport unavailability for flight operations
 - State (non-aviation) authorities (e.g. environmental & health authorities) and/or ANSP may decide on air navigation service provision limitation (resulting in airspace unavailability or reduced capacity for flight operations)
 - Aircraft Operators will follow NOTAM and any additional instructions issued by responsible authorities

8. Security Incident

a. Description

Major security incident, or threat of, resulting in airspace and/or airport(s) unavailability for civil traffic.

b. Impact analysis

Impact on aircraft

- immediate safety of an aircraft
- damage: an aircraft may get damaged

Impact on airspace

- airspace unavailable for flight ops
- reduced capacity

Impact on aerodrome

- aerodrome unavailable for flight ops
- reduced capacity
- infrastructure: building, equipment, access

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight re-scheduling
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs workload
- infrastructure: building, equipment, access

- communications

Impact on persons

- flight crew workload
- flight crew health
- passenger health
- passenger handling
- ground personnel workload
- ground personnel health

Impact on cargo

- live stock
- goods (including dangerous goods)

c. Support to decision making

- State authorities, airport authority and/or ANSP may decide on the airport's reduced capacity
- Appropriate (non-aviation) authorities may decide on the airport unavailability for flight operations
- State authorities and/or ANSP may decide on air navigation service provision limitation (airspace/ATS route unavailability or reduced capacity for flight operations)
- Appropriate (non-aviation) authorities may make a decision impacting air navigation service provision ability (resulting in airspace unavailability or reduced capacity for flight operations)
- Aircraft Operators will follow NOTAM and any additional instructions issued by responsible authorities

9. Airborne spread of diseases / pandemic

a. Description

Cessation or reduction of civil air traffic from/to certain destinations, following an outbreak of communicable disease(s) in a specific region.

b. Impact analysis

Impact on aircraft

- contamination of an aircraft

Impact on aerodrome

- aerodrome unavailable for flight ops, entirely, or only for flights from certain destinations
- reduced capacity (e.g. due to quarantine)
- infrastructure: access

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight re-scheduling
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs availability and/or workload
- infrastructure: access

Impact on persons

- flight crew workload
- flight crew health
- passenger health
- passenger handling
- ground personnel workload
- ground personnel health

Impact on cargo

- live stock
- goods (including dangerous goods)

c. Decision making

- State (non-aviation) authorities (e.g. health authorities) and/or ANSP may decide on the airport unavailability for flight operations
- State authorities, airport authorities and/or ANPS may decide on airport's reduced capacity
- Appropriate (non-aviation) authorities may make a decision impacting air navigation service provision ability (resulting in airspace unavailability or reduced capacity for flight operations)
- Aircraft Operators will follow NOTAM and any additional instructions issued by responsible authorities

10. Major Failure of Pan European Function

a. Description

Major failure of a pan European flow management function - for example, Network Manager Operations Centre (NMOC)

b. Impact analysis

Impact on airspace

- reduced capacity

Impact on aerodrome

- reduced capacity

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight delay

Impact on ANSP

- people: ATCOs workload

Impact on persons

- passenger handling
- ground personnel workload

Impact on cargo

- live stock
- goods (including dangerous goods)

c. Support to decision making

- Airport authorities will adapt to contingency arrangements
- ANSPs will adapt to contingency arrangements
- Aircraft Operators will adapt to contingency arrangements

11. Industrial action

a. Description

Strike affecting ATM service provision and/or causing disruption to flight operations.

b. Impact analysis

Impact on airspace

- airspace unavailable for flight ops
- reduced capacity

Impact on aerodrome

- aerodrome unavailable for flight ops
- reduced capacity
- infrastructure: building, equipment, access

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight re-scheduling
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs workload and/or unavailability
- infrastructure: building, equipment, access
- communications

Impact on persons

- flight crew workload
- passengers handling
- ground personnel workload

Impact on cargo

- live stock
- goods (including dangerous goods)

c. Decision making

- State authorities, airport authorities and/or ANSP may decide on the airport unavailability for flight operations or reduced capacity
- State authorities and/or ANSP may decide on air navigation service provision limitation (resulting in airspace unavailability or reduced capacity for flight operations)
- Aircraft Operators will follow NOTAM

12. Cyber attack

a. Description

A large scale cyber attack resulting in denial of air navigation service; attack on any infrastructure on aircraft, airport, ANSP and infrastructure, directly as well as indirectly, i.e. access, power supplies, telecom, etc.

b. Impact analysis

Impact on aircraft

- immediate safety of an aircraft: if aircraft equipment impacted

Impact on airspace

- airspace unavailable for flight ops
- reduced capacity

Impact on aerodrome

- aerodrome unavailable for flight ops
- reduced capacity
- infrastructure: building, equipment, access

Impact on flight operations

- flight cancellation
- flight re-routeing
- flight re-scheduling
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs workload

- infrastructure: building, equipment, access
 - communications
- Impact on persons
- flight crew workload
 - flight crew health
 - passenger health
 - passenger handling
 - ground personnel workload
- Impact on cargo
- live stock
 - goods (including dangerous goods)
- c. Decision making
- Appropriate (non-aviation) authorities may decide on the airport unavailability for flight operations
 - State authorities, airport authorities and ANSP may decide on the airport's reduced capacity
 - State authority and/or ANSP may decide on air navigation service provision limitation (resulting in airspace unavailability or reduced capacity for flight operations)
 - Appropriate (non-aviation) authorities may make a decision impacting air navigation service provision ability (resulting in airspace unavailability or reduced capacity for flight operations)
 - Aircraft Operators will follow NOTAM and any additional instructions issued by responsible authorities

13. Heavy Meteorological Situation

a. Description

Heavy meteorological conditions, for example thunderstorms, snow, ice; may impact airspace, airport, aircraft operator or ATC services (infrastructure), directly as well as indirectly, i.e. access, power supplies, telecom, etc.

b. Impact analysis

Impact on aircraft

- immediate safety of an aircraft: if aircraft directly impacted
- damage: aircraft may get damaged

Impact on airspace

- airspace unavailable for flight ops
- reduced capacity

Impact on aerodrome (s)

- aerodrome unavailable for flight ops

- reduced capacity
- Impact on flight operations
- flight cancellation
 - flight re-routing
 - flight re-scheduling
 - flight diversion
 - flight delay
- Impact on ANSP
- people: ATCOs workload and/or unavailability
 - infrastructure: building, equipment, access
 - communications
- Impact on persons
- flight crew workload
 - flight crew health
 - passenger health
 - passenger handling
 - ground personnel workload
 - ground personnel health
- Impact on cargo
- live stock
 - goods (including dangerous goods)
- c. Decision making
- State authorities (non-aviation and aviation), airport authorities and/or ANSP may decide on the airport unavailability for flight operations or reduced capacity
 - ANSP may decide on air navigation service provision limitation (resulting in airspace unavailability or reduced capacity for flight operations)
 - Aircraft Operators will make flight ops decisions based on the available MET information

14. Threats from Space

14.1 Space Debris & Meteorites

a. Description

Space debris and meteorites may impact aircraft, airport, flight operations or ATC service(s) (infrastructure), directly as well as indirectly.

b. Impact analysis

Impact on aircraft

- immediate safety of an aircraft: accident of an aircraft hit by space debris or meteorite
- damage: aircraft may get damaged

Impact on airspace

- airspace impact assessment currently lacks timely predictability and accuracy

Impact on aerodrome(s)

- aerodrome unavailable for flight ops
- reduced capacity
- infrastructure: building, equipment, access

Impact on flight operations

- flight cancellation
- flight re-routeing (tactical)
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs workload
- infrastructure: building, equipment, access
- communications

Impact on persons

- flight crew workload
- flight crew health
- passenger health
- passenger handling
- ground personnel workload
- ground personnel health

Impact on cargo

- live stock
- goods (including dangerous goods)

c. Decision making

- State authorities (non-aviation and aviation), airport authorities and/or ANSP may decide on the airport unavailability for flight operations or reduced capacity
- Airspace impact assessment currently lacks timely predictability and accuracy
- Aircraft Operators will follow NOTAM

14.2 Space Weather

a. Description

Solar activity impacting satellite navigation, HF, ground infrastructure (e.g. power supply) and leading to increased radiation.

b. Impact analysis

Impact on aircraft

- immediate safety of an aircraft: if satellite navigation or HF impacted

Impact on airspace

- reduced capacity

Impact on aerodrome(s)

- reduced capacity if satellite navigation impacted
- infrastructure: equipment

Impact on flight operations

- flight re-routeing
- flight diversion
- flight delay

Impact on ANSP

- people: ATCOs workload
- infrastructure: equipment
- communications

Impact on persons

- flight crew workload
- flight crew health
- passenger health
- passenger handling

Impact on cargo

- live stock
- goods (including dangerous goods)

c. Decision making

- State authorities (non-aviation and aviation), airport authorities and/or ANSP may decide on the airport reduced capacity
- Aircraft Operators will make flight operations decisions based on the available space weather information

15. Shortage of Fuel

a. Description

Shortage of fuel supply.

b. Impact analysis

Impact on aerodrome(s)

- aerodrome unavailable for flight ops
- reduced capacity

Impact on flight operations

- flight cancellation
- flight re-scheduling
- flight diversion

Impact on persons

- flight crew workload
- passenger handling
- ground personnel workload

Impact on cargo

- live stock
- goods (including dangerous goods)

c. Decision making

- State authorities (non-aviation and aviation), airport authorities and/or ANSP may decide on the airport unavailability for flight operations or reduced capacity
- Aircraft Operators will make flight operations decisions based on the available fuel information

Annex 2 – Acronyms

ACI	Airport Council International
AFI	ICAO African Region
AIREP's	Air Report
AN	Air Navigation
ANSP	Air Navigation Service Provider
ASECNA	The Agency for Aerial Navigation Safety in Africa and Madagascar
ASIA/PAC	ICAO Asia and Pacific Region
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATM	Air Traffic Management
CANSO	Civil Air Navigation Services Organisation
COG	EANPG Program Coordination Group
DG-ECHO	European Commission Humanitarian Aid & Civil Protection
EACCC	European Aviation Crisis Coordination Cell
EANPG	European Air Navigation Planning Group
EASA	European Aviation Safety Agency
EIR	Emergency and Incident Response
ERCC	European Emergency Response Coordination Centre
EU	European Union
EUR	ICAO European Region
EVITA	European Crisis Visualisation Interactive Tool for ATFCM
FAA	Federal Aviation Administration
IAEA	International Atomic Energy Agency
IATA	International Airline Transport Association
ICAO	International Civil Aviation Organization
MET	Meteorological
MID	ICAO Middle East Region
NASA	National Aeronautics and Space Administration
NAV Canada	Navigation Canada
NM	Network Manager
NOAA	National Oceanic and Atmospheric Administration
NOP Portal	Network Operation Portal
NOTAM	Notice to Airmen
SRA	Safety Risk Methodology
UN	United Nations
USA	United States of America
VAAC	Volcanic Ash Advisory Centres
WHO	World Health Organization

Annex 3 – Bibliography

1. EACCC Rules of Procedure (available on request from EUROCONTROL/Network Manager)
2. EC Regulation 677/2011 (COMMISSION REGULATION (EU) No 677/2011 laying down detailed rules for the implementation of air traffic management (ATM) network functions - http://ec.europa.eu/transport/modes/air/single_european_sky/doc/2012_10_24_regeu677_2011_oj_l185.pdf)
3. ICAO Doc 7300 , Convention on International Civil Aviation
4. ICAO Annex 6, Aircraft Operations and related Guidance Material
5. ICAO Annex 11, Air Traffic Services and related Guidance Material
6. ICAO Annex 13, Aircraft Accident and Incident Investigations and Tools
7. ICAO Annex 15, Aeronautical information Services
8. ICAO Annex 17 Aviation Security and related Guidance Material, Tools and Processes
9. ICAO Annex 19 Safety Management and related Guidance Material, Tools and Processes
10. NATO AC/52 (EAPC)D(2013)0005, Annex 1, NATO Airborne Early Warning and Control (NAEW&C) considerations regarding the Air Traffic Management (ATM) system in conflict and crisis situations

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