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ICAO Annex 11 Mapping to the CADENA AFTM/CDM Procedures Manual

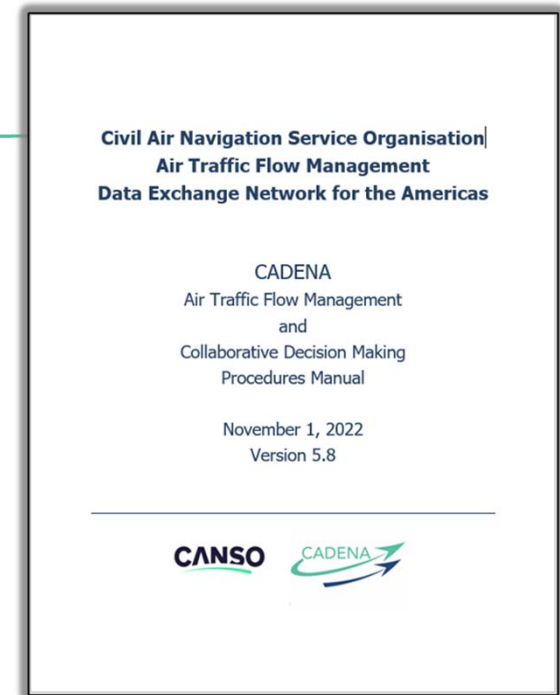
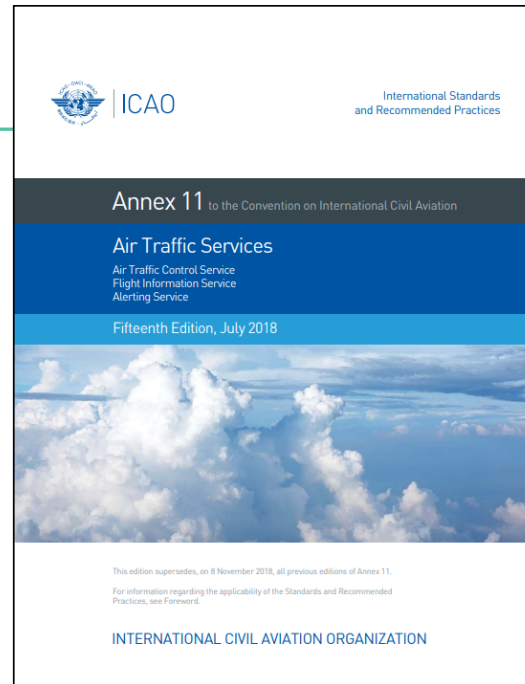
For: ICAO NAM/CAR/CONT/3

Date: May 9, 2023

By: CADENA Team - Al Castillo and Midori Tanino

Introduction

- This presentation contains an ICAO Annex 11, Attachment C mapping to the CADENA ATFM/CDM Procedures Manual.
- At least one mapping to the CADENA ATFM/CDM Procedures Manual is provided for each section of Annex 11, Attachment C in the body of the PowerPoint.
- Appendix A of this presentation contains a table with a more complete mapping to the CADENA ATFM/CDM Procedures Manual.



ICAO Annex 11 Attachment C, Section 1 – “Introduction”

1.1 Guidelines for contingency measures for application in the event of disruptions of air traffic services and related supporting services were first approved by the Council on 27 June 1984 in response to Assembly Resolution A23-12, following a study by the Air Navigation Commission and consultation with States and international organizations concerned, as required by the Resolution. The guidelines were subsequently amended and amplified in the light of experience gained with the application of contingency measures in various parts of the world and in differing circumstances.

ICAO Annex 11, Attachment C, Section 1.1

6 CADENA and Contingency Planning

6.1 Background

CADENA has focused on two aspects of Contingency Planning: 1) Establishing ATFM plans and checklists to help mitigate the impact of disruptions to air traffic operations caused by unplanned equipment outages, hurricane impacts, etc. and, 2) Establishing plans and checklists to mitigate disruptions to the provision of ATFM/CDM caused by unplanned equipment outages at any one of the participating CADENA FMUs.

CADENA ATFM/CDM Procedures Manual, Section 6.1

1.2 The purpose of the guidelines is to assist in providing for the safe and orderly flow of international air traffic in the event of disruptions of air traffic services and related supporting services and in preserving the availability of major world air routes within the air transportation system in such circumstances.

ICAO Annex 11, Attachment C, Section 1.2

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CADENA ATFM/CDM Procedures Manual, Section 6.1

1.3 The guidelines have been developed in recognition of the fact that circumstances before and during events causing disruptions of services to international civil aviation vary widely and that contingency measures, including access to designated aerodromes for humanitarian reasons, in response to specific events and circumstances must be adapted to these circumstances. They set forth the allocation of responsibility among States and ICAO for the conduct of contingency planning and the measures to be taken into consideration in developing, applying and terminating the application of such plans.

ICAO Annex 11, Attachment C, Section 1.3

6.2 Disruptions to Air Traffic Operations

CADENA has gained extensive experience in dealing with disruptions to Air Traffic operations in the Regions. Examples include: the long-term impact of the lightning strike in 2017 at the Kingston ACC; the devastating impact of Hurricane Maria in September 2017; the impact of active volcanoes in the Regions; the power outage at CENAMER ACC that resulted in the complete loss of communications, navigation, and surveillance. CADENA understands the importance of preparing for disruptions and gathering the information related to:

- ACCs
 - Evacuation
 - Radar failure
 - Air/Ground (A/G) communication failure
 - Telephone or landline failure
 - Power failure
 - Flight data processing system (FDPS) failure
 - Staffing shortages
 - Work stoppages (strikes)

- Severe weather / natural phenomena
 - Hurricanes / tropical storms
 - Volcanic eruption
 - Earthquakes
- Airports
 - Aircraft accidents / incidents
- FMU outages
 - Equipment failure
 - FMU services not available
- Off-Nominal (Unusual) Events
 - Global pandemic (COVID-19, for example)

CADENA ATFM/CDM Procedures Manual, Section 6.2, para 1

1.4 The guidelines are based on experience which has shown, inter alia, that the effects of disruption of services in particular portions of airspace are likely to affect significantly the services in adjacent airspace, thereby creating a requirement for international coordination, with the assistance of ICAO as appropriate. Hence, the role of ICAO in the field of contingency planning and coordination of such plans is described in the guidelines. They also reflect the experience that ICAO's role in contingency planning must be global and not limited to airspace over the high seas and areas of undetermined sovereignty, if the availability of major world air routes within the air transportation system is to be preserved. Finally, they further reflect the fact that international organizations concerned, such as the International Air Transport Association (IATA) and the International Federation of Airline Pilots' Associations (IFALPA), are valuable advisers on the practicability of overall plans and elements of such plans.

ICAO Annex 11, Attachment C, Section 1.4

6.2 Disruptions to Air Traffic Operations

CADENA has gained extensive experience in dealing with disruptions to Air Traffic operations in the Regions. Examples include: the long-term impact of the lightning strike in 2017 at the Kingston ACC; the devastating impact of Hurricane Maria in September 2017; the impact of active volcanoes in the Regions; the power outage at CENAMER ACC that resulted in the complete loss of communications, navigation, and surveillance. CADENA understands the importance of preparing for disruptions and gathering the information related to:

CADENA ATFM/CDM Procedures Manual, Section 6.2, para 1

3.4 CADENA Ad Hoc Web Conferences

CADENA Ad Hoc Web Conferences may be convened to allow participating ANSPs and stakeholders to discuss and work on solutions to pressing operational issues.

Topics may include: Developing and managing reroutes within an ANSP due to equipment outages; managing the impact of volcanic ash; managing the impact of an earthquake.

CADENA ATFM/CDM Procedures Manual, Section 3.4, para 1

Note: CADENA Ad Hoc Web Conference participants include regional ANSPs, Airlines, CANSO, IATA, ICAO, etc.





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Annex 11 Attachment C, Section 2 “Status of Contingency Plans”

2. Status of contingency plans

Contingency plans are intended to provide alternative facilities and services to those provided for in the regional air navigation plan when those facilities and services are temporarily not available. Contingency arrangements are therefore temporary in nature, remain in effect only until the services and facilities of the regional air navigation plan are reactivated and, accordingly, do not constitute amendments to the regional plan requiring processing in accordance with the “Procedure for the Amendment of Approved Regional Plans”. Instead, in cases where the contingency plan would temporarily deviate from the approved regional air navigation plan, such deviations are approved, as necessary, by the President of the ICAO Council on behalf of the Council.

ICAO Annex 11, Attachment C, Section 2

6.3 Planned Airway System Alternatives (PASA) Contingency Routes

During significant events such as a complete outage of an FIR or the impact of a major hurricane, CADENA has developed, in collaboration between the airlines and participating ANSPs, the Planned Airway System Alternatives (PASA) contingency routes that can be used to temporarily route around the impacted airspace.

Note: Partial segment of the CADENA Procedures Manual Section 6.3

The Host will facilitate the collaborative discussion and ensure the following points are covered:

- Review the known details regarding the event that led to application of the routes.
- Discuss which routes may and will be used to circumnavigate the impacted airspace(s).
- Ensure the receiving ANSPs can support the routes.
- Ensure the airlines and other airspace users have adequate time to plan and fuel for the routes. Normally, a three to four hour lead-time planning window is preferred.
- Determine how long the routes will be in effect.
- Determine, to the extent possible, the demand on the routes in an appropriate time segment (such as per 15 minutes, or per hour).
- Establish, if necessary, TMMs to manage the demand.
- Determine the strategy for exiting the routes and returning to normal operations when the event ends.

Note: Partial segment of the CADENA Procedures Manual Section 6.3



Annex 11 Attachment C, Section 3

“Responsibility for developing, promulgating and implementing contingency plans”

3.1 The State(s) responsible for providing air traffic services and related supporting services in particular portions of airspace is (are) also responsible, in the event of disruption or potential disruption of these services, for instituting measures to ensure the safety of international civil aviation operations and, where possible, for making provisions for alternative facilities and services. To that end the State(s) should develop, promulgate and implement appropriate contingency plans. Such plans should be developed in consultation with other States and airspace users concerned and with ICAO, as appropriate, whenever the effects of the service disruption(s) are likely to affect the services in adjacent airspace.

3.2 The responsibility for appropriate contingency action in respect of airspace over the high seas continues to rest with the State(s) normally responsible for providing the services until, and unless, that responsibility is temporarily reassigned by ICAO to (an)other State(s).

3.3 Similarly, the responsibility for appropriate contingency action in respect of airspace where the responsibility for providing the services has been delegated by another State continues to rest with the State providing the services until, and unless, the delegating State terminates temporarily the delegation. Upon termination, the delegating State assumes responsibility for appropriate contingency action.

ICAO Annex 11, Attachment C, Section 3.1 thru 3.3

6.3 Planned Airway System Alternatives (PASA) Contingency Routes

During significant events such as a complete outage of an FIR or the impact of a major hurricane, CADENA has developed, in collaboration between the airlines and participating ANSPs, the Planned Airway System Alternatives (PASA) contingency routes that can be used to temporarily route around the impacted airspace.

The PASA route database is based on routes that are already in use by the airlines and have been approved by the participating ANSPs. The route database is reviewed and updated on a quarterly basis and is available on the CADENA OIS under the "Information" tab on the CADENA OIS homepage and then under "Reroute Repository."

Note: Partial segment of the CADENA Procedures Manual Section 6.3

The Host will facilitate the collaborative discussion and ensure the following points are covered:

- Review the known details regarding the event that led to application of the routes.
- Discuss which routes may and will be used to circumnavigate the impacted airspace(s).
- Ensure the receiving ANSPs can support the routes.
- Ensure the airlines and other airspace users have adequate time to plan and fuel for the routes. Normally, a three to four hour lead-time planning window is preferred.
- Determine how long the routes will be in effect.
- Determine, to the extent possible, the demand on the routes in an appropriate time segment (such as per 15 minutes, or per hour).
- Establish, if necessary, TMMs to manage the demand.
- Determine the strategy for exiting the routes and returning to normal operations when the event ends.

Note: Partial segment of the CADENA Procedures Manual Section 6.3



CADENA ATFM/CDM Procedures Manual – Appendix E

- CADENA has collaboratively developed Contingency Checklists with ANSPs, airlines and other stakeholders. Each Checklist contains initial and follow up contingency actions.

There are fourteen checklists for the following events:

1. Evacuation of an ACC
2. Radar Failure
3. A/G Communication Failure
4. Telephone or Landline Failure
5. Power Failure
6. FDPS Failure
7. Staff Shortage
8. Work Stoppage (Strike)
9. Hurricane or Tropical Storm
10. Volcanic Eruption
11. Earthquake
12. Aircraft Accident/Incident
13. FMU Outage
14. Off-Nominal (Unusual) Event
15. AFTN Outage

Note: Partial section of the CADENA Procedures Manual Appendix E

1: Evacuation of an ACC	Impacted Facility: ACC (Name)
Initial ATFM Action	Follow-Up ATFM Actions
<ul style="list-style-type: none"> • Whichever FMU receives the information first, notify your adj 	<ul style="list-style-type: none"> • Notify CADENA and ICAO leadership as soon as possible
2: Radar Failure	Impacted Facility: ACC (Name) or TMA (Name)
Initial ATFM Action	Follow-Up ATFM Actions
<ul style="list-style-type: none"> • Stop departure traffic under your FMU's jurisdiction that is 	<ul style="list-style-type: none"> • Notify CADENA and ICAO leadership
3: A/G Comm Failure	Impacted Facility: ACC (Name)
Initial ATFM Action	Follow-Up ATFM Actions
<ul style="list-style-type: none"> • Stop departure traffic under your FMU's jurisdiction that is 	<ul style="list-style-type: none"> • Notify CADENA and ICAO leadership
4: Telephone Or Landline Failure	Impacted Facility: ACC (Name)
Initial ATFM Action	Follow-Up ATFM Actions
<ul style="list-style-type: none"> • Notify adjoining FMUs via any 	<ul style="list-style-type: none"> • Notify CADENA and ICAO leadership
5: Power Failure	Impacted Facility: ACC (Name) or TMA (Name)
Initial ATFM Action	Follow-Up ATFM Actions
<ul style="list-style-type: none"> • If necessary, stop departure traffic under your FMU's jurisdiction that is filed to/through the impacted airspace • Notify adjoining FMUs via landline • Coordinate re-routes for existing, airborne traffic, if necessary • Coordinate airborne holding, if necessary • Notify stakeholders, as able 	<ul style="list-style-type: none"> • Notify CADENA and ICAO leadership • Gather information on: <ul style="list-style-type: none"> ○ How long is the power expected to be out of service? ○ What is the impact to demand and capacity? ○ Have aircraft diverted? ○ If so, how many and to which airports? • If circumstances require, CADENA leadership will schedule and conduct a CADENA CDM web conference, including airspace users, to relay available information and establish next steps

3.4 ICAO will initiate and coordinate appropriate contingency action in the event of disruption of air traffic services and related supporting services affecting international civil aviation operations provided by a State wherein, for some reason, the authorities cannot adequately discharge the responsibility referred to in 3.1. In such circumstances, ICAO will work in coordination with States responsible for airspace adjacent to that affected by the disruption and in close consultation with international organizations concerned. ICAO will also initiate and coordinate appropriate contingency action at the request of States.

ICAO Annex 11, Attachment C, Section 3.4

- Annex 11 Attachment C, Section 3.4, refers to ICAO’s responsibilities when a State is unable to discharge their responsibilities according to Section 3.1 of Annex C.
- ICAO’s responsibilities are outside the scope of CADENA; however, CADENA is available to Collaborate with ICAO in initiating and coordinating appropriate contingency action with the affected States.

Annex 11 Attachment C, Section 4 “Preparatory action”

Annex 11 Attachment C – Preparatory Action

4.1 Time is essential in contingency planning if hazards to air navigation are to be reasonably prevented. Timely introduction of contingency arrangements requires decisive initiative and action, which again presupposes that contingency plans have, as far as practicable, been completed and agreed among the parties concerned before the occurrence of the event requiring contingency action, including the manner and timing of promulgating such arrangements.

4.2 For the reasons given in 4.1, States should take preparatory action, as appropriate, for facilitating timely introduction of contingency arrangements. Such preparatory action should include:

- a) preparation of general contingency plans for introduction in respect of generally foreseeable events such as industrial action or labour unrest affecting the provision of air traffic services and/or supporting services. In recognition of the fact that the world aviation community is not party to such disputes, States providing services in airspace over the high seas or of undetermined sovereignty should take appropriate action to ensure that adequate air traffic services will continue to be provided to international civil aviation operations in non-sovereign airspace. For the same reason, States providing air traffic services in their own airspace or, by delegation, in the airspace of (an)other State(s) should take appropriate action to ensure that adequate air traffic services will continue to be provided to international civil aviation operations concerned, which do not involve landing or take-off in the State(s) affected by industrial action;
- b) assessment of risk to civil air traffic due to military conflict or acts of unlawful interference with civil aviation as well as a review of the likelihood and possible consequences of natural disasters or public health emergencies. Preparatory action should include initial development of special contingency plans in respect of natural disasters, public health emergencies, military conflicts or acts of unlawful interference with civil aviation that are likely to affect the availability of airspace for civil aircraft operations and/or the provision of air traffic services and

CADENA Procedures Manual Section 6.2 (1 of 3)

6.2 Disruptions to Air Traffic Operations

CADENA has gained extensive experience in dealing with disruptions to Air Traffic operations in the Regions. Examples include: the long-term impact of the lightning strike in 2017 at the Kingston ACC; the devastating impact of Hurricane Maria in September 2017; the impact of active volcanoes in the Regions; the power outage at CENAMER ACC that resulted in the complete loss of communications, navigation, and surveillance. CADENA understands the importance of preparing for disruptions and gathering the information related to:

- ACCs
 - Evacuation
 - Radar failure
 - Air/Ground (A/G) communication failure
 - Telephone or landline failure
 - Power failure
 - Flight data processing system (FDPS) failure
 - Staffing shortages
 - Work stoppages (strikes)
- Severe weather / natural phenomena
 - Hurricanes / tropical storms
 - Volcanic eruption
 - Earthquakes
- Airports
 - Aircraft accidents / incidents

CADENA Procedures Manual Section 6.2 (2 of 3)

- FMU outages
 - Equipment failure
 - FMU services not available

- Off-Nominal (Unusual) Events

- Global pandemic (COVID-19, for example)

Based on CADENA's experience with such events and the associated lessons learned, CADENA has recognised that the key steps to help ANSPs and prepare for the unexpected include the development of:

- A description of potential events that can disrupt air traffic operations.
- A checklist of initial ATFM/CDM steps for responding to a disruptive event.
- The process for evaluating the effectiveness of ATFM measures during an event and for adjusting throughout the event.
- The ATFM/CDM-related steps necessary to recover from a disruptive event.
- The CADENA points of contact, roles, and responsibilities.
- The lessons learned documentation and post-event reports.

CADENA Procedures Manual Section 6.2 (2 of 3)

- The “Contingency Events and Checklists” shown in APPENDIX D to mitigate the impact of such events through a ready-reference checklist when the unexpected happens.
- The Point of Contact List of CADENA for each ANSP and the stakeholders. This list is posted on the CADENA OIS as a ready reference.
- The Lessons Learned document, which is available to CADENA ANSPs through the CADENA OIS.

Annex 11 Attachment C – Preparatory Action

- c) monitoring of any developments that might lead to events requiring contingency arrangements to be developed and applied. States should consider designating persons/administrative units to undertake such monitoring and, when necessary, to initiate effective follow-up action; and
- d) designation/establishment of a central agency which, in the event of disruption of air traffic services and introduction of contingency arrangements, would be able to provide, 24 hours a day, up-to-date information on the situation and associated contingency measures until the system has returned to normal. A coordinating team should be designated within, or in association with, such a central agency for the purpose of coordinating activities during the disruption.

ICAO Annex 11, Attachment C, Section 4.2 c and d

- **Annex 11, Section 4.2 c and d, refer to internal State responsibilities. Participating ANSP personnel assigned FMU duties interface with CADENA. FMU personnel, in conjunction with support from CADENA can support the introduction of contingency arrangements and provide up-to-date information on the situation and associated traffic management measures.**
- **Note: The CADENA ATFM/CDM Procedures Manual contains procedures for:**
 - **Monitoring developments that could lead to contingencies (CADENA ATFM/CDM Procedures Manual Section 3.3 and Appendix E).**
 - **Responsibilities of the Virtual Support Team (VST) to keep up-to-date information on contingencies and associated contingency measures (CADENA ATFM/CDM Procedures manual Section 8)**



Annex 11 Attachment C – Preparatory Action

4.3 ICAO will be available for monitoring developments that might lead to events requiring contingency arrangements to be developed and applied and will, as necessary, assist in the development and application of such arrangements. During the emergence of a potential crisis, a coordinating team will be established in the Regional Office(s) concerned and at ICAO Headquarters in Montreal, and arrangements will be made for competent staff to be available or reachable 24 hours a day. The tasks of these teams will be to monitor continuously information from all relevant sources, to arrange for the constant supply of relevant information received by the State aeronautical information service at the location of the Regional Office and Headquarters, to liaise with international organizations concerned and their regional organizations, as appropriate, and to exchange up-to-date information with States directly concerned and States which are potential participants in contingency arrangements. Upon analysis of all available data, authority for initiating the action considered necessary in the circumstances will be obtained from the State(s) concerned.

ICAO Annex 11, Attachment C, Section 4.3

- **NOTE: Annex 11, Section 4.3 refers to ICAO responsibilities which are outside CADENA's scope; however, CADENA is available to collaborate with ICAO in initiating and coordinating appropriate contingency action with the affected States and helping to provide up-to-date information to all stakeholders.**



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Annex 11 Attachment C, Section 5 “Coordination”

5.1 A contingency plan should be acceptable to providers and users of contingency services alike, i.e. in terms of the ability of the providers to discharge the functions assigned to them and in terms of safety of operations and traffic handling capacity provided by the plan in the circumstances.

5.2 Accordingly, States which anticipate or experience disruption of air traffic services and/or related supporting services should advise, as early as practicable, the ICAO Regional Office accredited to them, and other States whose services might be affected. Such advice should include information on associated contingency measures or a request for assistance in formulating contingency plans.

ICAO Annex 11, Attachment C, Sections 5.1 and 5.2

When an event occurs that requires implementation of the PASA contingency routes, CADENA will schedule and convene an Ad Hoc Web Conference to coordinate the use of specific routes. The Host for the Ad Hoc Web Conference will depend on which ANSP is impacted and which FMU is available to serve as Host.

The Host will facilitate the collaborative discussion and ensure the following points are covered:

- Review the known details regarding the event that led to application of the routes.
- Discuss which routes may and will be used to circumnavigate the impacted airspace(s).
- Ensure the receiving ANSPs can support the routes.
- Ensure the airlines and other airspace users have adequate time to plan and fuel for the routes. Normally, a three to four hour lead-time planning window is preferred.
- Determine how long the routes will be in effect.
- Determine, to the extent possible, the demand on the routes in an appropriate time segment (such as per 15 minutes, or per hour).
- Establish, if necessary, TMMs to manage the demand.
- Determine the strategy for exiting the routes and returning to normal operations when the event ends.

CADENA ATFM/CDM Procedures Manual, Section 6.3, Para 4 and 5

3.4 CADENA Ad Hoc Web Conferences

CADENA Ad Hoc Web Conferences may be convened to allow participating ANSPs and stakeholders to discuss and work on solutions to pressing operational issues.

Topics may include: Developing and managing reroutes within an ANSP due to equipment outages; managing the impact of volcanic ash; managing the impact of an earthquake.

CADENA ATFM/CDM Procedures Manual, Section 3.4

Note 1: CADENA ATFM/CDM Procedures Manual Sections 3.4.1 through 3.4.6 contain detailed pre-conference, conference and post-conference responsibilities.

Note 2: Appendix E of the CADENA ATFM/CDM Procedures Manual includes contingency checklists that require ICAO notification.



5.3 Detailed coordination requirements should be determined by States and/or ICAO, as appropriate, keeping the above in mind. In the case of contingency arrangements not appreciably affecting airspace users or service provided outside the airspace of the (single) State involved, coordination requirements are naturally few or non-existent. Such cases are believed to be few.

5.4 In the case of multi-State ventures, detailed coordination leading to formal agreement of the emerging contingency plan should be undertaken with each State which is to participate. Such detailed coordination should also be undertaken with those States whose services will be significantly affected, for example by re-routing of traffic, and with international organizations concerned who provide invaluable operational insight and experience.

5.5 Whenever necessary to ensure orderly transition to contingency arrangements, the coordination referred to in this section should include agreement on a detailed, common NOTAM text to be promulgated at a commonly agreed effective date.

ICAO Annex 11, Attachment C, Sections 5.3 thru 5.5

When an event occurs that requires implementation of the PASA contingency routes, CADENA will schedule and convene an Ad Hoc Web Conference to coordinate the use of specific routes. The Host for the Ad Hoc Web Conference will depend on which ANSP is impacted and which FMU is available to serve as Host.

The Host will facilitate the collaborative discussion and ensure the following points are covered:

- Review the known details regarding the event that led to application of the routes.
- Discuss which routes may and will be used to circumnavigate the impacted airspace(s).
- Ensure the receiving ANSPs can support the routes.
- Ensure the airlines and other airspace users have adequate time to plan and fuel for the routes. Normally, a three to four hour lead-time planning window is preferred.
- Determine how long the routes will be in effect.
- Determine, to the extent possible, the demand on the routes in an appropriate time segment (such as per 15 minutes, or per hour).
- Establish, if necessary, TMMs to manage the demand.
- Determine the strategy for exiting the routes and returning to normal operations when the event ends.

CADENA ATFM/CDM Procedures Manual, Section 6.3, Para 4 and 5

3.4 CADENA Ad Hoc Web Conferences

CADENA Ad Hoc Web Conferences may be convened to allow participating ANSPs and stakeholders to discuss and work on solutions to pressing operational issues.

Topics may include: Developing and managing reroutes within an ANSP due to equipment outages; managing the impact of volcanic ash; managing the impact of an earthquake.

CADENA ATFM/CDM Procedures Manual, Section 3.4

Note: Annex 11, Section 5.5 recommends including common NOTAM text. During Ad Hoc Conferences (CADENA ATFM.CDM Section 3.4.1 thru 3.4.6), contingency details, including NOTAM information, are discussed by ANSPs and stakeholders.



Annex 11 Attachment C Section 6 “Development, promulgation and application of contingency plans”

6.1 Development of a sound contingency plan is dependent upon circumstances, including the availability, or not, of the airspace affected by the disruptive circumstances for use by international civil aviation operations. Sovereign airspace can be used only on the initiative of, or with the agreement or consent of, the authorities of the State concerned regarding such use. Otherwise, the contingency arrangements must involve bypassing the airspace and should be developed by adjacent States or by ICAO in cooperation with such adjacent States. In the case of airspace over the high seas or of undetermined sovereignty, development of the contingency plan might involve, depending upon circumstances, including the degree of erosion of the alternative services offered, temporary reassignment by ICAO of the responsibility for providing air traffic services in the airspace concerned.

ICAO Annex 11, Attachment C, Sections 6.1

- **Annex 11, Attachment C, Section 6.1, refers to a State which does not consent to the use of its sovereign airspace during contingency events. It also refers to airspace over the high seas with undetermined sovereignty.**
- **Based on the degree of erosion of services offered, the consistent feedback to CADENA by the aircraft operators is that they prefer to route around impacted airspace in order to remain in communication and surveillance coverage. CADENA and the participating FMUs have demonstrated success in establishing routes acceptable to the aircraft operators that bypass impacted airspace.**

Annex 11, Attachment C, Section 6.2

Note: See Mapping to CADENA ATFM/CDM Procedures Manual on next slide

6.2 Development of a contingency plan presupposes as much information as possible on current and alternative routes, navigational capability of aircraft and availability or partial availability of navigational guidance from ground-based aids, surveillance and communications capability of adjacent air traffic services units, volume and types of aircraft to be accommodated and the actual status of the air traffic services, communications, meteorological and aeronautical information services. Following are the main elements to be considered for contingency planning depending upon circumstances:

- a) re-routing of traffic to avoid the whole or part of the airspace concerned, normally involving establishment of additional routes or route segments with associated conditions for their use;
- b) establishment of a simplified route network through the airspace concerned, if it is available, together with a flight level allocation scheme to ensure lateral and vertical separation, and a procedure for adjacent area control centres to establish longitudinal separation at the entry point and to maintain such separation through the airspace;
- c) reassignment of responsibility for providing air traffic services in airspace over the high seas or in delegated airspace;
- d) provision and operation of adequate air-ground communications, AFTN and ATS direct speech links, including reassignment, to adjacent States, of the responsibility for providing meteorological information and information on status of navigation aids;
- e) special arrangements for collecting and disseminating in-flight and post-flight reports from aircraft;
- f) a requirement for aircraft to maintain continuous listening watch on a specified pilot-pilot VHF frequency in specified areas where air-ground communications are uncertain or non-existent and to broadcast on that frequency, preferably in English, position information and estimates, including start and completion of climb and descent;
- g) a requirement for all aircraft in specified areas to display navigation and anti-collision lights at all times;
- h) a requirement and procedures for aircraft to maintain an increased longitudinal separation that may be established between aircraft at the same cruising level;
- i) a requirement for climbing and descending well to the right of the centre line of specifically identified routes;
- j) establishment of arrangements for controlled access to the contingency area to prevent overloading of the contingency system; and
- k) a requirement for all operations in the contingency area to be conducted in accordance with IFR, including allocation of IFR flight levels, from the relevant Table of Cruising Levels in Appendix 3 of Annex 2, to ATS routes in the area.

ICAO Annex 11, Attachment C, Sections 6.2

CADENA ATFM/CDM Procedures Manual Section 6.3

Note 1: The CADENA ATFM/CDM Procedures Manual Section 3.4 provides detailed guidance for Ad Hoc Web Conferences including pre-conference, conference and post-conference responsibilities.

Note 2: The CADENA ATFM/CDM Procedures Manual, Appendix E, contains “Contingency Events and Checklists” for 15 specific types of contingency events.

6.3 Planned Airway System Alternatives (PASA) Contingency Routes

During significant events such as a complete outage of an FIR or the impact of a major hurricane, CADENA has developed, in collaboration between the airlines and participating ANSPs, the Planned Airway System Alternatives (PASA) contingency routes that can be used to temporarily route around the impacted airspace.

The PASA route database is based on routes that are already in use by the airlines and have been approved by the participating ANSPs. The route database is reviewed and updated on a quarterly basis and is available on the CADENA OIS under the “Information” tab on the CADENA OIS homepage and then under “Reroute Repository.”

The excel spreadsheet can be downloaded by double clicking on the “CADENA Planned Airway System Alternatives – contingency route” entry.

When an event occurs that requires implementation of the PASA contingency routes, CADENA will schedule and convene an Ad Hoc Web Conference to coordinate the use of specific routes. The Host for the Ad Hoc Web Conference will depend on which ANSP is impacted and which FMU is available to serve as Host.

The Host will facilitate the collaborative discussion and ensure the following points are covered:

- Review the known details regarding the event that led to application of the routes.
- Discuss which routes may and will be used to circumnavigate the impacted airspace(s).
- Ensure the receiving ANSPs can support the routes.
- Ensure the airlines and other airspace users have adequate time to plan and fuel for the routes. Normally, a three to four hour lead-time planning window is preferred.
- Determine how long the routes will be in effect.
- Determine, to the extent possible, the demand on the routes in an appropriate time segment (such as per 15 minutes, or per hour).
- Establish, if necessary, TMMs to manage the demand.
- Determine the strategy for exiting the routes and returning to normal operations when the event ends.

Airlines and ANSPs have the ability to submit Planned Airway System Alternatives (PASA) Route Requests after login to the CADENA OIS.

Refer to the latest version of the CADENA OIS Manual to see step-by-step information for entering PASA Route Request information.

CADENA ATFM/CDM Procedures Manual, Section 6.3, Para 4 and 5

6.3 Notification, by NOTAM, of anticipated or actual disruption of air traffic services and/or related supporting services should be dispatched to users of air navigation services as early as practicable. The NOTAM should include the associated contingency arrangements. In the case of foreseeable disruption, the advance notice should in any case not be less than 48 hours.

6.4 Notification by NOTAM of discontinuance of contingency measures and reactivation of the services set forth in the regional air navigation plan should be dispatched as early as practicable to ensure an orderly transfer from contingency conditions to normal conditions.

ICAO Annex 11, Attachment C, Sections 6.3 and 6.4

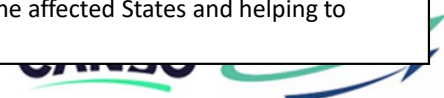
- Annex 11, Attachment C, Section 6.2 and 6.3, refer to a State's responsibility to issue NOTAMs for the implementation and discontinuance of contingency measures. These matters are outside CADENA's scope and therefore, are not applicable.

Note: Although a State's NOTAM responsibilities are outside CADENA's scope, CADENA Ad Hoc Web Conferences (CADENA ATFM/CDM Operations Manual, Section 3.4 and Appendix E) require all details of the contingency measures to be discussed. During the conferences, CADENA asks the States implementing the contingency measures to issue applicable NOTAMs as soon as possible and to keep the NOTAMs up-to-date.

**Appendix A:
Annex 11 Attachment C
and
CADENA ATFM/ CDM Procedures
Manual Mapping Table**

ICAO Annex 11, Attachment C and CADENA ATFM/CDM Procedures Manual Mapping Table (1 of 2)

ICAO Annex 11, Attachment C	CADENA ATFM/CDM Procedures Manual
Section 1.1	Section 6.1
Section 1.2	Section 6.1
Section 1.3	Section 6.2, Section 6.4, Appendix E
Section 1.4	Section 3.4, Section 6.2, Section 6.3
Section 2	Section 6.4, Section 6.4, Appendix E
Section 3.1	Section 3.3, Section 3.4, Section 6.2, Section 6.3, Appendix E
Section 3.2	Section 3.3, Section 3.4, Section 6.3, Appendix E
Section 3.3	Section 6.3
Section 3.4	Annex 11 Attachment C, Section 3.4, refers to ICAO’s responsibilities when a State is unable to discharge their responsibilities according to Section 3.1 of Annex C. ICAO’s responsibilities are outside the scope of CADENA; ; however, CADENA is available to partner with and support ICAO in initiating and coordinating appropriate contingency action with the affected States.
Section 4.1	Section 6.2, Section 6.3, Appendix E
Section 4.2	Section 6.2, Section 6.3, Appendix E
Section 4.3	Annex 11, Section 4.2 c and d, refer to internal State responsibilities which are outside CADENA’s; however, CADENA is available to partner with and support ICAO in initiating and coordinating appropriate contingency action with the affected States and helping to provide up-to-date information to all stakeholders.



ICAO Annex 11, Attachment C and CADENA ATFM/CDM Procedures Manual Mapping Table (2 of 2)

ICAO Annex 11, Attachment C	CADENA ATFM/CDM Procedures Manual
Section 5.1	Section 3.4, Section 6.3
Section 5.2	Section 3.4, Section 6.3, Appendix E
Section 5.3	Section 6.2, Section 6.3, Section 6.4, Appendix E
Section 5.4	Section 3.3, Section 3.4, Section 6.3, Section 6.4, Appendix E
Section 5.5	Annex 11, Section 5.5 recommends including a common NOTAM (i.e., common between States). During Ad Hoc Conferences (CADENA ATFM.CDM Section 3.4.1 thru 3.4.6), contingency details, including NOTAM information, are discussed by ANSPs and stakeholders.
Section 6.1	Section 6.1, refers to a State which does not consent to the use of its sovereign airspace during contingency events. It also refers to airspace over the high seas with undetermined sovereignty. <i>NOTE: Based on the degree of erosion of services offered, the consistent feedback to CADENA by the aircraft operators is that they prefer to route around impacted airspace in order to remain in communication and surveillance coverage. CADENA and the participating FMUs have demonstrated success in establishing routes acceptable to the aircraft operators that bypass impacted airspace.</i>
Section 6.2	Section 3.3, Section 3.4, Section 6, Appendix E
Section 6.3	Annex 11, Attachment C, Section 6.2 and 6.3, refer to a State's responsibility to issue NOTAMs for the implementation and discontinuance of contingency measures.
Section 6.4	<i>CADENA Ad Hoc Web Conferences (CADENA ATFM/CDM Operations Manual, Section 3.4 and Appendix E) require all details of the contingency measures to be discussed. During the conferences, CADENA asks the States implementing the contingency measures to issue applicable NOTAMs as soon as possible and to keep the NOTAMs up-to-date.</i>



QUESTIONS AND ANSWERS

Thank you!

¡Gracias!

3.3 Planned Airway System Alternatives (PASA) Contingency Routes

During significant events such as a complete outage of an FIR or the impact of a major hurricane, CADENA has developed, in collaboration between the airlines and participating ANSPs, the Planned Airway System Alternatives (PASA) contingency routes that can be used to temporarily route around the impacted airspace.

The PASA route database is based on routes that are already in use by the airlines and have been approved by the participating ANSPs. The route database is reviewed and updated on a quarterly basis and is available on the CADENA OIS under the “Information” tab on the CADENA OIS homepage and then under “Reroute Repository.”

The excel spreadsheet can be downloaded by double clicking on the “CADENA Planned Airway System Alternatives – contingency route” entry.

When an event occurs that requires implementation of the PASA contingency routes, CADENA will schedule and convene an Ad Hoc Web Conference to coordinate the use of specific routes. The Host for the Ad Hoc Web Conference will depend on which ANSP is impacted and which FMU is available to serve as Host.

The Host will facilitate the collaborative discussion and ensure the following points are covered:

- Review the known details regarding the event that led to application of the routes.
- Discuss which routes may and will be used to circumnavigate the impacted airspace(s).
- Ensure the receiving ANSPs can support the routes.
- Ensure the airlines and other airspace users have adequate time to plan and fuel for the routes. Normally, a three to four hour lead-time planning window is preferred.
- Determine how long the routes will be in effect.
- Determine, to the extent possible, the demand on the routes in an appropriate time segment (such as per 15 minutes, or per hour).
- Establish, if necessary, TMMs to manage the demand.
- Determine the strategy for exiting the routes and returning to normal operations when the

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- Determine the strategy for exiting the routes and returning to normal operations when the event ends.

Annex 11 Attachment C

1. Introduction

1.1 Guidelines for contingency measures for application in the event of disruptions of air traffic services and related supporting services were first approved by the Council on 27 June 1984 in response to Assembly Resolution A23-12, following a study by the Air Navigation Commission and consultation with States and international organizations concerned, as required by the Resolution. The guidelines were subsequently amended and amplified in the light of experience gained with the application of contingency measures in various parts of the world and in differing circumstances.

1.2 The purpose of the guidelines is to assist in providing for the safe and orderly flow of international air traffic in the event of disruptions of air traffic services and related supporting services and in preserving the availability of major world air routes within the air transportation system in such circumstances.

1.3 The guidelines have been developed in recognition of the fact that circumstances before and during events causing disruptions of services to international civil aviation vary widely and that contingency measures, including access to designated aerodromes for humanitarian reasons, in response to specific events and circumstances must be adapted to these circumstances. They set forth the allocation of responsibility among States and ICAO for the conduct of contingency planning and the measures to be taken into consideration in developing, applying and terminating the application of such plans.

1.4 The guidelines are based on experience which has shown, inter alia, that the effects of disruption of services in particular portions of airspace are likely to affect significantly the services in adjacent airspace, thereby creating a requirement for international coordination, with the assistance of ICAO as appropriate. Hence, the role of ICAO in the field of contingency planning and coordination of such plans is described in the guidelines. They also reflect the experience that ICAO's role in contingency planning must be global and not limited to airspace over the high seas and areas of undetermined sovereignty, if the availability of major world air routes within the air transportation system is to be preserved. Finally, they further reflect the fact that international organizations concerned, such as the International Air Transport Association (IATA) and the International Federation of Airline Pilots' Associations (IFALPA), are valuable advisers on the practicability of overall plans and elements of such plans.

CADENA Procedures Manual

6 CADENA and Contingency Planning

6.1 Background

CADENA has focused on two aspects of Contingency Planning: 1) Establishing ATFM plans and checklists to help mitigate the impact of disruptions to air traffic operations caused by unplanned equipment outages, hurricane impacts, etc. and, 2) Establishing plans and checklists to mitigate disruptions to the provision of ATFM/CDM caused by unplanned equipment outages at any one of the participating CADENA FMUs.

6.2 Disruptions to Air Traffic Operations

CADENA has gained extensive experience in dealing with disruptions to Air Traffic operations in the Regions. Examples include: the long-term impact of the lightning strike in 2017 at the Kingston ACC; the devastating impact of Hurricane Maria in September 2017; the impact of active volcanoes in the Regions; the power outage at CENAMER ACC that resulted in the complete loss of communications, navigation, and surveillance. CADENA understands the importance of preparing for disruptions and gathering the information related to:

- ACCs
 - Evacuation
 - Radar failure
 - Air/Ground (A/G) communication failure
 - Telephone or landline failure
 - Power failure
 - Flight data processing system (FDPS) failure
 - Staffing shortages
 - Work stoppages (strikes)