International Civil Aviation Organization

Eleventh Meeting of the Air Traffic Management Sub-Group (ATM/SG/11) of APANPIRG

Singapore, 2 – 6 October 2023

Agenda Item 6: ATM Coordination (Meetings, Route Development, Contingency Planning)

CADENCE'S CONTINGENCY PLANNING APPROACHES

(Presented by the Civil Air Navigation Services Organisation)

SUMMARY

Past contingency events in the Asia Pacific have borne out the lack of information sharing which is much needed to minimize the impact of disruptions. CANSO is offering a free to use operational information system (OIS) and the help of the CANSO ATFM Data Exchange Network for Cooperative Excellence (CADENCE) Task Force (TF). This OIS can enhance situational awareness and business continuity across the region. The CADENCE OIS was built from the contingency experience of the Latin America and Caribbean (LAC) region. It is strongly recommended that the Asia and Pacific Air Navigation Service Provider (ANSP) Committee (AAC) workstream on contingency preparedness try out the CADENCE OIS during its exercises.

1. INTRODUCTION

1.1 Operational disruptions can significantly affect air traffic operations. In the Asia Pacific, such disruptions can be due to seasonal tropical weather patterns, volcanic ash events, earthquakes, equipment failures or unplanned personnel actions. In order to cope with these situations, the States providing air traffic services (ATS) must collaborate closely with neighboring States and other aviation stakeholders to develop and implement effective contingency plans that mitigate the impact of such events.

1.2 According to one climate study, 25 typhoons take place in the Western North Pacific a year, and 12 normally pass through East Asia. According to another study, the destructive power of typhoons in Asia seems to be rising and could double by the end of the century. Such shocks can be dislocating but can be mitigated with more coordination. Mutual assistance among Air Navigation Service Providers (ANSPs) can minimise disruptions to the flow of the growing volume of air traffic in the region.

ICAO Requirements for Contingency Handling

1.3 ICAO Annex 11 has established the requirement for air traffic services contingency preparedness and business continuity through ANSPs working in close coordination with one another:

2.32 Contingency Arrangements

"Air traffic services authorities shall develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption, of air traffic services and related supporting services in the airspace for which they are responsible for the

provision of such services. Such contingency plans shall be developed with the assistance of ICAO as necessary, in close coordination with the air traffic services authorities responsible for the provision of services in adjacent portions of airspace and with airspace users concerned."

1.4 Further, Attachment C to the Annex 11 states:

ATTACHMENT C. MATERIAL RELATING TO CONTINGENCY PLANNING, 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. …"

2. CANSO'S OFFER AND CADENCE TASK FORCE

2.1 One consistent lesson learnt from past contingency events in the region is the lack of information sharing. In past events, the ICAO Regional Office was usually the first to step in to form the Contingency Coordination Teams. A more systematic tool with more stakeholders connected can help with the process. CANSO could help in this regard through the CANDENCE TF which is a subgroup of the CANSO Operations Standing Committee. This Task Force is a strategic initiative designed to help develop, or enhance, a network for operational coordination and information sharing among ANSPs around the world.

2.2 Specifically, CANSO is offering the CADENCE Operational Information System (OIS) free to use to the region. There are distinct benefits in having a region-wide OIS that is simple to use and readily implementable. This OIS is a web platform that facilitates information sharing and promotes common situational awareness for regions. To ease the transition and implementation, the CADENCE TF offers subject matter expert knowledge and experience based on the experience using this OIS in LAC through CANSO ATFM Data Exchange Network for the Americas (CADENA). The CADENCE TF advocates effective approaches of "step-by-step", "simple-to-achieve solutions" and "do the best you can." This approach to advance regional collaboration supports ICAO's "No Country Left Behind" policy.

2.3 When the Asia Pacific ANSP Committee (AAC) met in April 2023, several work streams were formed to enhance ANSP regional collaboration. In recognition of the importance of contingency preparedness, one of the workstreams is on business continuity and contingency planning led by Federal Aviation Administration (FAA), Civil Aviation Authority of Malaysia (CAAM) and Japan Air Navigation Service (JANS). This work stream is planning to conduct contingency exercises. It is strongly recommended that the CADENCE OIS be tried out during the exercises. Other alternatives are either non-existent or require financial outlay which makes it difficult to proliferate region wide.

2.4 The subsequent segments of the paper elaborate on the context and use of the OIS.

3. CONTINGENCY HANDLING IN THE LAC REGION

3.1 CADENCE is built on the experience of CADENA. Since 2016, CADENA has gained extensive experience in dealing with disruptions to air traffic operations in the LAC region. Examples include: the long-term impact of the lightning strike at an Area Control Center (ACC) that disabled its operational capabilities; the devastating impact of powerful hurricanes; the impact of active volcanoes in the LAC region; the power outage at an ACC that resulted in the complete loss of communications, navigation, and surveillance.

3.2 CADENA recognized the importance of handling contingency events and building capabilities among participating ANSPs to face such events. The capabilities built to face contingency events include: training of staff, establishing communication methods (e.g., web conferences, CADENA OIS, emails via group lists, WhatsApp Chat Group); developing procedures, documents (e.g., briefing templates and manuals), and forms (e.g., contingency form and contingency check lists); and, establishing the CADENA Virtual Support Team. CADENA continues to offer many types of training including annual hurricane training and quarterly contingency training.

4. INFORMATION ON CONTINGENCY HANDLING

4.1 To handle contingency events, it is essential that each ANSP has a dedicated unit with trained personnel. In the case of LAC, they use their ATFM unit (FMU) for contingency preparedness too. CADENA identified the minimum requirements for ANSPs to establish a functional FMU and FMU personnel qualifications.

4.2 It is important to identify the contingency event so that the proper action can be taken. CADENA has identified fifteen such events and grouped them into 4 categories as shown below:

- 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)
  - FMU services not available
  - AFTN Outage
- Severe weather / natural phenomena
  - Hurricanes / tropical storms
  - Volcanic eruption
  - Earthquakes
- Airports
  - Aircraft accidents / incidents
- Off-Nominal (Unusual) Events
  - Off-Nominal (Unusual) Events (e.g., Global pandemic)

4.3 Once the contingency event is identified, the appropriate information must be gathered to share with others who are also impacted by the event. CADENA has recognised the following as the key information to be gathered and utilized:

- 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.

4.4 CADENA has prepared the ANSP Contingency Form (see below from the CADENA ATFM/CDM Procedures Manual, Section 6.4) to help collect pertinent contingency event information, put all of the available information in one form, and display it on the CADENA OIS for stakeholder situational awareness. This form will be completed and uploaded to the CADENA OIS by the participating ANSP that has taken the lead for a contingency event. This task may be delegated to another participating ANSP or CADENA Headquarters if workload during an event requires. When the ANSP uploads the Contingency Form to the CADENA OIS, a CADENA Advisory will also be issued.

CANSO CADENA

ANSP CONTINGENCY FORM

Impacted Facility / Sector: _____

REF #: _____

Type of Contingency

☐Communication ☐Facility ☐Surveillance ☐Staffing ☐Other

Detail

Click here to enter text.

Traffic Management measures

☐ Miles-in-trail (MIT) ☐ Minutes-in-trail (MINIT) ☐ Re-routing

☐ Fix Balancing ☐ Level Capping ☐ Tunnelling

☐ Airborne Holding ☐ Ground Delay Program (GDP) ☐ Ground Stop (GS)

☐ Airspace Flow Program (AFP)

Detail

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FIRs Affected

☐ TTZP	☐ TJZS	☐ SVZM	☐ TNCF	☐ MDCS
☐ MTEG	☐ KZMA	☐ KZWY	☐ KZHU	☐ MUFH
☐ MKJK	☐ MMFR	☐ MHCC	☐ MPZL	☐ SKEC
☐ SKED	☐ SARR	☐ SACF	☐ SAEF	☐ SAVF
☐ ___	☐ ___			

Start Time

Click here to enter text.

End Time

Click here to enter text.

4.5 The CADENA Advisory has two types, Urgent and For Your Information (FYI). The contingency event highly likely will require an Urgent Advisory. If the CADENA participant is registered for the email notification, the CADENA OIS will automatically notify them of the advisory via registered email. The CADENA Virtual Support Team will organize and notify the stakeholders of an Ad Hoc web conference to discuss the event if it is deemed necessary.

4.6 CADENA has prepared fifteen "Contingency Events and Checklists", one for each contingency event identified in the previous section of this Working Paper. Contingency Event and Checklists enable ANSPs to mitigate the impact of such events through a ready-reference checklist when the unexpected happens. It describes the initial and following ATFM actions that the impacted ANSP should take depending on the event.

4.7 In the event that ad hoc web conference is warranted, the CADENA Virtual Support Team will work with the impacted ANSP(s) to prepare the event information briefing materials to present during the web conference. In addition to the ANSP Contingency Form, helpful information should be prepared in an appropriate form. Sample slides for presenting information during a HURRICANE / TROPICAL STORM WEB CONFERENCE and VOLCANO WEB CONFERENCE are also provided.

4.8 It is important for the CADENA Virtual Support Team to be able to reach out to the right Point of Contact (PoC) during a contingency event. The PoC List of CADENA for each of the participating ANSPs and the stakeholders is posted on the CADENA OIS (not in the public view, but through the password protected site) as a ready reference for CADENA participants. The Virtual Support Team is an important community self-help arrangement for members to render assistance. This will relieve some of the burden on the ICAO Regional Office.

5. COMMUNICATION METHODS FOR CONTINGENCY HANDLING

5.1 CADENA uses several different communication methods to share information during a contingency. Different types of communication methods are used because they offer different types of services and CADENA uses the best types available to meet the needs of an event.

5.2 In collaboration with participating ANSPs and airlines, in August 2017, CADENA launched the CADENA OIS, allowing ANSPs to easily share special events, contingency events, and operational information via the web application. Since then, the CADENA OIS has been enhanced several times to provide more capabilities to exchange ATFM/CDM related information and to boost coordination opportunities.

5.3 The CADENA OIS plays a critical role during a contingency event by offering participating ANSPs a basic capability of sharing information including: the ANSP Contingency Form; briefings on the event; CADENA advisories; Contingency Events Checklists; and, the Planned Airway System Alternative (PASA) route database. The CADENA OIS provides functions to issue CADENA advisories and PASA End-to-End (E2E) route requests.

5.4 In addition to the CADENA OIS, ad hoc web conferences, group emails, and the WhatsApp application are also used to quickly exchange short messages. The usage of WhatsApp was not considered in 2016; however, CADENA has found it is useful and officially formed the CADENA Ops WhatsApp chat group.

6. PLANNED AIRWAY SYSTEM ALTERNATIVE (PASA)

6.1 PASA routes are contingency routes that can be used temporarily to circumvent airspace impacted by a significant event (e.g., major hurricane, complete power outage, satellite outage, etc.). There are two types of PASA contingency routes: predetermined routes stored in the CADENA database and dynamic end-to-end (E2E) routes that can be created and requested as needed. CADENA has found that both the PASA route database and the PASA E2E routes, help to improve operational predictability, mitigate delays, and enhance safety during these rare events.

6.2 In October 2018, a few PASA routes were identified and used in response to the loss of an ANSP's surveillance capabilities and the closure of a large volume of airspace in the Caribbean region. Recognizing the usefulness of PASA predetermined contingency routes for each FIR, CADENA created the PASA route database based on routes that were already in use by the airlines and have been approved by the participating ANSPs. The implementation of PASA routes must be coordinated with the appropriate ANSPs through their FMU prior to use.

6.3 When an event occurs that requires implementation of the PASA routes from the database, the CADENA Virtual Support Team will schedule and convene an ad hoc web conference to coordinate the use of specific routes. A member of the CADENA Virtual Support Team will serve as the host for the ad hoc web conference. The PASA route database became very handy during the COVID pandemic when ATC-Zero events occurred regularly due to staffing issues. The PASA route database is in an Excel spreadsheet format, is updated quarterly, and can be accessed via the CADENA OIS.

6.4 While the PASA route database contains the predetermined contingency route, the airlines sometimes need more tactical routes to fly. The PASA E2E routes are requested by airlines/stakeholders on an ad hoc basis (i.e., when needed). Airlines/stakeholders can submit these route requests via the CADENA OIS and PASA E2E routes must be approved by all ANSPs through their FMU in which any segment of the route occurs.

6.5 Notable examples of PASA E2E routes include: Delta Airlines' creation of a special route to avoid a hurricane while traveling from the Mexico to the U.S. in October 2020; and, American Airlines successful transport of COVID vaccines from the U.S. to Chile via the coordinated efforts of ANSPs which resulted in the vaccine's timely arrival and safe delivery in December 2020.

6.6 CADENA has developed and maintains a Lessons Learned document based on experiences gained from the various contingency events and from day-to-day operations. The most recent version of the document is available to participating ANSPs after login to the CADENA OIS.

7. USE OF OIS FOR ASIA PACIFIC CONTINGENCIES

7.1 The OIS has proven to be a useful tool in the LAC region. It allows ANSPs, and importantly airlines, to easily access and share special events, contingency events, and operational information via the web. It facilitates a standardised way to share information throughout the region.

7.2 This OIS has 14 ANSPs, 29 airlines and 4 international organisations in the LAC region sharing information and collaborating on it. It has the advantage of being transparent and inclusive, with very low barrier for entry. One reason for the proliferation of this OIS is that it is simple to use. Stakeholders can participate with just a computer and internet access.

7.3 The OIS used by the LAC region is now available free to use by other regions. CANSO and CGH Technologies, Inc., the developer of this OIS, signed an agreement in March 2021 to secure the use of the software for 20 Years. For contingency management, all stakeholders should be on the same platform. While another OIS can be developed, this would involve costs which may be difficult to recover. Having the same OIS as LAC has the advantage of having a common information system in the event of an inter-regional contingency. The choice of OIS must be harmonised. The CANSO CANDENCE TF is prepared to help the Asia Pacific region implement the use of this OIS.

8. ACTION BY THE MEETING

8.1 The meeting is invited to:

a) support the use of the CADENCE OIS in the Asia Pacific;

b) discuss any relevant matters as appropriate; and

c) consider adaptation of relevant contents in this paper into the state and regional contingency plan; and

d) adopt the conclusion below.

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<table>
<tr><td colspan="3">Conclusion ATM/SG/11-X: Use of CADENCE OIS for Contingency Exercises</td></tr>
<tr><td colspan="2">What: That, the Asia Pacific region finds opportunities to trial the CADENCE OIS in next available contingency exercises to assess its suitability as a common platform for the region.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To enhance situational awareness and business continuity across the region as there is a lack of such an OIS in the region today. It also allows inter-regional contingency information sharing with LAC.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: dd-Mmm-yy</td><td colspan="2">Status: Adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
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