



ICAO

International Civil Aviation Organization
North American, Central American and Caribbean Office

WORKING PAPER

NACC/DCA/11 — WP/40

31/05/23

**Eleventh North American, Central American and Caribbean Directors of Civil Aviation Meeting
(NACC/DCA/11)**

Varadero, Cuba, 28-30 June 2023

Agenda Item 4: NAM/CAR Regional Safety/Air Navigation Implementation

4.2 Air Navigation Implementation Matters

CANSO ATFM DATA EXCHANGE NETWORK FOR THE AMERICAS (CADENA) ADVANCEMENTS

(Presented by CANSO)

EXECUTIVE SUMMARY

CANSO is supporting the harmonized implementation of Air Traffic Flow Management (ATFM) based on Collaborative Decision Making (CDM) principles at a global level. CANSO's CADENA initiative offers a regional, cross-border ATFM communications and a seamless operational atmosphere incorporating operational procedures and practices. Implementing regional, networked ATFM requires the establishment of CDM practices among participating Air Navigation Service Providers (ANSPs) and regional and international stakeholders. These practices are collaborative, inclusive and transparent, allowing the exchange of operational information to facilitate common situational awareness and promoting strategic, pre-tactical, and tactical planning in a CDM environment of multilateral decision-making.

Action:	Please refer to item 5
<i>Strategic Objectives:</i>	<ul style="list-style-type: none">• Strategic Objective 2 – Air Navigation Capacity and Efficiency• Strategic Objective 4 – Economic Development of Air Transport• Strategic Objective 5 – Environmental Protection
<i>References:</i>	<ul style="list-style-type: none">• ICAO Doc 9971, Manual on Collaborative Air Traffic Flow Management.• CADENA ATFM-CDM Procedures Manual• CANSO - CADENA Air Traffic Management and Collaborative Decision-Making Letter of Agreement• CANSO and Federal Aviation Administration (FAA) Air Traffic Organization (ATO) Space Operations Letter of Agreement

1. Introduction

1.1 CANSO is supporting the harmonized implementation of ATFM/CDM at a global level.

1.2 In June 2016, the Latin America and Caribbean CANSO CEO Committee (LAC3) established a multi-nodal ATFM network named CANSO ATFM Data Exchange Network for the Americas (CADENA) among ANSPs and stakeholders to contribute to a safe, orderly, and expeditious flow of air traffic.

1.3 Instituto Dominicano de Aviación Civil (IDAC) holds the CADENA chairmanship, and Empresa Argentina de Navegación Aérea, EANA, is the vice chair of CADENA.

1.4 The CADENA Regional Implementation Group (RIG) implemented varying ATFM/CDM capabilities and improved readiness levels of participants since its initiation in 2016. The result is the successful implementation of regional ATFM/CDM, a harmonized system to share vital operational information and decision-making opportunities. CADENA has proved its value to its participants and made significant advances.

1.5 From the beginning, CADENA has been run with a policy of collaboration, inclusiveness and transparency. Although CANSO led the CADENA team, CANSO membership was not required to become a CADENA participant. The CADENA participant list includes ANSPs, airlines, international organizations, and regional stakeholders. One of the tangible benefits of CADENA has been the day-to-day sharing of operational information among this growing community which improves coordination, enhances common situational awareness, and allows for better decision-making among the regional aviation community.

1.6 CADENA ANSP participation includes Aruba (ANSA), Bahamas (BANSAs), Central America (COCESNA), Colombia (UAEAC), Costa Rica CAA ANS, Curacao (DC-ANSP), Argentina (EANA), Ecuador CAA - ATFM, Cuba (ECNA), USA (FAA including DCC, ZMA, SJU, ZHU, Space Operations Office), Dominican Republic (IDAC), Venezuela (INAC), Jamaica (JCAA), Grand Cayman (MWCR), Haiti (OFNAC), Mexico (SENEAM), and Trinidad and Tobago (TTCAA).

1.7 CADENA stakeholder participation includes ACI-LAC, ALTA, IATA, Centre National D'Études Spatiales (CNES), ICAO, NBAA, Caribbean Aviation Resilience and Recovery Group (CARRG), Aerolíneas Argentinas, Aeromexico, Air Canada, Alaska Airlines, American Airlines, Atlas Air, Avianca Airlines, Azul Brazilian Airlines, Caribbean Airlines, COPA Airlines, Delta Airlines, Emirates, FedEx, Gol, JetBlue, MESA Airlines, Sky Airlines, Southwest, Spirit Airlines, United Airlines, UPS, Viva Aerobus, Volaris, and WestJet.

2. Discussion

2.1 Many essential components are needed for successfully implementing ATFM capabilities and CDM processes. Sharing information among stakeholders is one of the primary components. CADENA promotes universal situational awareness through timely communication, collaboration, and coordination of operational data and information to ANSPs, airspace users, and other stakeholders. Implementing a harmonized, regional, networked ATFM has required the establishment of robust CDM practices among participating ANSPs and stakeholders.

2.2 The System Wide Information Management System (SWIM) provides greater access to real-time information concerning flight data, airport operations, and weather. This expanding connectivity will help ensure the entire region has common situational awareness of traffic demand and constraints to enhance safety, improve efficiency, and better manage resources. CADENA continuously encourages

regional ANSPs to connect to SWIM. Trinidad and Tobago CAA and COCESNA are connected to the FAA SWIM network and exchanging flight data in real-time. Other regional ANSPs are developing their business cases.

2.3 CADENA's processes, procedures, best practices, and regional experience have become the foundation for establishing a new global initiative called CANSO ATFM Data Exchange Network for Cooperative Excellence (CADENCE). Recognizing that each region is unique, CANSO will consult with ANSPs in each region to support regional action teams in implementing globally harmonized ATFM/CDM. The creation of CADENCE is an acknowledgement of the LAC region's dedication, collaboration, and cooperation.

3. Development

3.1 The Operational Information System (OIS) enables common situational awareness and allows regional ANSPs to exchange information, including ATFM Daily Plans, expected demand, planned and implemented traffic management measures, constraints, weather and geological issues, special events, and runway closures which improve operational planning and collaborative decision-making. Figure 3.1 shows the CADENA OIS home page that the public can access at <https://www.cadenaois.org/index.html>



Figure 3.1: CADENA OIS Home page

3.2 Accomplishments by CADENA participants include the development and use of the CADENA Procedures Manual, CADENA ANSP Contingency Forms, Letters of Agreement (LOAs) from Flow

Management Unit (FMU) to FMU, Space Launch and Recovery Protocols LOA, Planned Airway System Alternative (PASA) routes, use of Flight Radar 24, and quarterly operational contingency training exercises, to mention a few.

3.3 CADENA implemented many capabilities using “step-by-step”, “simple-to-achieve solutions” and “do the best you can” approaches to improve the airspace usage. CADENA implemented PASA (database of pre-negotiated routes to be used in contingency situations), PASA End-to-End (E2E) routes (tactical route request/approval capability), and PASA E2E route optimization process (a.k.a. Trial User Preferred Route (UPR)). Over a dozen E2E route optimization trials are conducted and produced significant savings. Experiences with PASA, E2E route requests, and Trial UPRs have allowed the aviation community to understand, train, learn, and prepare for the transition to Free Route Airspace (FRA).

3.4 CANSO, IATA, and ICAO agreed to work hand in hand to achieve their common goal of implementing the FRA. Thus, the CANSO, IATA, ICAO Free Route Airspace (CIIFRA) team was formed.

3.5 To highlight the success of the CIIFRA team, the projected yearly benefits from 9 Trial UPRs are a savings of 15,232 flight minutes which is the equivalent of 39 flights saved between Atlanta and Lima based on an average flying time between ATL and LIM of 6.5 hours; a reduction of 4,561,606 kg of CO2 emissions which is the equivalent of greenhouse emissions of 11,322,844 miles driven by an average passenger car; and a savings of over 3 million USD in operational costs.

3.6 The following sections describe highlights of recent CADENA activities. In January 2022, CADENA implemented the Virtual Support Team (VST) to enhance collaboration between FMUs and stakeholders to ensure effective communication and coordination among all CADENA participants during disruptions to normal traffic operations. The VST share a common operational picture and situation awareness which strengthens and empowers teamwork across the LAC region.

3.7 In June 2022, the CANSO Latin America and Caribbean CEO Committee acquired twelve FlightRadar24 business subscriptions to enhance and support situational awareness within the ANSP's Flow Management Units (FMUs).

3.8 At the seventh NACC/WG meeting in August/September 2023, the ICAO NACC ATFM Task Force approved using CADENA to facilitate data sharing and promote a shared situational awareness vital to the safe, efficient, and harmonized flow of air traffic. Also, CADENA will be used as a contingency communications platform for the NACC region.

3.9 In November 2023, SENEAM initiated a Strategic Direct Routing (SDR) trial. This trial moves SENEAM one step closer to FRA. The trial started with just a few airlines participating to ensure the operational viability of the trial. Additional airlines were invited to participate as the trial progressed. Currently, 9 airlines have been invited to participate in SENEAM's SDR Trial.

3.10 On January 9, 2023, CADENA members transitioned from a once-weekly CADENA Planning Web Conference to a twice-weekly CADENA Planning Web Conference. The Operational Planning Web Conferences are held each Monday and Thursday at 1400 UTC. To mitigate the workload on FMUs from the additional Planning Web Conference, the CADENA Planning Web Conference was streamlined to include only information which impacts airport/airspace capacity and safety of flight issues.

3.11 PASA E2E (aka Trial UPR) route optimization continues to date. As of March 2023, 14 Trial UPRs have been completed. All completed trial routes are being processed for AIC/AIP publication with the support of ICAO regional office.

4. **Operational Support**

4.1 As of March 13, 2023, CADENA has held 335 weekly ATFM/CDM operational planning web conferences, 92 contingency ad-hoc CDM web conferences, and 22 Space Launch and Recovery CDM web conferences.

4.2 From 2016 through March 13, 2023, CADENA has prepared for and hosted Ad-hoc CDM Web conferences to address a wide variety of operational situations, including:

4.2.1 Hurricanes and Tropical Storms.
 2018: 3 Ad-hoc web conferences
 2019: 4 Ad-hoc web conferences
 2020: 9 Ad-hoc web conferences
 2021: 7 Ad-hoc web conferences
 2022: 6 Ad-hoc web conferences

4.2.2 Volcanic ash events.
 2018: 1 Ad-hoc web conference
 2021: 3 Ad-hoc web conferences
 2022: 2 Ad-hoc web conference

4.2.3 ATC-Zero events.
 2017: 3 Ad-hoc web conferences
 2019: 2 Ad-hoc web conferences
 2020: 12 Ad-hoc web conference
 2021: 9 Ad-hoc web conferences
 2022: 5 Ad-hoc web conferences
 2023: 1 Ad-hoc web conferences

4.2.4 Equipment outages (e.g., radar failure, electric power failure, communication failure, NOTAM and weather system outages).
 2017: 1 Ad-hoc web conference
 2018: 6 Ad-hoc web conferences
 2019: 3 Ad-hoc web conferences
 2020: 1 Ad-hoc web conference
 2021: 9 Ad-hoc web conferences
 2022: 5 Ad-hoc web conferences
 2023: 1 Ad-hoc web conference

- 4.2.5 Airport incidents and issues.
2017: 1 Ad-hoc web conference
2018: 5 Ad-hoc web conferences
2019: 3 Ad-hoc web conference
2020: 6 Ad-hoc web conferences
2021: 7 Ad-hoc web conferences
2022: 5 Ad-hoc web conferences
2023: 1 Ad-hoc web conference
- 4.2.6 High operational impact space launch coordination.
2020: 4 Ad-hoc web conferences
2021: 2 Ad-hoc web conferences
2022: 2 Ad-hoc web conferences
2023: 1 Ad-hoc web conference
- 4.3 CADENA has developed a number of documents and templates to support the various operational activities, including the:
- 4.3.1 CADENA ATFM/CDM Procedures Manual
 - 4.3.2 CADENA Operational Information System Manual
 - 4.3.3 CADENA Contingency Event Checklists
 - 4.3.4 CADENA Operational Planning Conference PowerPoint templates
 - 4.3.5 CADENA Hurricane and Tropical Storm briefing PowerPoint templates
 - 4.3.6 CADENA Volcanic Ash briefing PowerPoint Templates
- 4.4 CADENA has developed and provided a variety of training initiatives to support the ANSPs and the development of their Flow Management Units, including training on:
- 4.4.1 How to plan and implement a Flow Management Unit
 - 4.4.2 How to determine the Airport Acceptance Rate
 - 4.4.3 How to determine the Sector Capacity
- 4.5 CADENA has coordinated and assisted in the development of regional operational offload trials designed to mitigate operational challenges.
- 4.5.1 During the November 2022 CADENA CDM meeting in Merida, Mexico, the Jamaican Civil Aviation Authority (JCAA) proposed an offload trial to mitigate highly congested routes with overlapping radar data blocks. CADENA assisted with the regional coordination of JCAA's Miami (MIA) to Bogota (BOG) offload trial. The MIA – BOG offload trial began in January of 2023 and has successfully mitigated the operational challenges.
- 4.5.2 During the November 2022 CADENA CDM meeting in Merida, Mexico, SENEAM proposed an offload trial for Cancun (MMUN) departures filed via UM219 MYDIA to mitigate departure delays. CADENA has assisted SENEAM by conducting MMUN departure analysis, identifying viable offload routes and coordinating the trial with regional ANSPs and stakeholders. The MMUN UM219 offload trial is scheduled for April 6th to the 9th of this year.

5. **Suggested action**

5.1 The Meeting is invited to:

- a) Take note of the information provided in this paper;
- b) Encourage the participation of ANSPs in the twice-weekly ATFM/CDM operational planning web conference;
- c) Encourage regional ANSPs to use and input data in the CADENA OIS; and
- d) Participate in CADENA and use the CADENA OIS at no charge to the ANSP, airlines and aviation organizations.