



ICAO

International Civil Aviation Organization

Thirteenth Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/13)

Bangkok, Thailand, 03 – 07 April 2023

Agenda Item 3: ATFM Global Update

LATIN AMERICA AND CARIBBEAN (LAC) REGIONAL FREE ROUTE AIRSPACE (FRA) ROADMAP

(Presented by CANSO)

SUMMARY

This Information Paper presents the roadmap to implement Free Route Airspace (FRA) in the Latin America and Caribbean (LAC) Region. The effort started small by CANSO ATFM Data Exchange Network for the Americas (CADENA) using its simple but effective implementation approach. The effort evolved into the collaborative FRA initiative between CANSO, IATA, and ICAO (CIIFRA) since all three international organizations share a common goal: the efficient use of airspace.

1. INTRODUCTION

1.1 The aviation industry has undergone numerous changes in the past few years with air traffic management (ATM) being one of the areas undergoing transformation. The post-COVID recovery and increased demand for air travel has led to greater pressure on ATM systems. The LAC region is no exception.

1.2 The Civil Air Navigation Services Organization (CANSO) recognized the importance of regional air traffic flow management (ATFM) and established the CANSO ATFM Data Exchange Network for the Americas, or CADENA, in 2016. The CADENA initiative aims to improve ATFM through data exchange and collaborative decision making (CDM) among air navigation service providers (ANSPs) and other aviation stakeholders.

1.3 CADENA organized a core number of ANSPs, airlines, and other stakeholders and is successfully carrying out the regional ATFM/CDM operation. To enhance the ATFM/CDM operation, CADENA developed the regional FRA implementation roadmap and started the implementation process step-by-step including the creation of a route database and optimized route trials since 2018. The IATA and ICAO regional offices have the common goal of better usage and optimization of airspace. In 2021, CANSO/CADENA, IATA and ICAO formed the CIIFRA team (CANSO-IATA-ICAO Free Route Airspace) to carry out the implementation of regional FRA.

2. BACKGROUND

CADENA Weekly Operational Web Conference and Operational Information System (OIS)

2.1 In August 2016, the first CADENA Regional Implementation Group (RIG) Meeting was convened and four months later, in December 2016, the weekly CADENA Operations Planning Web Conference was established.

2.2 When the weekly CADENA Operations Planning Web Conference first started in 2016, there was an exchange of information such as ATFM Daily Plans and advisories via emails and phone calls. The use of emails and phone calls was workable but not very efficient. CADENA implemented the Operational Information System (OIS) in August 2017 allowing ANSPs to share information more effectively 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 coordination opportunities.

2.3 Through these web conferences, participating CADENA ANSPs and stakeholders established relationships and engaged in regular discussions with one another which fostered a collaborative environment and strengthened their working relationships. The CADENA Weekly Operational Web Conference became so important for regional airline operators that they requested a more frequent occurrence of the web conference. CADENA expanded the once-a-week Operational Web Conference to the twice-weekly Operational Web Conferences in January 2023.

CADENA's Implementation Approach

2.4 The LAC region has a unique characteristic in that some of the ANSPs within the region have relatively small Flight Information Regions (FIRs). Thus, the success of any regional implementation effort is heavily dependent on the participation of adjacent ANSPs and airline operators for collaboration.

2.5 To facilitate broader participation, CADENA purposely sought to reduce barriers to entry for resource-limited parties by requiring only three participation prerequisites: a computer, internet access, and staff. Therefore, even the most economically disadvantaged countries can participate if they possess the determination and necessary personnel. These considerations are crucial in many regions where resource constraints have increased in the past few years.

2.6 CADENA's success is based on a "small step-by-step", "simple-to-achieve solutions" and "do the best you can" approach. Here are some of the advantages to this approach. It allows for projects to get started more quickly since they utilize with a small step-by-step approach. It also reduces project complexity since the focus is on "simple-to-achieve solutions." Any operational issues can quickly be identified and mitigated. Successful projects can easily be expanded.

ICAO Global Air Navigation Plan (GANP) and Aviation System Block Upgrade (ASBU)

2.7 ICAO's Global Air Navigation Plan (Doc 9750) consists of an Aviation System Block Upgrade (ASBU) framework. ASBU specifies two ASBU Elements that lead to the FRA. These Elements are Direct Routes or DCTs (ASBU FRTO, Block 0, Element 1) and FRA (ASBU FRTO, Block 1, Element 1). LAC regional FRA efforts follows the ICAO's guidance of ASBU description.

3. CADENA'S STEP-BY-STEP APPROACH TO FRA IMPLEMENTATION

3.1 CADENA's step-by-step approach to the implementation of FRA includes a variety of steps and trials. These steps and trial processes are designed to ensure successful, safe trial execution relying on trust and cooperation with stakeholders. The five steps of the LAC regional FRA roadmap are:

- a) STEP 1: CADENA Planned Airway System Alternative (PASA) Routes
- b) STEP 2: CADENA Planned Airway System Alternative End-to-End Routes (PASA E2E)
- c) STEP 3: CADENA Trial User Preferred Routes (Trial UPR)
- d) STEP 4: Strategic Direct Routing (SDR)
- e) STEP 5: Regional Free Route Airspace (FRA)

3.2 In order to ensure a successful and safe trial execution, it was critical to establish a foundation of trust and cooperation with the ANSPs and airlines prior to its commencement. The determination and willingness of those involved played a crucial role in determining the outcome of the trial.

3.3 Specific phases of the trial were conducted during the peak of the COVID pandemic when in-person interactions were limited. The success of the trial during this challenging period was attributed to the preexisting connections as well as the relationships that had been previously established. This highlights the importance of these attributes (i.e., establishing contacts and relationships) in the success of such endeavors.

STEP 1: CADENA Planned Airway System Alternative (PASA) Routes

3.4 PASA Routes are established 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.). The implementation of PASA routes must be coordinated with the appropriate ANSPs through their Flow Management Units prior to use.

3.5 In October 2018, the PASA Database was established in response to the loss of an ANSP's surveillance capabilities and the closure of a large volume of airspace in the Caribbean region. This database became very handy during the pandemic when ATC-Zero events happened often. This database is updated quarterly and can be accessed on the CADENA OIS.

STEP 2: CADENA Planned Airway System Alternative End-to-End (PASA E2E) Routes

3.6 PASA E2E Routes are temporary routes requested by airlines/stakeholders on an ad hoc basis (i.e., when needed). PASA E2E Routes must be approved by all ANSPs through their Flow Management Units in which any segment of the route occurs. Airlines/stakeholders can submit these route requests via the CADENA OIS.

3.7 Notable examples of PASA 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 vaccines timely arrival and safe delivery in December 2020.

STEP 3: CADENA Trial User Preferred Routes (UPRs)

3.8 Trial UPRs [previously Optimized End-to-End Routes] are routes requested by the airlines that optimize the route between a specific city-pair. Trial UPRs must be approved by all ANSPs through their Flow Management Units, Area Control Center managers, or Civil Aviation Authorities, as applicable, in which any segment of the route occurs. Once a Trial UPR is approved, it will be available for a specified period of time (i.e., trial period) and a specific airline. The purpose of the route trials is to determine the operational feasibility of the routes and once the operational feasibility of the routes is verified, to have them published via AIC/AIP. After the States publish the route segments within their AIC/AIPs, those segments may be used by all airlines for any city pair until further notice.

3.9 Delta Airline's KATL (Atlanta, U.S.) to/from SPJC (Lima, Peru) Trial UPR was initiated in July 2021. Seven ANSPs including non-participating CADENA ANSPs were involved in the trial. The trial route was initially tested on a single leg and after it was determined to be operationally viable through follow up meetings, subsequent legs were added. ANSP and airline feedback was regularly solicited during the trial. UPR Trials continue today with increasingly longer durations of up to one-year without heavy coordination.

3.10 The estimated annual benefits from Delta Airlines' 90-day KATL to SPJC to KATL UPR Trial are a reduction of 2,089 flight minutes, a savings of 589,779 pounds of jet fuel, a reduction of 845,360 kilograms of CO₂, and a savings of \$384,033 US dollars. Many more Trial UPRs have been conducted to-date and they have each produced similar outcomes. CADENA continues to coordinate and conduct UPR Trials as requested by airlines successfully with undeniable quantitative benefits.

STEP 4: Strategic Direct Routing (SDR)

3.11 SDR allows users to plan a route using any named waypoints within a specified volume of airspace as long as the route complies with parameters set by the State. The parameters may include restrictions such as hours in which SDR rules apply, at or above altitude requirements, and maximum distance between waypoints. Users must file flights via authorized (i.e., published) routes to the entry and exit point at the boundaries of the SDR airspace volume; that is, the SDR system only applies inside the defined volume of airspace. SDR is considered to be a transition to the implementation of the FRA concept.

3.12 In February 2021, CANSO and IATA agreed to unify their respective initiatives, by combining the CADENA Optimized End-to-End Routes and IATA's Direct Routing Implementation for the LAC region. Both initiatives aim to optimize flight routes and by merging them, they can achieve a common goal with greater impact. Thus, the CANSO-IATA FRA (CIFRA) initiative was created for the LAC regional FRA. In November 2021, ICAO joined the project, resulting in the formation of CANSO-IATA-ICAO FRA (CIIFRA).

3.13 In November 2022, Servicios a la Navegacion en el Espacio Aereo Mexicano (SENEAM) initiated a SDR trial in the portion of their FIR where surveillance and communications were available. The SENAM SDR trial effective times are 0500Z-1100Z and apply to flights at or above FL290. SENEAM started the trial with 3 participating airlines and has incrementally increased to 9 participating airlines. The participating airlines may file any named waypoints within the SDR portion of the FIR as long as they are not more than 400 nautical miles apart.

STEP 5: Regional Free Route Airspace (FRA)

3.14 FRA is a specified volume of airspace within which users may freely plan a route between a defined entry point and a defined exit point with the possibility to route via intermediate (published or unpublished) waypoints without reference to the ATS route network subject to airspace availability. Within this airspace, flights remain subject to air traffic control. FRA enables airspace users to fly as

close as possible to what they consider the optimal trajectory without the constraints of a fixed route network structure (*from ASBU FRTO, Block 1, Element 1*).

3.15 The regional FRA will be achieved by ANSPs with its airspace designed to support DCT capability efficiently. The Latin America-Caribbean Region plan is to encourage the ANSPs in the region to obtain the appropriate capabilities to conduct SDR trials. Adjacent airspaces controlled by ANSPs that can support FRA will lead to the regional FRA.

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

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