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

CANSO, IATA, ICAO FREE ROUTE AIRSPACE (CIIFRA) INITIATIVE IN THE LATIN AMERICA AND CARIBBEAN (LAC) REGION

(Presented by CANSO)

EXECUTIVE SUMMARY

This paper presents the CANSO, IATA, ICAO Free Route Airspace (CIIFRA) initiative in the Latin America and Caribbean (LAC) region. The CIIFRA was initiated in November 2021 by CANSO, IATA, and ICAO. The purpose of CIIFRA is to optimize the LAC region airspace with the goal of implementing Free Route Airspace (FRA). The ICAO Global Air Navigation Plan (GANP) Aviation System Block Upgrade (ASBU) defines and provides guidance to achieve FRA in the Free Route Operation (FRTO) Element. The CIIFRA team has defined and taken steps towards FRA based on this guidance. This paper provides some background on CIIFRA and the progress that CIIFRA has made.

Action:	a) note the information presented in the paper; and b) discuss any relevant matters as appropriate.
Strategic Objectives:	• Strategic Objective 1 – Safety • Strategic Objective 2 – Air Navigation Capacity and Efficiency • Strategic Objective 4 – Economic Development of Air Transport • Strategic Objective 5 – Environmental Protection

1. Introduction

1.1 CANSO, IATA and ICAO initiated the CIIFRA initiative in the LAC region in November 2021. The purpose of CIIFRA is to optimize the LAC region airspace with the goal of implementing FRA.

1.2 CANSO, IATA and ICAO have a common goal of creating safe and efficient airspace. Even with common goals, it is often difficult to build cooperative relationships and make advancements. The CIIFRA team is pleased to see three major organizations in the aviation industry working together to achieve the common goal of implementing regional FRA.

2. BACKGROUND

CANSO ATFM Data Exchange Network for Americas (CADENA)

2.1 CADENA is the foundation of the CIIFRA initiative. With the roadmap to regional FRA already designed, the organizational structure (i.e., regional POCs) established and the coordination process already defined and operated by CADENA, the CIIFRA initiative had an advantageous beginning. The companion WP titled "CADENA Advancements" describes CADENA's accomplishments and contributions in more detail. The subsections below offer an abbreviated version.

2.2 CADENA was established in June 2016 to implement LAC regional ATFM. Prior to CADENA, the LAC region did not have regional ATFM in an organized manner. The first CADENA Regional Implementation Group (RIG) meeting was hosted by Cuba in August 2016 with nine ANSPs participating. As of March 16, 2023, 14 ANSPs, 3 states/territories, 26 airlines, and 8 international organizations are members of CADENA.

2.3 At the beginning, CADENA supported ANSPs in the building of their TMUs and provided guidance for the establishment of ATFM functions. CADENA prepared the CADENA Operational Procedures Manual based on ICAO DOC 9971 and tailored it for the LAC region. CADENA made multiple forms (e.g., contingency checklist) and templates (e.g., ATFM Daily Plan, AIC/AIP approval process) available to ensure a uniform and efficient operation. CADENA continues to offer many types of training including, annual hurricane training and quarterly contingency training.

2.4 CADENA operates under the policy of transparency, inclusiveness, and collaboration, supporting a multi-nodal regional ATFM/Collaborative Decision Making (CDM) framework. Information sharing and having a common situational awareness is very important among CADENA participants. CADENA launched the CADENA Operational Information System (OIS) in August 2017, which greatly improved regional information sharing and having a common situational awareness. Since then, the CADENA OIS has been enhanced multiple times and is offered globally -at no cost - through CANSO. Refer to the companion WP describing CANSO ATFM Data Exchange Network for Cooperative Excellence (CADENCE) for more details.

2.5 CADENA continues to operate and bring significant benefits to the LAC region. CADENA's success is based on a "step-by-step", and "simple-to-achieve solutions" approach to implement new capabilities. Most stakeholders can participate with the relative ease needing to only provide (1) a computer, (2) internet access, and (3) human resources. This approach supports ICAO's "No Country Left Behind" policy.

2.6 In October 2018, CADENA implemented its Planned Airway System Alternative (PASA) routes (i.e., contingency routes) and in August 2020, we added a PASA End-to-End (E2E) capability within the CADENA OIS. Together, these allow airlines to request temporary ad-hoc routes. CADENAs next step was to initiate PASA E2E Route Optimization Trials in July 2021. The purpose of these trials was to optimize the routes between specific city-pairs. The success of these trials indicated CADENA was ready for the next step in the roadmap towards regional FRA.

3. **CANSO IATA ICAO Free Route Airspace (CIIFRA) – Initiative**

Formation of CIIFRA Initiative

3.1 IATA Latin America (LAT) was promoting the regional FRA by recognizing the benefits to be realized in the region. In February 2021, CANSO/CADENA and IATA Latin America formed the CANSO and IATA (CIFRA) initiative to collaborate towards the implementation of FRA in the LAC region. In November 2021, the ICAO North America, Central American and Caribbean (NACC) office joined the effort, thus creating the CIIFRA initiative.

CIIFRA (via CADENA) Participation

3.2 The CIIFRA team hosts a weekly meeting with key members (e.g., the ICAO NACC Airspace Optimization TF Rapporteur, ANSPs leading certain projects, project-contributing airlines) participating. The CIIFRA meetings are both strategic and tactical. The meetings are practical and the status of the actions to be accomplished are reviewed and discussed. The CIIFRA team records the meeting minutes to ensure that action items are tracked until accomplished, and progress is captured.

3.3 ANSPs, airlines, and stakeholders directly and indirectly support the CIIFRA initiative. Table 3.4 below shows the list of CADENA participants. Some ICAO member states and territories are participating through the ANSPs that manages their upper airspace.

Table 3.4: List of CIIFRA (via CADENA) Participants

ICAO NACC Region (Yes for participation)			
YES	Antigua and Barbuda (via TTCAA)	YES	Guatemala (via COCESNA)
YES	Bahamas	YES	Haiti
YES	Barbados (via TTCAA)	YES	Honduras (via COCESNA)
YES	Belize (via COCESNA)	YES	Jamaica
YES	Canada	YES	Mexico
YES	Costa Rica (via COCESNA)	YES	Nicaragua (via COCESNA)
YES	Cuba	YES	Saint Kitts and Nevis (via TTCAA)
YES	Dominica (via TTCAA)	YES	Saint Lucia (via TTCAA)
YES	Dominican Republic	YES	Saint Vincent and the Grenadines (via TTCAA)
YES	El Salvador (via COCESNA)	YES	Trinidad and Tobago
YES	Grenada (via TTCAA)	YES	United States
YES	France: Guadeloupe, Martinique, Saint Barthélemy, Saint Martin, Saint Pierre et Miquelon (via TTCAA, via FAA)		
YES	Netherlands: Aruba, Curaçao, Sint Maarten, Bonaire, Saba, Sint Eustatius (via DC-ANSP, via TTCAA)		
YES	United Kingdom: Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Montserrat, Turks and Caicos Islands (via TTCAA, via JCAA)		
YES	United States: Puerto Rico, Virgin Islands (via FAA)		
ICAO SAM Region (Yes for participation)			
YES	Argentina		Panama
	Bolivia		Paraguay

	Brazil (Joined on February 2017 then left on July 2019)		Peru
	Chile		Suriname
YES	Colombia		Uruguay
YES	Ecuador	YES	Venezuela
	Guyana		
Note*	France: French Guiana (Note*: Centre National d'Études Spatiales participates)		
Airline Participants			
1. Aerolines Argentina	8. Azul Aerolines	15. JetBlue	22. UPS
2. AeroMexico	9. Caribbean Airlines	16. KLM	23. Viva Aerobus
3. Air Canada	10. Copa Air	17. Mesa Airlines	24. Viva Air
4. Alaska Airlines	11. Delta Airlines	18. Sky Airlines	25. Volaris
5. American Airlines	12. Emirate	19. Southwest	26. WestJet
6. Atlas Air	13. FedEx	20. Spirit Airlines	
7. Avianca	14. GOL	21. United Airlines	
International Organization and Stakeholder Participants			
ACI: Airports Council International			
CANSO: Civil Air Navigation Services Organization			
CARRG: Caribbean Aviation Resilience and Recovery Group			
CNES: Centre National d'Études Spatiales			
IATA: International Air Transport Association			
ICAO: International Civil Aviation Organization			
NBAA: National Business Aviation Association			

COCESNA: Corporación Centroamericana de Servicios de Navegación Aérea
DC-ANSP: Dutch Caribbean Air Navigation Service Provider
EANA: Empresa Argentina de Navegación Aérea
FAA: Federal Aviation Administration
JCAA: Jamaica Civil Aviation Authority
TTCAA: Trinidad and Tobago Civil Aviation Authority

Roadmap to LAC Regional FRA and Implementation Status

3.5 The five steps of the LAC regional FRA roadmap are:

- STEP 1: Identify CADENA Planned Airway System Alternative (PASA) Routes – Completed in October 2018.
- STEP 2: Identify CADENA Planned Airway System Alternative End-to-End Routes (PASA E2E) – Completed in August 2020
- STEP 3: CADENA Trial User Preferred Routes (Trial UPR) (Renamed from the CADENA PASA Optimized E2E Routes Trial to suit the CIIFRA initiative) – Initiated in July 2021. Fourteen trials have been completed so far (as of March 2023). These trials continue today based on airline requests.
- STEP 4: Strategic Direct Routing (SDR) – An SDR trial was initiated in November 2022, and the trial continues as of March 2023.

- STEP 5: Regional Free Route Airspace (FRA) – The approach to tackle this step will be discussed and defined in the future based on the SDR trial results.

DCT and FRA described in ASBU

3.6 ICAO's GANP (Doc 9750) consists of an 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). The LAC regional FRA efforts follows ICAO's guidance as described in the ASBU.

3.7 (*from ASBU FRTO, Block 0, Element 1)* DCTs are established with the aim of providing airspace users with additional flight planning route options on a larger scale across FIRs such that overall planned leg distances are reduced in comparison with the fixed route network. DCTs are established at national and regional levels and made available for flight planning (with published conditions of use). DCTs should be considered as an early iteration of the FRA concept. DCT operations allow airspace users to optimize flight and fuel planning.

3.8 (*from ASBU FRTO, Block 1, Element 1)* The FRA concept brings significant flight efficiency benefits and a choice of user preferred routes to airspace users. As a step to full trajectory-based operations, the FRA concept brings increased flight predictability, reduced uncertainty for the ATM network function, which in turn can lead to potential capacity increases for ATM, which will also benefit the user.

3.9 (from ASBU FRTO, Block 1, Element 1) FRA is a specified volume of airspace within which users may freely plan a route between a defined FIR boundary entry point and a defined exit point with the possibility to route via intermediate (published or unpublished) waypoints without reference to the fixed 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.

CIIFRA's Target - STEP 4: Strategic Direct Routing (SDR)

3.10 CIIFRA describes SDR as follows. SDR allows users to plan a route using named waypoints within a specified volume of airspace if 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.

3.11 In November 2022, Servicios a la Navegacion en el Espacio Aereo Mexicano (SENEAM) initiated an SDR trial in the portion of their FIR where surveillance and communications are available. The SENAM SDR trial effective times are 0600Z-1100Z and apply to flights at or above FL290. SENEAM started the trial with 3 participating airlines. The participating airlines may file any named waypoints within the SDR portion of the FIR as long as the filed waypoints are not more than 400 nautical miles apart.

3.12 The SENEAM SDR trial continues as of March 2023 and SENEAM reports no operational difficulties. Thanks to the smooth trial, SENEAM has expanded the trial scope by starting the trial time one hour earlier (from 0600Z-11000Z to 0500Z-1100Z) and has incrementally increased from 3 to 9 participating airlines.

3.13 Among the 9 airlines with permission to participate in the SENEAM SDR Trial, 5 airlines have provided benefits data as of March 2023. Some airlines have taken this opportunity to try out as many as 13 city pairs while some experiment with only 2 city pairs. According to the airline reported data, fuel savings ranges from approximately 10kg/year to over 200kg/year. CO2 savings are from approximately 34kg/year to near 675kg/year. Combining the result of all 5 participating airlines, there is an estimated annual savings of 500kg in fuel and 1.6Mkg in CO2.

3.14 The CIIFRA team is encouraging more airlines to participate in the SENEAM SDR trial. Emirates started to participate in the trial in February 2023. Two more airlines outside the LAC region are also considering participating. The CIIFRA team is also encouraging more ANSPs to volunteer to conduct SDR trials. A couple of ANSPs are analyzing their ATM systems and operations to determine the feasibility of becoming the next SDR trial ANSPs. Multiple SDRs will lead to the regional FRA.

— END —