CANSO

SHAPING OUR FUTURE SKIES

canso.org

CANSO OIS Platform and FRA/UPR Trials

For: The Africa-Indian Ocean (AFI) User Preferred Routes Trails Laboratory and AFI FRA PMT/5

By: CADENCE Task Force

Date: 22 October 2024

CANSO Africa Region

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FAA

Introduction

The CANSO Aviation Data Exchange Network for Cooperative Excellence Task Force (CADENCE TF) is the newest member of the OSC Operations Programmes.

Purpose of CADENCE TF

(CANSO Aviation Data Exchange Network for Cooperative Excellence)

The CADENCE TF is a strategic initiative designed to help develop, or enhance, a network for

operational coordination and **information sharing**

among air navigation service providers (ANSPs) and aviation stakeholders around the world

Background of CADENCE- CADENA

CANSO ATFM Data Exchange Network for the Americas

The capabilities offered by the CADENCE TF are based on the successful operational work accomplished by CADENA

- Fragmented airspaces
  - Multi-nodal ATFM operation
  - Most States need adjacent States to conduct effective ATFM
  - Collaboration is a must
- Many States are financially constrained
  - Difficult to make big financial investments
  - Difficult to make investment with low ROI to your organization
- Latin America had little ATFM operational experience in a collaborative manner prior to CADENA

Background of CADENCE - **CADENA**

Inclusiveness | **Transparency** | **Collaboration**

CADENA became operational quickly and all ANSPs can participate with a small investment

Aug 2016:	1st CADENA RIG Meeting
Dec 2016:	Weekly Ops Webex
Aug 2017:	CADENA OIS v1.0
Oct 2019:	Contingency Procedures
Jan 2023:	Twice-Weekly Ops Webex

- CADENA's success is based on the "**simple-to-achieve solutions**" and a "**do the best you can**" approach
- Can start with low investment

You only need:

1. Computer
2. Internet Access
3. Human Resource

CADENA Regional Stakeholders

ANSPs

- BANSA (Bahamas)
- COCESNA (Central America)
- CORPAC (Peru)
- EANA (Argentina)
- ECNA (Cuba)
- DC-ANSP (Curacao)
- DGAC (Ecuador)
- FAA (USA)
  - ZMA, SJU, ZHU, ATCSCC
  - Space Operations Office
- IDAC (Dominican Republic)
- INAC (Venezuela)
- JCAA (Jamaica)
- OFNAC (Haiti)
- SENEAM (Mexico)
- TTCAA (Trinidad & Tobago)
- UAEAC (Colombia)

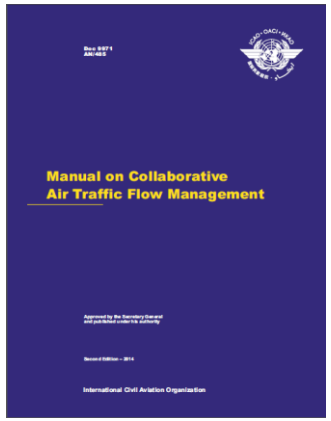
State/Territory/Group

- ANSA (Aruba)
- DGAC (Costa Rica)
- MWCR (Cayman Islands)
- TNCM (Sint Maarten)
- CNES (France)
- CARRG (Caribbean Aviation Resilience and Recovery Group)

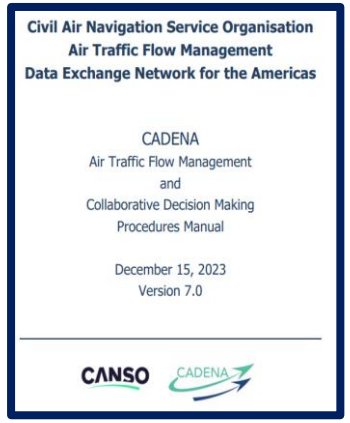
Background of CADENCE - **CADENA**

Procedures and Communications

In Concert with ICAO



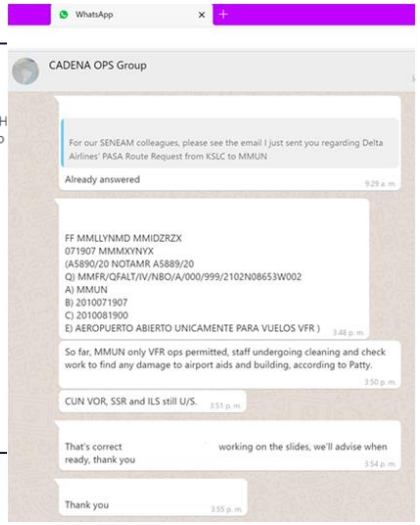
ICAO Doc 9971



CADENA Proc. Manual

Email

Chat



Contingency Management

- 15 Contingency Events Check List
- ANSP Contingency Form
- ANSP Info Sharing Slide Template
- CADENA OIS – Advisory
- Ad Hoc Web Conference
- Contingency Training

Web Conference

GoToMeeting

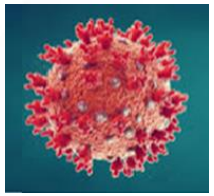
Microsoft Teams

zoom

CANSO OIS

Background of **CADENCE** - **CADENA**




- CADENA has proven the CADENA OIS web application is an effective means to exchange operational information
- The value of information exchange and collaboration is most recognized during contingency / irregular operations
  - ➢ Reduced: MIT, CO2, and airlines' operating costs

CADENCE TF

Past Involvement of AFRICA Region

Focused on regional ATFM and Contingency Management

- CANSO Mombasa ATFM Roadmap (Sep 2018)
- Introduction of the CADENCE OIS in Africa (Aug 2021)
- CADENCE OIS Demonstration for Africa (May 2022)
  - Volcanic Ash Contingency Event CADENCE OIS Demonstration - Mount Nyiragongo eruption scenario
  - Earthquake Contingency Event CADENCE OIS Demonstration - Cairo earthquake scenario
- ICAO Workshop – Introduction to ATFM (July 2024)

CADENCE TF

Past Involvement of AFRICA FRA/UPR

Focused on the CADENA's regional FRA implementation efforts

- Introduction of the CADENA/CADENCE and FRA Trials for ICAO Africa FRA Project Management Team (Feb 2023)
- Free Route Airspace/User Preferred Route (FRA/UPR) Trial – Kick-off Workshop (Nov 2023)

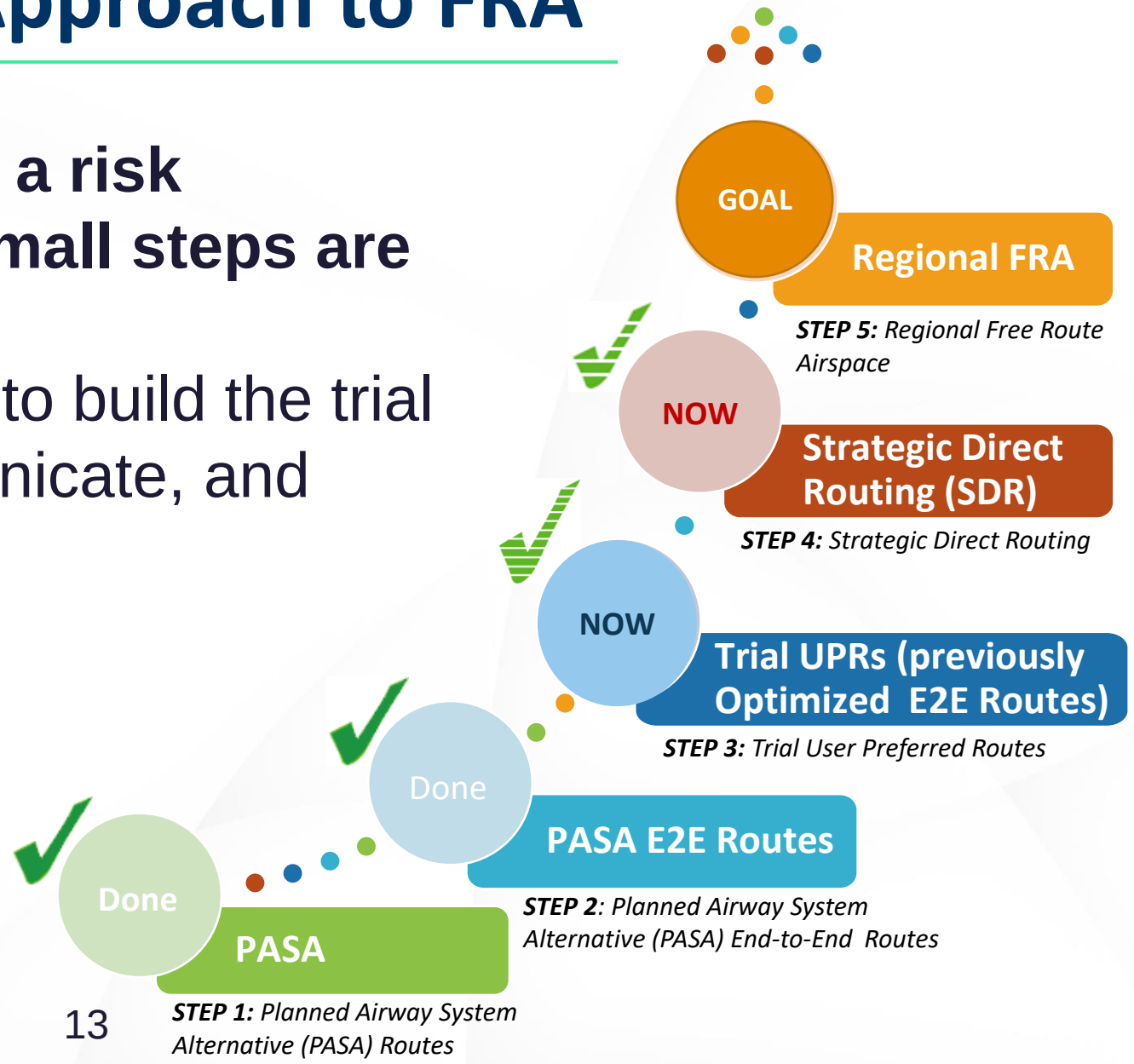
Free Routing Airspace in Africa inches closer to reality with trial flights kicking off on 2nd November 2023

Posted on 03/11/2023 by African Airlines Association

CADENA's Step by Step Approach to FRA

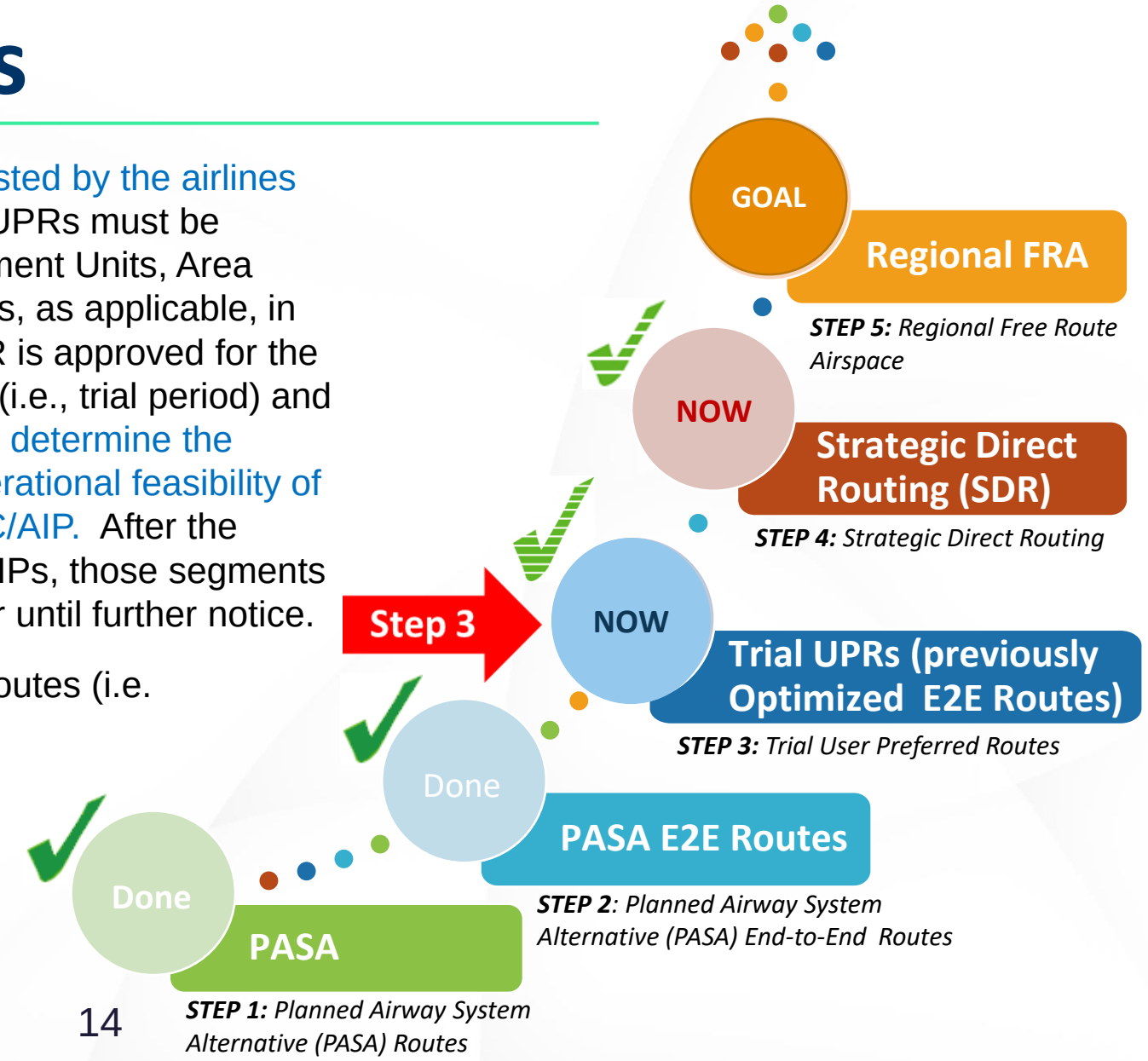
The Step-by-Step approach is a risk mitigation approach. When small steps are taken:

- Easy to set up the trial (easy to build the trial scenario, coordinate, communicate, and collaborate)
- Easy to identify an issue
- Easy to address the issue
- Easy to halt the trial
- Easy to expand the trial



CADENA's Step by Step Approach to FRA: Step 3 Trial UPRs

- **Trial User Preferred Routes (UPR)** - Routes requested by the airlines that optimize the route between a specific city-pair. 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 UPR is approved for the trial, 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 aircraft operators for any city pair until further notice.
- Trial UPRs mitigate risk associated with optimizing routes (i.e. transitioning to direct routes).
- The risk associated with the development of Trial UPRs is mitigated by coordinating with each ANSP and by starting with short trial periods (e.g., one leg, then round trip, then one week etc.)

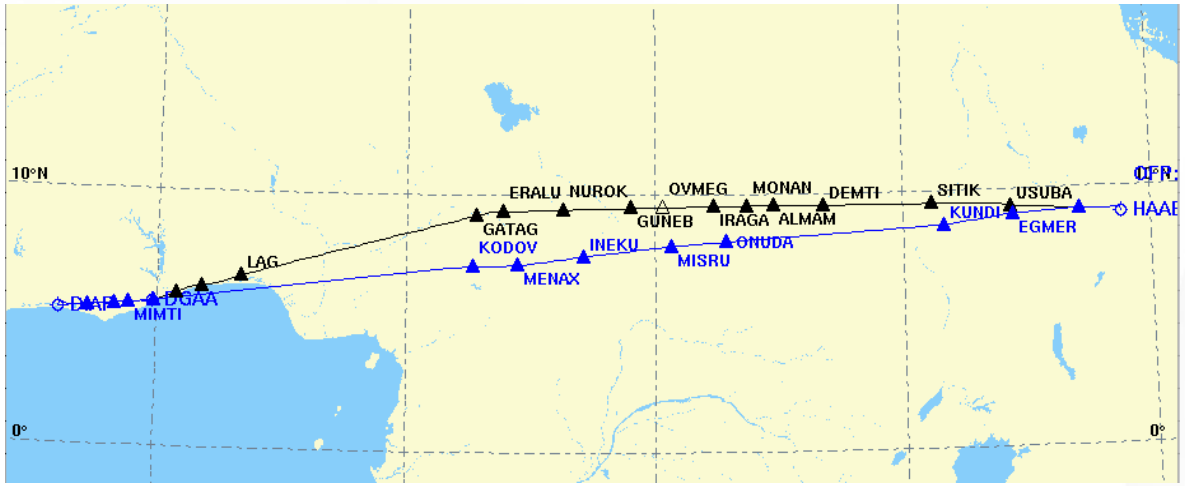


Savings - What to Expect

Important to know your accomplishments in terms of:

- CO2 Savings
- Monetary Savings

Example: ADD-ABJ



Airline will collect data:

- Baseline (ATS RTE in this example)
- UPR Trial (DCT RTE in this example)

TRIP FUEL IN KGs		TRIP TIME		SAVING	
ATS RTE	DCT RTE	ATS RTE	DCT RTE	FUEL (KGs)	TIME (Mins)
37,100	36,600	5:42	5:37	500	0:05

Example: Data Collection and Validation

Step 2: Enter ATS and DCT data

Step 3: Estimate savings

	TRIP FUEL IN KGs		TRIP TIME		SAVING				
Date	ATS RTE	DCT RTE	ATS RTE	DCT RTE	FUEL (KG)	TIME (Min)	CO2 (KG)	COST (US$)	Valid
1-Nov	37,100	36,600	5:42	5:37	500	5	1580	$ 815.00	1
2-Nov	37,100	36,000	5:42	5:35	1,100	7	3476	$ 1,513.00	1
3-Nov	37,100	35,900	5:42	5:40	1,200	2	3792	$ 1,256.00	1
4-Nov	37,100	38,000	5:42	5:59	-900	-17	-2844	$ (2,027.00)	0
5-Nov	37,100	36,200	5:42	5:37	900	5	2844	$ 1,187.00	1
6-Nov	37,100	35,700	5:42	5:36	1,400	6	4424	$ 1,722.00	1
7-Nov	37,100	37,000	5:42	5:38	100	4	316	$ 373.00	1

	3.16	Fuel kg to CO2 kg conversion factor
$	0.93	Fuel cost per kg
$	70.00	Operational cost per min

Step 1: Enter parameters

Step 4: Validate data

Step 5: Enter validation results

(ATS RTE fuel) – (DCT RTE fuel)
(ATS RTE min) – (DCT RTE min)
(saved fuel) * (fuel to CO2 conversion factor)
(saved fuel) * (fuel cost per kg) + (saved min) * (op cost per min)

Example: Benefit Calculation

	TRIP FUEL IN KGs		TRIP TIME		SAVING				
Date	ATS RTE	DCT RTE	ATS RTE	DCT RTE	FUEL (KG)	TIME (Min)	CO2 (KG)	COST (US$)	Valid
1-Nov	37,100	36,600	5:42	5:37	500	5	1580	$ 815	1
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3-Nov	37,100	35,900	5:42	5:40	1,200	2	3792	$ 1,256	1
4-Nov	37,100	38,000	5:42	5:59	N/A	N/A	N/A	N/A	0
5-Nov	37,100	36,200	5:42	5:37	900	5	2844	$ 1,187	1
6-Nov	37,100	35,700	5:42	5:36	1,400	6	4424	$ 1,722	1
7-Nov	37,100	37,000	5:42	5:38	100	4	316	$ 373	1
				Total	**5,200**	**29**	**16432**	**$ 6,866**	**6**

Step 6: Calculate total

Step 7: Calculate "Saving per Flight"

SAVING PER FLIGHT			
FUEL (KG)	TIME (Min)	CO2 (KG)	COST (US$)
867	5	2739	$ 1,144

Step 9: Calculate "Saving per Year"

SAVING PER YEAR			
FUEL (KG)	TIME (Min)	CO2 (KG)	COST (US$)
271,143	1,512	856,811	358,013

Step 8: Calculate anural rate parameter

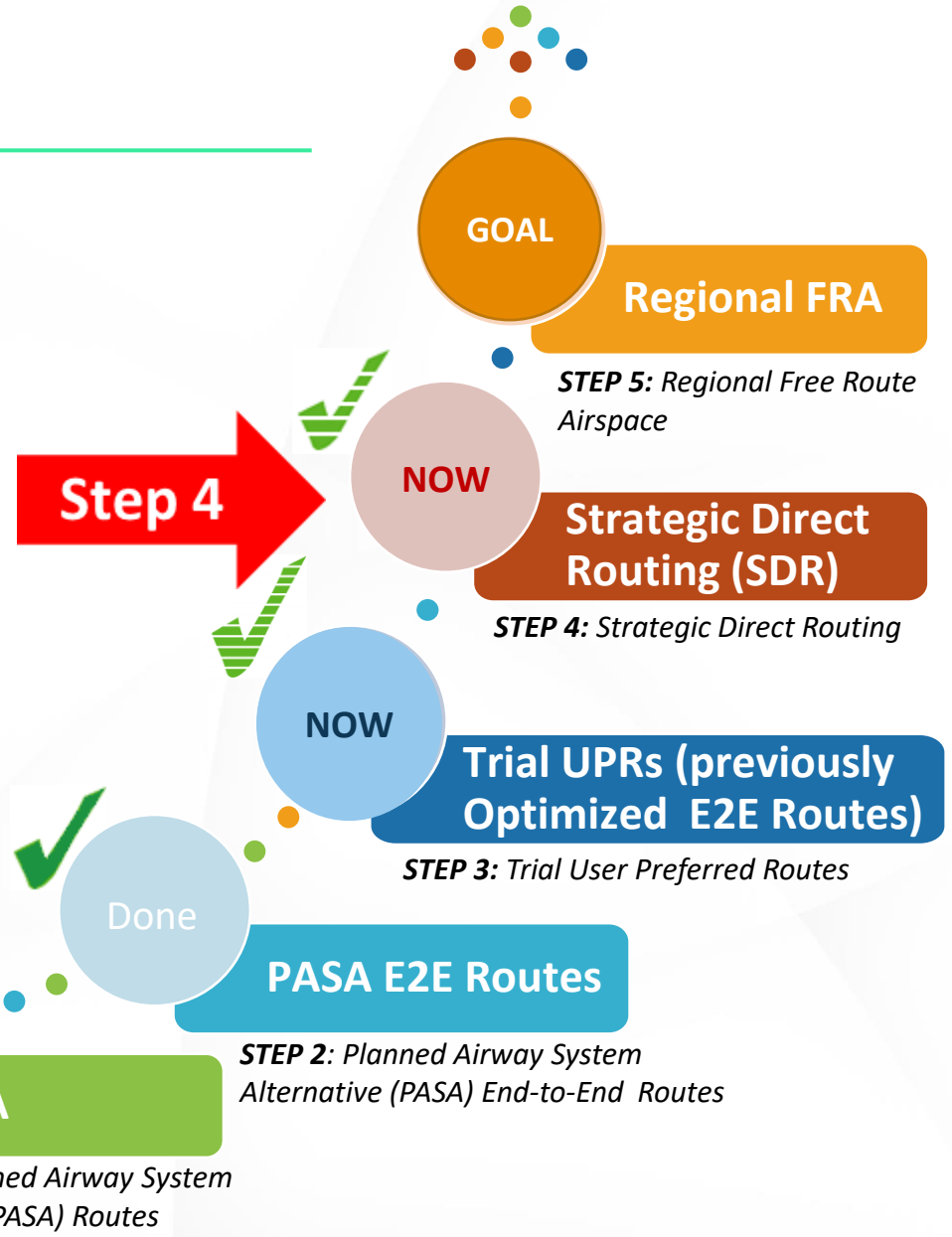
	365	days/year
	7	days data
Parameter	52.14	

Summary of CADENA UPR Trial Benefits

	As of May 09, 2024			1-Year			
		City Pairs		Time (min)	Fuel (kg)	CO2 (kg)	Cost (USD)
1	Jul 9 - Oct 6, 2021	KATL↔SPJC	DAL	2,089	267,520	845,360	384,033
2	Jul 27 - Oct 25, 2021	KATL↔SBGR	DAL	1,175	140,693	444,590	209,625
3	Aug 6 - Nov 3, 2021	TTPP↔KMIA	BWA	1,038	86,055	271,934	160,170
4	Sep 1 - Nov 27, 2021	KIAH↔MMPR	UAL	2,263	97,204	307,168	296,027
6	Dec 6, 2021 - Mar 5, 2022	SAEZ↔KMIA	ARG	1,115	118,970	375,944	209,420
7	Use DAL KATL<->SPJC	KMIA↔SPJC	AAL	2,089	267,520	845,360	384,033
8	Aug 29 - Noc 27, 2022	MMUN→SAEZ	ARG	410	46,939	148,327	106,347
9	Oct 20, 2022 - Jan 31, 2023	SKBO→KATL	DAL	1,818	243,288	768,789	380,250
10	Nov 25 - Dec 25, 2022	MPTO→KLAX	CMP	1,166	40,723	128,684	149,782
11	Dec 1, 2022 - Feb 28, 2023	KATL↔SAEZ	DAL	3,297	657,546	2,077,844	866,083
12	Dec 1, 2022 - Feb 28, 2023	KATL↔SCEL	DAL	2,977	434,709	1,373,681	652,274
13	Feb 23-May 23, 2023	KIAH↔MMSD	UAL	10,038	439,326	1,388,272	833,113
14	May 3 -Aug 31, 2023	SKBO→KJFK	DAL	1,056	119,407	377,325	203,019
15	Sep 1 - Dec 31, 2023	KATL↔MMMY	DAL	1,445	87,758	277,317	216,089
16	Dec 22, 2023 -Mar 31, 2024	KATL↔SKCG	DAL	1,883	126,676	400,295	291,612
			TOTAL	**33,858**	**3,174,333**	**10,030,891**	**5,341,877**
	Note: the 5th Trial not included due to the duplicate city pair, KATL↔SAEZ.						

CADENA's Step by Step Approach to FRA: Step 4 SDR

- **Strategic Direct Routing (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 Free Route Airspace (FRA) concept.
- SDR risk is mitigated by limiting the number or participating airlines and the hours of the trial. Also, operational feedback is reviewed weekly.



CADENA's Step by Step Approach to FRA

SENEAM initiated the SDR trial

TIME:
0600Z - 1200Z

AIR SPACE:
At or above FL290, within the MÉXICO FIR, except on the portion within: 212045N 1103420W, 135242N 0964242W, 143200N 0921300W, 130000N 0950000W, 121357N 0973611W, 113000N 1000000W, 150000N 1050000W, 152008N 1051656W, 161100N 1060000W, 181326N 1074545W.

RULES:
The Strategic Direct Routing (SDR) is established in the MÉXICO FIR, as a Direct Route (DCT) inserted in the flight plans, using published fixes, waypoints and navaids, with the purpose of planning more efficient routes. The FPL using SDR can be applied using the next procedures:

Table 2 of semicircular cruising IFR altitudes must be applied (AIP ENR 1.3-2).
Flight Plan must be filed using published fixes, waypoints or navaids.
The distance between such waypoints, fixes and navaids inserted in the flight plan will be no greater than 400 NM (or 60 minutes flight).
The flight plan will include a significative fix, waypoint or navaid in the limits of the MÉXICO FIR.
Flight plans involving departures from airports within the MÉXICO FIR, must include the last point of the appropiate SID.
Flight plans involving arrivals to airports within the MÉXICO FIR, must include the first point of the appropiate STAR.
For airports with no published STAR, fixes, waypoints or navaids to join the published routes must be included, at a distance of no less than 50NM from the destination airport.

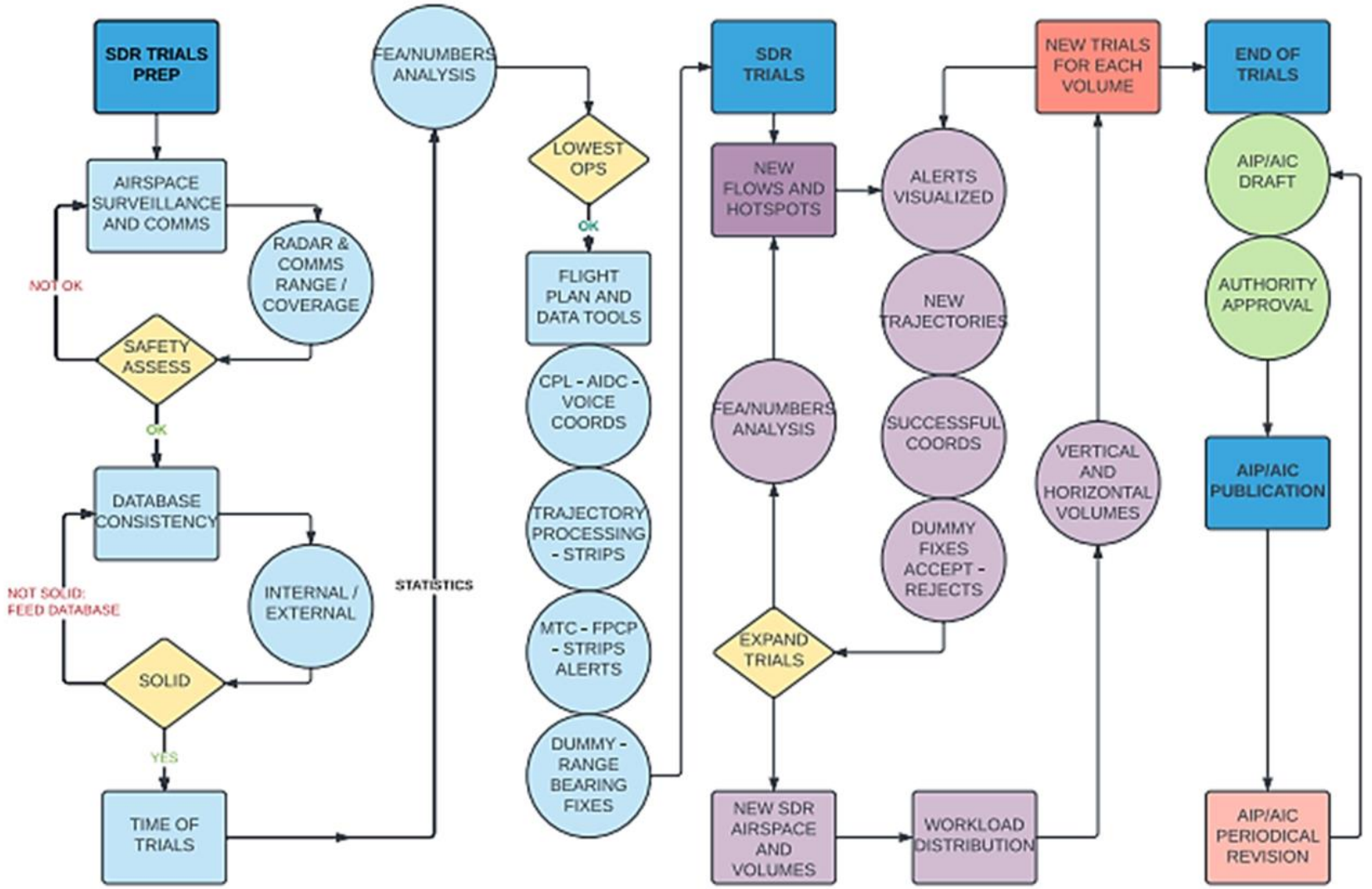
Start Simple

- Time Restriction
- Flight Level Restriction
- Participating Airline Restriction

As of 07/23/2024				
1-yr Estimate	Time (min)	Fuel (kg)	CO2 (kg)	Cost ($)
AeroMexico	1,168	51,157	161,655	$ 158,749
Delta	517	51,586	163,012	$ 93,805
Emirates	63	11,261	35,584	$ 15,507
FedEx	3,136	323,796	1,023,194	$ 579,142
United	1,626	178,122	562,865	$ 278,298
VivaAerobus	4,998	216,186	683,148	$ 677,073
Volaris	46,407	1,693,566	5,351,667	$ 6,029,457
Total	**57,915**	**2,525,674**	**7,981,125**	**$ 7,832,031**

CADENA's Step by Step Approach to FRA

SENEAM SDR trial process



Inter FIR SDR/FRA Trial: SENEAM and COCESNA

- Testing ATM system compatibility
  - SENEAM/Thales and COCESNA/Indra
- Trial Condition
  - Between MMID and CENAMER FIRs
  - 0400-1200UTC
  - At or above FL290
  - AAL, DAL, UAL, and Aero Mexico

Benefit Information (dated May 2024)

- United Airlines - 60-day data collected
- For UAL855, use "RADIM DCT TEXUP DCT TIRNA DCT CPE"
- For UAL818, use "RADIM DCT URPOS DCT APMEL/N0480F380 DCT DUTNA

1-year Estimate	Time (min)	Fuel (kg)	CO2 (kg)	Cost ($)
SAEZ→KIAH UAL818	1,236	126,371	399,334	226,753
SPJC→KIAH UAL855	1,024	68,334	215,936	158,199
Total	**2,261**	**194,706**	**615,270**	**384,952**

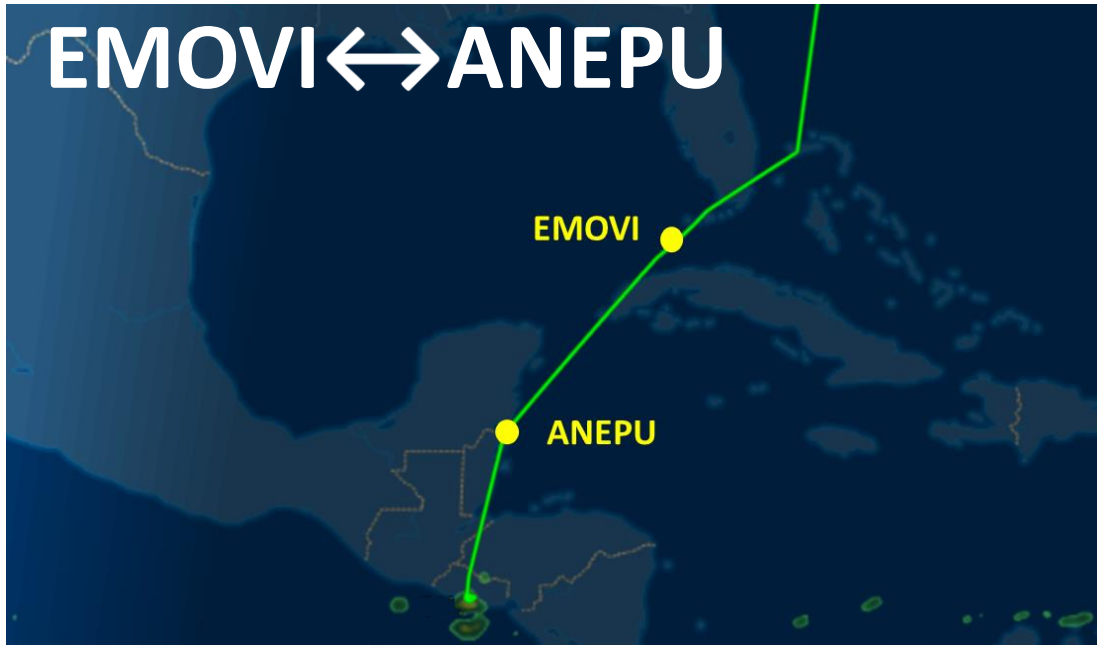
CADENA's Step by Step Approach to FRA

Inter FIR DCT Trial: SENEAM and ECNA

- EMOVI in Cuba and ANEPU in Mexico
- 8.5 NN shorter than baseline

Benefit Information is based on modeled savings and actual usage count

EMOVI DCT ANEPU or EMOVI DCT ANEPU			As of 05/09/2024	
1-yr Estimate	Time (min)	Fuel (kg)	CO2 (kg)	Cost (USD)
Total	**491**	**17,254**	**54,400**	**61,200**



Gen Schnee, Chief Dispatcher – Aeronautical Services, United Airlines

"The savings are much smaller than what you are used to seeing but please also highlight the ability to trial UPR when potential constraint in certain airspace exist, the airlines maybe able to help to mitigate or deconflict, and also save a little."

Delta Airlines SDR Trial

- Delta is moving away from UPR Trial and moving towards SDR Trial
- Delta system stores DCT data and connects the most economically optimized route

DELTA

Duration	City Pairs	Time (min)	Fuel (kg)	CO2 (kg)	Cost ($)
Aug 12, 2024-Sept 30, 2024	KATL→SKBO	1,139	93,489	295,426	190,140
Aug 12, 2024-Sept 30, 2024	KJFK→SKBO	2,402	141,899	448,402	355,919
	Total	**3,541**	**235,389**	**743,828**	**546,059**

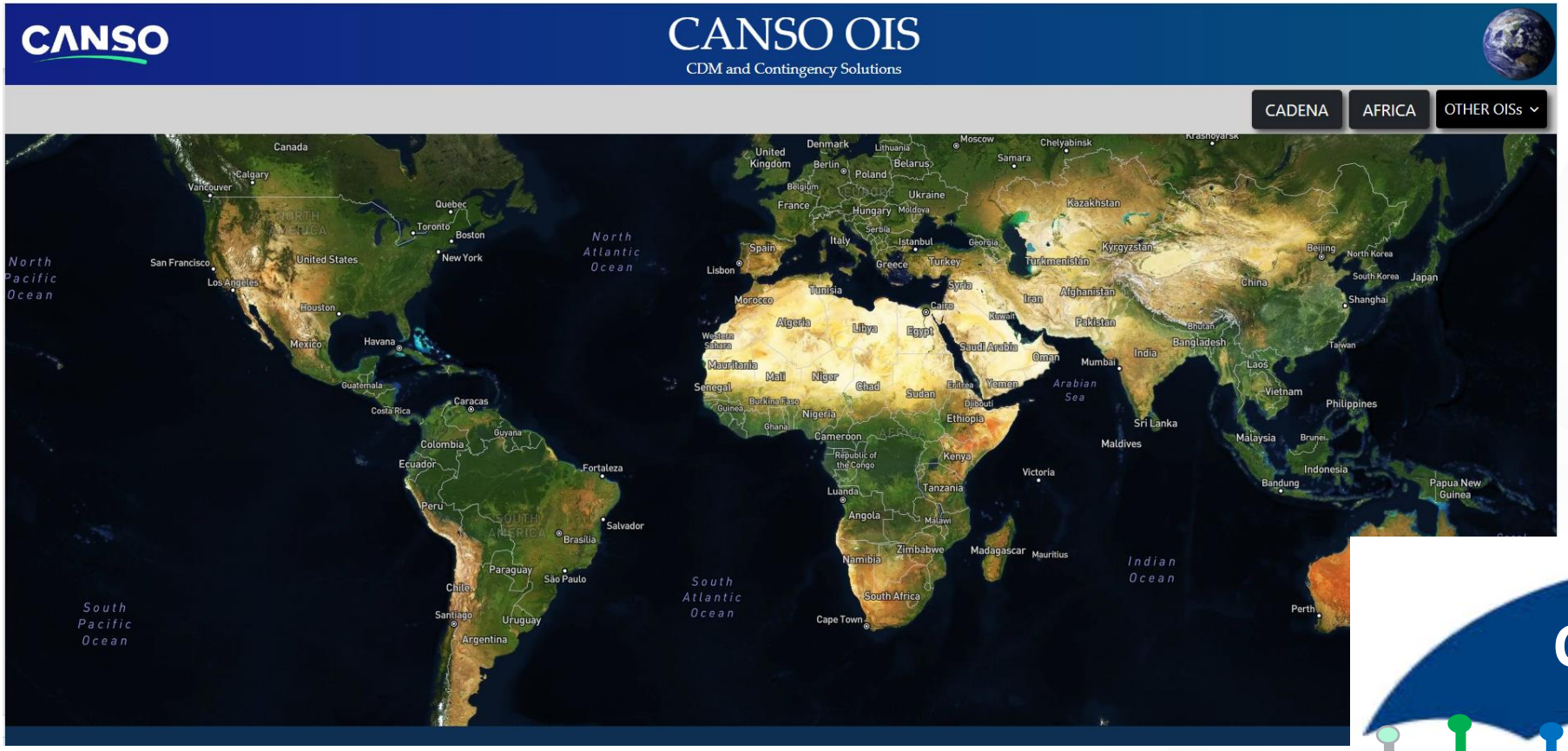
Background of CADENCE
LOA between CGH Technologies and CANSO

CANSO and CGH Technologies virtually signed CADENCE LOA on March 22, 2021

- CGH Technologies built the CADENA OIS under the contract with the FAA.
- CADENA OIS technology has been transferred from the FAA to CGH Technologies.

- The agreement secures the provision of a purpose-built collaborative software platform based on the successful regional initiative, CADENA.
- The CADENCE OIS version will be updated when the CADENA OIS version is updated.
- The baseline CADENCE OIS is offered at no cost to regions and functional groups for 20 years.
- CGH Technologies will support the CADENCE OIS for 20 years.

CANSO OIS


CANSO
CANSO OIS
CDM and Contingency Solutions
CADENA
AFRICA
OTHER OISs
Canada
Calgary
Vancouver
Quebec
Toronto
Boston
New York
United States
San Francisco
Los Angeles
Houston
Mexico
Havana
Guatemala
Costa Rica
Caracas
Colombia
Guyana
Ecuador
Fortaleza
Peru
Salvador
Brasilia
Paraguay
São Paulo
Chile
Santiago
Uruguay
Argentina
North Pacific Ocean
North Atlantic Ocean
South Pacific Ocean
South Atlantic Ocean
Indian Ocean
Arabian Sea
United Kingdom
Denmark
Lithuania
Moscow
Chelyabinsk
Samara
Berlin
Belarus
Poland
Belgium
France
Ukraine
Hungary
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Turkey
Turkmenistan
Beijing
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South Korea
Japan
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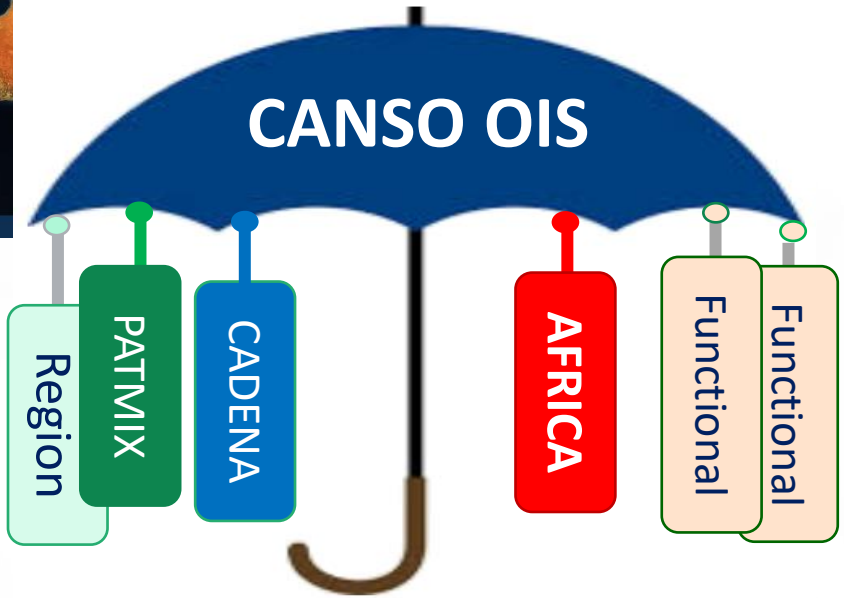
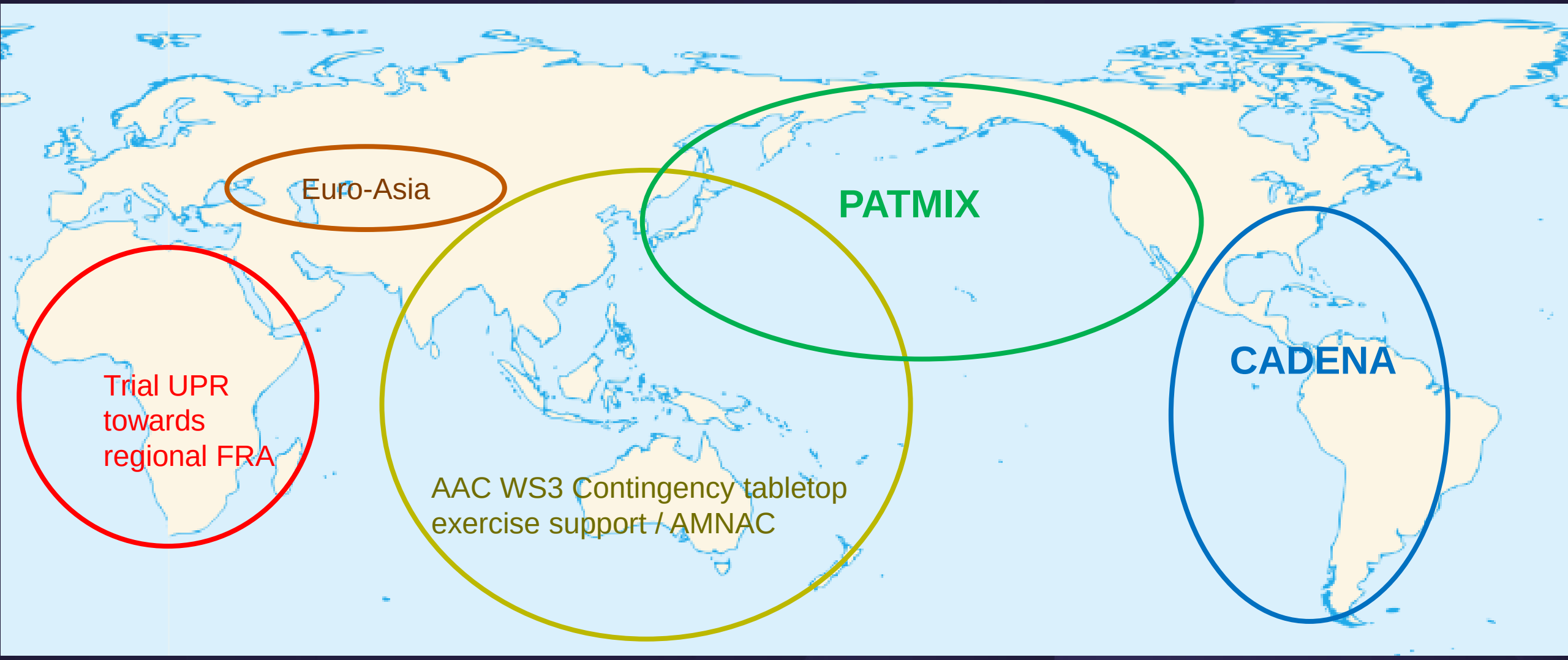
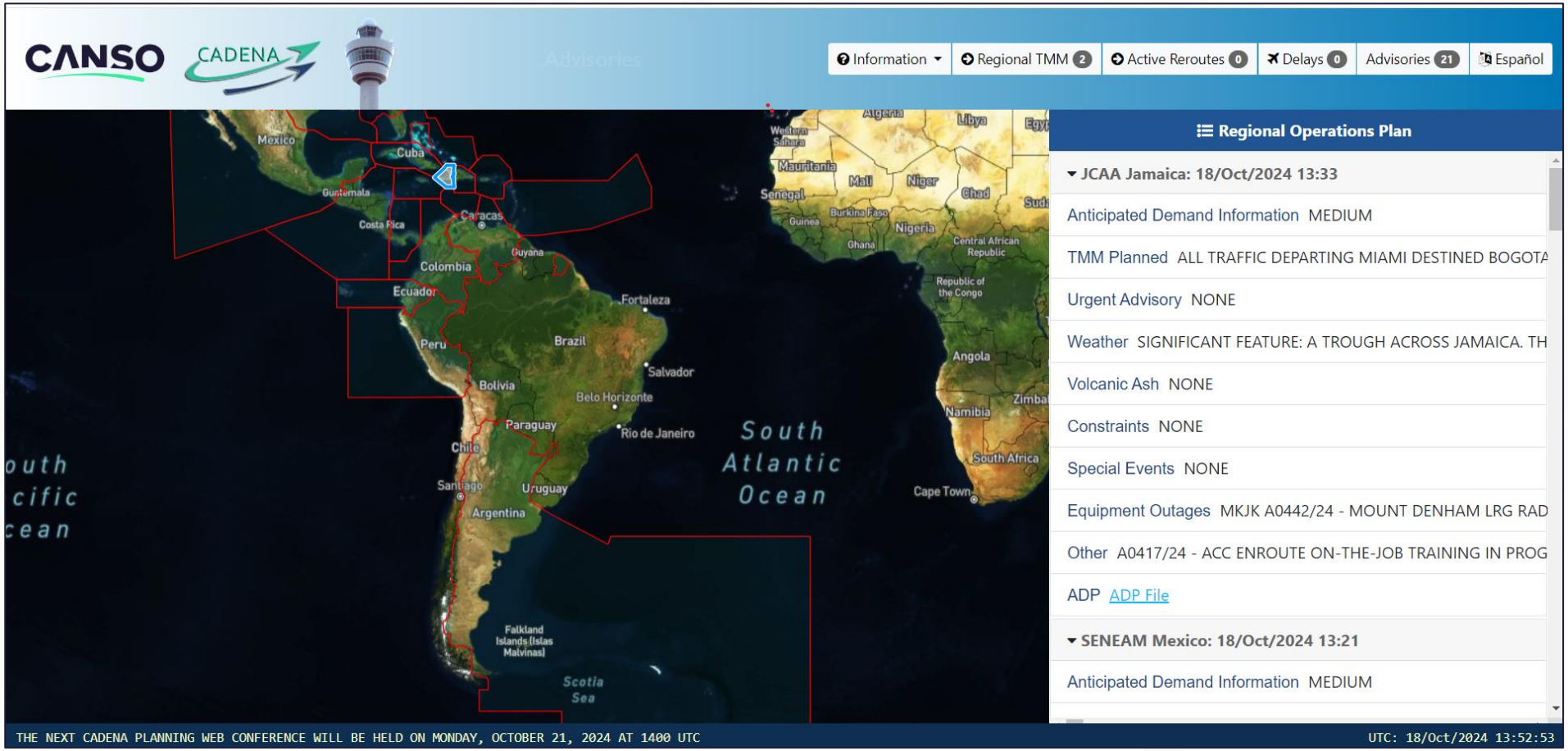
Syria
China
Shanghai
Tunisia
Iran
Afghanistan
Morocco
Cairo
Kuwait
Pakistan
Algeria
Libya
Egypt
Bhutan
Bangladesh
Taiwan
Western Sahara
Saudi Arabia
Oman
India
Mumbai
Laos
Mauritania
Mali
Niger
Chad
Sudan
Eritrea
Yemen
Vietnam
Philippines
Senegal
Djibouti
Ethiopia
Sri Lanka
Nigeria
Cameroon
Maldives
Malaysia
Brunei
Republic of the Congo
Kenya
Victoria
Indonesia
Bandung
Papua New Guinea
Luanda
Tanzania
Angola
Malawi
Zimbabwe
Madagascar
Mauritius
Namibia
South Africa
Cape Town
Perth


CANSO OIS
Region
PATMIX
CADENA
AFRICA
Functional
Functional

Current CADENCE TF Efforts



CADENA OIS



https://www.cadenaois.org Public domain for read only. Member domain to read and upload information.

Exchange:

- MS documents (Word, PPT, Excel)
- Text, pdf, and picture

Enter:

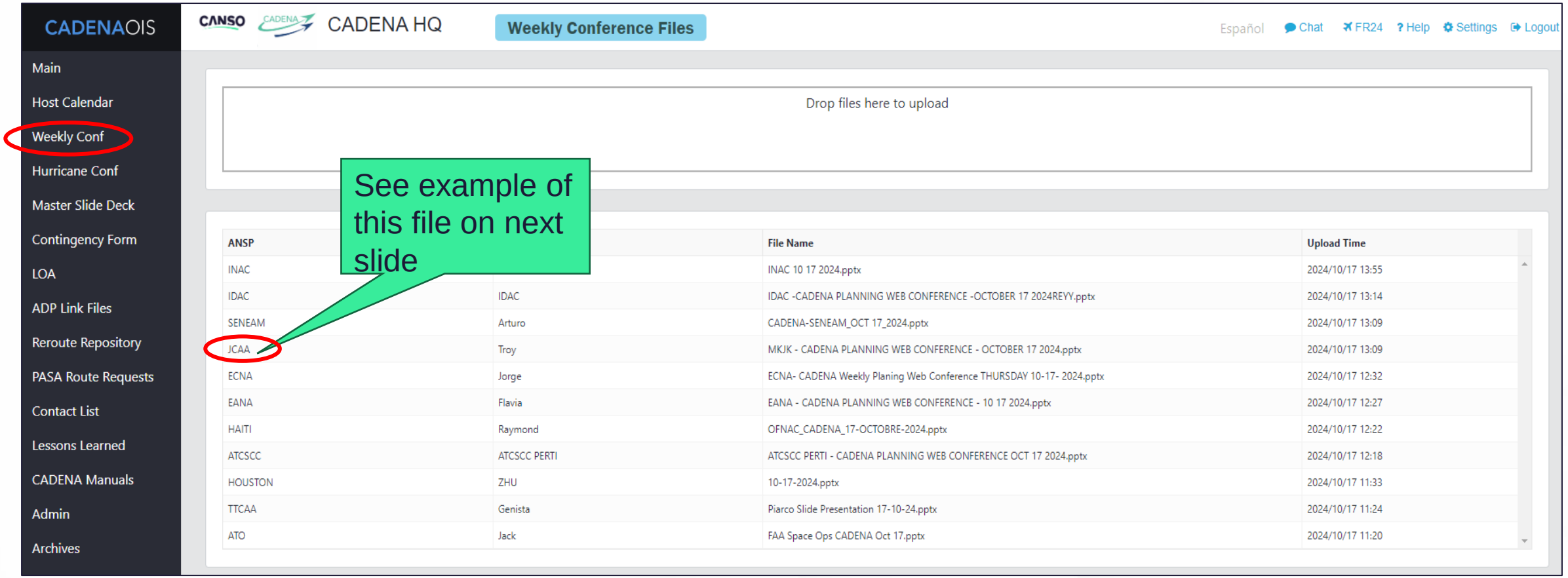
- ATM Solutions
- Advisories/Notices
- Airport delay
- ATFM Daily Plan
- Calendars
- PASA Route Request
- Chat

Store:

- Routes (PASA, UPR)
- Forms (Contingency)
- Capacity info (Airport/Airspace)
- Documents

CADENA OIS Usage: Web Planning Conference

- ANSPs upload their slides to the CADENA OIS
- CADENA HQ downloads the ANSP slides and creates a Host Master slide deck for the Web Planning Conference



CADENA OIS Usage: Web Planning Conference

Example Web Planning Conference ANSP Information

Jamaica Civil Aviation Authority

"Committed to the Safe and Orderly Development of Aviation in Jamaica"

CADENA

MKJK – OCTOBER 17, 2024.

Airport/Airspace Constraints (Equipment Outages/Significant NOTAMS/Special Events)	Significant Wx	Other
TMMS: **MKJK** • **AIC 02/23 : KMIA => SKBO OFFLOAD** **OUTAGES: MKJP & MKJS** • **A0403/24** - SIMPLE APCH LIGHTING SYSTEM RWY 30 U/S DUE MAINT. 19 SEP 13:15 2024 UNTIL 15 NOV 22:00 2024. • **A0414/24** - IMLY ILS/DME RWY 12 (109.100MHZ) U/S. 26 SEP 23:12 2024 UNTIL 15 NOV 23:59 2024. • **AIP SUPP 15/24** – ILS/DME (ISIA) 109.500MHz US. 01 SEPTEMBER 2024 AT 0000 UTC – 31 DECEMBER 2025 AT 2359 UTC. VOR/DME (RWY 07) & RNP RWY O7/25 APPs AVAIL.	**JAMAICA** AREA OF LOW PRESSURE IN SW CARIBBEAN. UNSTABLE WX CONDITIONS IN THE KFIR EXPECTED. **GRAND CAYMAN TMA** TROPICAL WAVE + AREA OF LOW PRESSURE EXPECTED TO CAUSE HEAVY SHWRS & TS	**A0417/24** - ACC ENROUTE ON-THE-JOB TRAINING IN PROGRESS. EXPECT ATS IN ACCORDANCE WITH A TRAINING ENVIRONMENT. 27 SEP 16:37 2024 UNTIL 24 DEC 23:59 2024.

CADENA OIS Usage: Web Planning Conference

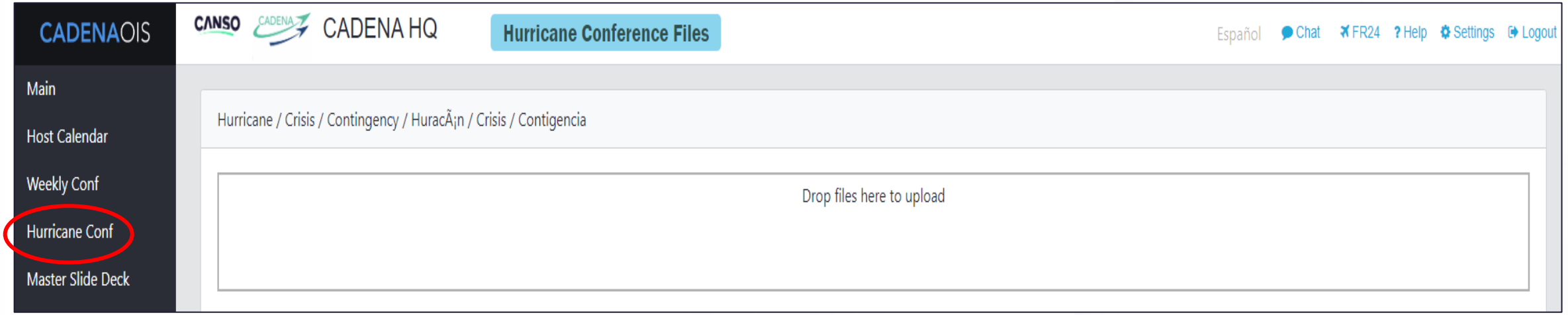
Sample Web Planning Conference Master Slide Deck

Once CADENA HQ combines all ANSP slides, they create a Master Host PPT which contains all of the region's slides. This Master slide deck is used during the twice weekly Web Planning Conference

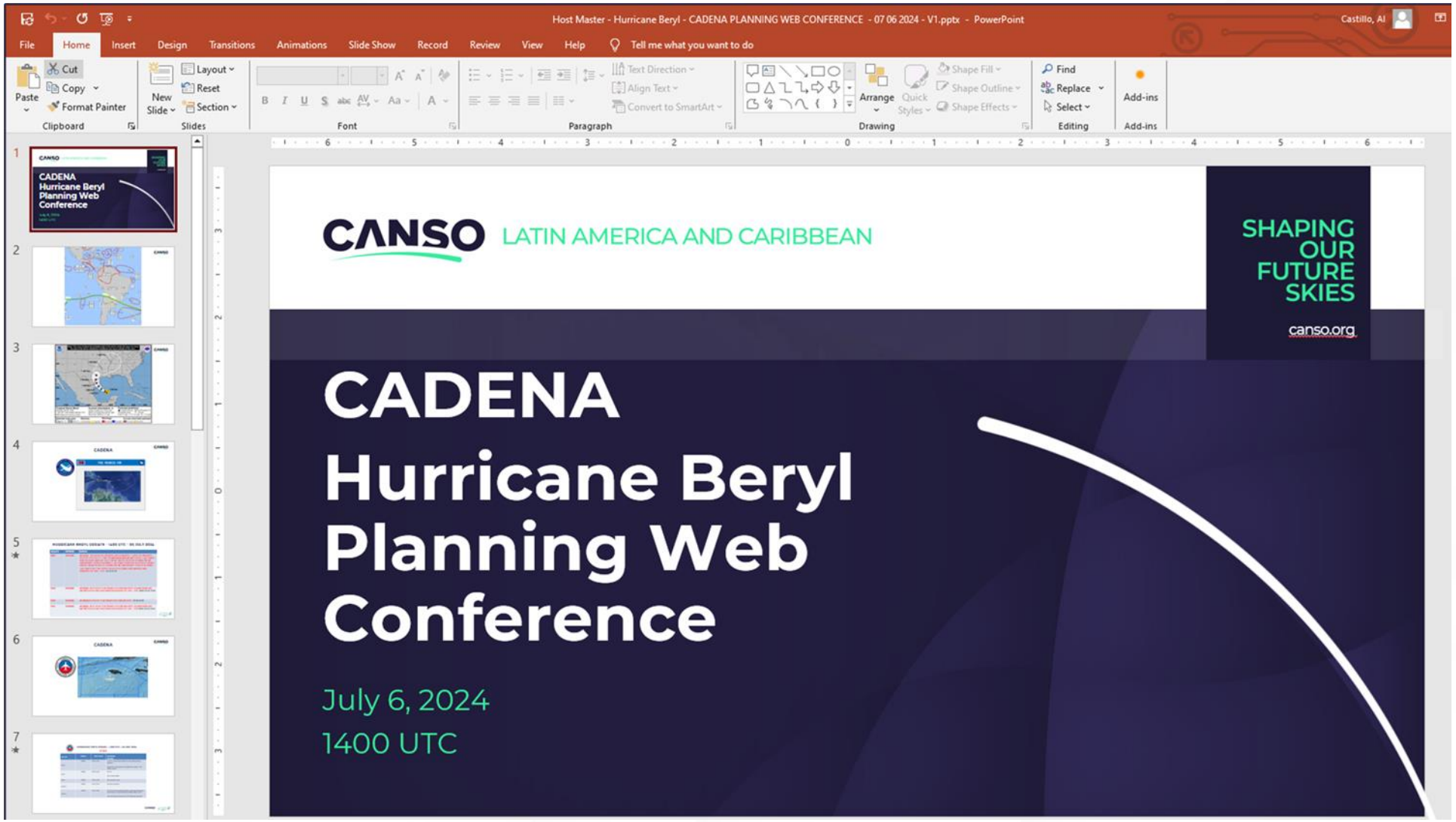
The Master slide deck is accessible by the public

CADENA OIS Usage: Hurricane (Contingency)

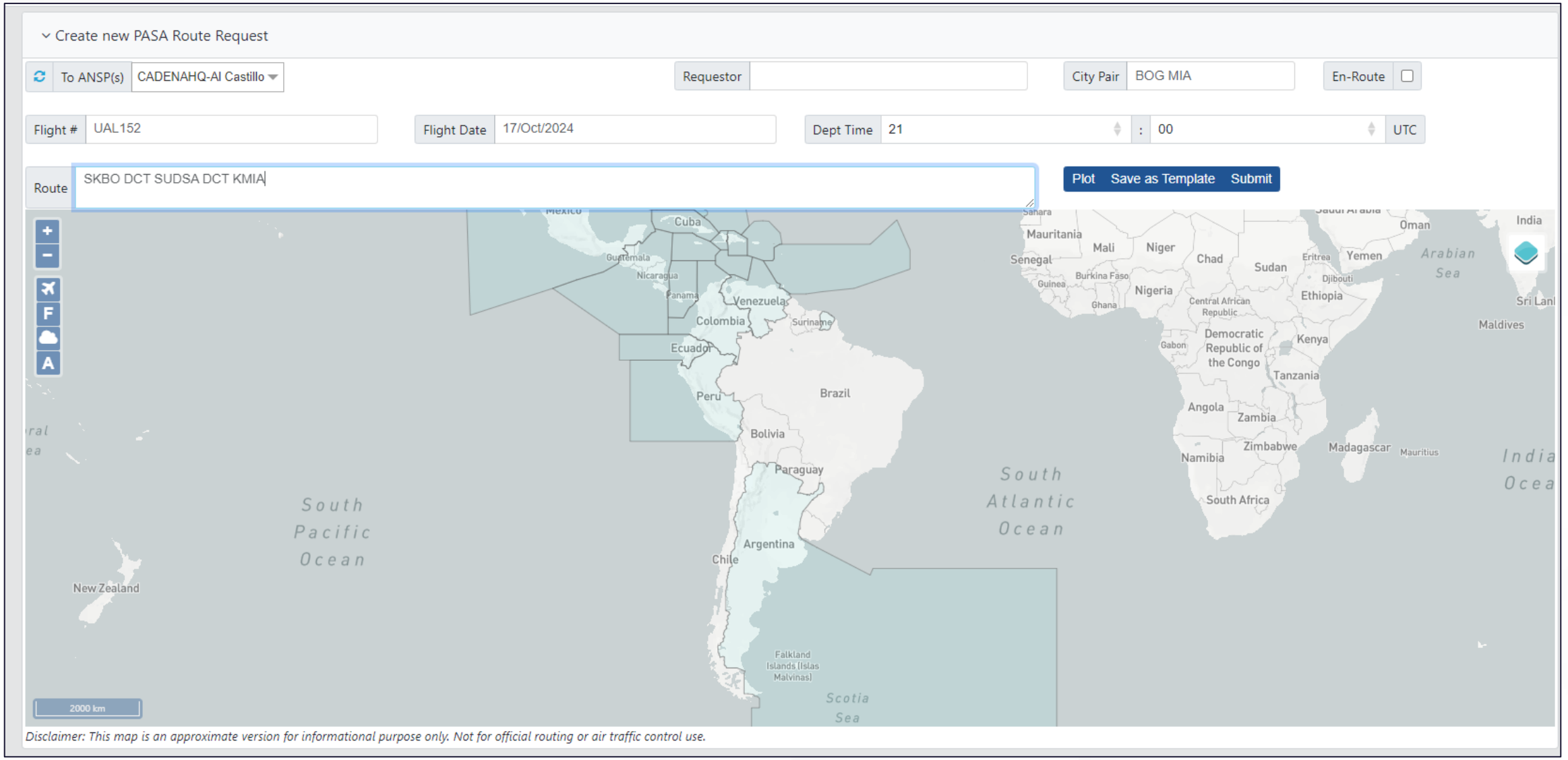
- When hurricanes or any significant contingency event occur, CADENA holds an Ad Hoc Conference
- The appropriate ANSPs create slides and upload them to the CADENA OIS about 1 hour prior to the Conference
- CADENA HQ puts together all the slides into one PowerPoint which is used during the meeting
- The final copy of the Master Contingency PowerPoint is uploaded after the Ad Hoc Conference and becomes accessible to the public



CADENA OIS Usage: Ac Hoc (Contingency) Conference
Example of completed Contingency PowerPoint

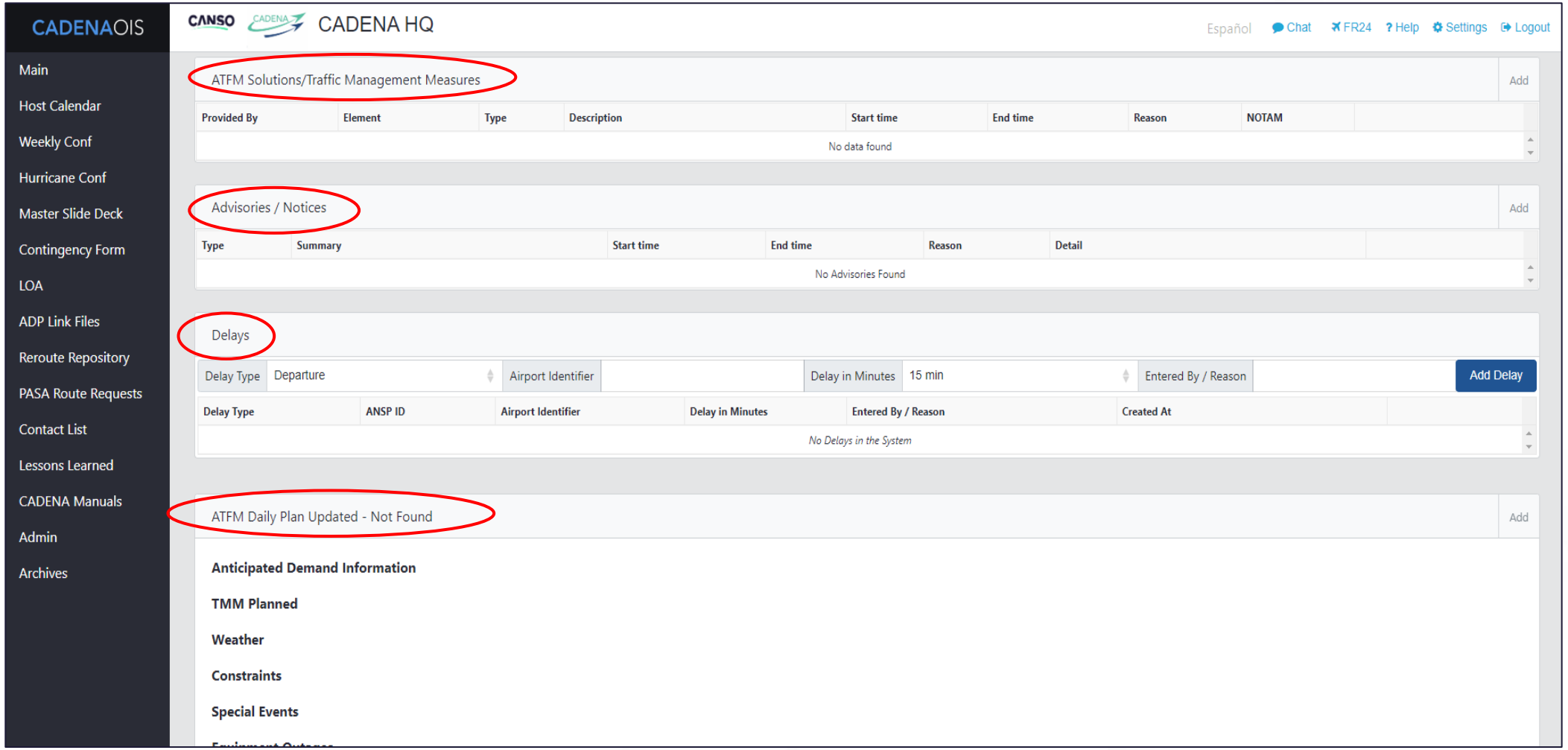


CADENA OIS Usage: Airlines Request PASA Routes



CADENA OIS Usage: Information Sharing (Advisories, ANSP ADP, TMMs, Delay)

- Once an advisory, ANSP ADP, TMM, Delay is submitted, it becomes available to the public



Africa OIS Demonstration

https://cadence-africa.cghlab.net/globe.html

CANSO OIS Functions Supporting FRA/UPR Trials

- **PASA Route Requests** – Airlines could initiate a Trial UPR (route) request using the PASA Route Requests feature. It could be set up so that the Trial UPR Coordinator automatically gets a notification each time a PASA Route Request is made.
- **Weekly Conf** – Prior to Trial UPR meetings, participants (ANSPs, airlines etc.) can upload PPT slides to the Weekly Conf section of the CANSO OIS with information they wish to share. The Trial UPR lead can create a master PPT for the Trial UPR meeting by adding the slides uploaded to the Weekly Conf section of the OIS. ***NOTE**: Slides uploaded to the Weekly Conf section of the CANSO OIS are archived at midnight local and will disappear from the Weekly Conf section. Slides should be uploaded the day of the meeting.*
- **Master Slide Deck** or **ADP Link Files** – The Trial UPR coordinator may choose to share the slide deck described in the previous bullet by uploading it to the Master Slide Deck or ADP Link Files section of the CANSO OIS
- **Reroute Repository** – A copy of all ongoing Trial UPRs can be maintained in the Reroute Repository section of the CANSO OIS.
- **Contact List** – A list of POCs to coordinate Trial UPRs can be maintained in the Contact List section of the CANSO OIS.
- **Host Calendar** – The Host Calendar section of the OIS may be used to display and track the dates of all Trial UPRs.

Next Steps

To Use Africa OIS Effectively

AFRICA OIS framework is ready under the CANSO OIS umbrella and a little more work needed to use it

- Need critical information from African users to use AFRICA OIS (e.g., member ANSPs and airlines, POC, adjacent FIR table, and server location)
- Need to determine how to use AFRICA OIS
- Need to determine roles and responsibilities of members to use AFRICA OIS
- Train members to familiarize OIS functionalities

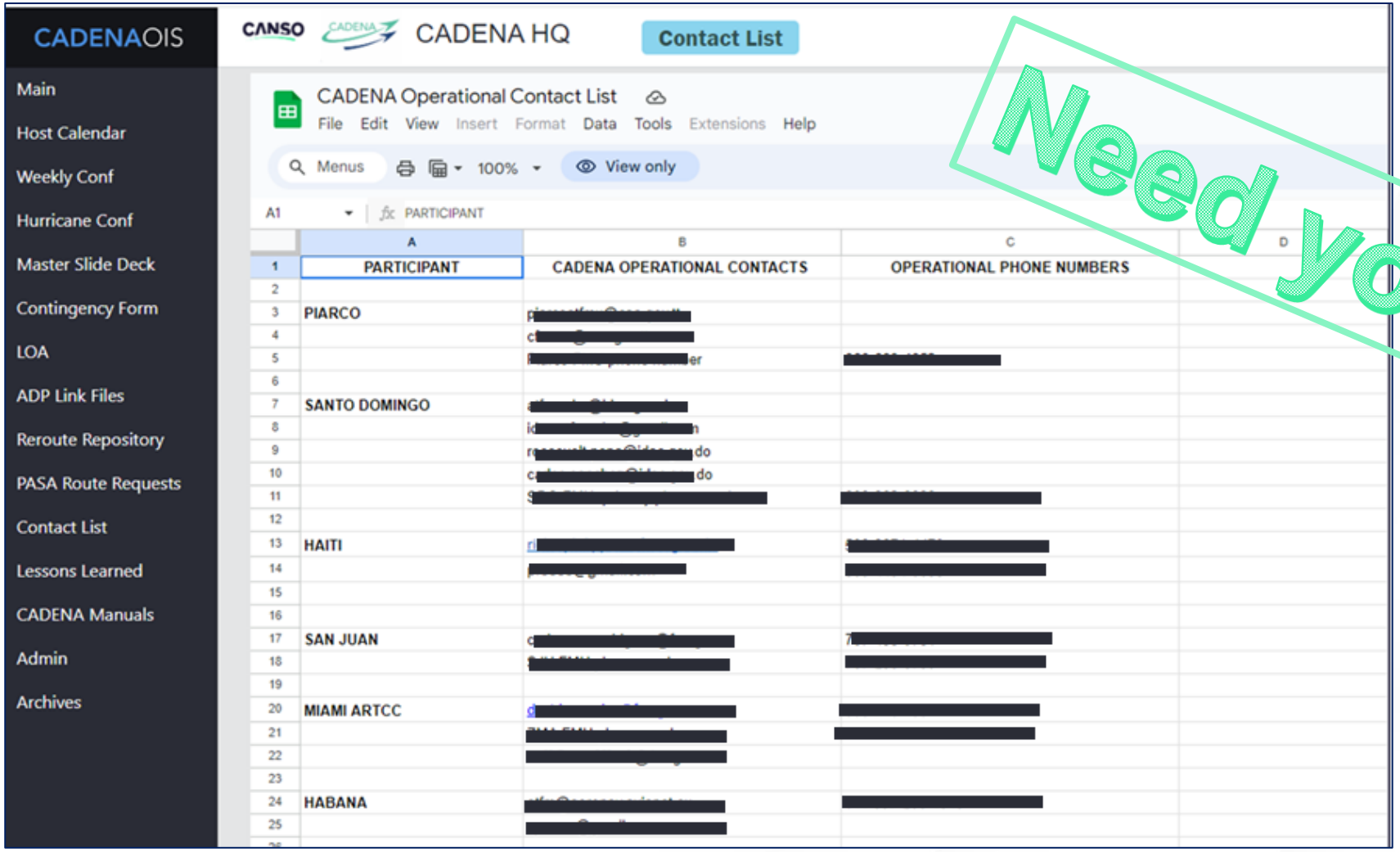
A “**cool**” name for AFRICA OIS?

Approved FIRs (ANSPs) for Africa OIS by CANSO

FIR Name	ICAO FIR Code	Country
Khartoum	HSSS	South Sudan
Addis Ababa	HAAA	Ethiopia
Nairobi	HKNA	Kenya
Entebbe Huec	HUEC	Uganda
Kinshasa	FZZA	DR Congo
Accra	DGAC	Ghana, Togo, Benin
Kano	DNKK	Nigeria
Brazzaville	FCCC	Cameroon, Gabon, Equatorial Guinea, Republic of the Congo, Central African Republic
Dar Es Salaam	HTDC	Tanzania
Lusaka	FLFI	Zambia
Lilongwe	FWLL	Malawi
Beira	FQBE	Mozambique
Harare	FVHF	Zimbabwe
Johannesburg	FAJA	South Africa
Cape town	FACA	South Africa

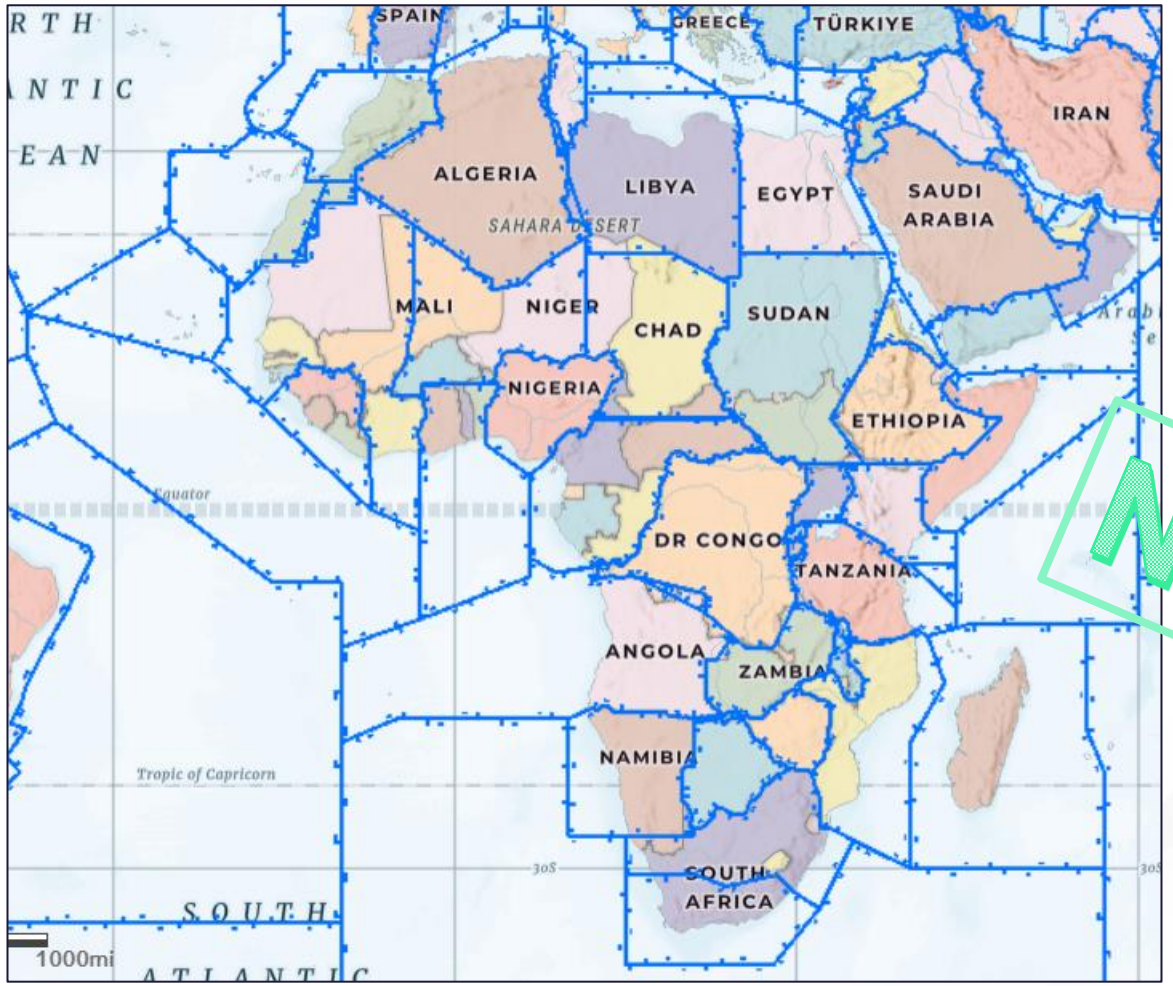
Need your input

POC database for Africa OIS



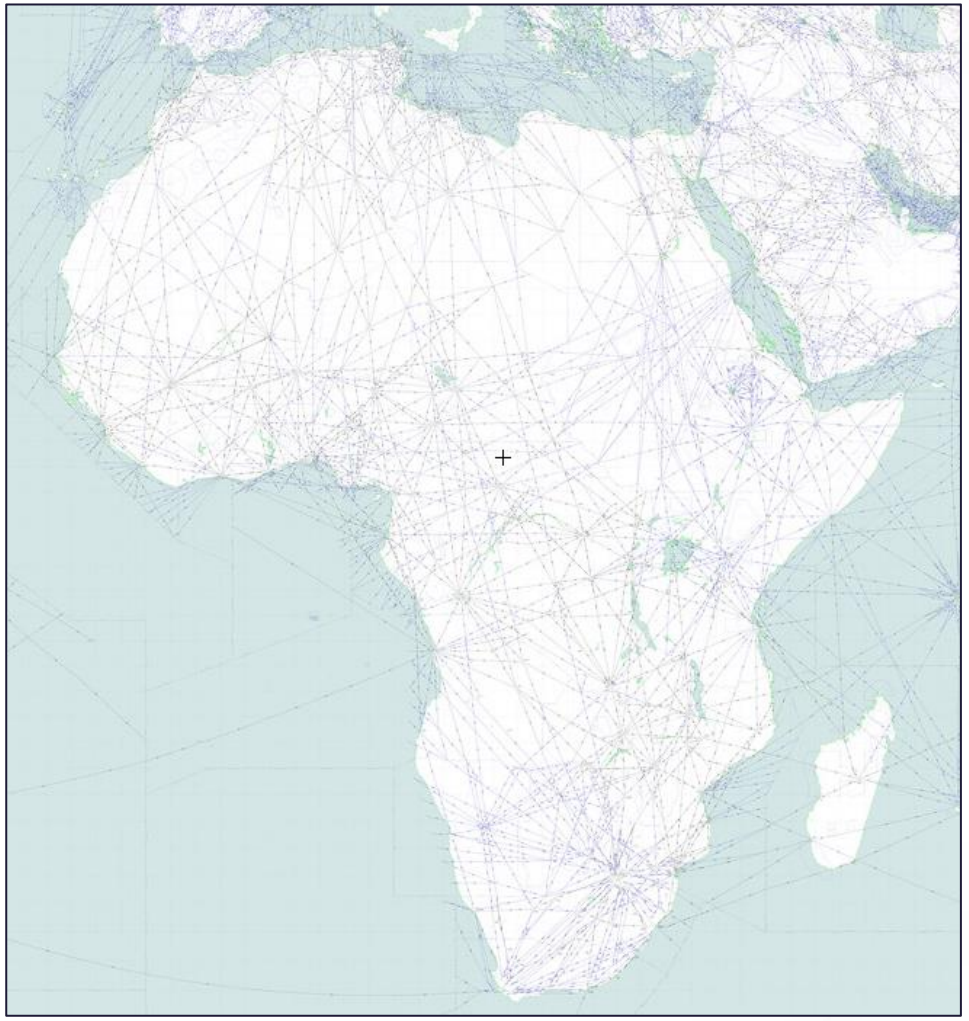
Need your input

Adjacent FIR Information for Africa OIS



Need your input

Nav Data Base for Africa



Need your input

Note: The PASA Route Request function of the CANSO OIS will not recognize some routes until the database is updated with Africa Navigation data.

Questions and Answers