

# Introducing the CADENA/CADENCE and FRA Trials

**For: ICAO Africa FRA Project Management Team**

**Date: 27 February 2023**

# CADENA Introduction

## CANSO ATFM Data Exchange Network for Americas



# Purpose and Objectives of CADENA

**Build and Operate Regional ATFM** leading to the optimized airspace

- Exchange operational information
- Promote common situational awareness
- Enhance operational safety
- Improve operational efficiency

# CADENA Key Regional Stakeholders

## ANSPs

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

## State/Territory/Group

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



# CADENA – Major Accomplishments

2016	Aug: 1 <sup>st</sup> CADENA RIG Meeting Dec: Weekly Ops Webex
2017	May: 1 <sup>st</sup> Hurricane Training Aug: CADENA OIS v1.0
2018	Oct: PASA DB established
2019	Oct: Contingency Procedures

2020	Aug: PASA E2E via CADENA OIS Dec: 1 <sup>st</sup> Vaccine Flight
2021	Jul: PASA E2E Route Opt Trials started Nov: Virtual Support System
2022	Sep: First Trial Routes published Oct: SDR Trial started
2023	Jan: Twice Weekly Ops Webex

# Who is CIIFRA?

- In 2021, IATA and ICAO joined the CADENA's on-going efforts to implement regional Free Route Airspace project.
- Three major aviation organizations are now collaborating to optimize regional airspace and to ultimately achieve FRA in the LAC region

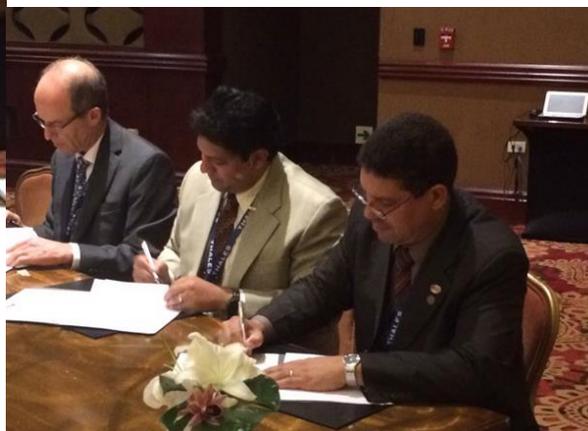
**CIIFRA = CANSO – IATA – ICAO Free Route Airspace Project**



# Dec 6, 2016: CADENA member CEOs/COOs signed the historic “*CADENA Member ANSP Air Traffic Management and Collaborative Decision Making Letter of Agreement*”

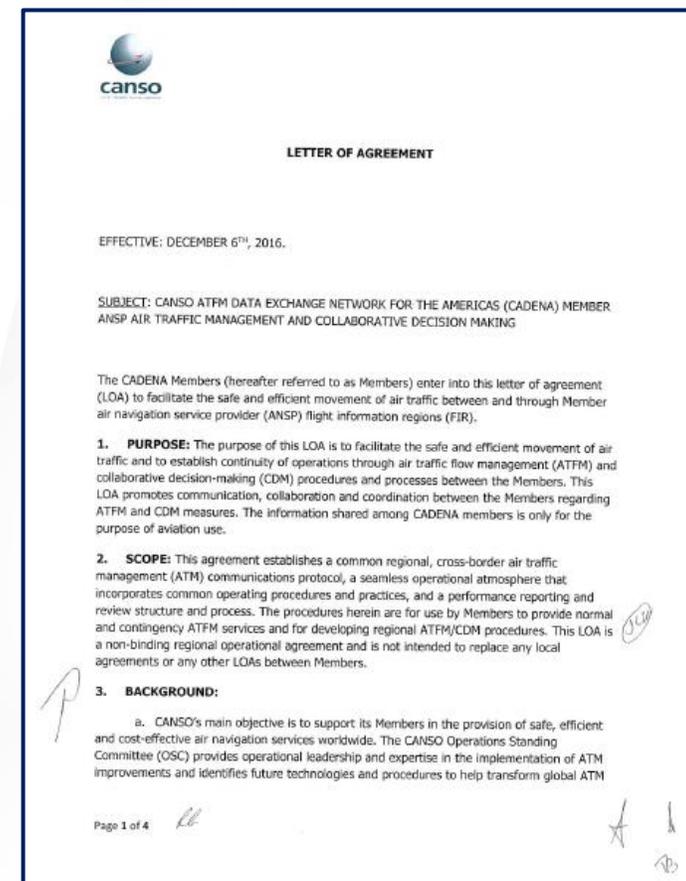


SENEAM, FAA, EANA, DC-ANSP



COCESNA, TTCAA, IDAC

“This Letter of Agreement promotes communication, collaboration and coordination between the Members regarding ATFM and CDM measures.”



# Dec 3, 2020: CADENA the LAC3 signed a first regional Letter of Agreement to coordinate the exchange of information with the FAA ATO Space Operations office



**“The LoA promotes communication, collaboration, and coordination between the participating ANSPs and ATO Space Ops, with information shared among participating CADENA ANSPs and stakeholders for the purpose of enhancing aviation safety”**



## LETTER OF AGREEMENT

EFFECTIVE: DECEMBER 3, 2020

SUBJECT: CANSO ATFM DATA EXCHANGE NETWORK FOR THE AMERICAS (CADENA) SPACE LAUNCH AND RECOVERY PROTOCOLS

The participating CADENA Air Navigation Service Providers (ANSPs) and the Federal Aviation Administration (FAA) Air Traffic Organization (ATO) Space Operations office (ATO Space Ops) enter into this Letter of Agreement (LOA) to facilitate the safe and efficient movement of space launch and recovery between and through participating ANSP flight information regions (FIRs).

**1. PURPOSE:** The purpose of this LOA is to facilitate the safe and efficient movement of space launch and recovery operations between and through participating ANSP FIRs. This LOA promotes communication, collaboration, and coordination between the participating ANSPs and ATO Space Ops regarding space launch and recovery operations. The information shared among participating CADENA participating ANSPs and stakeholders is for the sole purpose of aviation safety.

**2. SCOPE:** This agreement establishes a common regional, cross-border air traffic management (ATM) communications protocol, a seamless operational atmosphere that incorporates common operating procedures and practices, and a performance reporting and review structure and process. The operations described herein are for use by participating CADENA ANSPs and ATO Space Ops to provide space launch and recovery information. This LOA is a non-binding regional operational agreement and is not intended to replace any local agreements or any other LOAs between participating ANSPs.

# Aligning the Regional Goal with ICAO GANP/ASBU

## Direct Routes (FRTO-B0/1)

DCTs are established at national and regional levels and made available for flight planning (with published conditions of use).

DCT is an early iteration of the FRA.

- ✓ Reduced flight time
- ✓ Fuel savings
- ✓ CO2 savings

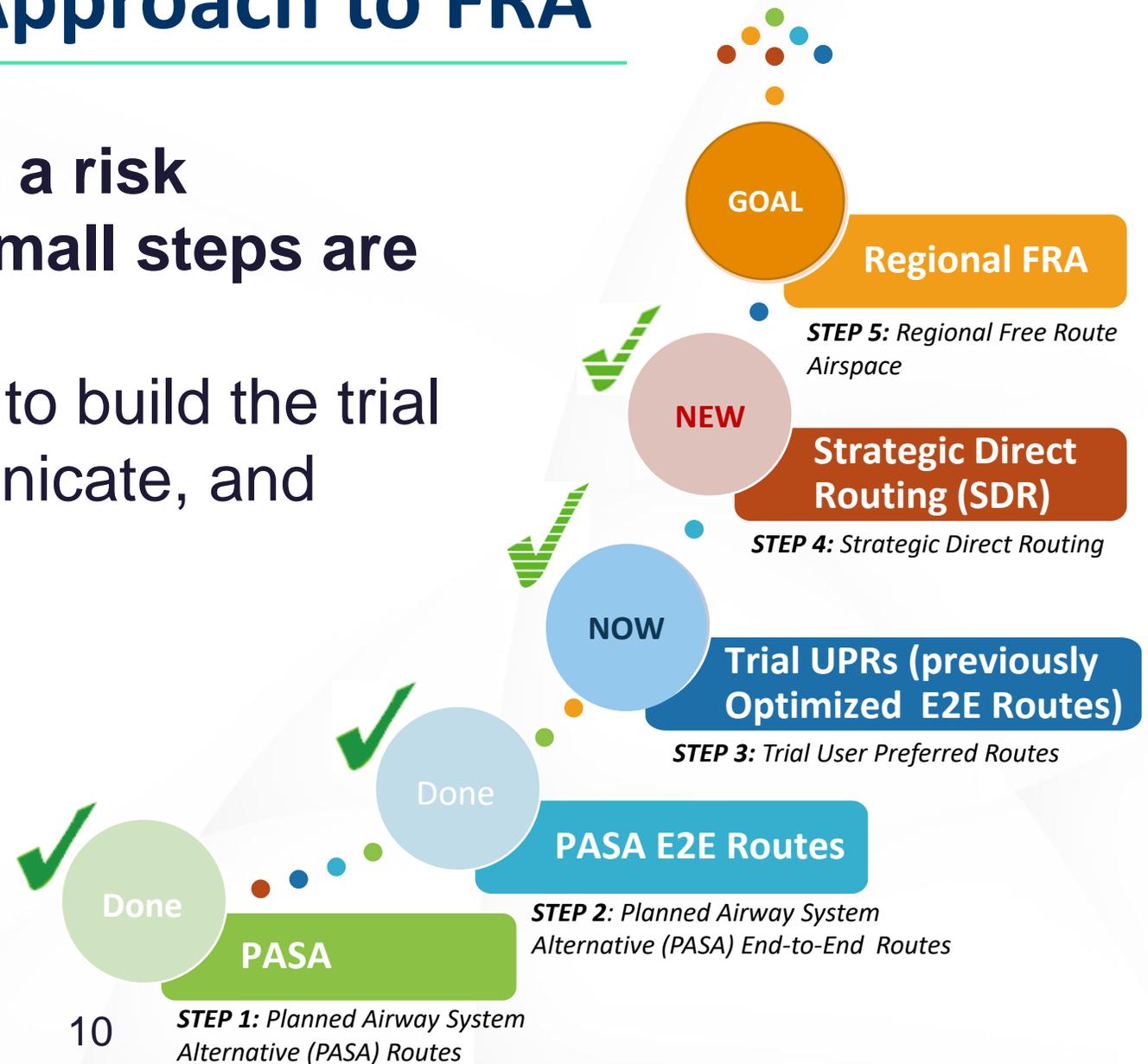
## Free Route Airspace (FRTO-B1/1)

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.

# CADENA's Step by Step Approach to FRA

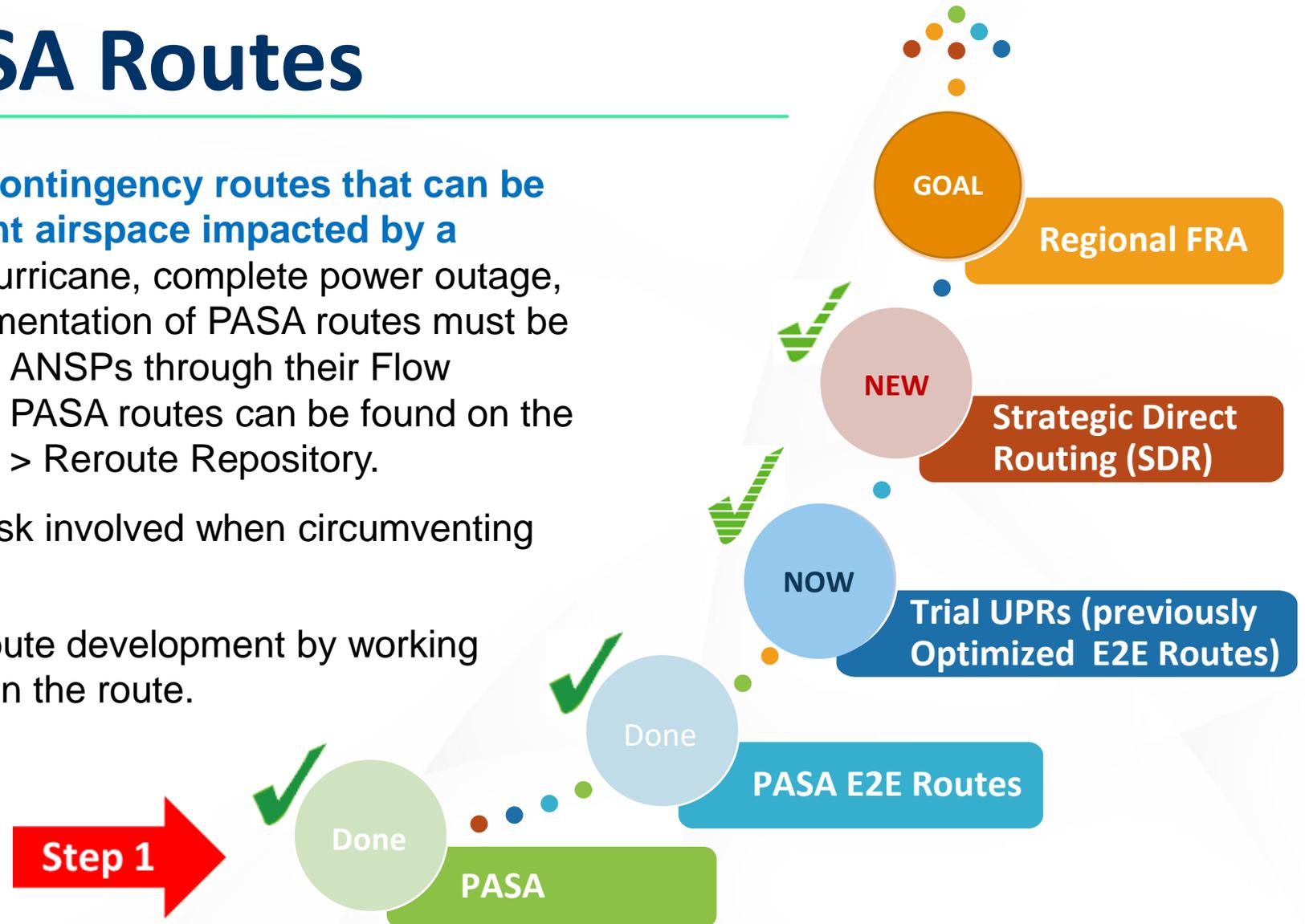
The Step-by-Step approach is a risk mitigation approach. When small steps are taken:

- 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



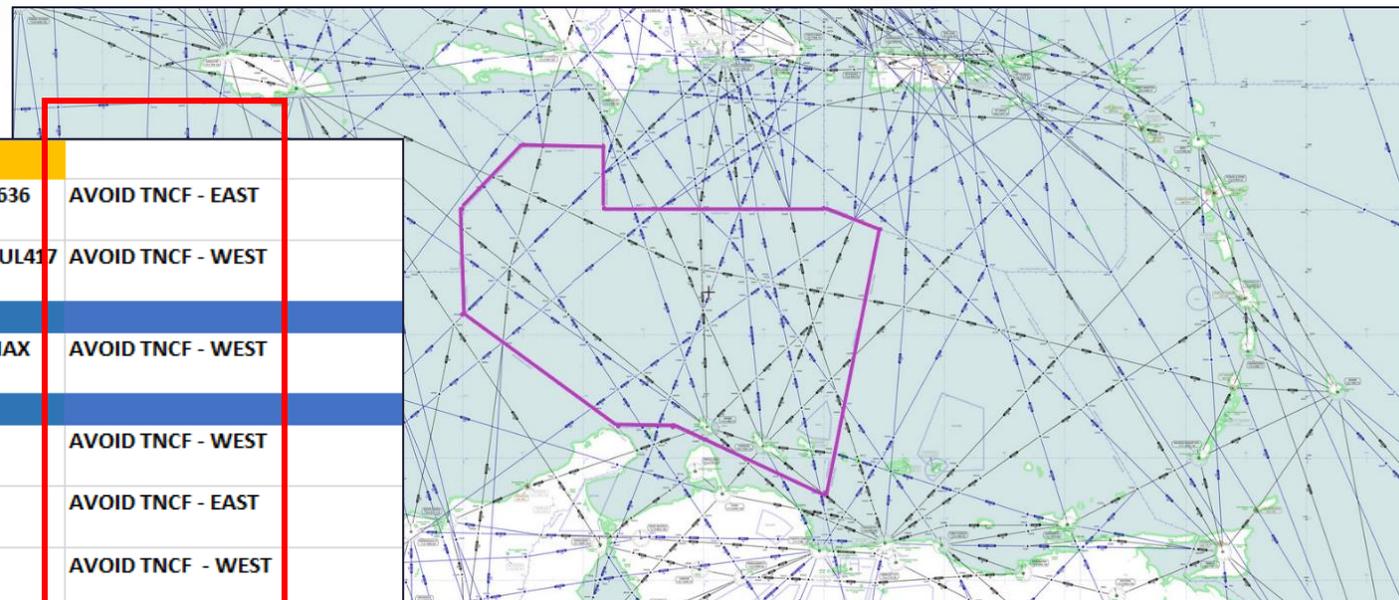
# CADENA's Step by Step Approach to FRA: Step 1 PASA Routes

- **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. PASA routes can be found on the CADENA OIS under Information > Reroute Repository.
- PASA Routes mitigate risk the risk involved when circumventing airspace becomes necessary.
- Risk is mitigated during PASA route development by working closely with all ANSPs involved in the route.



# CADENA OIS PASA Routes Repository

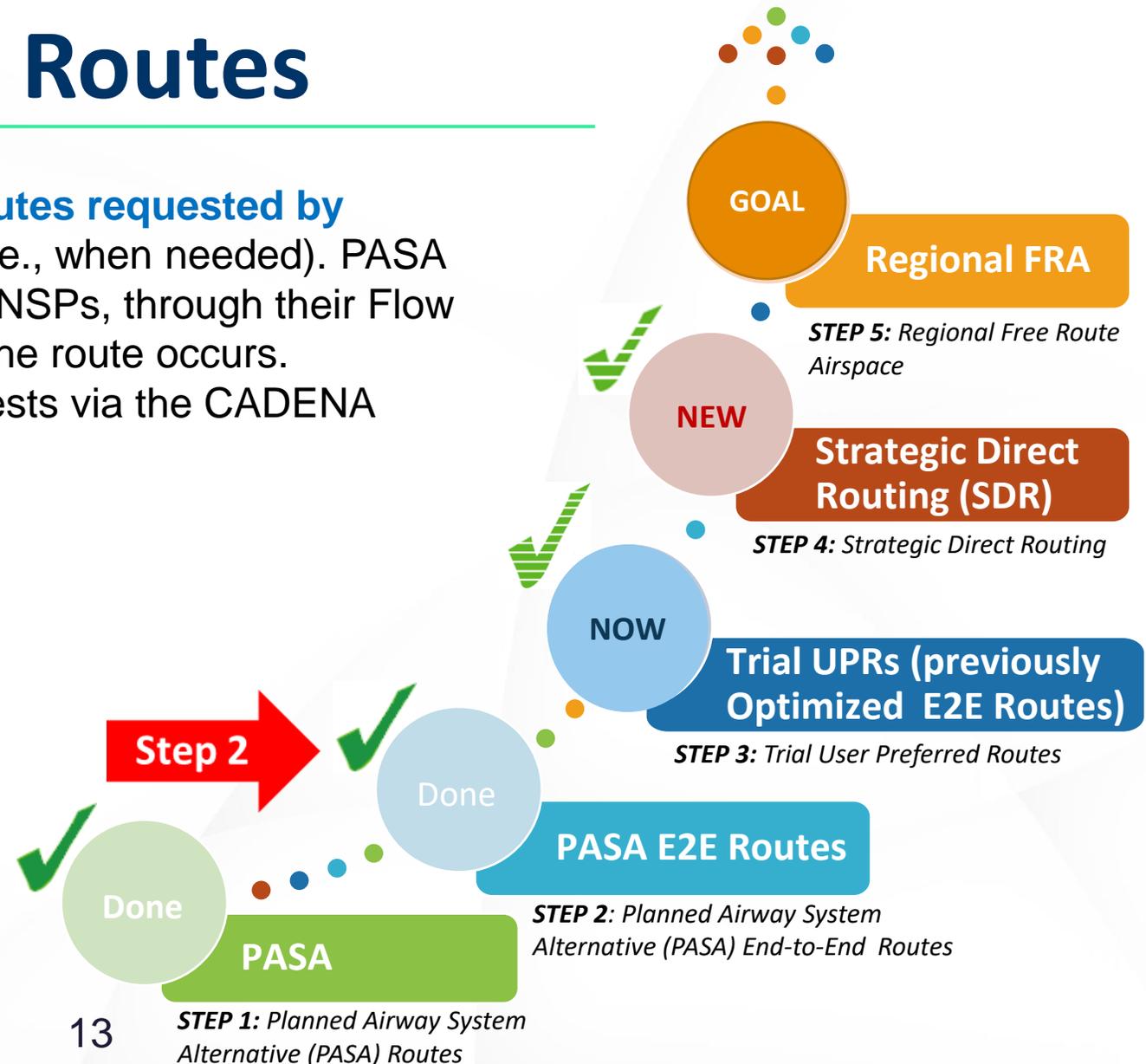
ORIG	DEST	NORTHBOUND	
SBGR	KMIA	... UKBEV UZ26 BSI UZ26 BEL UA555 TRAPP UL454 ILURI A555 COY RTE4 BQN A636 KATOK UA636 PTA L463 JUELE ...	AVOID TNCF - EAST
SBGR	KMIA	... UKBEV UL201 ASTOB UL201 ISVOM UM656 BUVKA UM656 BNS UR640 MLY UL417 LENAX UL795 BEXEN UM347 ZEUSS ...	AVOID TNCF - WEST
SBGR	KATL	... UKBEV UL201 ASTOB UM417 MOTVI UM549 MTU UM782 LONAX UL417 LENAX UL795 BEXEN UM347 ZEUSS Y217 OCTAL Q77 ETORE SHRKS LAIRI ...	AVOID TNCF - WEST
SBGR	KJFK	... UKBEV UL201 ASTOB ABIDE UM782 MTU UQ108 OTAMO UA301 MLY UL417 BORDO B760 ZBV RAMJT AR18 DIW ...	AVOID TNCF - WEST
SBGR	KJFK	... UKBEV UZ26 BSI UL452 ACARI UA312 LEPOD UG449 ANADA G449 DDP G431 ELMUC LAMER L453 PAEPR HOBOH SILLY ...	AVOID TNCF - EAST
SBGR	KJFK	... UKBEV UL201 ASTOB ABIDE UM782 MTU UQ108 OTAMO UA301 MLY UL417 BORDO B760 ZBV RAMJT AR18 DIW ...	AVOID TNCF - WEST
SBGR	KIAH	... SCB UM415 EVNES ABIDE UM782 TAKUX DCT SUVUM UM782 KEHLI ...	AVOID TNCF - WEST
SKBO	KMIA	... KOMBO UW1 PIE UW34 LFA UW8 BRM UW14 BNA DAREK UA561 GND UA324 FOF UA312 ANU G633 COY RTE4 BQN A636 KATOK UA636 ALBBE ...	AVOID TNCF - EAST
SKBO	KMIA	... GIKPU UQ120 PADUD DAGAN UL542 OTAMO UA301 MLY UL417 NEFTU UR625 ENAMO ...	AVOID TNCF - WEST
SKBO	KMIA	... PIE UW34 LFA UW8 BRM PBL MIQ UDIMA MEGIR POS GND UA324 FOF UA312 ANU G633 COY RTE4 BQN A636 KATOK UA636 ALBBE ...	AVOID TNCF - SOUTH AND EAST -



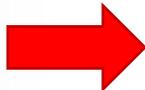
TNCF = Curacao FIR

# CADENA's Step by Step Approach to FRA: Step 2 PASA E2E Routes

- **PASA End-to-End Routes** are **temporary routes requested by airlines/stakeholders on an ad hoc basis** (i.e., when needed). PASA End-to-End Routes must be approved by all ANSPs, through their Flow Management Units, in which any segment of the route occurs. Airlines/stakeholders submit these route requests via the CADENA Operational Information System webpage.
- PASA Route risk is mitigated by following a standardized coordination process that involves all impacted ANSPs and by having a centralized point of coordination (i.e. CADENA).



# CADENA OIS: PASA E2E Routes



**CADENA OIS**

- Main
- Weekly Conf
- Hurricane Conf
- Contingency Form
- ADP Link Files
- PASA Route Requests**
- Contact List
- Lessons Learned
- CADENA Manuals

Delta Air Lines

Español Chat 1 ? Help Settings Logout

▼ Create new PASA Route Request

To ANSP(s)  Send to  Requestor  City Pair  SPJC KATL En-Route

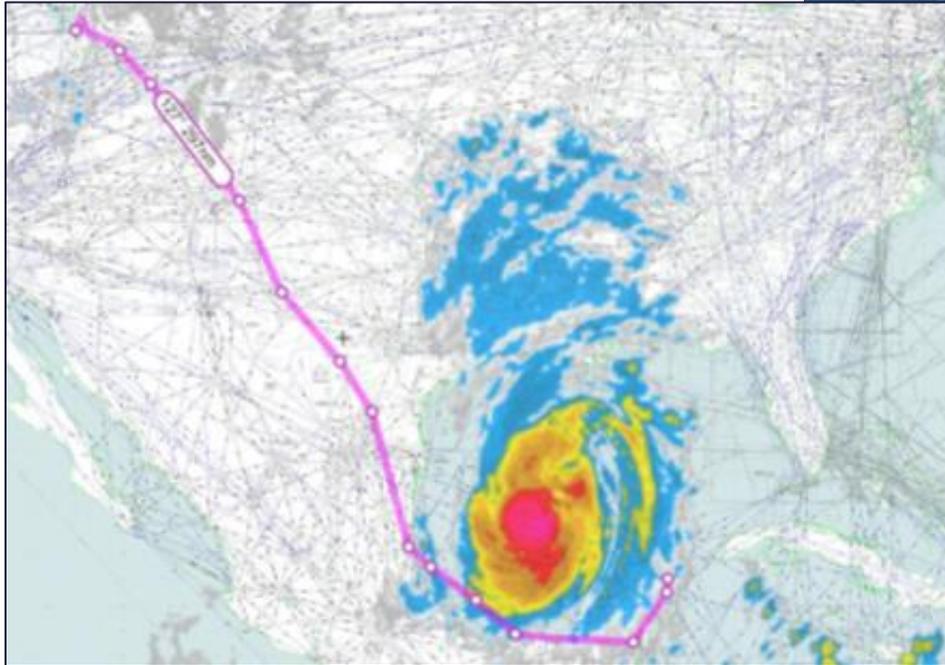
Flight #  DAL150 Flight Date  22/Apr/2021 Dept Time  22 :  00  UTC

Route  SPJC ISREN2F ISREN DCT GYV DCT TINPA DCT LEVOR DCT GCM DCT IKBIX Y183 PEAKY Q87 MATLK Q77 SHRKS DCT LAIRI DCT LARZZ JJEDI2 KATL

Some locations or airways in the route ISREN2F, Y183, Q87, Q77, JJEDI2 are not found in the System.  
They are ignored in the plotting, but the route request can still be submitted.  
If you think they are valid locations or airways and should be part of the System, please let Cadena Support know.

# Samples: CADENA PASA E2E Routes

PASA ROUTE REQUEST DEC 31, 2020



PASA ROUTE REQUEST OCT 7, 2020

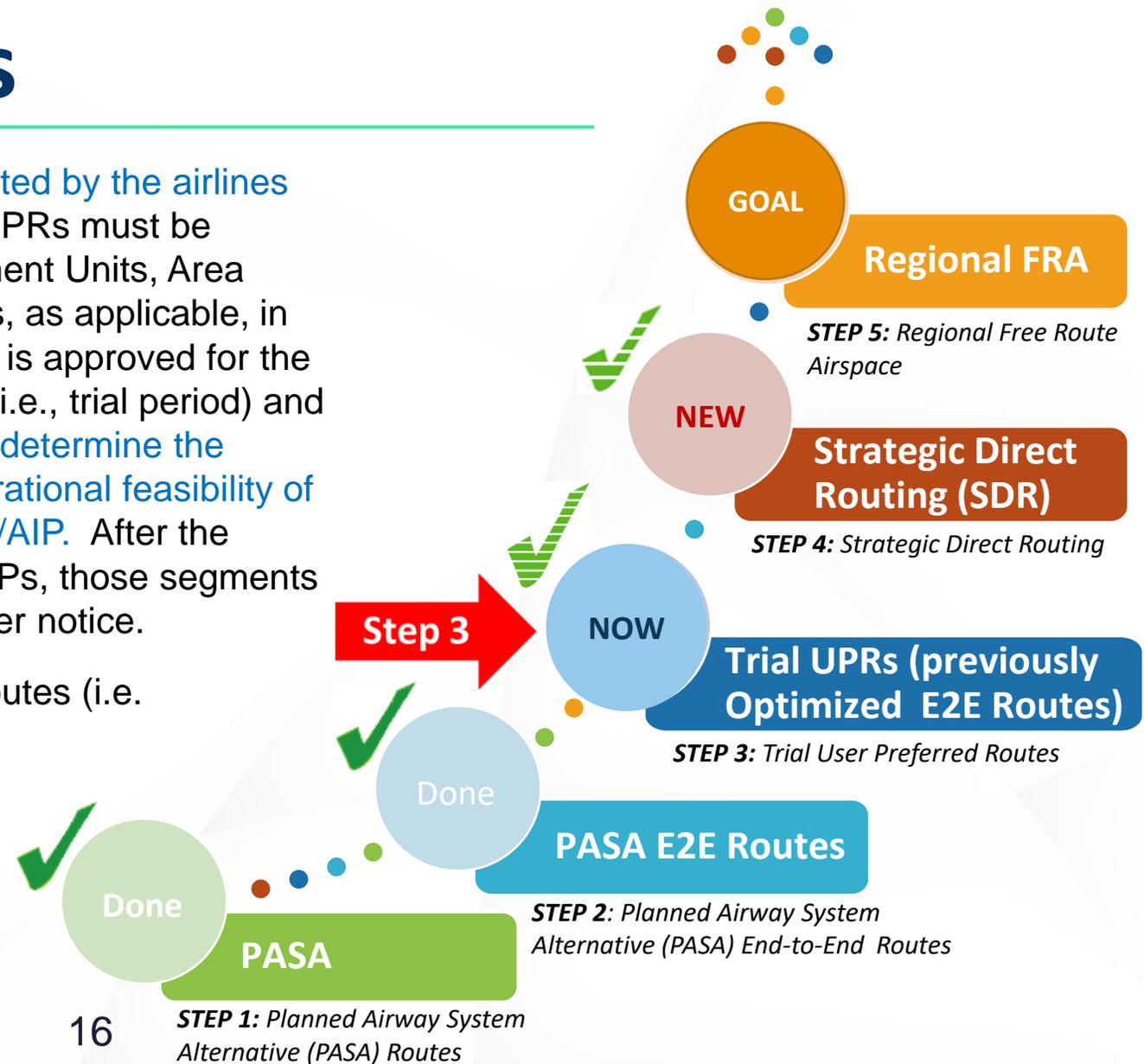


PASA ROUTE REQUEST NOV 16, 2020



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

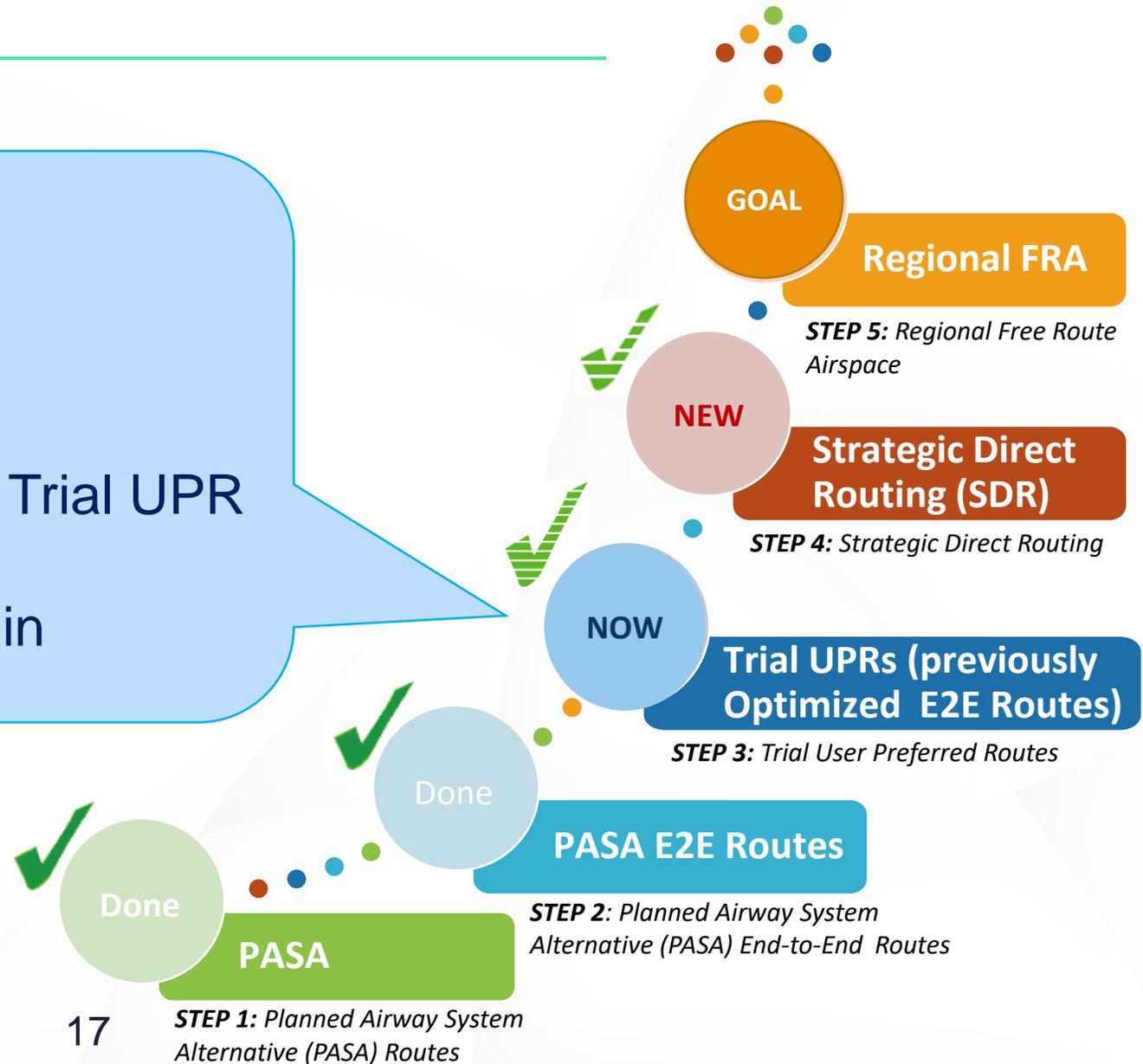
- **Trial User Preferred Routes (UPR)** - Routes requested by the airlines that optimize the route between a specific city-pair. UPRs must be approved by all ANSPs, through their Flow Management Units, Area Control Center managers, or Civil Aviation Authorities, as applicable, in which any segment of 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 airlines 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.)



# Trial UPRs

## Trial UPRs

- Six completed 90-day trials
  - KATL - SPJC
  - TTPP - KMIA
  - SAEZ - KMIA
  - KATL - SBGR
  - KIAH - MMPR
  - KATL - SAEZ
- Extended usage for one year for the Trial UPR routes completed during the trials
- Work towards publishing trial routes in AIC/AIP



# Trial UPR - 90-Day Trial Benefits

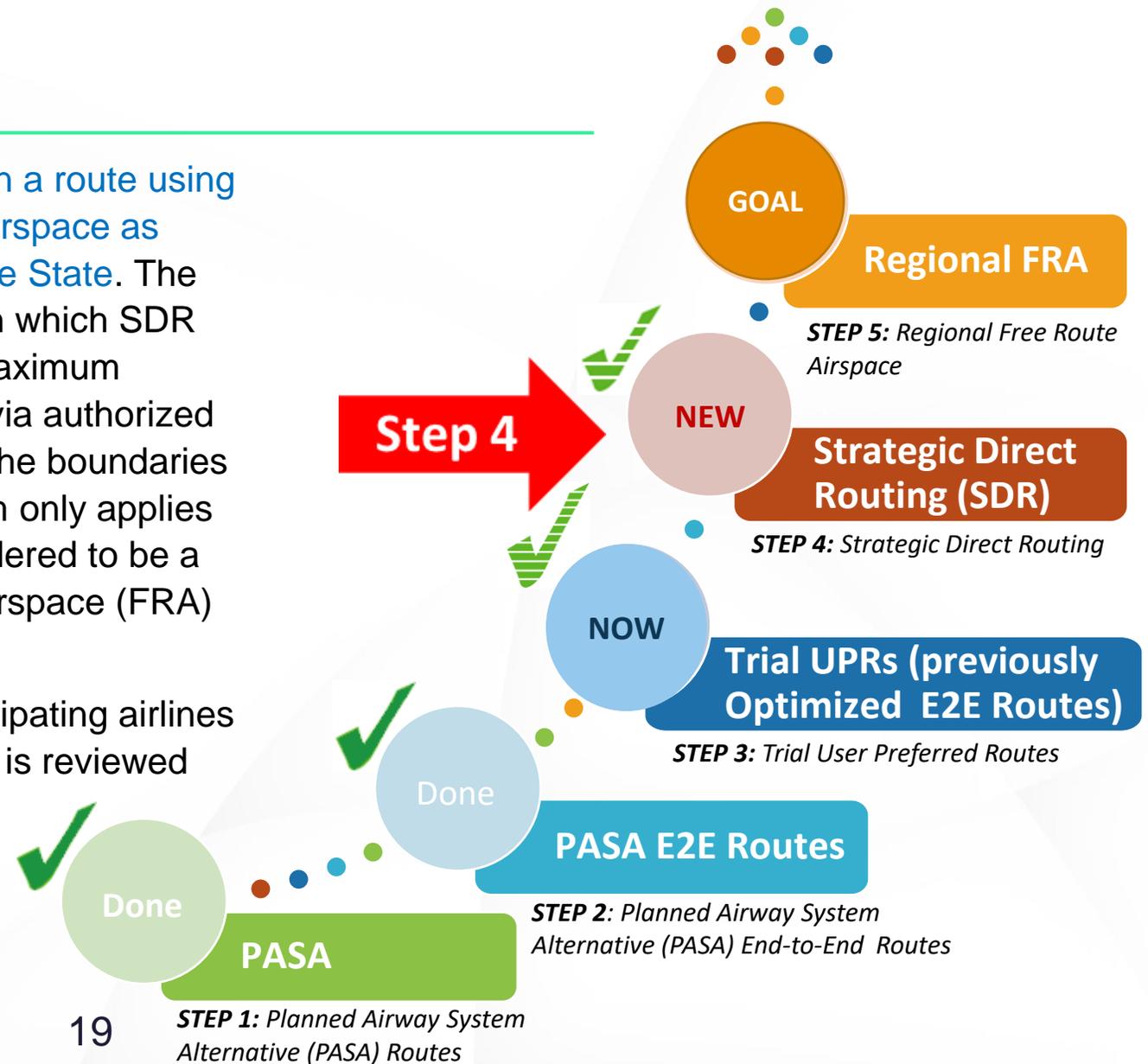
	Delta Airlines <b>DELTA</b> KATL↔SPJC Jul 9 - Oct 6, 2021		Delta Airlines <b>DELTA</b> KATL↔SBRG Jul 27 - Oct 24, 2021		Carribean Airlines <i>Caribbean Airlines</i> TTPP↔KMIA Aug 6 - Nov 3, 2021	
Savings	90-Day	1-Year	90-Day*	1-Year	90-Day	1-Year
Flight min:	515	2,089	235	1,175	256	1,038
Fuel (lb):	145,425	589,779	62,035	310,175	46,780	189,719
CO2 (kg):	208,445	845,360	88,918	444,590	67,052	271,934
Cost (\$):	94,693	384,033	41,925	209,625	39,494	160,170

	United Airlines <b>UNITED</b> KIAH↔MMPR Sep 1 - Nov 29, 2021		Delta Airlines <b>DELTA</b> KATL↔SAEZ Dec 6, 2021-Mar 5, 2022		Aerolineas Argentinas <i>Aerolíneas Argentinas</i> SAEZ ↔ KMIA Dec 6, 2021-Mar 5, 2022	
Savings	90-Day	1-Year	90-Day*	1-Year	90-Day	1-Year
Flight min:	558	2,263	940	5,446	275	1,115
Fuel (lb):	52,841	214,300	175,508	1,016,832	64,673	262,283
CO2 (kg):	75,740	307,168	251,565	1,457,480	92,699	375,944
Cost (\$):	72,993	296,027	146,390	848,135	51,638	209,420

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

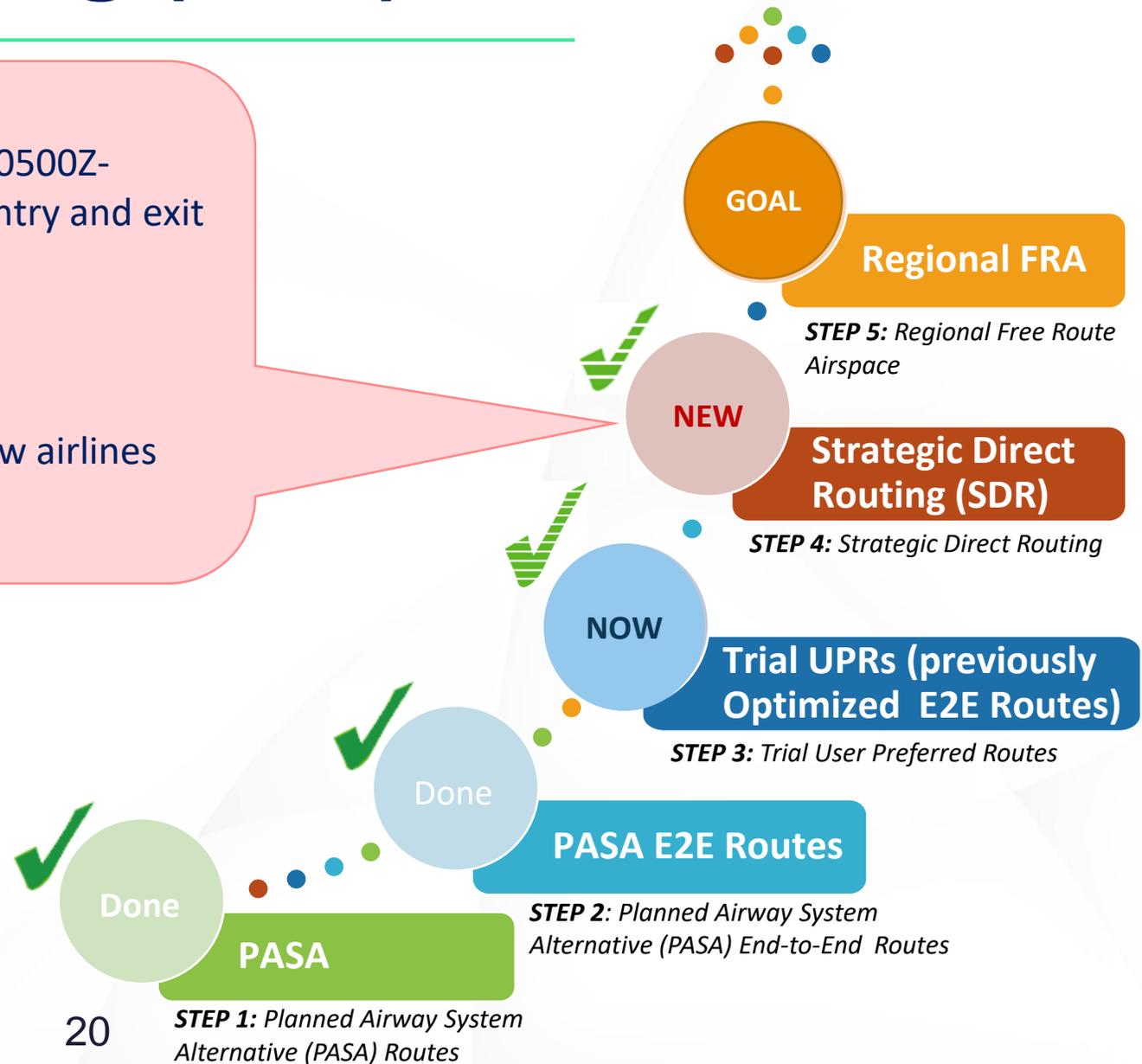
- **Strategic Direct Routing (SDR)** allows users to plan a route using any named waypoints within a specified volume of airspace as long as the route complies with parameters set by the State. The parameters may include restrictions such as hours in which SDR rules apply, at or above altitude requirements 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.



# Strategic Direct Routing (SDR) Trial

## Mexico's SENEAM SDR Trial

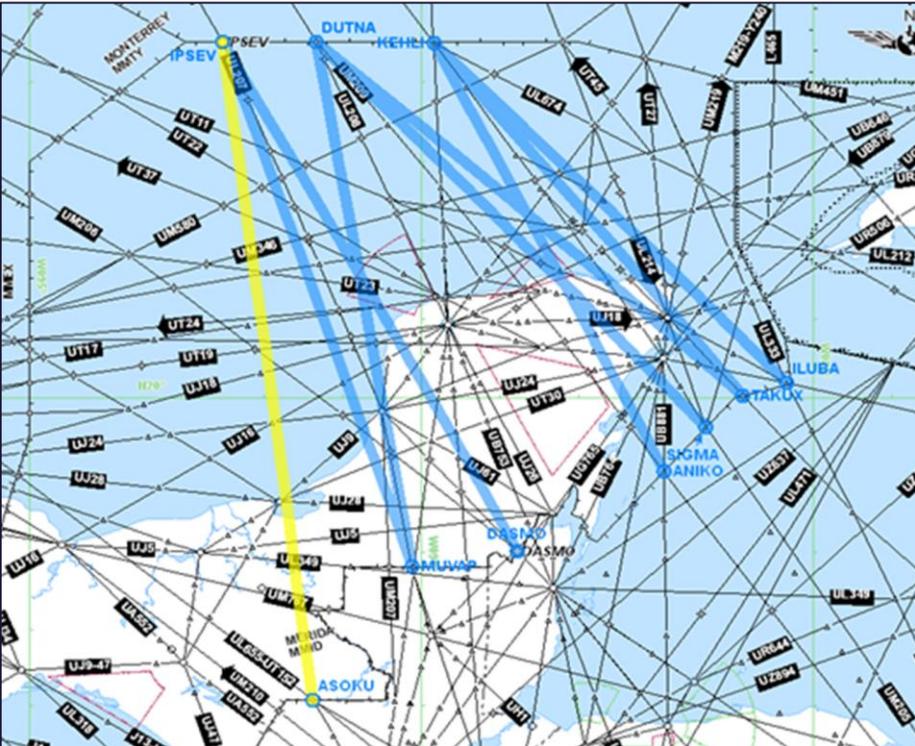
- SENEAM determined the trial requirements (e.g., 0500Z-1100Z, from Oct 3 – 31, 2022, FL290 and above, entry and exit point specification, and airspace specification)
- SDR Trial started with 3 airlines participating
- Currently nine participating airlines
- SDR Trial risk is mitigated by starting with just a few airlines during limited hours with carefully designed rules



## Collaboration between



# SENEAM SDR Trial – UAL 4 Month Data



MONTHLY SDR USAGE BY FLIGHT

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL/FLIGHT
UAL63 SBGR-KIAH	10	10	24	25					69
UAL818 SAEZ-KIAH	22	24	23	26					95
UAL128 SBGL-KIAH	12	16	25	24					77
UAL855 SPJC-KIAH	6	0	0	0					6
UAL846 SCEL-KIAH	22	20	16	26					84
UAL206 SKBO-KIAH	5	3	10	10					28
UAL2083 SEQM-KIAH	7	4	1	2					14
UAL1907 MGGT-KIAH	3	0	28	28					59
<b>TOTAL/MONTH</b>	<b>87</b>	<b>77</b>	<b>127</b>	<b>141</b>					

SDR USAGE BY DCT SEGMENTS

	UAL63 SBGR-KIAH	UAL818 SAEZ-KIAH	UAL128 SBGL-KIAH	UAL855 SPJC-KIAH	UAL846 SCEL-KIAH	UAL206 SKBO-KIAH	UAL2083 SEQM-KIAH	UAL1907 MGGT-KIAH	TOTAL/DCT
TAKUX-KEHLI	49	4	54						107
TAKUX-DUTNA			2						2
ILUBA-KEHLI	13		17						30
SIGMA-DUTNA	4		2		1	10	9		26
MUVAP-IPSEV		71		6	72	1	3		153
MUVAP-DUTNA		18			7		1		26
ANIKO-KEHLI	3	2	2			15			22
DASMO-IPSEV					4	2	1		7
ASOKU-IPSEV								59	59
<b>TOTAL/FLIGHT</b>	<b>69</b>	<b>95</b>	<b>77</b>	<b>6</b>	<b>84</b>	<b>28</b>	<b>14</b>	<b>59</b>	

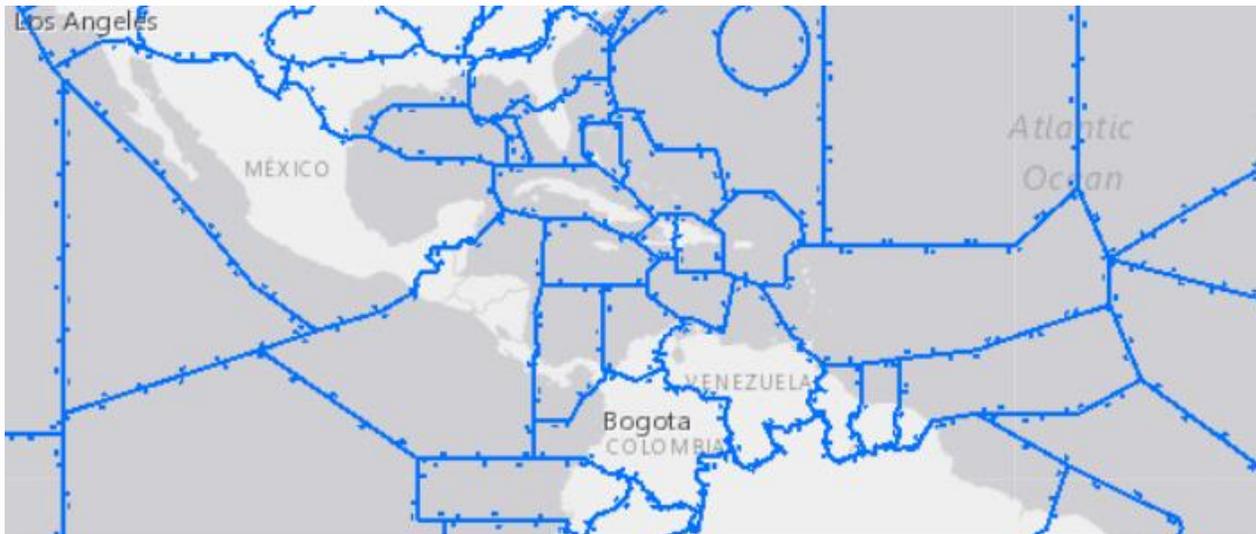
# SENEAM SDR Trial – Viva Aerobus Benefits

<b>Nov 1 - Dec 31, 2022</b>									
<b>Nov 1 - Dec 31, 2022</b>		<b>Saved</b>				<b>Per Flight</b>			
City Pair	No.	Time (min)	Fuel (lb)	CO2 (kg)	Cost (\$)	Time (min)	Fuel (lb)	CO2 (kg)	Cost (\$)
KLAX-MMGL	24	88.0	3,592	11,351	11,745	3.7	150	473	489
KLAX-MMMX	28	28.0	1,134	3,583	3,730	1.0	41	128	133
KORD-MMGL	26	67.0	2,358	7,451	8,634	2.6	91	287	332
KORD-MMLO	2	5.0	199	629	663	2.5	100	314	332
MMGL-MMTJ	22	26.0	1,930	6,099	4,183	1.2	88	277	190
MMLO-MMTJ	9	44.0	1,600	5,056	5,712	4.9	178	562	635
MMMD-MMMX	31	93.0	3,254	10,283	11,968	3.0	105	332	386
MMMX-MMMD	25	51.0	1,588	5,018	6,402	2.0	64	201	256
MMMX-MMTJ	11	22.0	1,016	3,211	3,033	2.0	92	292	276
MMTJ-MMGL	111	61.0	8,346	26,373	12,944	0.5	75	238	117
MMTJ-MMMX	48	265.0	6,678	21,102	31,976	5.5	139	440	666
MMTJ-MMMY	35	35.0	2,296	7,255	5,383	1.0	66	207	154
MMTJ-MMUN	24	48.0	2,040	5,095	6,473	2.0	85	212	270
<b>Total</b>	<b>396</b>	<b>833.0</b>	<b>36,031</b>	<b>112,507</b>	<b>112,845</b>				
<b>1 Year</b>		<b>4,998</b>	<b>216,186</b>	<b>675,040</b>	<b>677,073</b>				

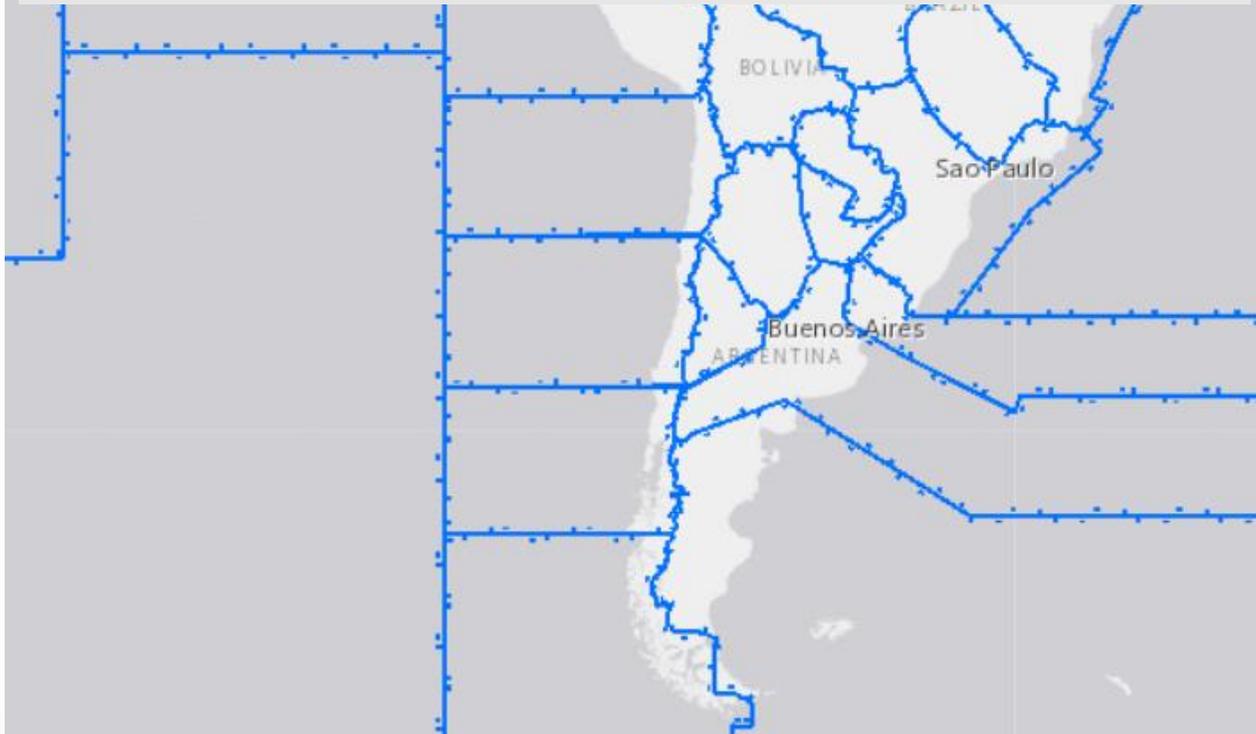
# SENEAM SDR Trial Benefits Summary



1-yr Estimate	Time (min)	Fuel (kg)	CO2 (kg)	Cost (\$)
<b>AeroMexico</b>	1,168	51,157	161,655	\$ 158,749
<b>Delta</b>	517	51,586	163,012	\$ 93,805
<b>Emirates</b>	76	10,783	34,073	\$ 16,446
<b>United</b>	1,626	178,122	562,865	\$ 278,298
<b>VivaAerobus</b>	4,998	216,186	675,040	\$ 677,073
<b>Total</b>	8,385	507,834	1,596,645	\$1,224,371



**CANSO ATFM Data Exchange Network for Americas**



# The development of ATFM and CDM in the Latin America and Caribbean Region

## CADENA

Why?  
When?  
How?

## Why?

- Multiple, relatively small FIRs in the LAC region.
- Lack of an integrated network for common situational awareness.
- Inconsistent ATFM operations across FIR boundaries.
- Significant tropical weather events and volcanic ash situations.
- Very desirable tourist destinations.



**Example:  
Cancun, Mexico**



First Meeting of the CANSO Caribbean  
ATFM Regional Implementation  
Workgroup  
*Havana, Cuba, 2-3 August 2016*



# When?

August 2-3, 2016 ...  
all the way through today !!



# Havana, Cuba

## AGENDA

Tuesday, 02 August 2016

09:00

### Opening of the Meeting

- Javier Vanegas – CANSO Latin American and Caribbean Regional Director
- Mr. Jose Manuel Peña – Director ECASA
- Introductions
- Identification of interim chair

### ATFM Regional Implementation under CANSO

- CANSO ATFM WG and Caribbean ATFM Regional Implementation - Kapri Kupper, CANSO Operations Programme Manager
- Review of ICAO CAR/SAM CONOPS ATFM- Javier Vanegas, CANSO Latin American and Caribbean Regional Director
- Caribbean ATFM multi-FIR, multi-State, collaborative ATFM capability - Kevin Chamness, Director, International, FAA ATO

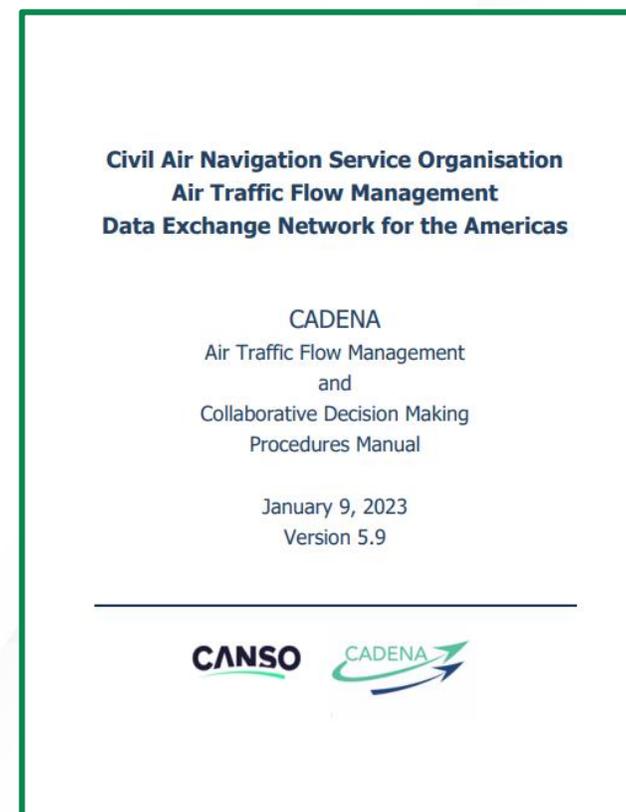
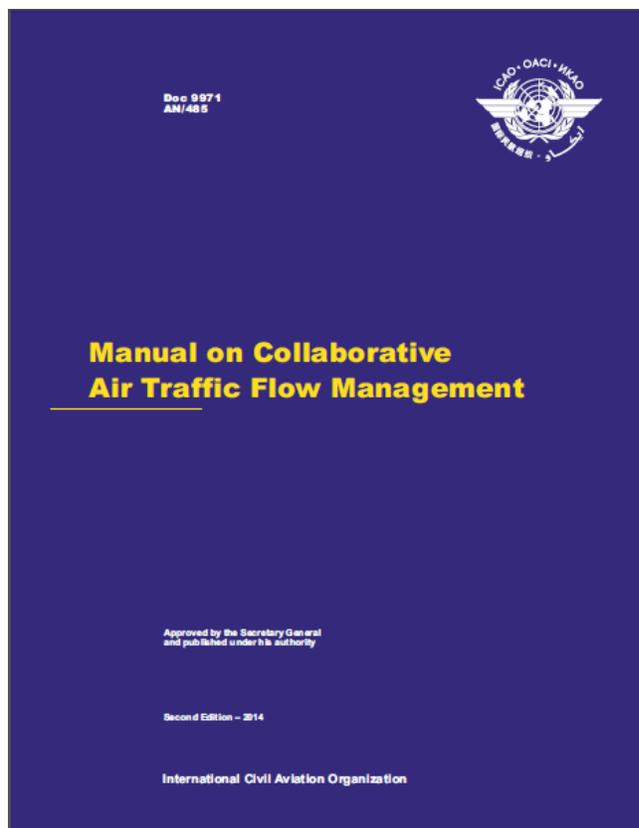
### Governance Process – Javier Vanegas

- Approve draft Terms of Reference
- Roles and responsibilities
- Working arrangements

# How?

# In Concert with ICAO

CADENA is designed to implement the processes and procedures from ICAO DOC 9971.



# How?

## ➤ Terms of Reference

CAN SO ATFM Data Exchange Network for the Americas

Regional Implementation Group  
(CADENA RIG)

Terms of Reference

**1. Background**

A proposal to establish a regional initiative under the leadership of the Civil Air Navigation Services Organisation (CAN SO) to develop a network for coordination and information sharing among air navigation service providers (ANSPs) in the Caribbean flight information regions (FIRs) was presented at the 14<sup>th</sup> CAN SO Latin America CEO Committee (LAC3) meeting held in Madrid, Spain on March 6, 2016.

## ➤ CADENA Roles and Responsibilities



## ➤ Project Management Plan with goals, milestones, and responsible parties

MILESTONE	COMPLETED	DUE DATE
a) Agree on Concept and Scope	✓	8/30/2016
MILESTONE	COMPLETED	DUE DATE
b) Identify your ATFM Project Champion	✓	10/4/2016
Roosevelt Pena roosevelt.pena@idac.gov.do Nico Borovich nborovich@eana.com.ar Midori Tanino midori.tanino@faa.gov Curtis Fraser cfraser@caa.gov.tt Curt Francisca cfrancisca@dc-ansp.org Jose Manuel josemanuel@ecasa.avianet.cu Jacques Lasten J.Lasten@dc-ansp.org Howard Greaves howard.greaves@jcaa.gov.jm Roberto Prado rta_prado@hotmail.com Fernando Soto fernando.soto@cocesna.org Nico Borovich nborovich@eana.com.ar		
MILESTONE	COMPLETED	DUE DATE
c) Identify Key Stakeholders		10/4/2016
COCESNA	✓	
Dominican Republic	✓	
SENEAM	✓	
Trinidad & Tobago	✓	
FAA	✓	
Argentina	✓	
Cuba	✓	
Curaçao	✓	
Jamaica	✓	

# How?

## Regional ATFM/CDM Operational Planning Web Conference

- Started in December 2016 as a weekly web conference to plan for each weekend's air traffic volume.
- Transitioned to twice-a-week web conference to cover the entire week starting in January 2023.
- The responsibility of hosting the web conferences rotates among the CADENA ANSPs.
- Regional aviation stakeholders actively participate.
- Information is shared, discussed, and the regional operations plan is developed collaboratively.
- Simple and **EFFECTIVE!**

# How?

## CADENA Operational Information System

### Exchange:

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

### Enter:

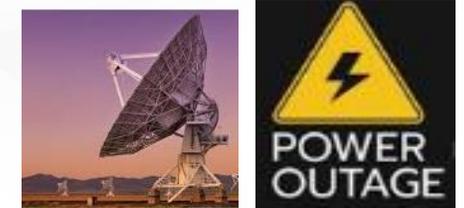
- ATM Solutions
- Advisories/Notices
- Airport delay
- ATFM Daily Plan
- Calendars
- PASA Route Request

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

# How?

## CADENA Ad Hoc Web Conferences

The value of information exchange and collaboration is really recognized during irregular operations.



- CADENA Ad hoc Web Conferences – held on an as-needed basis.
- CADENA Operational Procedures Manual (based on ICAO DOC 9771).
  - ✓ Contingency operational procedures.
  - ✓ 15 unique contingency event forms.
  - ✓ Quarterly contingency event training.

**CADENA OIS**  
supports information exchange

# Example

# Volcanic Eruption Checklist

10: Volcanic Eruption	Impacted Facility: ACC (Brazzaville) / Airport Tower (Goma)
Initial ATFM Action	Follow-Up ATFM Actions
<ul style="list-style-type: none"><li>● Notify adjoining FMUs via landline</li><li>● Notify stakeholders, as able</li><li>● Post an Urgent Advisory on the CADENCE OIS</li><li>● Update the Volcanic Ash portion of the ATFM Daily Plan on the CADENCE OIS</li></ul>	<ul style="list-style-type: none"><li>● If the situation is severe, notify CADENCE and ICAO leadership</li><li>● Gather information on:<ul style="list-style-type: none"><li>○ How significant is the eruption and its impact to airport and sector capacity?</li><li>○ Will TMMs be required to manage excess traffic demand?</li><li>○ Have aircraft diverted?</li><li>○ If so, how many and to which airports?</li></ul></li><li>● If circumstances require, CADENCE leadership will schedule and conduct a CADENCE CDM web conference, including airspace users, to relay available information and establish next steps</li></ul>

# Example

# Contingency Form

Impacted Facility / Sector: FZMA (GOM)

REF #: May 9, 2022 – 0700 UTC

## Type of Contingency

- Communication
  Facility
  Surveillance
  Staffing
  **Other**

## Detail

**Mount Nyiragongo explosive eruption**

## Traffic Management measures

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Miles-in-trail (MIT)               | <input type="checkbox"/> Minutes-in-trail (MINIT)   | <input checked="" type="checkbox"/> <b>Re-routing</b>       |
| <input type="checkbox"/> Fix Balancing                      | <input type="checkbox"/> Level Capping              | <input type="checkbox"/> Tunnelling                         |
| <input checked="" type="checkbox"/> <b>Airborne Holding</b> | <input type="checkbox"/> Ground Delay Program (GDP) | <input checked="" type="checkbox"/> <b>Ground Stop (GS)</b> |

## Detail

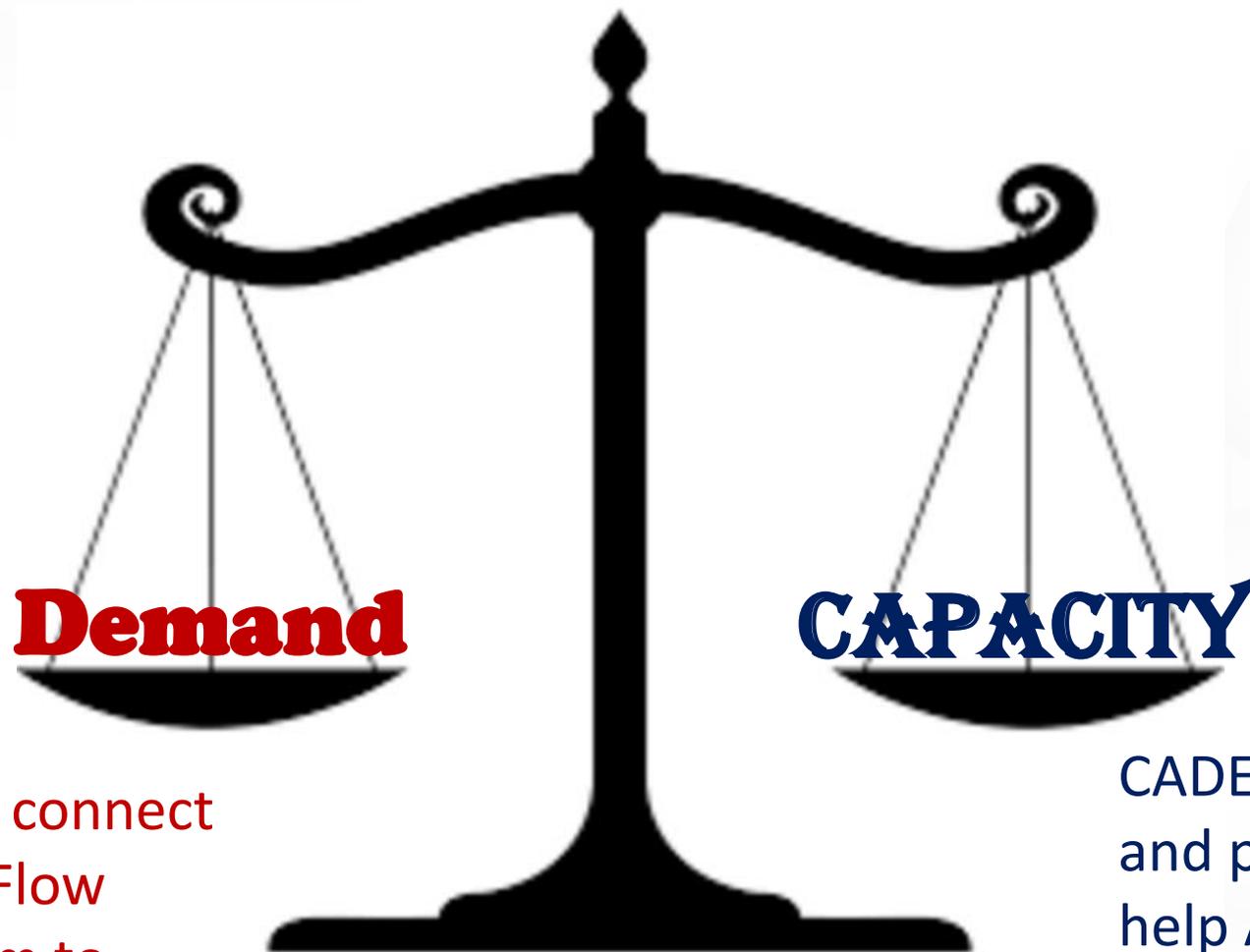
**FZNA (GOM) Ground stop in effect. Expect an update at 1800 UTC.**

## FIRs Affected

- FZZA**
 **HTDC**
 **FLFI**
 **FNAN**

**How?**

# Balancing Demand and Capacity



CADENA ANSPs can connect to the FAA's Traffic Flow Management System to exchange Flight Data and predict demand.

CADENA has developed and provides training to help ANSPs determine airport and airspace capacities.

# FMUs Around the LAC Region

How?



# Purpose of CADENCE TF

(CANSO ATFM 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



# CADENCE Task Force



**Mr. Joe Hof**

**Co-Chair CADENCE Task  
Force**

**CGH Technologies**



**Ms. Midori Tanino**

**Co-Chair CADENCE Task  
Force**

**FAA**

# BACKGROUND Of CADENCE - CADENA <sup>CANSO</sup>

## CANSO ATFM Data Exchange Network for Americas

- The capabilities offered by the CADENCE TF are based on the successful operational work accomplished by the CADENA
  - CADENA is a multi-nodal, regional ATFM/CDM system operated under the policy of **transparency, inclusiveness, and collaboration**
  - CADENA's success is based on the “**simple-to-achieve solutions**” and “**do the best you can**” approaches
- ❑ The baseline CADENCE OIS is offered at no cost.
  - ❑ Can start with low investment (e.g., computer, internet, human resource)

*Basic Solutions*



# OIS BENEFITS– Examples

**Qualitative Benefits** - understood intuitively

- More information sharing, better decisions
- Better coordination, better decisions
- Better decisions, more benefits

## Quantitative (monetary) Benefits

- UAL - Hurricane Maria Recovery Operation Case Study – \$1.0M-\$5.4M
- JBU - Return Home from Hurricane Maria Case Study – \$182.0K
- AAL - Jamaica Loss of Radar Surveillance Case Study – \$225.0K
- CPA - Jamaica Loss of Radar Surveillance Case Study – \$175.5K
- UAL - Colombia Loss of Satellite Comm Case Study – \$192.0K
- VOL - Filed FPLs via CADENA OIS while AFTN outage - \$690.8K
- DAL - PASA Optimization Trial (ATL-LIM) - \$384.0K/yr, 835,360kg of CO<sub>2</sub>
- BWA - PASA Optimization Trial (POS-MIA) - \$160.2K/yr, 271,934kg of CO<sub>2</sub>
- UAL - PASA Optimization Trial (IAH-PVR) - \$296.0K/yr, 307,168kg of CO<sub>2</sub>
- ARG - PASA Optimization Trial (EZE-MIA) - \$209.4K/yr, 375,944kg of CO<sub>2</sub>
- VIV – SENEAM SDR Trial – \$677.1K/yr, 675,040kg of CO<sub>2</sub>



Numbers in this briefing should not be interpreted literally, however, **the savings achieved by stakeholders are real**.

# ATFM Situation in Latin Americas

## Similarities?

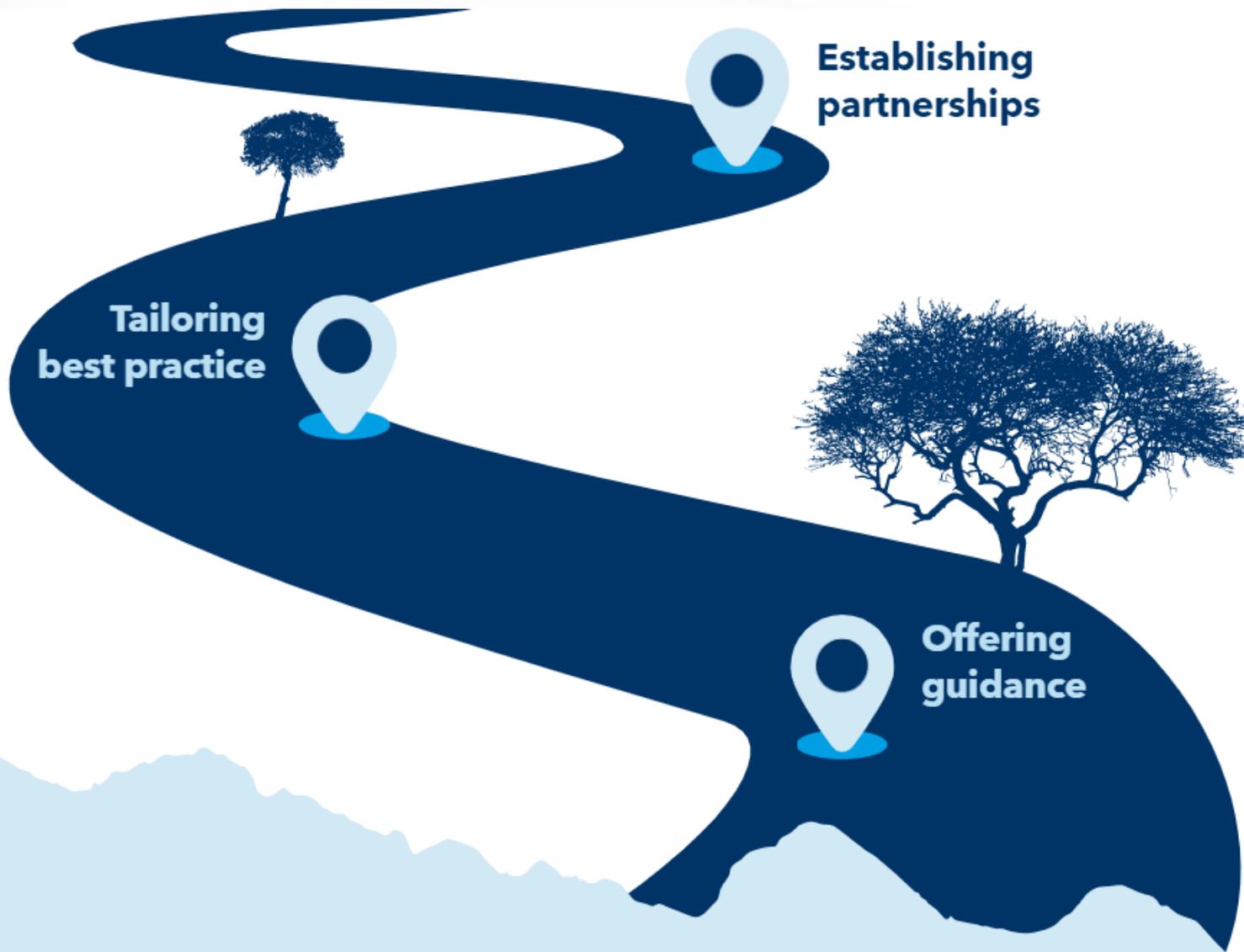
- Fragmented airspaces
  - Multi-nodal ATFM operation
  - Most states need adjacent states to conduct effective ATFM
  - Collaboration is a must
- Many states are financially constrained
  - Difficult to make big financial investments
  - Difficult to make investment with low ROI to yourself
- Latin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

# CANSO Mombasa ATFM Roadmap



“CANSO Mombasa ATFM Roadmap requires strong partnership, collaboration, **a platform for data and information sharing**, and most importantly – stakeholder commitment to achieve seamless operations in Africa.”

# The CANSO Africa Conference 2018 concluded with seven emerging issues



## **1. Collaboration**

2. Technology and innovation

3. Policies and regulations

## **4. Data and information sharing**

5. Member commitment

**6. Implementation plan of CDM, A-CDM and ATFM**

**7. Compliance with ICAO requirements**

# CADENCE OIS

– baseline version available at no cost

## Exchange:

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

## Enter:

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

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

# Background of CADENCE LOA between CGH Technologies and CANSO



CANSO and CGH Technologies virtual signing –  
CADENCE (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.
- CADENA OIS version 3.2 is the baseline for the CADENCE OIS v1.0.
- 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.

# Next Steps



- CADENCE TF is available to meet with aviation stakeholders to provide:
  - ✓ Additional operational and technical information.
  - ✓ High level demonstrations to management.
  - ✓ In-depth demonstrations to Operational Staff.



# Questions and Answers