

P/02 Rev. Agenda Item 2

History: From PASA to PASA E2E Route Optimization

For: ICAO Airspace Optimization webex

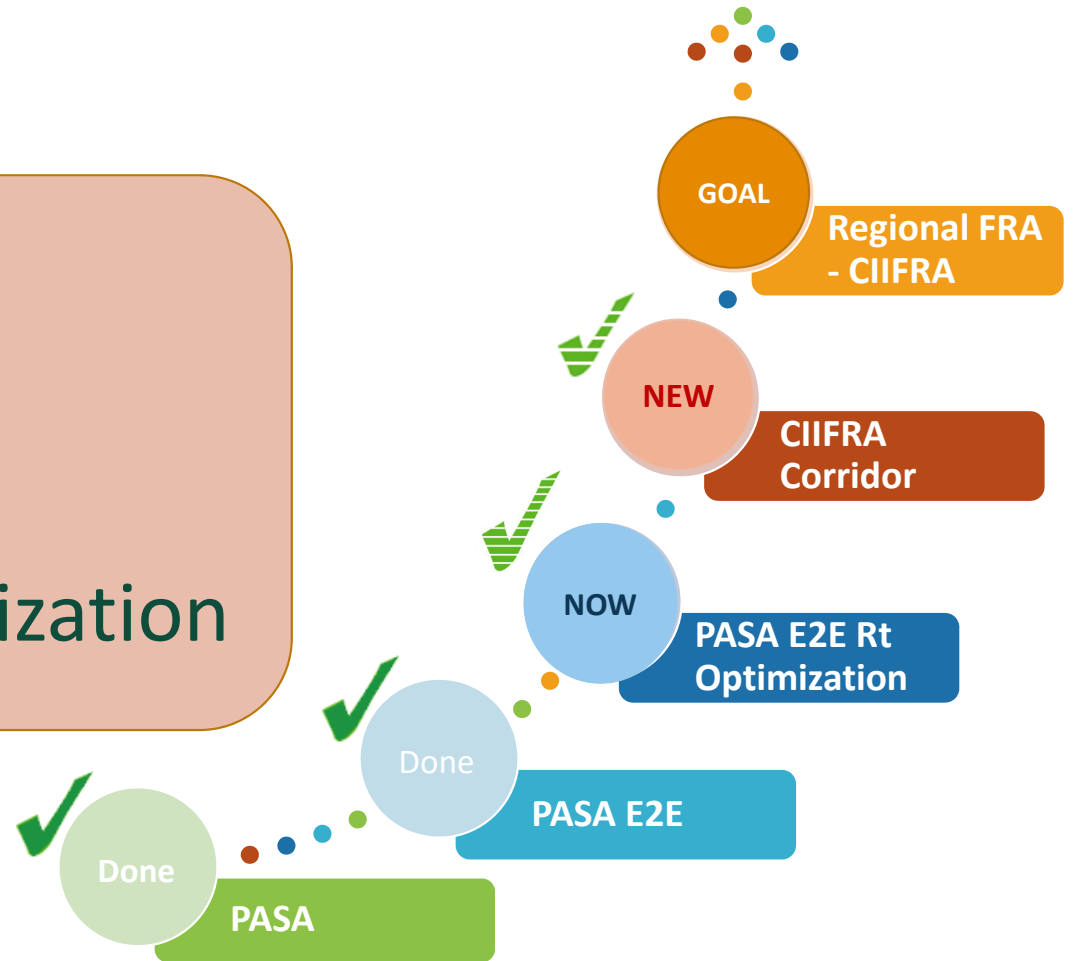
From: CADENA Team

Date: January 27, 2022

Steps 1 - 3: From PASA to PASA E2E Route Optimization

History

- PASA
- PASA E2E
- PASA E2E Route Optimization



CADENA Planned Airways System Alternative (PASA) Routes



ORIG	DEST	EASTBOUND THROUGH KZMA		
MEXICO	KMIA AND BEYOND	... AXOMU UM346 CANOA ...	AVOID KHU - EAST	BI-DIRECTIONAL ROUTE
CENAMER	KMIA AND BEYOND	... CTM ANIKO CZM UG765 FIS ...	AVOID KZHU - EAST	BI-DIRECTIONAL ROUTE
MMUN	KMIA AND BEYOND	MMUN NUDAL UV106 FRANT UG765 FIS ...	AVOID KZHU - EAST	
MMUN	KATL	... CUN UJ18 URTOK UG765 MAXIM G765 FIS PLYER JAWJA DAWWN ...	AVOID ZHU - EAST	INCLUDES ZMA FEEDBACK
ORIG	DEST	WESTBOUND THROUGH ZMA		
KATL	MMUN	... WALET YUESS OTK TEPEE BRDGE RSW KARTR Q81 TUNSL Y196 CANOA UB879 CUN ...	AVOID ZHU - EAST	
ZMA	MMMX	... ENDEW Q81 TUNSL Y196 CANOA UM346 AXOMU UR522 PAZ UJ55 DATUL ...	AVOID KHU - EAST	
ORIG	DEST	WESTBOUND THROUGH ZAB		
MEXICO	KZAB AND BEYOND	... MOV MRF ...	AVOID KZHU - WEST	
ZMA	KZAB AND BEYOND	... CANOA ELUNI COFRE UM506 SESNO UJ15 MOV UJ2 CUU UJ47 CJS ELP ...	AVOID KZHU - WEST	

AVOID ZHU THROUGH ZAB

CANOA .. ELP

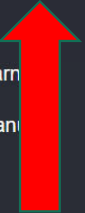
CANOA ELUNI COFRE UM506 SESNO UJ15 MOV UJ2 CUU UJ47 CJS ELP



CADENA OIS Planned Airways System Alternative (PASA) Routes



- CADENA OIS
- Main
- Weekly Conf
- Hurricane Conf
- Contingency Form
- ADP Link Files
- PASA Route Requests
- Contact List
- Lessons Learn
- CADENA Man



DELTA Delta Air Lines

Spanish 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 JJED12 KATL

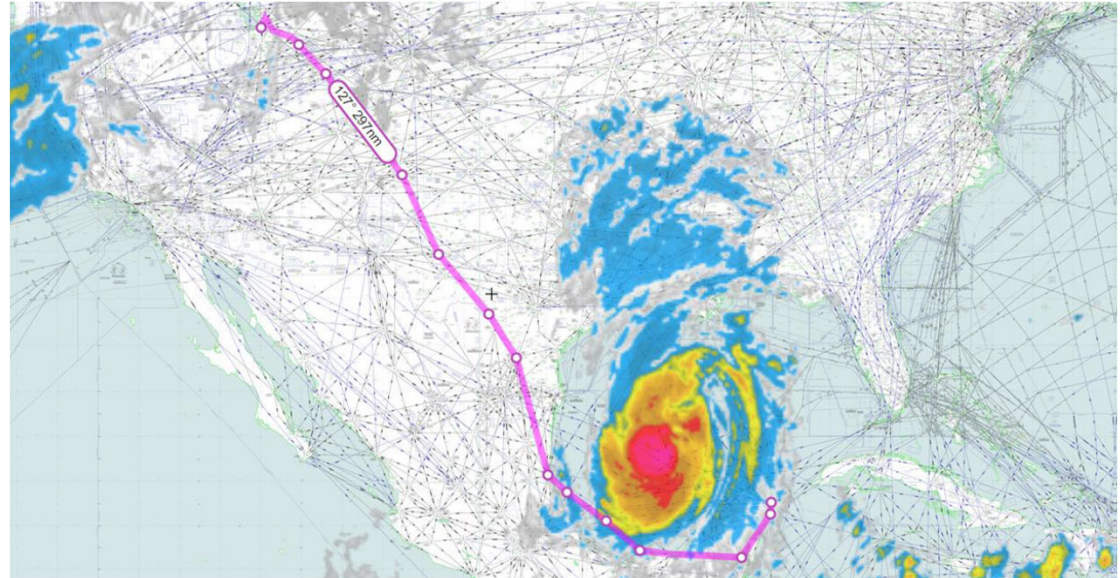
Plot Save as Template Submit

Some locations or airways in the route ISREN2F, Y183, Q87, Q77, JJED12 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.





PASA ROUTE REQUEST OCT 7, 2020



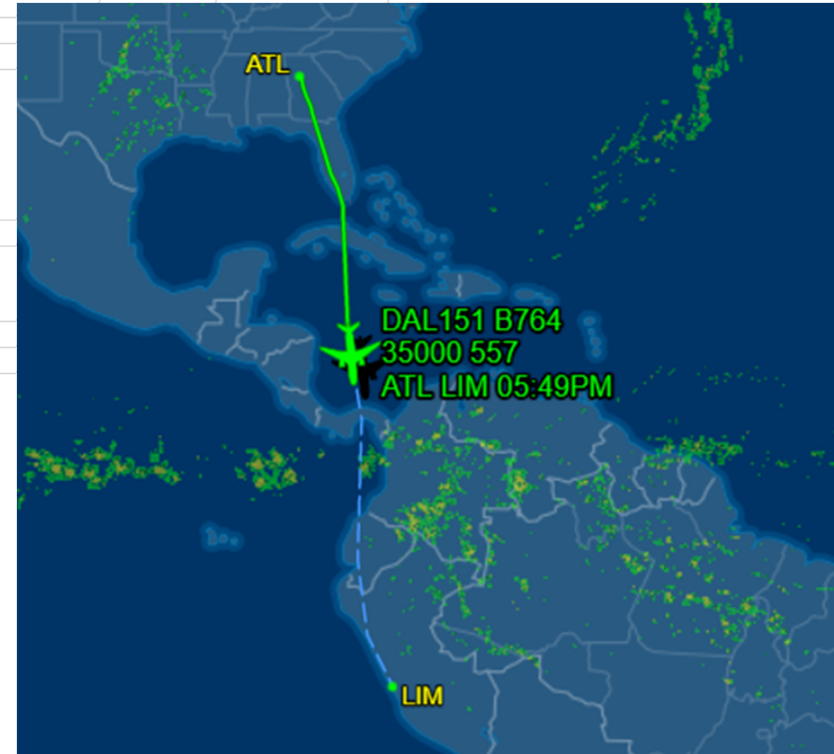
PASA ROUTE REQUEST NOV 16, 2020

PASA E2E Route Trial: May 25, 2021



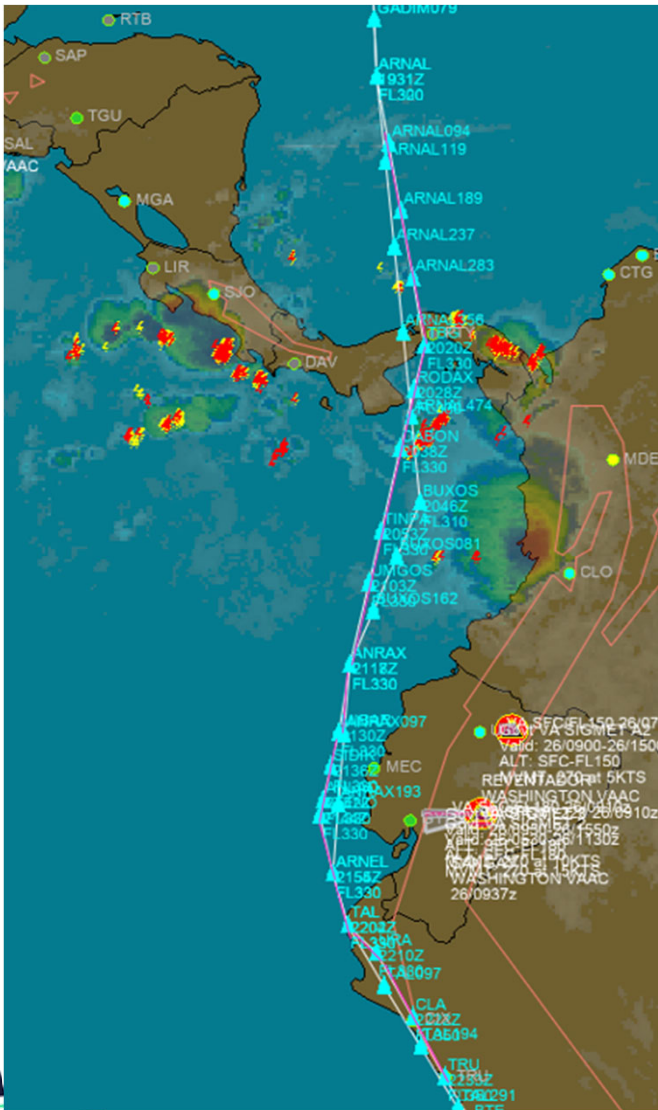
	Origin	Dest	Route
DAL151	1621 UTC	2300 UTC	
Current	ATL	LIM	SOUTHBOUND KATL VRSTY2 MCN YANTI Q89 SHRKS DEBRL Q97 TOVAR Y297 URSUS UG430 KILER UQ102 BOKAN UP533 QIT UM674 ATATU ATATU2 SPJC
Requested	ATL	LIM	KATL SMLT22 WALET DCT YUESS Q79 MCLAW Y442 FUNDI DCT ARNAL DCT VAMOS DCT GYV DCT ATATU ATATU2 SPJC
Approved			KATL SMLT22 WALET DCT YUESS Q79 MCLAW Y442 FUNDI DCT LEPON DCT ARNAL DCT VAMOS DCT GYV DCT ATATU ATATU2 SPJC

				SOUTHBOUND COORDINATION	
	SENT	RECEIVED	ACC/FIR	CURRENT ROUTE	REQUESTED ROUTE
			MUFH	URSUS UG430 UG430 KILER	REQUEST: FUNDI LEPON ARNAL REQUEST: FUNDI ARNAL
			MKJK		
			MPZL		REQUEST: ARNAL VAMOS
			SKED	UQ102 BOKAN	REQUEST: ARNAL VAMOS
			SEFG	BOKAN UP533 QIT UM764	REQUEST: VAMOS GYV ATATU
			SPIM	UM764 ATATU ATATU2 SPJC	REQUEST: GYV ATATU ATATU2 SPJC



Coordination

Pilot test: DAL150 on May 25, 2021



Code	ACC/FIR	Country
MUFH	Habana	Cuba
MKJK	Kingston	Jamaica
MPZL	Panama	Panama
SKED	Bogota	Colombia
SEFG	Guayaquil	Ecuador
SPIM	Lima	Peru

Pink: Baseline route

Cyan: Route with DCT



May 25, 2021: KATL to SPJC

Type	ETE	Burn	Distance	Route
Baseline	6:18	83900	2858	KATL SMLTZ2 WALET DCT YUESS Q79 MCLAW Y442 FUNDI UM335 ARNAL UL465 TBG UM542 TAL UV1 ATATU ATATU2 SPJC
w/ DCTs	6:16	83300	2855	KATL SMLTZ2 WALET YUESS Q79 MCLAW Y442 FUNDI DCT LEPON UM335 ARNAL DCT BUXOS DCT ANRAX DCT ARNEL UM542 TAL DCT ATATU ATATU2 SPJC

DCT route Savings by DAL150

- Saved 89.55 gallons of fuel
- Saved 857kg of CO2
- Saved 2 min of flight time
- \$1.73 per gallon
- \$100.00 operational cost per min

- Annual monetary saving = $\left[\left(\frac{89.55 \text{ gal}}{\text{flight}} * \frac{\$1.73}{\text{gal}} \right) + \left(\frac{2 \text{ min}}{\text{flight}} * \frac{\$100.00}{\text{min}} \right) \right] * \frac{5 \text{ flight}}{\text{week}} * \frac{52 \text{ week}}{\text{year}}$

- Annual CO2 saving = $\frac{857 \text{ kg}}{\text{flight}} * \frac{5 \text{ flight}}{\text{week}} * \frac{52 \text{ week}}{\text{year}}$

- \$92,280/year CO2: 222,817 kg/year

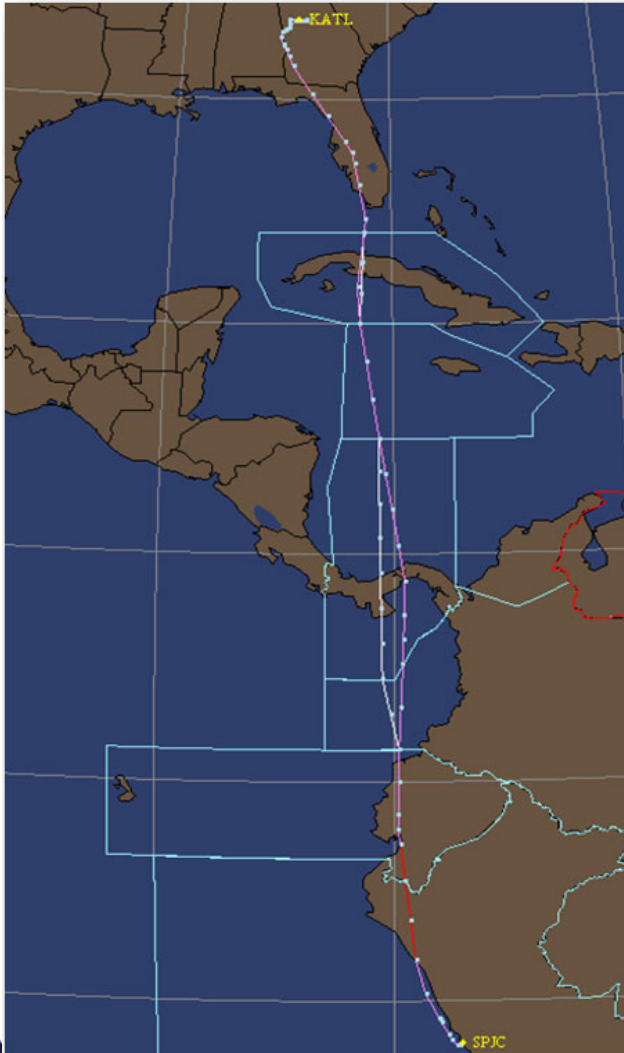
Data provided by DAL

Coordination

Pilot test: DAL151 on May 11, 2021

Code	ACC/FIR	Country
SPIM	Lima	Peru
SEFG	Guayaquil	Ecuador
SKED	Bogota	Colombia
MPZL	Panama	Panama
MKJK	Kingston	Jamaica
MUFH	Habana	Cuba

Pink: Baseline route
 White: Route with DCT



May 11, 2021: SPJC to KATL

Type	ETE	Burn	Distance	Route
Baseline	6:35	87017	2916	SPJC ISREN2F ISREN UL780 TBG UL465 ARNAL DCT ATUVI UG448 IKBIX Y183 PEAKY Q118 SHEEK Q110 DAWWN DCT BEORN HOBTT2 KATL
w/ DCTs	6:31	84445	2882	SPJC ISREN2F ISREN UL780 UGUPI DCT TINPA DCT MORLI DCT ARNAL DCT ATUVI DCT IKBIX Y183 PEAKY Q118 SHEEK Q110 DAWWN DCT BEORN GNDLF2 KATL

DCT Route Savings by DAL151

- Saved 383.88 gallons of fuel
- Saved 3,673.73kg of CO2
- Saved 4 min of flight time
- \$1.73 per gallon
- \$100.00 operational cost per min

- Annual monetary saving = $\left[\left(\frac{383.88 \text{ gal}}{\text{flight}} * \frac{\$1.73}{\text{gal}} \right) + \left(\frac{4 \text{ min}}{\text{flight}} * \frac{\$100.00}{\text{min}} \right) \right] * \frac{5 \text{ flight}}{\text{week}} * \frac{52 \text{ week}}{\text{year}}$

- Annual CO2 saving = $\frac{3673.73 \text{ kg}}{\text{flight}} * \frac{5 \text{ flight}}{\text{week}} * \frac{52 \text{ week}}{\text{year}}$

- \$172,699/year CO2: 955,170 kg/year

Data provided by DAL

DCT Route Savings by DAL150 and DAL151 combined

Monetary Savings	CO2 Savings
\$368,949/year	1,177,987 kg/year
Where Fuel savings: \$212,949/year Op cost savings: \$156,000/year	

PASA E2E Route Optimization: Completed 90-Day Trial KATL..SPJC..KATL



KATL..SPJC..KATL: Jul 9 - Oct 7, 2021		
Savings	90-Day	1-Year
Flight minutes:	515	2,089
Fuel (lb):	145,425	589,779
CO2 (kg):	208,445	845,360
Ops cost (\$):	\$USD 94,693	\$USD 384,033

Note: Extended until 10/7/22

PASA E2E Route Optimization: 30 days of track data

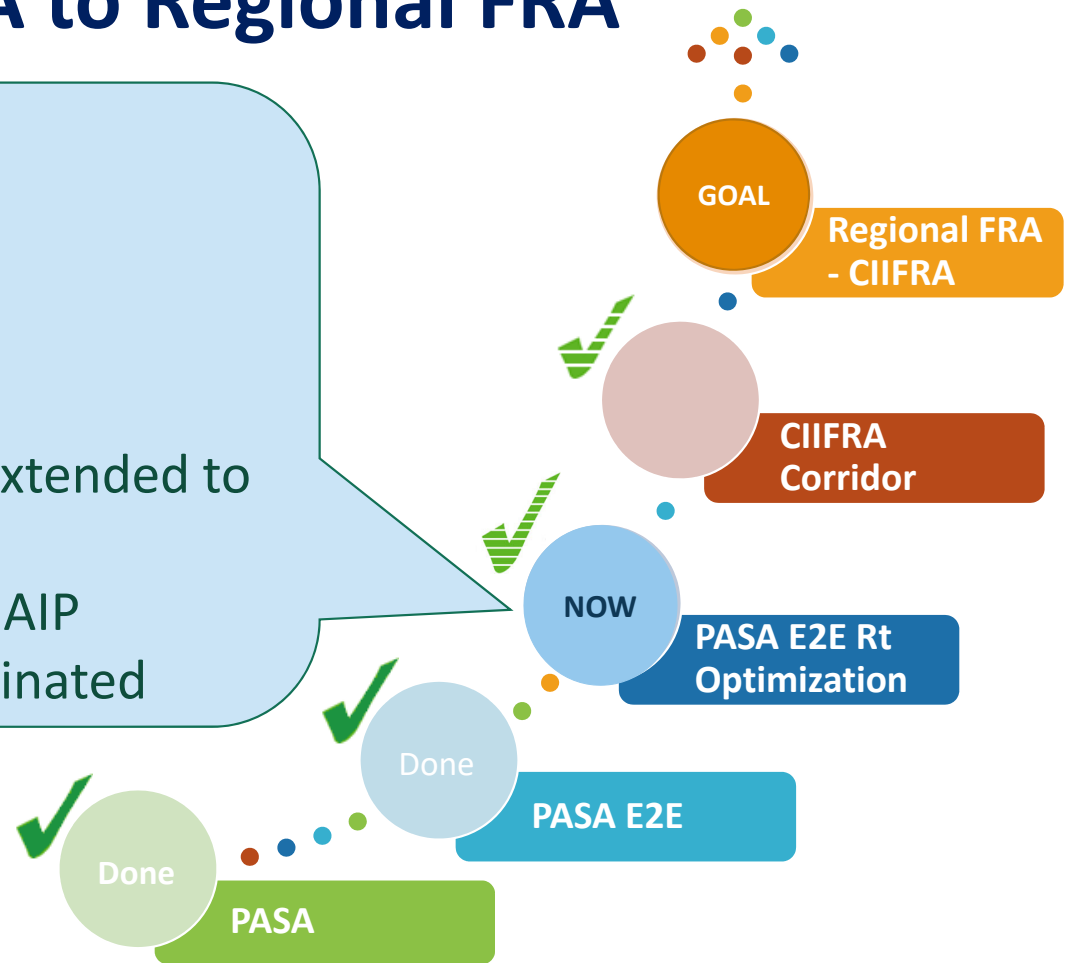


PASA E2E Route Optimization: 90 days of track data



Step-by-Step: From PASA to Regional FRA

- Two on-going 90-Day Trials:
 - SAEZ - KMIA
 - KATL - SAEZ
- Four completed 90-Day Trials:
 - KATL - SPJC
 - KATL - SBGR
 - TTPP - KMIA
 - KIAH - MMPV
- PASA optimized routes use are all extended to one year
- Next Step: Publish these routes in AIP
- More 90-Day Trials are being coordinated





PASA E2E Route Optimization: Completed 90-Day Trials

KATL..SPJC..KATL: Jul 9 - Oct 7, 2021		
Savings	90-Day	1-Year
Flight minutes:	515	2,089
Fuel (lb):	145,425	589,779
CO2 (kg):	208,445	845,360
Ops cost (\$):	94,693	384,033

Extended until 10/7/22

TTPP..KMIA..TTPP: Aug 6 - Nov 3, 2021		
Savings	90-Day	1-Year
Flight minutes:	256	1,038
Fuel (lb):	46,780	189,719
CO2 (kg):	67,052.28	271,934
Ops cost (\$):	39,494	160,170

Extended until 11/3/22

KATL..SBGR..KATL: Jul 27 - Oct 25, 2021		
Savings	73-Day*	1-Year
Flight minutes:	235	1,175
Fuel (lb):	62,035	310,175
CO2 (kg):	88,918	444,590
Ops cost (\$):	41,925	209,625

* Note: Trial conducted for 90 days and data available for 73 days. Extended until 10/25/22

KIAH..MMPR..KIAH: Sep 1 - Nov 27, 2021		
Savings	90-Day	1-Year
Flight minutes:	558	2,263
Fuel (lb):	52,841	214,300
CO2 (kg):	75,740	307,168
Ops cost (\$):	72,993	296,027

Extended until 11/27/22

Total of 4 routes/year: 6,565 min; 1,303,973lb of fuel; 1,869,052Kg of CO2, and \$1,049,855 of ops cost

On-going 90-Day Route Optimization Trials

- SAEZ..KMIA..SAEZ
by Aerolíneas Argentinas
Dec 6, 2021 – Mar 5, 2022

Dec 6 2021 – Jan 21 2022	Savings
Flight min:	142
Fuel (kg):	15,890
CO2 (kg):	50,212
Cost (\$):	27,285

NOTE: Fuel unit is kg.



- KATL..SAEZ..KATL
by Delta Airlines
Dec 6, 2021 – Mar 5, 2022

Jan 3 – Jan 24, 2022	Savings
Flight min:	378
Fuel (lb):	71,705
CO2 (kg):	102,779
Cost (\$):	59,204

NOTE: Dec 2021 data not available.





New 90-Day Route Optimization Trials

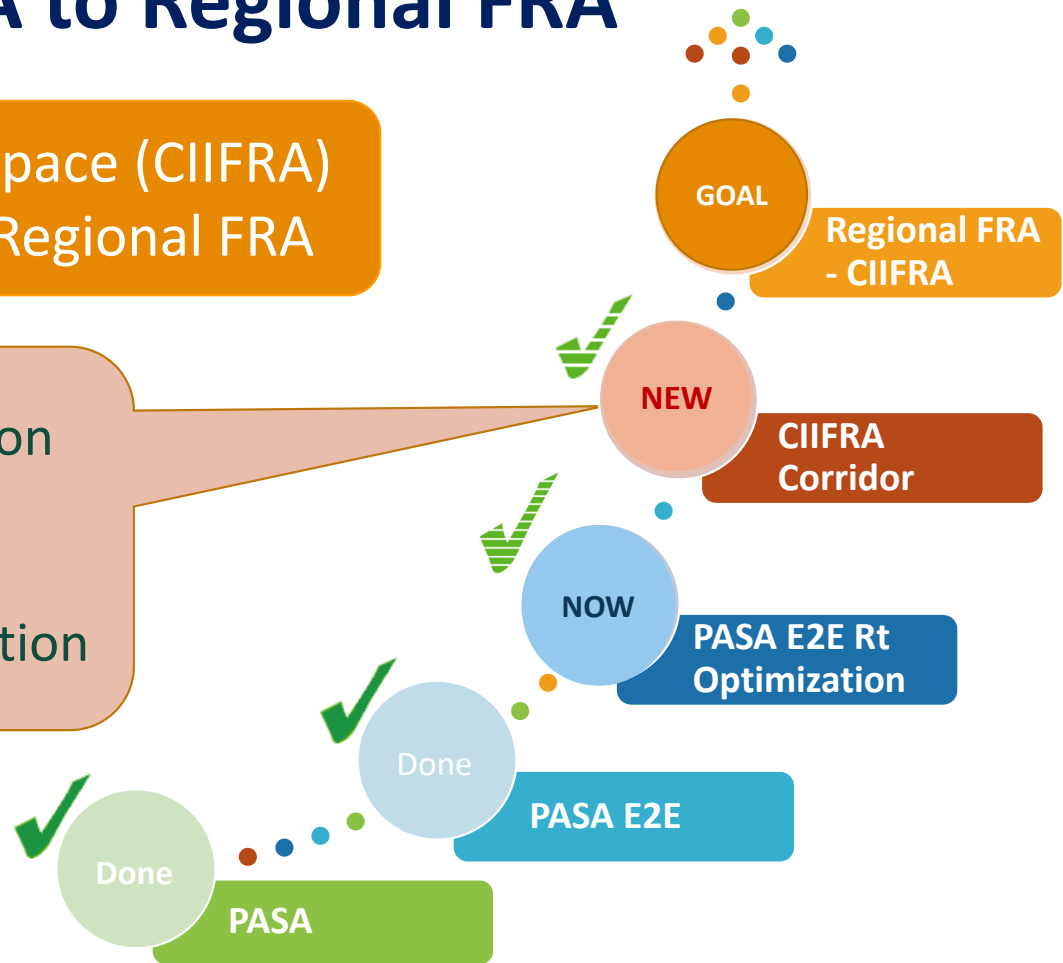
- TTPP..KJFK..TTPP by Caribbean Airlines (in progress)
- KIAH..MMSD..KIAH by United Airlines (in progress)
- KATL..SCEL..KATL by Delta Airlines (in progress)
- Selected city-pairs by Federal Express (in 2022)
- American Airlines is evaluating flights that could be added to the existing trials



Step-by-Step: From PASA to Regional FRA

CANSO IATA ICAO Free Route Airspace (CIIFRA)
for Latin America and Caribbean Regional FRA

- Approaches of FRA Implementation
- Formation of Focus Team
- Selection of the 1st CIIFRA Trial
- CIIFRA Trial Plan and Implementation



Questions?

Thank you!

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CANSO

