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P/04

Introduction of Vertical FRA Concept


**Presented by the Secretariat
Agenda Item 5**





Free Route Airspace

ASBU ELEMENTS

| FRTO-B1/1 | Free Route Airspace (FRA) | Operational |
|--|---|-------------|
| Main Purpose  | <p>The Free Route Airspace (FRA) concept brings significant flight efficiency benefits and a choice of user preferred routes to airspace users.</p> <p>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.</p> | |



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Free Route Airspace

New Capabilities

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between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) waypoints, without reference to the ATS route network, subject to airspace availability.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.



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Free Route Airspace

FRA implementation can be customized for instance:

- laterally and vertically;
- during specific periods;
- with a set of entry/exit conditions;
- with initial system upgrades.



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Regional Free Route Airspace (FRA)

- Definition of ASBU FRT0 B0/1 Direct Routing (DCT)
- Definition of ASBU FRT0 B1/1 Free Route Airspace (FRA)

In continental airspace, the most important operational improvement is related to **FRA** as the continuation of **DCT**. For airspace where FRA cannot be deployed , or for connectivity between FRA and terminal maneuvering areas (TMAs), RNP routes might be considered. Collaborative airspace management is enhanced with new features such as real time airspace management (ASM) data exchanges.

Definition of ASBU FRT0 B0/1 DCT



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DCT Capabilities: 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.

DCT Enablers

DCT Procedures

Establish operational procedures for DCT

ATC System

Upgrade for DCT clearances, notification and coordination data exchanges, etc.

AO Flt Planning Sys

Upgrade to enable flight planning of DCTs

Training

ATCO, AO, and ATM Network trainings for DCT operation

ATFM System for FRA

Upgrade for ATFM/flight planning systems to support FRA

Definition of ASBU FRTTO B1/1 FRA



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FRA Capabilities: FRA is a specified volume of airspace within which users may freely plan a route between defined entry and exit points, with the possibility to route via intermediate waypoints, without reference to the ATS route network, subject to airspace availability.

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.

FRA Enablers

Procedures for FRA Airspace Design

Establish operational procedures for FRA

ATC System

Upgrade to ensure conformance monitoring of flights and conflict detection

AO Flt Planning Sys

Upgrade Computerized Flight Plan Service Providers (CFSP) system for FRA operation

Training

ATCO and AO training for FRA operation

ATFM System

Upgrade for ATFM/flight planning systems to support FRA

Items to be Considered to implement FRA

- Who/Where
- What/Which
- When – *Soon but at your pace*
- How



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Implement DCT and FRA – Where/Who

Airline

- Operations Center Support System covering its operation
- Aircraft Equipment

ANSP

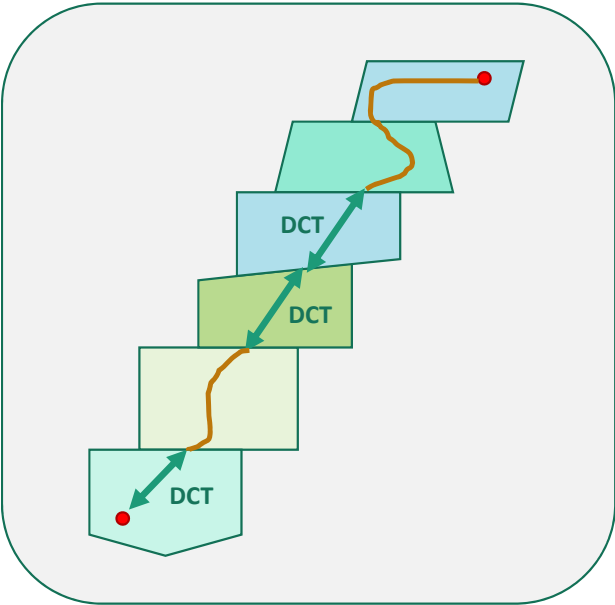
- Operations Center Support System covering its FIR(s)
- CSN System covering its FIR(s)

Region

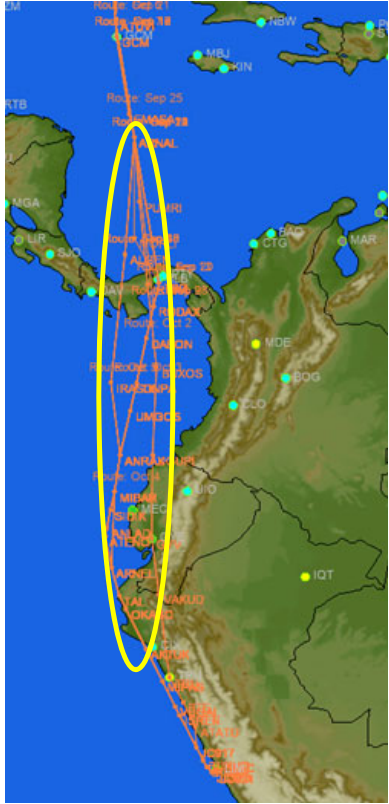
- CANSO, IATA, and ICAO to guide and support the implementation at all levels, but specially the regional level
- Adjacent ANSPs coordinating implementation

Implement DCT and FRA – What/Which

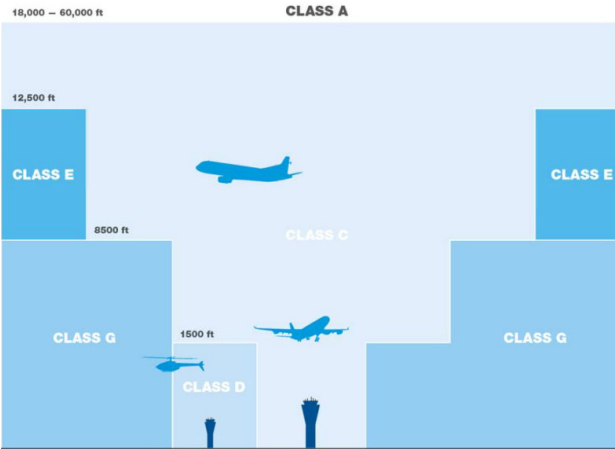
DCT



Horizontal FRA



Vertical FRA



Implementing FRA – How



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DCT

- Identify who can support DCT
- Identify adjacent ANSPs with DCT capabilities
- Extend continuous DCT coverage range by coordination among ANSPs with DCT capabilities

Horizontal FRA

- Identify the area where horizontal FRA can be achieved (one or more ANSPs involved)
- Identify what coordination and adjustments are necessary (system, administrative, policy, etc.) by ANSPs and airlines
- Work on identified items

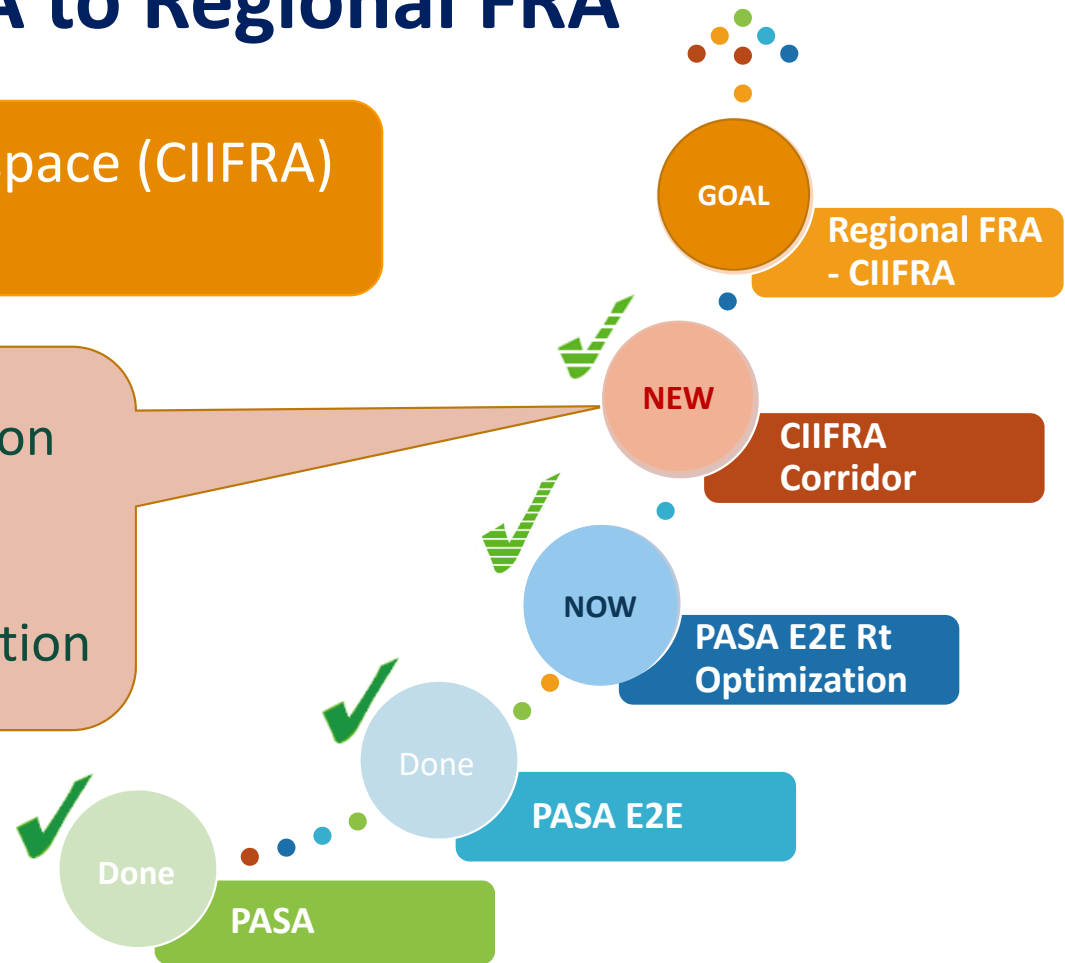
Vertical FRA

- Identify who can support Vertical FRA, at which flight levels, and during which times of the day
- Identify what coordination and adjustments are necessary (system, administrative, policy, etc.) by ANSPs and airlines
- Identify adjacent ANSPs who can support Vertical FRA
- Work on identified items

Step-by-Step: From PASA to Regional FRA

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

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





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Optimized Routes

Free Route Airspace

Low hanging fruit

save

save

save

Long term goal





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Free Route Airspace

Low hanging fruit

s
a
v
e

s
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s
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Long term goal





We are happy to report that there are 4 optimized routes that have been extended to fall 2022 and another 2 currently in 90 day trial. There are another 3 optimized routes in the process for approval.

On the 6 routes that are being utilized:

- 9,659 minutes flying time saved/year
- 1,820,041 lbs of fuel saved/year
- 2,826,330 Kg Co2 saved/year
- 1,579,325 USD saved/year
- 4,398 flights impacted/year





2,826,330 Kg Co2 saved is the equivalent of...

Equivalency Results [How are they calculated?](#)








The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:





2,826,330 **Kilograms**

Greenhouse gas emissions from

| | |
|--|---|
| 615 | 7,103,127 |
|  |  |
| Passenger vehicles driven for one year | Miles driven by an average passenger vehicle |

CO₂ emissions from

| | | | | | | |
|---|--|--|--|--|--|--|
| 318,030 | 277,636 | 3,123,896 | 37.4 | 340 | 513 | 15.6 |
|  |  |  |  |  |  |  |
| gallons of gasoline consumed | gallons of diesel consumed | Pounds of coal burned | tanker trucks' worth of gasoline | homes' energy use for one year | homes' electricity use for one year | railcars' worth of coal burned |

| | | | |
|--|---|---|---|
| 6,544 | 115,540 | 0.0007 | 343,802,261 |
|  |  |  |  |
| barrels of oil consumed | propane cylinders used for home barbeques | coal-fired power plants in one year | number of smartphones charged |





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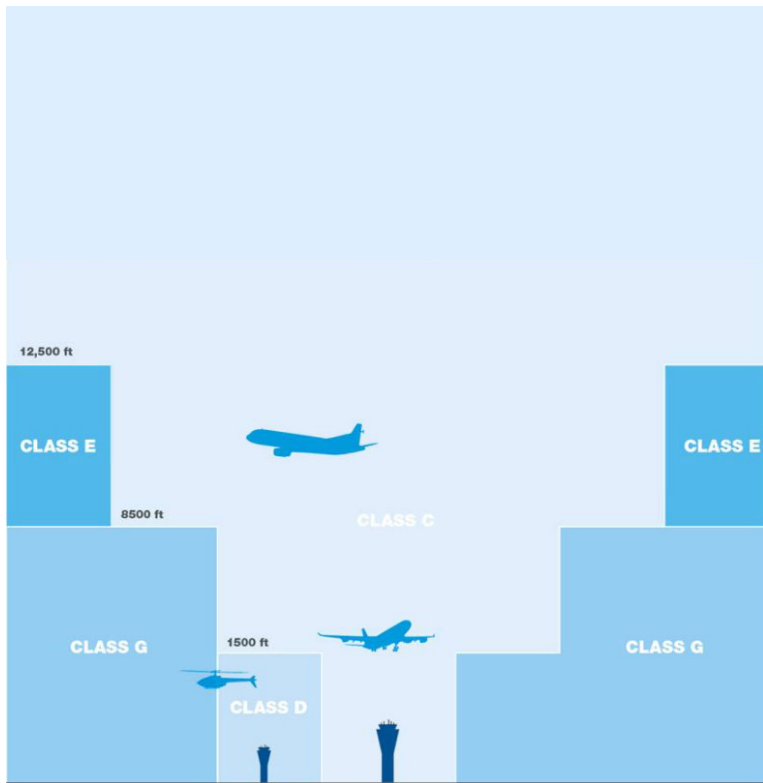


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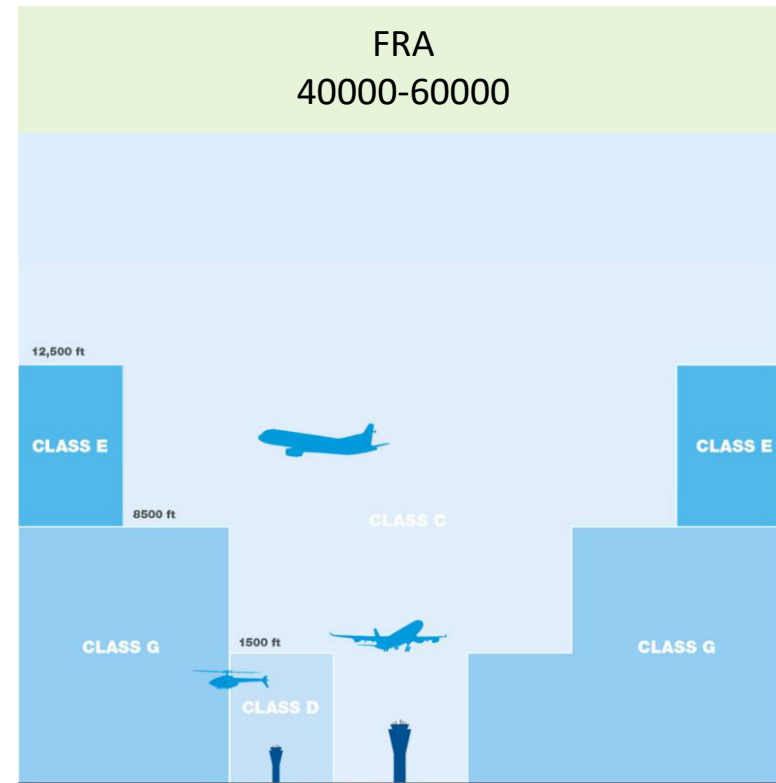
Questions?



VERTICAL - FRA



Class A
18000-60000





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Combination - FRA

horizontal
XXX ANSP will have FRA available between 0400
temporal
and 1100 UTC at or above vertical
FL390



How do we get there?

✈ Focus group

- ✈ High altitude ANSP's
- ✈ Some low altitude ANSP's
- ✈ IATA
- ✈ CADENA ICAO

✈ Meet regularly

- ✈ Report to main group
- ✈ Discover/analyze hindrances obstacles
- ✈ Work towards solutions

The 1st FRA Trial: Team Actions

Select the trial criteria for implementing FRA

- Time – low traffic time period
- Vertical – super high
- Horizontal – determine with participating ANSPs and airlines

Determine the details of the trial

- Roles and responsibilities
- Trial-CIIFRA structure
- Data collection and analysis
- Procedures and training
- Date/time
- Other

Prepare the trial plan, coordinate, and implement



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Questions?



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THANK YOU!