Free Route Airspace Implementation Workshop

17-18 November 2026







INTERNATIONAL CIVIL AVIATION ORGANIZATION

Free Route Airspace Implementation Workshop

Beijing, China

17 – 18 November 2026

Workshop Session

01 Introduction to Free Route Airspace

02 Progressive steps towards FRA

03 Preparing FRA Implementation

04 The Implementation of FRA

The Implementation of FRA in AFI Region

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Presentation overview

01 FRA and ICAO GANP: FRTO thread of the ASBU framework

02 AFI FRA Phase 1: Preparation and Local Implementation

03 AFI FRA Phase 2: UPR Trials and Implementation in AFI Region

04 UPR and Cross Border FRA Implementation

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1. FRA | ICAO Global Air Navigation Plan (GANP)

ICAO GANP places free routing in the FRTO thread of the ASBU framework.

FRTO-B0/1

Direct routing (DCT)

Direct routing provides an early form of route flexibility within local ATS rules.

FRTO-B1/1

Free Route Airspace

Flights may be planned within a defined volume, subject to published conditions.

FRTO-B2/3

Large-scale cross-border FRA

Neighbouring FIRs coordinate procedures and interfaces for regional FRA continuity.

AFI regional task: prepare each FIR and boundary interface, connect eligible volumes to realize more benefits

Source: ICAO GANP ASBU Portal, FRTO thread; APIRG/22-WP/43 (2019)

FRA Concept Definition

1. A **specified airspace** within which users may freely **plan a route between a defined entry point and a define exit point**, with the possibility to route via intermediate (published or unpublished) way points, **without reference to the ATS route network**, subject to airspace availability.

2. Free Route operations enable airspace users to fly as closely as possible to their preferred trajectory **without being constrained by fixed route networks or structures**. In an FRA airspace, all fixed route networks can be removed.

3. Flights remain subject to air traffic control.

4. Active restricted airspace are crossed or avoided depending on the degree of coordination (including civil/military coordination) and the status of the activity in the area.

5. It is important to note the difference between “Direct Routing Operations” (DRO) and “Free Route airspace” (FRA) operations.

6. Direct Route Operations will precede the implementation of Free Route Airspace.

FRA Implementation steps

OPS	TYPE	COMMENT
TACTICAL DCT	LOCAL	FRA PMT encourages to move to plannable directs
	CROSS-BORDER	Coordination required with adjacent FIR
PLANNABLE DCT	LOCAL	AIC/AIP SUP issued by States/FIR; repository of plannable DCT
	CROSS-BORDER	Coordination required with adjacent FIR and LOPs will need to be revised, has linkage with PBN route implementation or UPR/DCT trials
FRA	LOCAL	implemented in some FIRs, planned or in progress in other FIRs
	CROSS-BORDER	Current focus of FRA PMT. At regional level, more benefits, future steps, enhanced coordination

FRA SIGNIFICANT POINTS

A navigation point has one or more roles in the FRA air space:

Code	Meaning	Utilization
"E"	**Entry point**	For entering the free route airspace
"X"	**Exit point**	For exiting the free route airspace
"I"	**Intermediate point**	For flight level/direction changes
"D"	**Aerodrome Departure Point**	at the end of SID or at departure aerodrome
"A"	**Aerodrome Arrival Point**	at the start of STAR or at arrival aerodrome

Flight	Path
Overflight:	**E => I*=> X**
From external FRA to an aerodrome under FRA:	**E => I* => A**
From an aerodrome under FRA to the en-route phase:	**D => I* =>X**
Flight linking two aerodromes under FRA :	**D => I* => A**

*as needed, one or more Ex FRA point : OPERO(EX), PISPA(I)

Possible FRA points combination
EX, AD,,…

FRA points founded on 5LNC and NAVAIDs coding

FRA is based on very simple procedures derived from the use of DCT

FRA, DCT, UPR and random routes

FRA defines the airspace and rules; DCT, UPR and random route describe different route choices.

01 FRA

Published volume and rules for eligible off-route planning between defined points.

02 DCT

One direct segment between points; it may be filed or cleared inside or outside FRA.

03 UPR

A flight-specific preferred trajectory, may also use wind benefits; it can be trialled outside FRA.

04 Random route

Point/coordinate route only where the AIP permits; Mostly oceanic; ATC coordination still applies.

Direct routings, UPR trials and random routes do not by themselves establish FRA operations.

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2. AFI FRA mandate and Implementation tools, 2019–2022

2019

APIRG/22 launches regional work. States are invited to include FRA in their airspace and ATM plans.

2020

APIRG/23 establishes FRA as a regional priority. The draft CONOPS is discussed, and awareness activities begin.

2021-2022

The PMT develops the CONOPS, gap analysis, safety tools, AIC/AIP SUP templates, roadmap and FIR clusters.

AFI lesson: **Team work within PMT | Participation of National Focal Point | Experience Sharing.**

Economic pressure raised the value of FRA

COVID magnified airline viability pressure; operational readiness.

COVID-19 · 2020

DRC –49% · Angola –69%

IATA passenger-impact estimates. ICAO warned that aviation faced severe liquidity and survival risks globally.

African airline cost base

Fuel = 40% of costs

2024: 25% globally. IATA reports African fuel prices +17%, air-navigation charges +10%, and maintenance / insurance / capital +6–10% vs global averages.

Route-efficiency opportunity

USD 15 m estimated

AFI annual estimate for six UPR airlines: 5,000 t fuel and USD 15m fuel-cost savings. FRA allows preferred trajectories beyond the fixed ATS network within defined airspace.

Readiness still sets the pace: align navigation specifications and PBN requirements; publish FRA points and harmonized AIPs; validate CNS/ATM, flight-plan systems and safety coordination.

Keep fixed routes for non FRA flights and contingency or where transition needs require them.

Sources: IATA Africa COVID impact (2020); ICAO COVID guidance; IATA Africa outlook (2025); ICAO AASPG/1-WP/04A1 (2025)

Three AFI FRA pilot clusters

Cluster membership is a coordination structure in operation.

Clusters support joint gap reviews, safety work and action plans; Phase II advances eligible interfaces by readiness and traffic flow.

ICAO PMT membership is listed by participating States / ANSPs; operational readiness remains FIR- and interface-specific.

WEST & CENTRAL AFRICA
ICAO WACAF

ASECNA (18 States)

Cabo Verde · DR Congo

Ghana · Guinea (Conakry)

Liberia · Nigeria

Sierra Leone

EAST AFRICA
ICAO ESAF

Ethiopia · Kenya

Madagascar · Mauritius

Rwanda · Seychelles

Tanzania · Uganda

Somalia (Mogadishu)

SOUTH AFRICA
ICAO ESAF

Angola · Botswana

Malawi · Mozambique

Namibia · South Africa

Zambia · Zimbabwe

Source: ICAO AAO/SG7 WP/03.2D (2024), §5; APIRG/27 WP/03A1

CONOPS: One Regional Operating Framework

CONOPS gives States a common basis for designing, publishing and coordinating FRA and route options.

Airspace design

Define boundaries, levels, points and constraints; decide whether to remove, retain selectively or keep fixed routes published.

Flight planning

Set off-route filing rules and explain how retained routes serve non-FRA users, transitions and contingency.

ATS coordination

Agree transfer points, coordination procedures and responsibilities across FIRs.

Publication and contingency

Publish the usable arrangement and define how it is restricted, suspended or resumed.

Regional reference adopted by APIRG/25 through Conclusion 25/03.

FRA Readiness | Survey and Gap analysis

Comparing current capability with the FRA requirements.

Governance
Nominated PMT and focal points, owners and an agreed implementation scope.

Safety and systems
Check COM, NAV, surveillance, flight-plan processing and safety nets.

Airspace and data
Working AFI example: FL245–FL460, H24; each State publishes its volume and points.

AIM and publication
Publish AIP/NOTAM, point coordinates, 5LNCs and cross-FIR interfaces.

ATS procedures
Flight-plan handling, transfer and neighbour coordination.

People and resources
Training, staffing, technical support and continuity.

For each gap: action · owner · due date · closure evidence

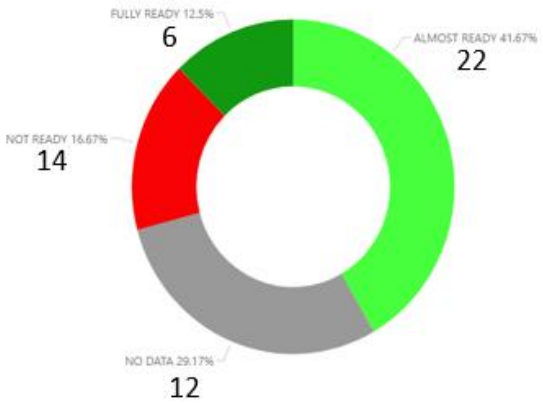
FRA concept of operations (CONOPS) 2nd Edition which includes **Procedures for FRA implementation** and safety requirements

Gap analysis. The gap analysis revealed the level of **preparedness of the AFI States** in implementing FRA

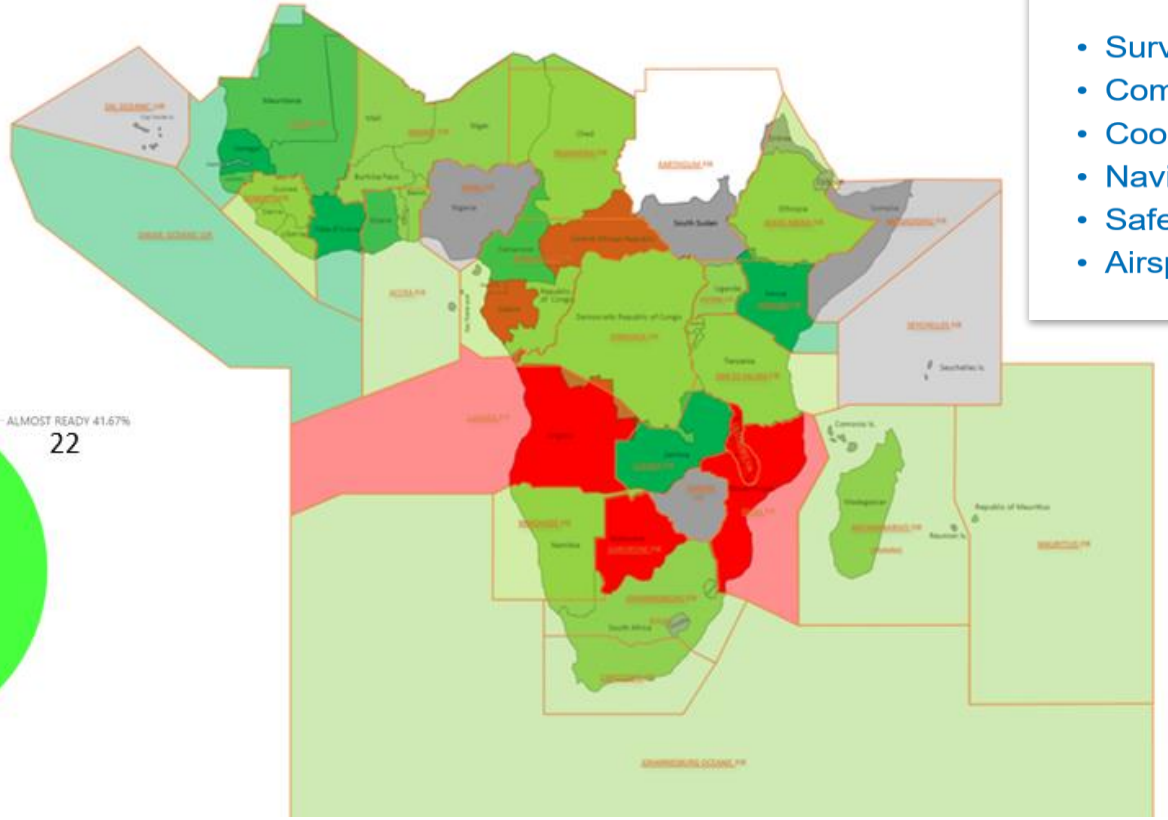
The results of the gap analysis and the CONOPS were shared with states during the **first AFI FRA workshop** held on **6-7 July 2022**

Local FRA CONOPS and GAP Analysis

FRA FIRs Readiness by weights combined



AFI Region Implementation of Airspace Layout



Areas of Focus

- Surveillance
- Communication
- Coordination
- Navigation
- Safety nets
- Airspace procedures

- ADS-C/B, SSR, PSR, MLAT
- VHF, CPDLC, HF
- AMHS, AFTN, OLDI/AIDC
- GNSS, VOR/DME
- APW, M/STCA, CD/R, MONA
- FRA, FUA, ATFM

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Safety tools

FRA changes route planning, assess each volume and FIR interface as formal Management of Change. Separation minima remain unchanged.

01 Assess risk

Identify hazards from the volume, traffic, restrictions and adjacent ATS interfaces.

02 Check separation

Validate approved methods for same, crossing and reciprocal tracks; confirm conflict-probe coverage.

03 Validate FPLs

Test flight plans and transfers across every participating ATS unit; confirm LoA/LoP.

04 Prepare contingency

Check Special Use Airspace (SUA) status and Flexible Use of Airspace (FUA) windows; test contingency.

SRA Acceptance, trained staff, civil-military coordination, trial, normal use or fallback.

AIC / AIP SUP templates

Common templates help States describe the same operational facts in a consistent way.

The PMT had developed AIC/AIP SUP templates in 2021–22.

Accra workshop (2026) validated AIP SUP, Trigger NOTAM and LoA templates for cross border FRA

Publication Tracking

AIC

Use the regional AIC template to communicate FRA implementation information consistently.

AIP SUP

Publish limits, points, nav specs, FPL rules, restrictions, retained-route conditions and FIR interfaces.

Trigger NOTAM

Alert users to the published change and its effective date.

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UPR Implementation in AFI Region









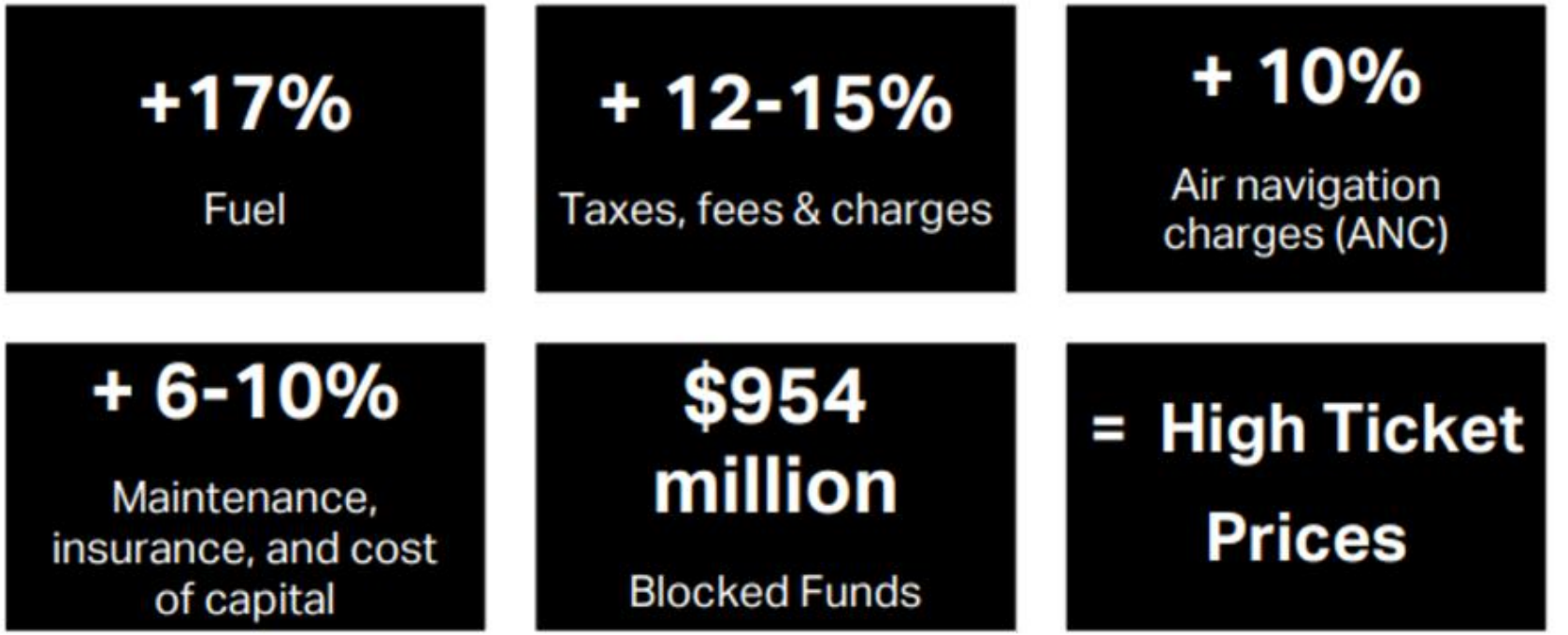






The first African Aviation Industry Sustainability Laboratory - 2022

Cost of doing business in Africa… (*source IATA*)



* compared to global average

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IATA

Why AFI began with UPR trials

Improve flight efficiency and airspace flexibility

Reduce flight time, fuel burn, costs and CO_2 emissions

Test cross-border operational coordination before broader FRA deployment

The AFI story in one view: Stakeholders' collaboration

APIRG 22/36 (2019): regional FRA initiative (IATA WP)

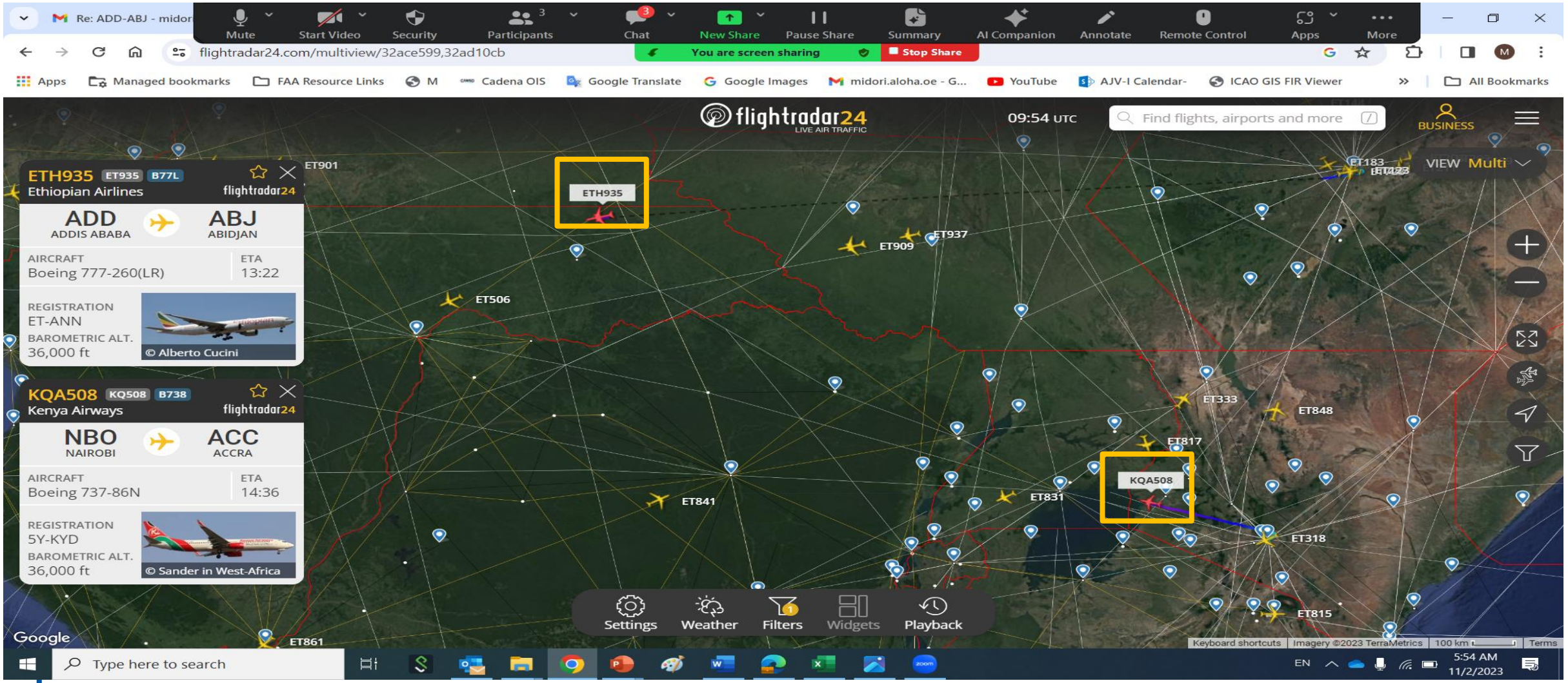
AFI FRA PMT: Drive FRA Implementation

The First African Aviation Air Transport Industry Sustainability Laboratory (2022): **Reducing Costs or Generating Revenues.**

AFREXIMBANK @ 30 Delivering the Vision Building Prosperity for Africans

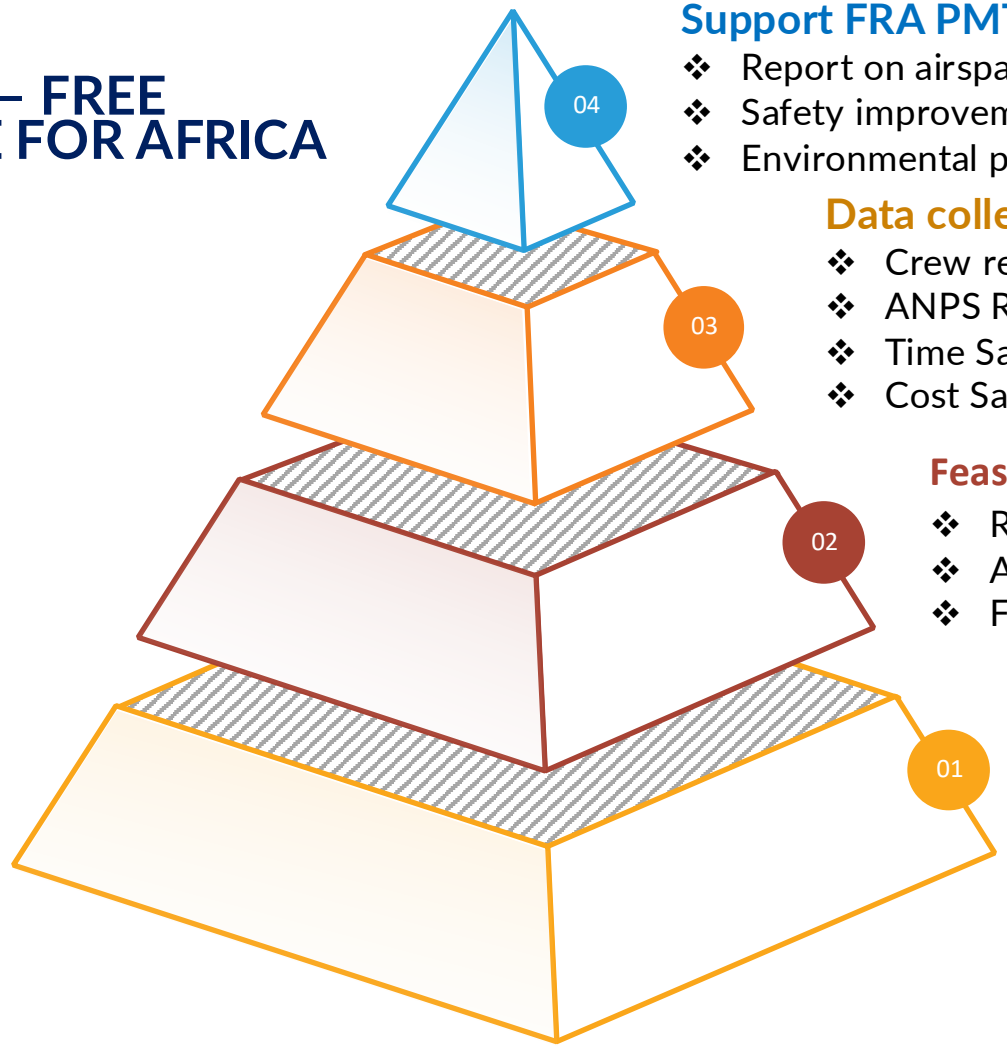
UPR Kick-Off Workshop | CADENCE Step-by-step Approach – November 2023 in Addis Ababa, Ethiopia

The Outcome of the Kick-off Workshop: Successful Inauguration of Africa UPR Trials



UPR/FRA cycle

ULTIMATE GOAL – FREE ROUTE AIRSPACE FOR AFRICA



Support FRA PMT at the Continental Level

- Report on airspace management efficiency
- Safety improvement
- Environmental protection

Data collection, Lesson Learned, Improvement

- Crew report
- ANPS Report
- Time Saving/ Fuel Saving ; CO2
- Cost Saving

Feasibility & Implementation

- Request for data & Review
- ANPS Review & Approval
- Final Approval/Go Decision

Volunteered airlines

- City pair
- Base Routes
- UPR/FRA Proposed routes

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03 Progressive Steps Towards FRA – UPR Trials



- High-Level Coordination | UPR Trial Team



- Stakeholders involved: ICAO, IATA, AFRAA, CANSO, and Airlines



- Phased Approach: data collection, trials ops, data analysis



- Reviews, assessment and next-steps CDM

UPR methodology in the AFI Region

From route identification to UPR catalogue update

1

Route definition

Identify the city pair
Set the base route
Define the UPR trial route

2

Airline request

Trial periods:
1 day, one-way
3, 7 or 30 days
90 days (round trip)

3

UPR Coordinator review

Studies the request and coordinates the review with concerned FIRs

4

State-level publication

UPR AIP Supplement (AIP SUP) issued at State level

5

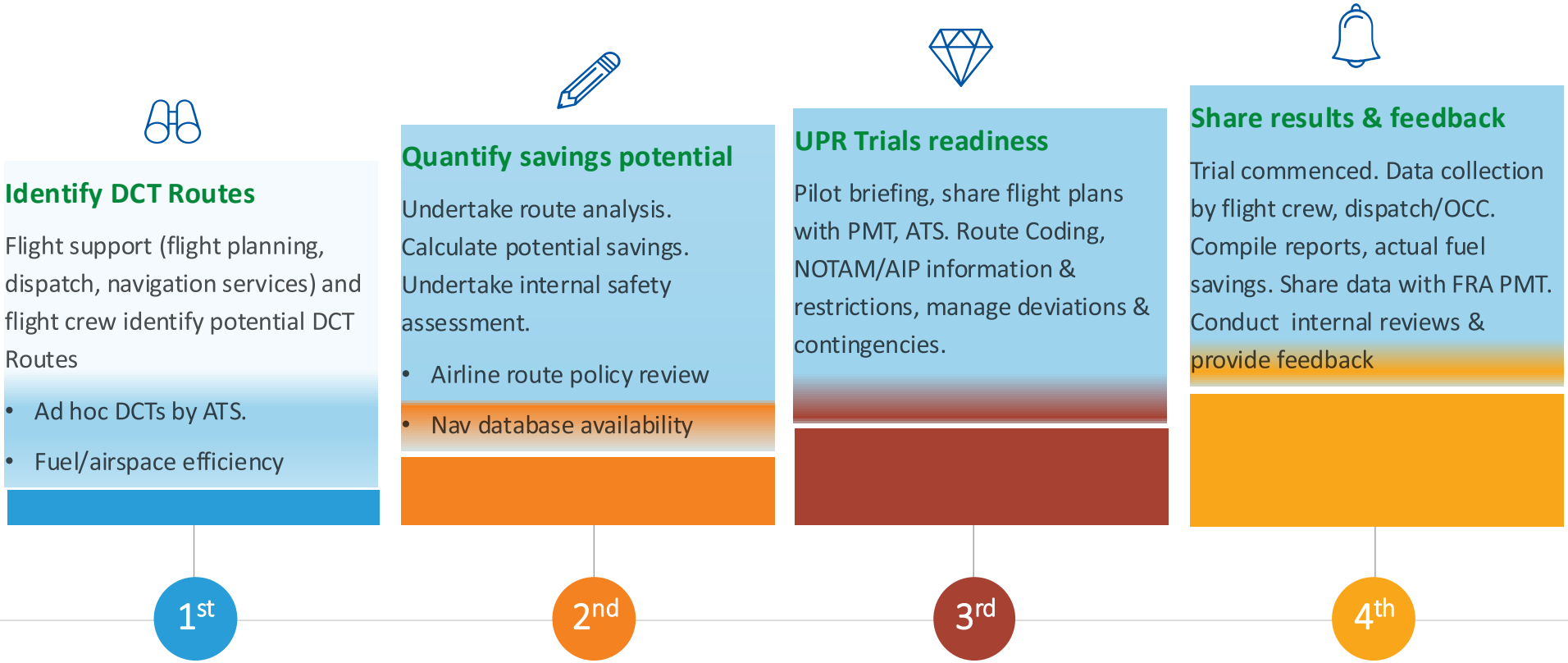
Operationalization

Put the route into operation
Publish or amend the UPR catalogue

The target is 48 hours; some coordination may take more than two weeks.

Airlines contribution to successful UPR/FRA implementation

Role of Airlines in UPR Trials & FRA Implementation



UPR/FRA WORKSHOP

IV. Records of UPR/FRA trial flights conducted

One day – One way Trials

ETHIOPIAN [ETH935 & ETH847]
01 Flights [East – West]
01 Flight [East – South]

KENYA [KQA508, KQA520 & KQA784]
02 Flights [East – West]
01 Flight [East – South]

Three days – One-way Trials

ETHIOPIAN [ETH935]
03 Flights [East – West]

KENYA [KQA520]
02 Flights [East – West]
Note: Initial planning Three days of two-way Trials, changed due to coordination issues

Three Days – Two-way Trials

ETHIOPIAN [ETH935 & ETH934]
ETHIOPIAN [ETH512 & ETH513]
02 Flights [East – West]
02 Flights [West – East]

KENYA [KQA520 & KQA521]
03 Flights [East – West]
03 Flights [West – East]

WORKSHOP UPR/FRA

IV. Records of UPR/FRA trial flights conducted [Cont'd]

07 Consecutive Days – East-West

ETHIOPIAN [ETH935]
07 Flights [East – West]
Daily Flight

KENYA [KQA520]
03 Flights [East – West]
25th – 27th – 30th

07 Consecutive Days – West-East

ETHIOPIAN [ETH934]
07 Flights [West - East]
Daily Flight

KENYA [KQA521]
03 Flights [West - East]
25th – 27th – 30th

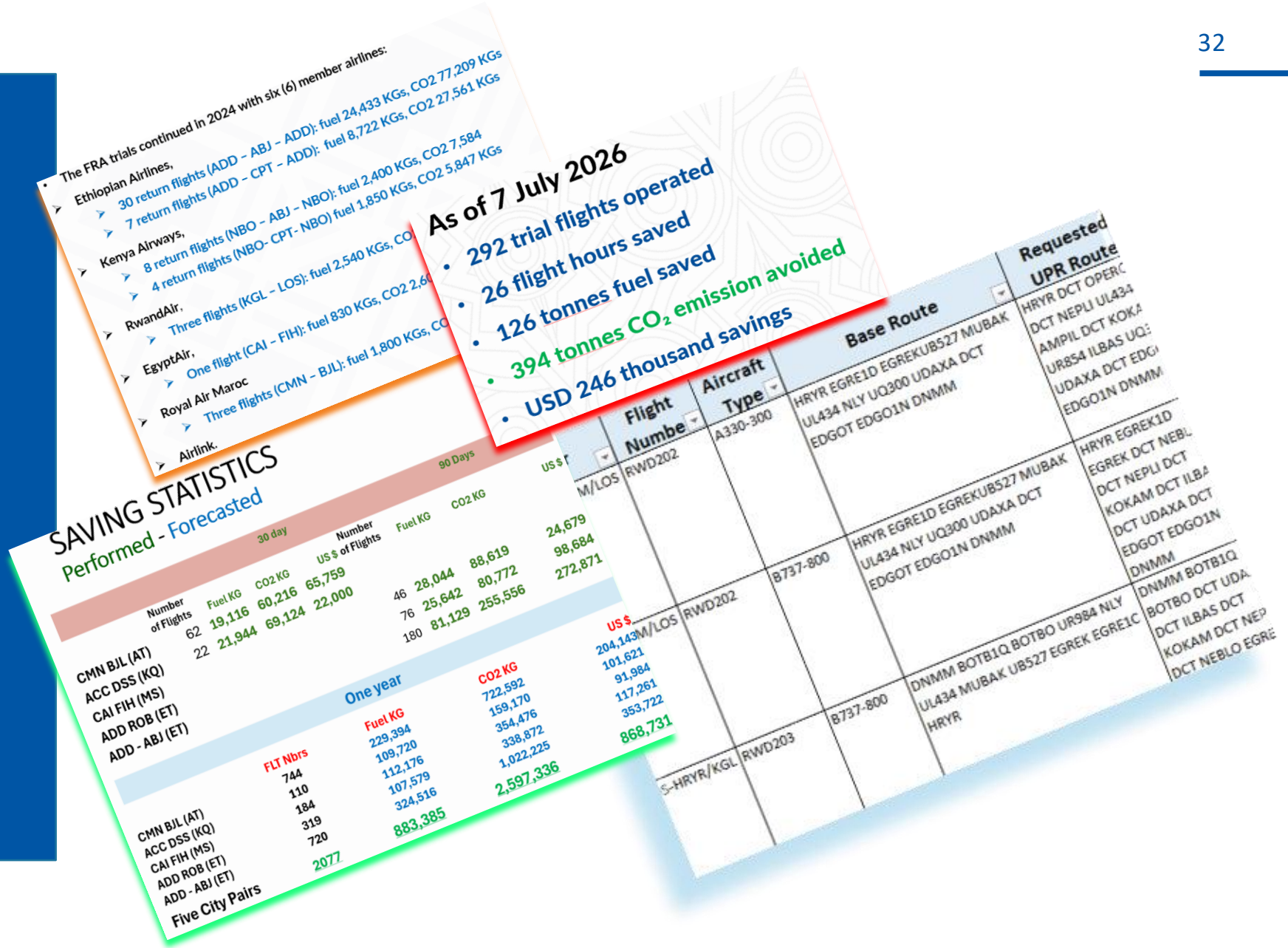
Thirty Days – Two-way Trials

ETHIOPIAN [ETH935 & ETH934]
OR
ETHIOPIAN [ETH512 & ETH513]
Daily Flight

KENYA [KQA520 & KQA521]
03 Flights [East – West]
03 Flights [West – East]
Weekly Flight

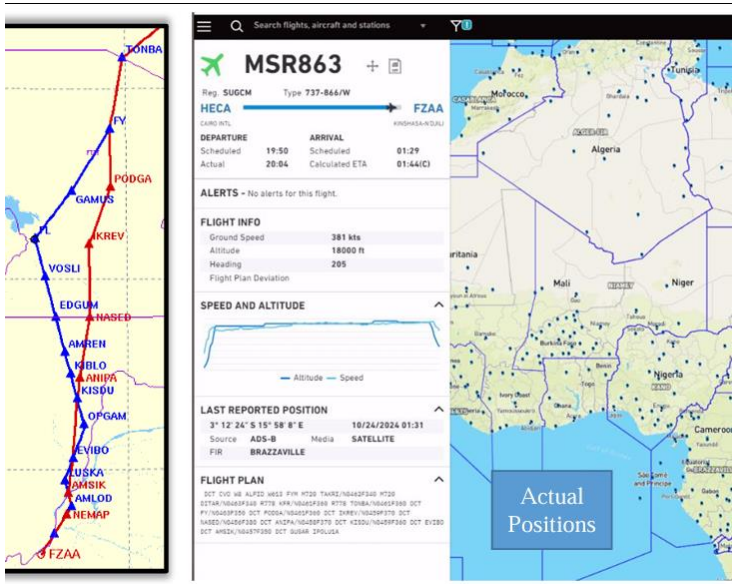
Data Collection and Analysis

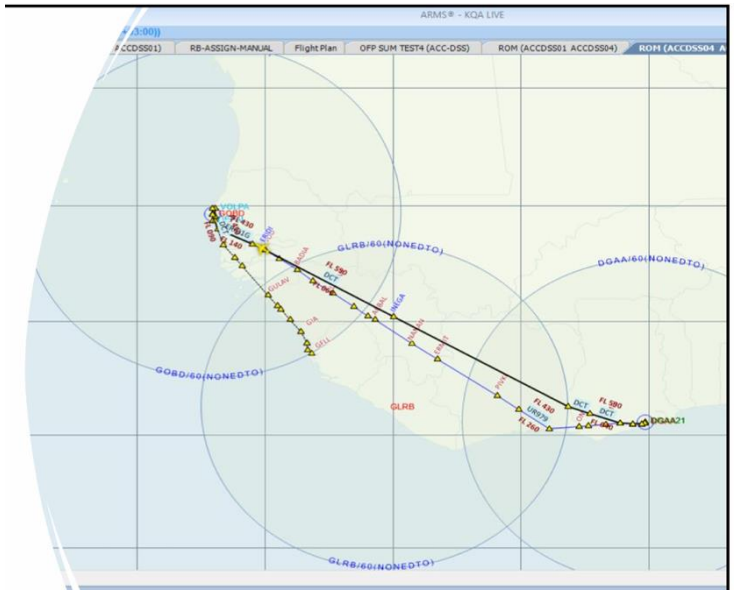
REPORT ON UPR TRIALS BASED ON AIRLINES REPORTS



As of end of November 2024

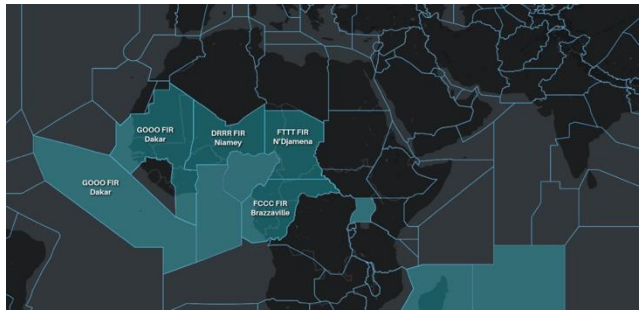
Many Stakeholders Engaged, cooperating and collaborating







- Ethiopian Airlines
- Kenya Airways
- RwandAir
- EgyptAir
- Royal Air Maroc



Ethiopia CAA
Kenya CAA
CAA Uganda
RVA (DR Congo)
ASECNA (18 States)
NAMA (Nigeria)

Ghana CAA
Tanzania CAA
Zambia ANSP
Zimbabwe CAA
ATNS (South Africa)
Roberts FIR (3 States)

Trials scaled from proof of concept to operations

2 November 2023: documented cross-FIR trial

2024: over 100 East–West trials and about 10 East–South trials reported

November 2023–May 2025: over 2,000 flights on six city pairs documented

UPR catalog validation: Validation workshop 22-26 September 2025 in Dakar

UPR implementation in WACAF: AIRAC date **30 October 2025** in WACAF FIRs (Accra, Brazzaville, Dakar, Kano, Kinshasa, Ndjamena, Niamey, Roberts)

ESAF UPR trials report measurable savings

2,189 trials reported by Ethiopian Airlines, Kenya Airways and RwandAir from 1 July to 15 September 2026.

8,000 min

Approx. 133.3 hours of flight time saved.

1,218 t

Reported fuel savings across the trial sample.

3,838 t

Reported CO_2 savings across the trial sample.

USD 2.0m

Estimated flight operating cost savings.

Savings varied with distance, winds and flight profiles.

Operationalization date set: **AIRAC date of 21 January 2027**

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Challenges seen during UPR trials

Multi-party coordination within airlines and between adjacent ANSPs

Timely sharing of weather, NOTAMs and last-minute changes

Crossing points, flight-level restrictions and contingency management

Incomplete post-flight reporting and benefit data

UPR lessons learned and mitigation

Named airline and ANSP focal points; clear decision and escalation flow

Brief ACC, OCC and crew; distribute approved route and restrictions

Use published/validated points and explicit contingency routing

Standardize crew/ANSP reports and reconcile operational data

AFI implementation footprint: 2026 snapshot

WACAF UPR catalogue: 47 entries (37 plus 10 new routes and 7 amendments reported)

ESAF UPR trials: 16 FIRs and 15 ANSPs participating

From trials to sustainable route availability

Trial evidence supports route review and refinement

State-level AIP SUP and harmonized UPR catalogue support repeatability

Catalogue and published restrictions must match operational approvals

Trials feed FRA CONOPS, safety and cross-border interface design

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Cross Border FRA Progress

≈ 40%

of AFI FIRs have implemented local FRA.

47

WACAF catalogue total, up from 37 after 10 new routes and 7 itinerary amendments.

16 FIRs

participate in ESAF UPR trials with 15 ANSPs.

ASECNA

Local FRA across all its FIRs since January 2024.

UPR trials are paving the way for the transition to FRA Phase II.

Sources: AFRAA WP04 §2.5; supplied study §5; PMT matrix, 24 Sep 2026

FRA MAP – MAY 2025

Source : EUROCONTROL





FRA Phase II advances according to FIR readiness

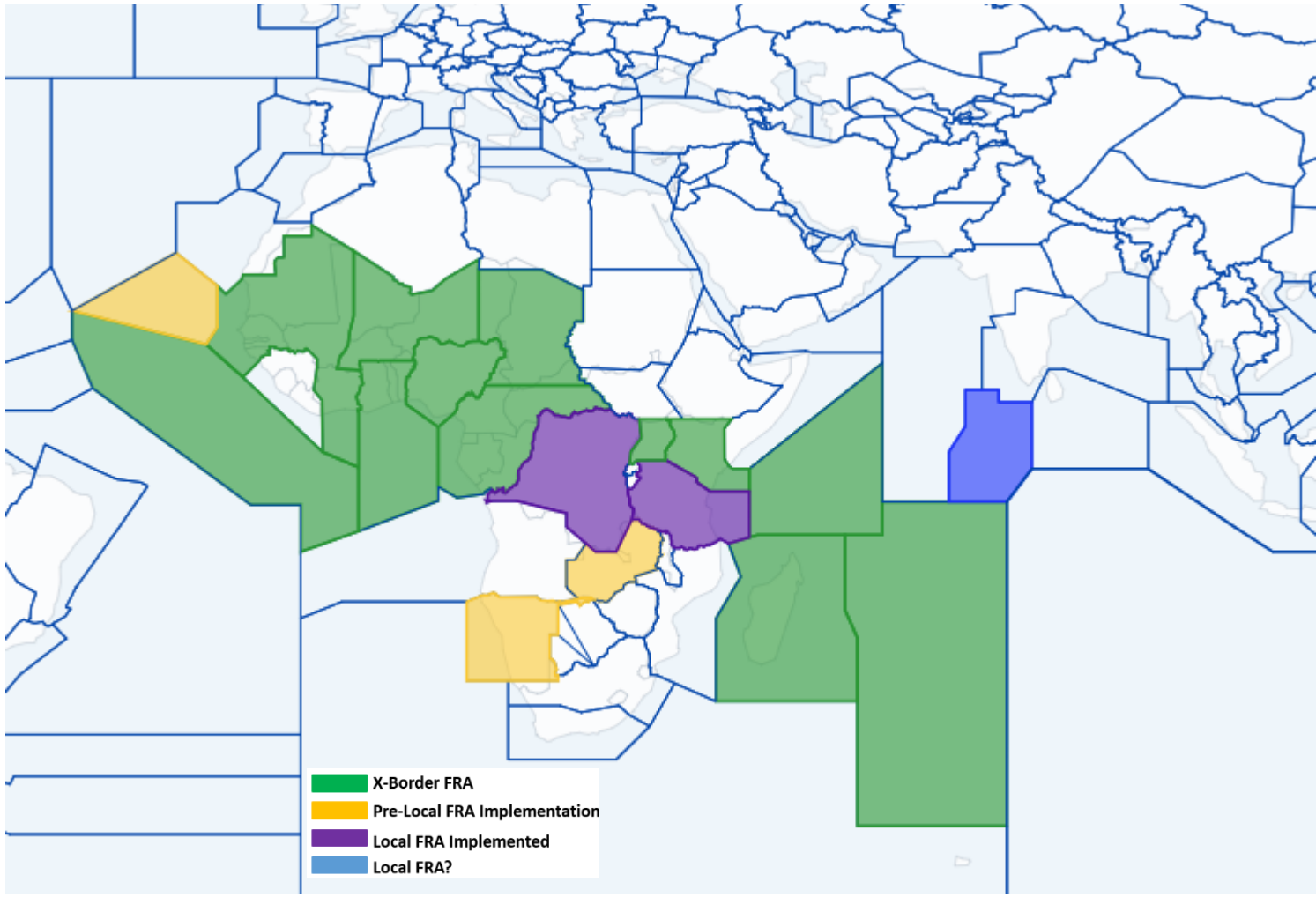
FIRs ready to proceed

Group ready FIRs by traffic flow; harmonize UPR/DCT points, 5LNCs, LoAs and transfers.

FIRs still preparing

Provide targeted support for the identified blocker: safety, coordinates, AIP, systems, training, ATS agreements or resources.

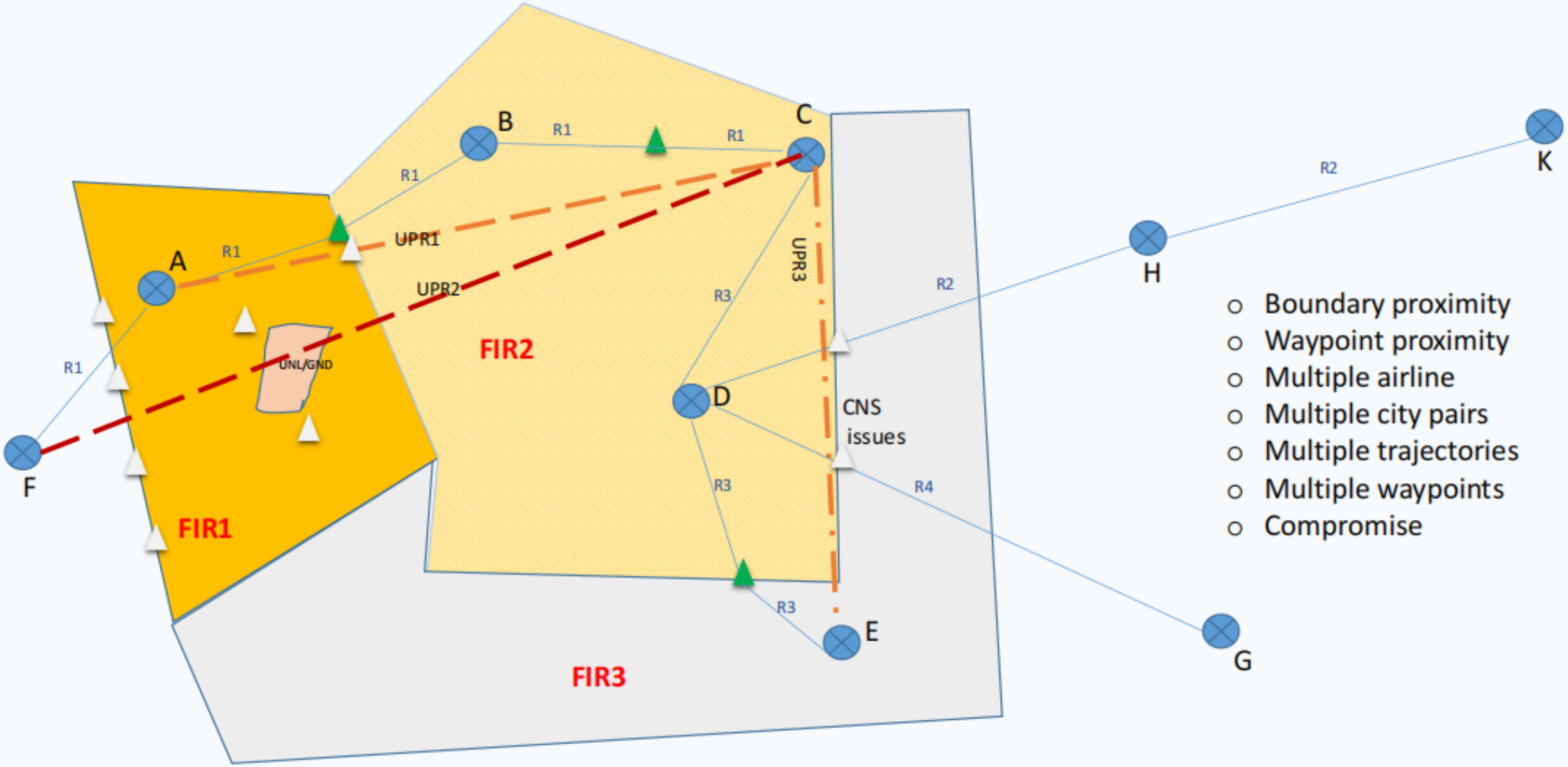




Hyunjong Park - IATA, Nov. 2026

Principle of voluntary participation and readiness.

Refine trajectories and identify crossings



- Boundary proximity
- Waypoint proximity
- Multiple airline
- Multiple city pairs
- Multiple trajectories
- Multiple waypoints
- Compromise

FRA / UPR and Contingency Events | Fallback Procedures

Operational flexibility must be supported by safe, coordinated contingency arrangements.

NORMAL OPERATIONS

FRA / UPR trajectories
ATC clearances and ACC coordination

→

CONTINGENCY TRIGGER

CNS/ATM failures · GNSS interference
Airspace restrictions

→

FALLBACK

Published ATS / contingency routes
Procedural separation · traffic measures

→

RESTORATION

Verify system and sector readiness
Coordinate phased FRA / UPR resumption

Key operational safeguards

- Clear activation criteria and timely NOTAM / operational notifications
- Coordination with neighbouring ACCs, alternative communications and applicable separation minima

AFI lesson: coexistence with the fixed ATS route network supports resilience during phased FRA implementation.

FRA Phase II milestones

Status updated: As per 25 October 2026

29 Oct 2026	Target start of cross-border trials in areas that meet the prerequisites.
21 Jan 2027	Agreed ESAF UPR AIRAC date. Activation depends on safety assessment, publication, coordination and operator readiness.
18 Feb 2027	Regional target for cross-border FRA in eligible FIRs only.
May 2027	Regional review of safety, use and benefits; prepare the next expansion.

AFI FRA FAQ

Questions	Answers
Intermediate points every 200NM?	Specified in Doc4444.
FRA and Nav Specification?	No nav specification defined, even basic RNAV can do, En-route RNAV5 or RNP4 planned.
FRA a/c approval required?	No, current navigation capability fits. Fleet analysis.
FRA horizontal boundary same as FIR boundary?	Not necessarily, same FIR can comprise 1 or more FRAs
Conflict detection becomes harder ?	ATC automation provided with conflict detection tools, further training if needed
Congestion at EX points?	Good coordination required
Point beyond FIR for automated ATS coordination?	Insert a published FRA significant point beyond in FPL

AFI REGION EXPERIENCE SHARING

Free Route Airspace Implementation

ICAO–IATA FRA Implementation Workshop · Beijing

17–18 November 2026

Thank You



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