



ICAO

International Civil Aviation Organization

Sixth Meeting of the Bay of Bengal Traffic Flow Review Group (BOBTFRG/6)

Bangkok, Thailand, 14 – 16 November 2024

Agenda Item 4: Discussion on PBN Routes Development and FLAS/FLOS Optimization

FREE ROUTE AIRSPACE CONCEPT IMPLEMENTATION

(Presented by IATA)

SUMMARY

This paper presents the Free Route Airspace (FRA) concept and explores steps to its implementation for the Bay of Bengal Traffic flow by identifying a milestone strategy.

1. INTRODUCTION

1.1 The aviation industry is continuously exploring innovations to improve efficiency, reduce environmental impacts, and uphold the highest safety standards. The Free Route Airspace (FRA) concept is a key development in modern airspace management, which offers a flexible and dynamic approach to flight path planning and execution.

1.2 FRA allows airspace users to flight plan and fly the most efficient trajectories without being restricted by traditional fixed ATS routes. It allows for real-time and forecast-based adjustments to factors such as weather conditions, traffic density, flight profile efficiency, and fuel consumption, all while ensuring compliance with airspace management requirements and safety standards.

1.3 The Bay of Bengal region, given its strategic importance as a crossroads between major global air traffic flows, presents both opportunities and challenges for FRA implementation.

2. DISCUSSION

Regional Context:

2.1 The Bay of Bengal is a key transit zone for flights between Europe, the Middle East, Africa, the Asia-Pacific, and Southeast Asia. Currently, in this airspace, air traffic needs to follow fixed routes and flight level allocation schemes (FLAS). This airspace is complex, influenced by geopolitical factors, and faces growing traffic volumes. As a result, traffic congestion, and operational inefficiencies have become a challenge, leading to increased costs, higher carbon emissions and departure delays.

2.2 To address these issues and overcome the operational challenges to a certain extent, Free Route Airspace (FRA) is a key concept that will enable airlines to flight plan and fly more efficient and flexible routes. FRA concept allows adapting to predicted or real-time conditions such as the activation or deactivation of restricted (R) and danger (D) areas, adverse enroute weather, traffic congestion, flight profile efficiency and fuel requirements. This approach is expected to reduce delays, optimize airspace usage, improve flight efficiency and minimize environmental impact. A phased implementation of FRA is proposed for review and consideration by the Bay of Bengal Traffic Flow Review Group (BOBTFRG).

FRA Concept evolution, milestone strategy- BOBTFRG:

2.3 FRA Definition¹:

A specified 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) significant points, without reference to the ATS route network, subject to airspace availability. Within this airspace, flights remain subject to air traffic control.

2.4 Route Description:

FRA-published significant points or unpublished points defined by geographical coordinates or by bearing and distance shall be described using the standard ICAO format. Route portions between all these points along the FRA flight path shall be indicated by means of DCT in accordance with ICAO Doc 4444 PANS-ATM.

2.5 FRA enablers:

- a) Appropriate System Support - enhancements aimed at improving Flight Planning, Air Traffic Flow and Capacity Management (ATFCM) and strategic traffic management. This includes features such as flight tracking, vertical and horizontal Adherence Monitoring and 4D Long-Term and Medium-Term Conflict Detection (LTCD/MTCD) to better anticipate and manage potential conflicts.
- b) Procedures - enhanced procedures where necessary for operations within FRA and at its interfaces.
- c) Adaptations to airspace structures.
- d) Adaptations to airspace management procedures.
- e) Developing/honing air traffic controllers skills necessary to perform FRA operations
- f) No additional equipment requirements or flight planning procedures changes are foreseen for aircraft operators. Nevertheless, modifications to flight planning systems may be required to ensure that the full benefit of the FRA can be realised.

2.6 Transition from Fixed Route Structure to FRA:

BOBTFRG participants are encouraged to consider the following strategic approach as a reference for transitioning to the Free Route Airspace (FRA) model.

2.6.1 Flight Plannable DCT segments: Even in the current fixed route structure, on an opportunity basis, ATC occasionally allows aircraft to fly direct-to segments when traffic conditions permit.

- Identify Flight Plannable direct-to segments (vide a NOTAM/AIP) during suitable timing.

2.6.2 Flight Plannable airway crossover in Oceanic airspace: Based on the extended Surveillance and VHF COMM coverage, authorising “airway changing over crossing points” helps in optimising the flight route.

- Identify flight-plannable Oceanic airway crossover points (vide a NOTAM/AIP).

¹ Ref Eurocontrol’s ERNIP Part 1 (European Airspace Design Methodology Guidelines – General Principles and Technical Specifications for Airspace Design) available at link: [eurocontrol-ernip-part-1-v2-6.pdf](https://www.eurocontrol.int/sites/default/files/2024-01/eurocontrol-ernip-part-1-v2-6.pdf)

2.6.3 Upgrading airspace class in Oceanic areas: Portions of oceanic airspace with extended surveillance and communication coverage can be upgraded to suitable airspace Class, enhancing safety and control. This is particularly relevant in:

- a) Coastal areas extending surveillance and VHF communications coverage over vast oceanic airspace.
- b) Island-adjacent airspace with mid-ocean surveillance and VHF communication coverage.
- Upgrade portions of oceanic airspace with adequate surveillance and VHF communication coverage to suitable ICAO airspace classification as appropriate, improving safety and operational oversight.

2.6.4 FRA Trial Operations: To ensure a smooth transition to FRA, BOBTFRG may consider adopting a phased trial approach. The following steps outline a suggested framework:

- a) Identify airspace volumes with suitable entry and exit waypoints, surveillance, and communication coverage for trial operations.
- b) Analyze traffic patterns and flight levels to determine optimal trial windows.
- c) Engage airlines with advanced flight planning tools, and the necessary operational expertise to participate in these trials.
- d) Conduct a comprehensive safety assessment involving operators and ATC before launching the trials.
- e) Begin the trials on a limited basis (e.g., a few hours per day), gradually expanding participation and trial hours based on performance and feedback.
- f) Share the results of the initial trials and analyze lessons learned before subsequent sessions.
- g) After successful trials and reviews, formally promulgate FRA in the designated airspace.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

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