INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE FIFTH MEETING OF THE BAY OF BENGAL TRAFFIC FLOW REVIEW GROUP (BOBTFRG/5)

BANGKOK THAILAND, 6 – 8 DECEMBER 2023

The views expressed in this Report should be taken as those of the Meeting and not the Organization

Approved by the Meeting
and published by the ICAO Asia and Pacific Office, Bangkok

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INTRODUCTION

Meeting

1.1   The fifth meeting of the Bay of Bengal Traffic Flow Review Group (BOBTFRG/5) was held in Bangkok Thailand, from 6 to 8 December 2023.

Attendance

2.1   The meeting was attended by 22 participants from Bangladesh, India, Indonesia, Malaysia, Pakistan, Singapore, Thailand, United States of America, IATA, and ICAO.

2.2   A list of participants is appended at **Appendix A** to this report.

Officers and Regional Office

3.1   Mr. Hyuk Jin Kwon, Regional Officer, Air Traffic Management (ATM) and Mr. Xu Zhi Feng, Regional Officer, ATM, ICAO Asia and Pacific Regional Sub-Office were the Secretaries for the meeting.

Opening of the Meeting

4.1   On behalf of Mr. Tao Ma, Regional Director of ICAO Asia and Pacific Office, Mr. Hyuk Jin Kwon welcomed participants to the meeting.

Documentation and Working Language

5.1   The working language of the meeting and all documentation was English. There were seven Working Papers (WP), seven Information Paper (IP) considered by the meeting.

5.2   A list of papers is included at **Appendix B** to this report.

Draft Conclusions, Draft Decisions and Decisions of BOBTFRG – Definition

6.1   BOBTFRG recorded their actions in the form of Draft Conclusions, Draft Decisions and Decisions within the following definitions:

a) **Draft Conclusions** deal with matters that, according to APANPIRG terms of reference, require the attention of States, or action by the ICAO in accordance with established procedures;

b) **Draft Decisions** deal with the matters of concern only to APANPIRG and its contributory bodies; and

c) **Decisions** of BOBTFRG that related solely to matters dealing with the internal working arrangements of these bodies.

List of Decisions and Draft Conclusions/Decisions

7.1   List of Draft Conclusions/Draft Decisions

Nil

7.2   List of Decisions

Nil

REPORT ON AGENDA ITEMS
Agenda Item 1: Adoption of Agenda

Adoption of Agenda

1.1   The Agenda (WP/01) was adopted by the meeting, which noted the Provisional Order of Discussion (OOD) and the Provisional List of Working and Information Papers (IP/01).

Agenda Item 2: Review of the Current and Planned CNS/ATM Capabilities and Identifying Associated Reduced Horizontal Separation

Proposal to Implement 30NM Longitudinal Separation on Routes P574, N563, M300, and P570 (WP/03)

2.1   WP/03 presents a draft trial implementation plan for Performance-Based Communication and Surveillance (PBCS) over the Bay of Bengal area was introduced by the Bay of Bengal Route Network Small Working Group at the Second Meeting of the South Asia, Indian Ocean, and Southeast Asia ATM Coordination Group (SAIOSEACG/2) in Bangkok, Thailand.

2.2   The Small Working Group emphasized the importance of implementing efficient separation standards to manage growing congestion in the region. The routes P574, N563, M300, and P570 segments in the Jakarta Flight Informatin Region (FIR) are fully equipped with surveillance and VHF Air-to-Ground (A/G) communications, ready for implementing 30 NM Longitudinal Separation.

2.3   This official paper shows the requirements for longitudinal separation, communications, and Air Traffic Services (ATS) surveillance for RNP 4, as specified in PANS-ATM. It outlined the route spacing calculations for RNP4 parallel routes and the separation minima for different navigational performances. Additionally, the communication capabilities over Banda Aceh and the surveillance capabilities in the area were detailed, including VHF coverage and ADS-B Ground Station locations.

2.4   The document also provided an overview of the ATM/CNS system readiness among the Bay of Bengal member States for PBCS implementation. It concludes that routes P574, N563, M300, and P570 have implemented the 50 NM separation and possess the capability for 30 NM reduced longitudinal separation, which will enhance efficiency across the entire Bay of Bengal and Indian Ocean airspace. The implementation of reduced horizontal separation as 30 NM RNP 4 separation in remote airspace and 30 NM surveillance separation in surveilled airspace is anticipated.

2.5   At the BOBTFRG/5 meeting, an extensive discussion was held on the proposal to implement a 30NM longitudinal separation on key routes, namely P574, N563, M300, and P570. The meeting reflected a commitment by the member States to improve airspace efficiency and safety in the Bay of Bengal region through the implementation of reduced longitudinal separation on air routes. The primary points addressed in the meeting were summarized as follows:

a)   The necessity for rapid implementation in the Bay of Bengal and Indian Ocean area was acknowledged, emphasizing the enhancement of traffic flow efficiency.

b)   Malaysia and India were urged to agree on a detailed implementation plan.

c)   The discussion touched upon the equipage rate of aircraft, particularly in Indonesia, where approximately 90% of domestic airlines are reported to be equipped for the

proposed separation standards.

d) The role of collaboration among member States was underlined, with IATA offering support in equipage data analysis. Specific discussions between Malaysia and India revolved around implementing reduced separation on route N571, considering both technical and regulatory aspects.

e) Technical issues such as VHF coverage limitations and the necessity for seamless implementation across FIRs were deliberated. A consensus emerged on adopting a comprehensive and coordinated approach to ensure effective implementation.

f) Aspects of environmental benefits and public policy implications of reduced separation were discussed, highlighting the aim for seamless transition across different airspace sectors.

2.6   Singapore expressed support for the planned implementation of 30NM longitudinal separation for the mentioned routes; in particular, a reduction in enroute longitudinal separation could be translated to a reduction of queuing time on the ground between suitably equipped aircraft, reducing ground delay.

2.7   Appreciation was expressed for the efforts made by participating member States, particularly Indonesia, towards enhancing regional airspace safety and efficiency. The meeting concluded with a transition to discussing relevant matters of the upcoming SAIOSEACG/3 meeting.

ATMSG/11 Meeting Outcomes (IP/06)

2.8   The BOBTFRG/5 meeting, as part of the Air Traffic Management Sub-Group (ATMSG) of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG), addressed several pivotal subjects introduced at the ATMSG/11 meeting. Key discussions related to air traffic management included:

a) Updates on the Asia/Pacific Seamless ANS Plan, focusing on regional aviation system upgrades in line with ICAO's No Country Left Behind principle and consultations for the Performance Improvement Plan.

b) A survey on ATC separation standards in the Asia/Pacific region, highlighting the need for a revised annual survey form to better capture arrangements between adjacent FIRs.

c) ICAO's progress on APANPIRG/33/5 Conclusion, addressing separation minima in oceanic airspace and the related procedures as per ICAO Document 7030 (SUPPS). A State Letter is expected to clarify standards and procedures requiring SUPPS support.

d) Outcomes of the 13th ATFM Steering Group meeting, emphasizing standardized FPL addressing requirements and the importance of compliant practices.

e) Discussion on the low fleet equipage rate for reduced separation in Indian oceanic airspace, with calls for States to encourage operators to equip ADS-C/CPDLC capabilities.

f) Singapore's presentation on Free Route Operation (FRTO), showcasing successful Direct Routing Operations trials and advocating for cross-border FRTO collaboration.

g) Updates on Regional ATM Contingency Planning, highlighting the need for States to report their implementation status and outlining contingency events and upcoming workshops.

h) JCAB's emphasis on standardizing the pronunciation of Five Letter Name Codes (5LNCs) for improved safety.

i) Progress report of the Space Vehicle Launch and Re-entry Coordination Small Working Group (SVLRC SWG) and its efforts to develop regional coordination guidance.

j) India's updates on Datalink performance monitoring in the Mumbai FIR and are going for Trial operation to implement 20NM separation based on space-based ADS-B using datalink (Ref:8.7.4.1 of PAN-ATM 4444) in Mumbai Oceanic airspace and the implementation of 3NM surveillance-based separation at Kolkata Airport.

k) Sri Lanka's initiatives in modernizing ATM and enhancing airspace capacity in the Colombo FIR.

l) Discussions on fatigue management regulations for Air Traffic Controllers in India and AIDC tests between Mumbai and Muscat FIRs.

2.9   The meeting concluded with a emphasis on the member States' active engagement in ongoing initiatives, considering the impacts of the Seamless ANS Plan update, standardizing practices for enhanced safety and efficiency, and staying updated on new technologies and ATM modernization initiatives.

Agenda Item 3: Review of the Existing Traffic Flow Route Structures in BOB Airspace and Identifying Priorities

<u>Traffic Sample Data Visualization Over the Bay of Bengal (IP/02)</u>

3.1   The Monitoring Agency for Asia Region (MAAR) presented the latest Traffic Sample Data (TSD) at the meeting. They annually collect TSD from 24 FIRs in Asia, including the Bay of Bengal area. This data, which has been compiled since 2018, helps illustrate the changes in air traffic over the years, particularly highlighting the impact of COVID-19 on flight reduction.

3.2   The meeting discussed the limitations in data collection, noting that TSD from each state varies in its generation method. These methods range from automated retrieval from Air Navigation Service Providers' (ANSPs) ATM systems to manual preparation and processing from flight plans (FPLs).

3.3   Consequently, the nature of the TSD can differ, with some based on actual flight trajectories and others on planned trajectories. Additionally, some datasets might lack significant points inside the FIR or miss a substantial number of flights. The provided visualization of traffic flows in the Bay of Bengal area, shown in the **Figure 1** below, uses blue lines to represent westbound movements and orange lines for eastbound movements, with the line thickness indicating the traffic volume for December of each year.
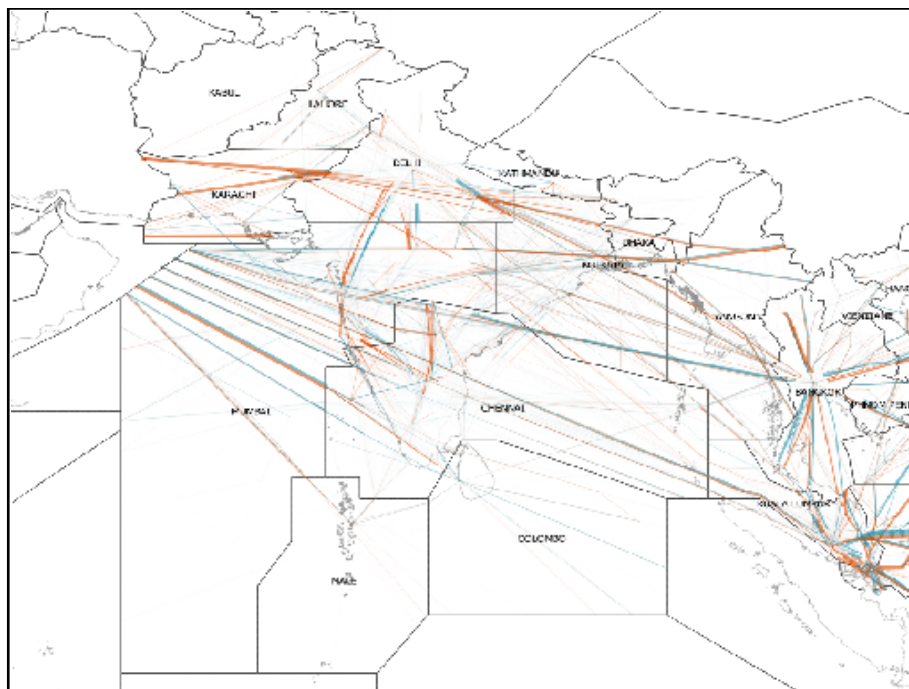
Figure 1: 2022 Traffic Flow from TSD in Bay of Bengal Area

3.4   During the BOBTFRG/5, the MAAR presented an in-depth analysis of Traffic Sample Data (TSD) from the Bay of Bengal area. The session provided a platform for a constructive exchange of ideas and requirements concerning traffic data analysis in the Bay of Bengal region. The insights gained from this discussion are expected to play a pivotal role in future strategies for airspace management and the effective implementation of PBCS in the region. The participants appreciated MAAR's efforts in data collection and analysis, recognizing the need for enhanced data-driven decision-making in air traffic management. The discussion following this presentation focused on several crucial aspects:

a) Participants showed keen interest in analyzing traffic flow on specific routes, emphasizing the need to compare data across different years. The discussion highlighted the importance of contrasting traffic trends before and after the COVID-19 pandemic, with a specific focus on comparing data from 2022 and 2023.

b) IATA representatives brought attention to the notable improvements in civil-military cooperation in India. The increased air traffic lines observed in the 2022 data compared to 2019 were seen as a positive development in the flexible use of airspace.

c) MAAR highlighted the challenge of fragmented data collection from different FIRs. Variability in data capture methods among States was identified as a limiting factor for consistent and accurate data analysis.

3.5   The discussion underscored the need for detailed equipage data to support the implementation of PBCS. However, MAAR pointed out the limitations in providing such data, which is contingent on the information received from individual States.

3.6   MAAR expressed willingness to undertake specific data analyses as requested and to present these findings at future meetings. The agency also mentioned the ongoing collection of traffic sample data for December, which could include additional details such as equipage information, subject to States' submissions.

Review of BOBTFRG Priority Areas Implementation Timelines (WP/04)

3.7   This paper aimed to facilitate the discussion to firm up the feasible implementation timelines of PBCS for performance-based longitudinal separation with the key enabler of ADS-C/CPDLC mandate over the Bay of Bengal area to optimise the airspace capacity.

3.8   Based on the BOB route structure and airspace condition, the meeting was highlighted by the expected implementation of PBCS provisions of ICAO Annexes 6 and 11, Doc 4444 PANS-ATM and Guidance Material by not later than 29 March 2018. It is stressed that in the BOB area, the majority of the ATS routes are specified as RNAV 10 (RNP 10), and so far, not so much progress has been made in terms of the implementation of RNP 2 (or RNP 4) routes and PBCS. More efficient application of performance-based separation should not be further deferred to cope with the traffic that is returning after a big halt by COVID-19.

3.9   The trial implementation plan which had reached consensus at BOBTFRG/4 (Virtual meeting, 6-8 December 2022) was also recalled. The phased detailed action plans are listed as follows:

    a) Phase 1– 50 NM longitudinal separation to be applied based on the current capability RNAV 10 (RNP 10) available as soon as possible;

    b) Phase 2 – to start transitional period: trial implementation of 30 NM longitudinal / 23 NM lateral separation with harmonized ADS-C/CPDLC equipage mandate for RNP 4 or RNP 2, RCP 240, RSP 180 requirements.

    c) Phase 3 – permanent implementation of 30 NM longitudinal / 23 NM lateral separation not later than 1 March 2026, subject to post-op evaluation on Phase 2 and ANSP's readiness to give flexibility or earlier implementation.

3.10   The Analysis of the Current Separation being applied in the BOB Area has also been updated, referred to the **Figure 2** below:

Figure 2: Horizontal Separation Minimus being applied in the BOB area (updated by BOBTFRG/5).
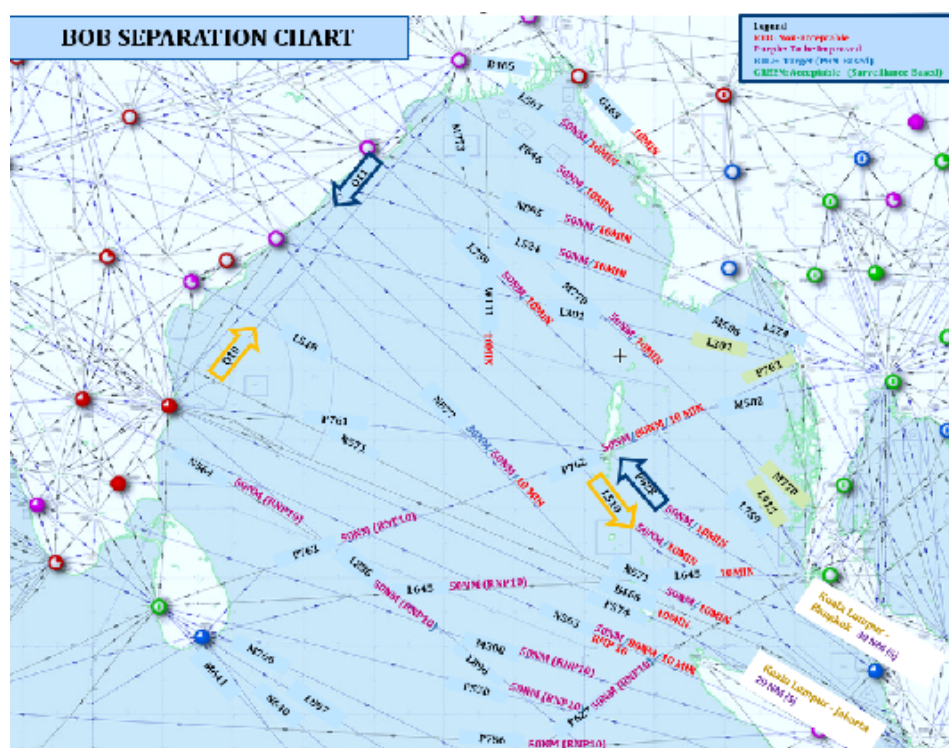
3.11 With the understanding of the requirements of applying 30 NM longitudinal separation with RNP 4 specification, **Table 1** collected the ATM/CNS system readiness among the BOB member States.

STATE	FIR	FPL PROCESSING FOR PBCS	ADS-C /CPDLC	RCP_240	RSP_180	POST IMPLEMENTATION MONITORING	REMARK
BANGLADESH	DHAKA						ATM automation system not implemented yet
INDIA	CHENNAI	YES	AVAILABLE	YES	YES	YES	System testing required
	KOLKATA	NO	AVAILABLE	YES	YES	YES	
	MUMBAI	YES	AVAILABLE	YES	YES	NO	System testing required
INDONESIA	JAKARTA	NO	TRIAL	NO	NO	NO	The system is being upgraded. PDC 2025
MALAYSIA	KUALA LUMPUR	NO	AVAILABLE	YES	YES	YES	monitoring only for ADS-C/CPDLC
MYANMAR	YANGON	NO	YES	NO	NO	NO	
SRILANKA	COLOMBO	NO	YES	TESTING	TESTING		System is being upgraded PDC by 2024.
THAILAND	BANGKOK	YES	NO	NO	NO	AVAILABLE	En-route airspace is fully covered with SSR. no plan to prescribe PDC.

Table 1: The readiness of ATM/CNS system of BOB States (Updated by BOBTFRG/5).

3.12 At the meeting, a comprehensive discussion was held on the Review of BOBTFRG Priority Areas Implementation Timelines, particularly focusing on the implementation of 30NM Longitudinal Separation on Routes N571, P574, N563, M300, and P570.

3.13 The dialogue centered around the necessity and presence of alerting systems in flight plan processing for PBCS, with a special focus on the systems used by India and Indonesia. The objective was to clarify the existing procedures and the requirements essential for effective flight plan processing.

3.14 The proposal to start trial implementations on Route N571 between India and Malaysia was a key topic. These trials were to focus on aircraft approved for Required Navigation Performance 4 (RNP4) or RNP2. The IATA indicated support from various airlines for such initiatives, affirming the readiness of airlines operating in the Bay of Bengal to participate in the trials.

3.15 The necessity to update the SAIOSEACG/2 meeting with relevant and timely information was emphasized. There was a discussion on the importance of drafting and disseminating essential documents promptly. ICAO and IATA's role in facilitating these trials and ensuring airline participation was underscored.

3.16 The collaboration between India and Malaysia was acknowledged, with discussions highlighting challenges related to the Central Report Agency (CRA). Malaysia particularly raised concerns about monitoring PBCS performance, suggesting that resolving these challenges could lead to significant progress in implementation. According to IATA, Airlines responded positively to the proposed trials. IATA emphasised that BOBTFRG/4 and SAIOSEACG/2 meetings had agreed that the non-exclusive 30NM PBCS trial should start as early as possible and no later than March 2024 and so the relevant States should prioritise that effort. IATA also stated support for ICAO's position that States should, at the earliest opportunity, apply the appropriate reduced separation standards according to available infrastructure and aircraft capabilities. The meeting recommended prioritizing these initiatives and suggested holding bilateral meetings to address any outstanding issues. The focus was on ensuring efficient implementation and on the importance of reporting progress at future SAIOSEACG meetings.

Agenda Item 4: Discussion on PBN Routes Development and FLAS/FLOS Optimisation
Review of Selected ATS Route Proposals from the *Asia/Pacific Region ATS Route Catalogue* (WP/05)

3.17   ICAO presented the updated Asia/Pacific Region ATS Route Catalogue, now in its version 23 catalogue reflected inputs from States, Administrations, and airspace users. To enhance the review process and foster effective communication between ANSPs and airspace users, the new catalogue iteration prioritizes proposals with immediate to medium-term benefits, archiving others for potential future review. The ICAO APAC Regional Sub-Office has actively sought updates from relevant entities to integrate into this latest version. Of the thirty-nine route proposals discussed in 2023, progress has been made on four, five are new additions, and the rest remain unchanged.

3.18   ICAO presented selected ATS route proposals from the most recent Draft Version 23 of the *Asia/Pacific Region ATS Route Catalogue for review and update* (**Attachment F**).

3.19   The meeting was asked to review and classify each ATS route proposal as:

   a)   Priority A – short term i.e. it could be implemented within 12 months;

   b)   Priority B – medium term i.e. it could be implemented within 13 to 36 months;

   c)   Priority C – long term i.e. more than 36 months; or

   d)   Priority D – cannot be implemented (reasons to be provided).

3.20   During the meeting, participants engaged in a discussion on the review of selected ATS route proposals from the Asia/Pacific Region ATS Route Catalogue. Feedback from the States and IATA was as follows:

   a)   BOB01:

      i.   The discussion highlighted the near-finalization of new route proposals involving Bangladesh and India. The meeting was informed that the Route designator has been approved as P632. The meeting expressed gratitude towards regional States for their contributions to the route designations.

      ii.   The need for a formal safety assessment process for the proposed routes was emphasized. Bangladesh and India indicated their commitment to finalizing the necessary safety assessments, including participation from ICAO for supervisory guidance.

      iii. Participants expressed hope that the proposed amendments to the routes would be promulgated in the first quarter of 2024, subject to the completion of safety assessments.

   b)   BOB02:

      i.   There was a consensus to move the BOB 02 route proposal into archives since the BOB 01 route has reached it's final stages of implementation. IATA, Bangladesh, and India agreed with this decision.

   c)   AFG01

      i.   Discussions about route proposals involving Afghanistan were influenced by the current situation in the States. Given the sanctions and focus on restoring air traffic services in Afghanistan, it was suggested that these route proposals be held in abeyance or archived until further notice.

Bay of Bengal Flight Level Allocation Scheme Chart (WP/06)

3.21   The paper presented the Bay of Bengal Flight Level Allocation Scheme (FLAS) Chart that was prepared based on the data submitted by BOBTFRG Administrations. The Bay of Bengal FLAS Chart is provided in **Figure 3**, which is recommended to be utilised for the Group to review the FLAS with a view to enhancing the efficiency of air traffic in the Bay of Bengal airspace (BOBTFRG Terms of Reference refers).
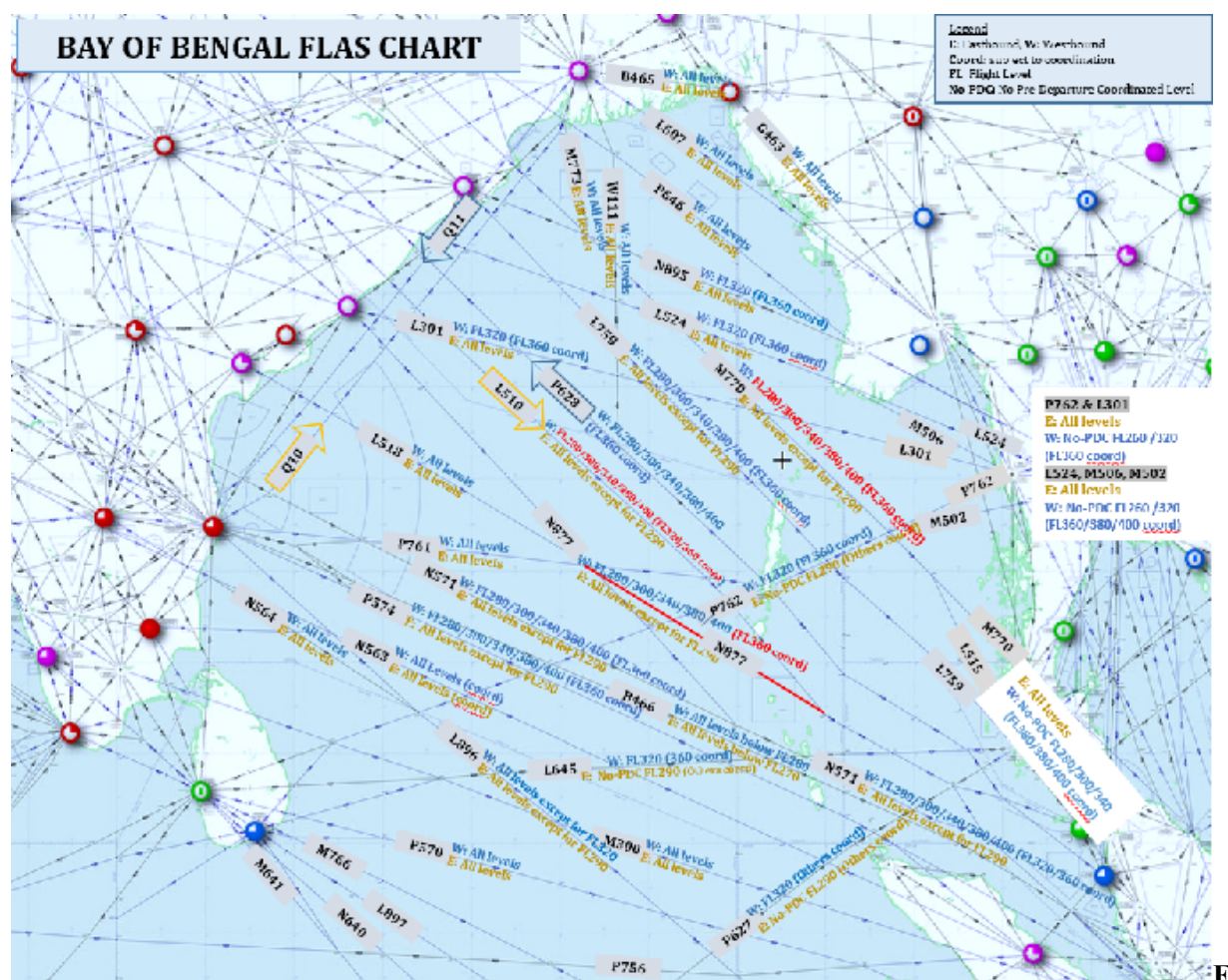
Figure 3: FLAS/FLOS among the ATS Routes

3.22   This group noted the airspace structure's interconnectivity and FLAS/FLOS system. In years of operation, ACCs have become accustomed to this FLAS system and derived a relatively mature risk response plan, such as the Large-Scale Weather Contingency Plan and flexible temporary coordination mechanism. In fact, the current FLAS system has been proven to be reliable, but several drawbacks should be taken into consideration.

Agenda Item 5: Decisions/ Recommendations to SAIOSEACG
4.1   None

Agenda Item 6: Any Other Business

<u>US Federal Aviation Adinistration (FAA) Implementation of Performance-Based Separation Minima (IP/03)</u>

4.2   The FAA shared their experience at the meeting that they have been actively working on implementing reduced Performance Based ADS-C separation minima, a shift initiated with the introduction of the Advanced Technologies and Oceanic Procedures (ATOP) program.

4.3   The ATOP system, replacing the older ODAPS, enabled support for reduced ADS-C separation minima of 30 NM both longitudinally and laterally. Key milestones included extensive software testing, controller training, and transitioning from ODAPS to ATOP in 2005. Subsequently, the FAA introduced the 23 NM lateral separation minimum in all its Oceanic FIRs and engaged in the NOPAC Redesign Project, aiming to optimize route efficiency. The report emphasizes the importance of collaboration with adjacent ANSPs, airspace operators, and the need for comprehensive controller training and ATC system adjustments to successfully implement new separation minima.

4.4   Advanced Technologies and Oceanic Procedures (ATOP):

- The FAA replaced the ODAPS system with ATOP in 1998 to advance oceanic control and support reduced ADS-C 30/30 separation minima.

- Extensive testing and evaluations were conducted from 2001 to 2004, leading to ATOP's implementation for 24/7 operations in October 2005.

- The ATOP system allowed for standard oceanic separation and introduced D50 and 30/30 reduced separation.

4.5   Enabling Performance-Based Longitudinal and Lateral Separation Reduction:

- In 2020, ICAO published a 20 NM Performance Based Longitudinal Separation (PBLS) minimum, which the FAA plans to implement in 2024.

- In 2016, ICAO revised lateral separation minimum to 23 NM, which the FAA has already implemented.

4.6   NOPAC Redesign Project:

- A collaborative project with IATA and JCAB, the NOPAC Redesign aimed to utilize the 23 NM lateral minima in the NOPAC route system.

- The project involves phased improvements and redesigns for more efficient route planning.

4.7   Benefits of Reduced Separation Minima:

- The implementation of reduced minima contributed to improved airspace efficiency, as evidenced by increased percentages of aircraft able to change altitudes upon request.

4.8   Lessons Learned:

- Key areas include the importance of having a Concept of Operations, conducting safety assessments, collaborating with adjacent ANSPs and airspace operators, making necessary ATC automation system changes, and providing controller training.

4.9   Conclusion

- The FAA's journey in implementing reduced ADS-C separation minima underscores the importance of technological advancements, comprehensive testing, collaboration,

and continuous improvement in operational procedures to enhance airspace efficiency and safety.

Recent Activities of Free Route Airspace (IP/04)

4.10   This meeting encapsulated key discussions and outcomes from recent events focused on the implementation and advancement of Free Route Airspace (FRA) in the Asia Pacific region. These events include a FRA webinar, the ATMSG/11 meeting, the "Air Navigation World – ATM Procedures for Today" conference, the Asia-Pacific ANSP's Committee Second Meeting, and the Free Route Airspace International Forum in Mongolia.

4.11   The FRA webinar provided a comprehensive overview of FRA's benefits and challenges, highlighting insights from regions like Europe and North America and emphasizing FRA's role in enhancing airspace capacity and reducing emissions.

4.12   The ATMSG/11 meeting in Singapore focused on the progression of FRTO, particularly Singapore's initiatives in implementing Direct Routing Operations (DRO) and exploring cross-border DRO and User-Preferred Routes. The meeting aligned with upcoming FF-ICE Release 1 services and the SWIM implementation by 2030.

4.13   The "Air Navigation World – ATM Procedures for Today" event delved into innovative ATM practices like FRA and FF-ICE, emphasizing their role in modernizing global airspace management.

4.14   The AAC/2 meeting marked a significant step in advancing Trajectory-Based Operations (TBO) and FRTO in the region, with major ANSPs endorsing the Asia-Pacific TBO Pathfinder Project.

4.15   The Free Route Airspace International Forum in Mongolia served as a platform for sharing knowledge on FRA implementation and challenges, with discussions on ATM technologies and planning for FRA.

4.16   In conclusion, ICAO underscored the transformative potential of FRA in revolutionizing air traffic management in the Asia Pacific region. The meeting called for member States and Administrations to actively participate and contribute to the ongoing initiatives, promoting the adoption and understanding of FRA concepts.

4.17   As invited by the meeting, Indonesia also introduced their valuable lessons learned from the implementation of User Prefered Route (UPR) in their FIRs.

Oceanic Transition - FRA, Case Study - BOB-AS-IO (IP/05)

4.18   The meeting discussed the development of Free Route Airspace (FRA) in the Bay of Bengal, Arabian Sea, and Indian Ocean (BOBASIO) Oceanic airspace suggested by IATA. Key points from this discussion include Airline Reports and ANSP Challenges, Oceanic Transition Free Route Airspace (FRA) Case Study, Benefits of FRA in BOB-AS-IO, and Collaboration Among ANSPs.

4.19   Airlines in the BOB-AS-IO area have reported departure delays and non-optimal flight profiles. Current limitations, such as the implementation of 50 NM longitudinal separation and mixed equipage of aircraft, are contributing to inefficiencies. These challenges impact airlines' abilities to maintain optimal flight levels, especially for long-haul flights following the same airway at the same flight level.

4.20   The study highlighted the need for procedural and airspace classification changes.

Portions of oceanic airspace with robust VHF communication and surveillance coverage could be upgraded to enable reduced separation minima, transforming them into FRA zones. This would enhance safety by distributing air traffic more effectively, reduce communication congestion, and optimize both vertical and horizontal flight profiles.

4.21   Implementing FRA in BOB-AS-IO would enhance airspace safety, capacity, and efficiency. It would allow for more optimal flight levels and paths, particularly valuable in avoiding weather deviations. The unique geographical position of Port Blair Radar and RCAG, integrated into the Chennai FIR, offers an excellent opportunity to enhance airspace efficiencies.

4.22   There are examples of successful collaboration among ANSPs in the BOB-AS-IO region, including ADS-B data sharing and multimodal ATFM. These collaborations can be expanded to utilize overlapping communication and surveillance coverage, with a focus on improving airspace safety, capacity, and efficiency.

4.23   In relation to the draft conclusion proposed by IATA, member States concurred on the necessity of holding the FRA workshop and suggested that ICAO take charge of its organization and IATA take the support role; all BOB States were encouraged to participate in the workshop.

Outcomes of Air Navigation World (IP/07)

4.24   The BOBTFRG/5 meeting addressed the development and implementation of Free Route Airspace (FRA) and improvements in ATM procedures, focusing on the growing air traffic demands in the South Asia region. Key discussions included:

4.25   Runway Capacity Enhancement:

- Lateral Separation with RNP1: Application of a 5 NM lateral separation as per ICAO DOC 4444 (PANS-ATM) to improve capacity and efficiency on arrival and departure routes.

- Optimized Runway Separations: Implementing separations suitable for different aircraft categories to enhance runway throughput. This involves allowing aircraft to cross thresholds or commence take-off based on specific distance criteria.

- RECAT and Time-Based Wake Turbulence: Introduction of more refined wake turbulence categories (from 4 to 7) to increase airport capacity and reduce runway separation minima, coupled with consistent and predictable Minimum Runway Occupancy Time (ROT) adherence by flight crews.

- Surveillance for 2.5NM Separation: Applying reduced separation minimums for aircraft within 10NM of the runway threshold, contingent on favorable conditions like good braking action and average ROT not exceeding 50 seconds.

4.26   Enroute Capacity Enhancement:

- Performance-Based Separations: Transitioning from traditional 50NM-30NM separations to potentially 20NM separations using RNP, RCP, and RSP, in line with ICAO's DOC 4444 guidelines. This includes performance-based communication standards and ADS-C periodic reporting.

- ATS Separation minima of 14 NM longitudinal and 19NM Lateral can be implemented using predicted identification of aircraft (e.g. SB ADS-B) with RNP4 and RCP240 capability, where VHF voice communication is not available.

- Future Plans: Looking towards 2024, there's a proposal for a 15NM horizontal separation minimum based on ATS surveillance systems meeting RCP240 requirements.

4.27   Free Route Airspace (FRA) Implementation:

- Operational Concept: FRA allows aircraft to choose trajectories between waypoints, differing from fixed published ATS routes. This requires ATC to tactically resolve conflicts using ATS surveillance, as opposed to strategic de-confliction in traditional route management.

- Adherence to Centerline: In FRA, as there is no published track, the flight paths don't have a navigation database record. Instead, the paths are defined by the aircraft's RNAV or RNP system.

- Horizontal and Vertical Implementation: FRA implementation is characterized by flight plannable paths within specified airspace, between promulgated entry/exit points or via intermediate points, and within specified flight level bands.

4.28   These discussions and analyses underscored the urgent need for stakeholders in the Bay of Bengal region to actively engage in enhancing ATM procedures and embracing FRA concepts to efficiently manage the anticipated growth in air traffic, while ensuring safety and sustainability.

Agenda Item 7: Review of BOBTFRG Task List
        BOBTFRG Terms of Reference and Task List (WP/07)

5.1   ICAO presented WP/07, which contained the BOBTFRG Terms of Reference for review and the BOBTFRG Task List for updating.

5.2   The BOBTFRG Task List, as updated by the meeting is appended at **Appendix D** to this report.

Agenda Item 8: Date and Venue of the Next Meeting
6.1   The BOBTFRG/6 was tentatively planned in December 2024 at a location to be determined (preferably in Bangkok). States/Administrations considering hosting the BOBTFRG/6 were invited to contact the Secretariat.

Closing of the Meeting
        Mr. Kwon Hyuk Jin and Mr. Xu Zhi Feng thanked the meeting participants for their significant work during a busy meeting program.