*International Civil Aviation Organization*

**Fourteenth Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/14)**

Bangkok, Thailand 22 – 26 April 2024

**Agenda Item 4: Review of Current ATFM Operations and Problem Areas**

# OPTIMISING AIR TRAFFIC FLOW OVER THE BAY OF BENGAL

(Presented by Singapore, Thailand and IATA)

**SUMMARY**

This paper highlights the route capacity constraints faced by air traffic in the Asia Pacific region that operates through the Bay of Bengal towards Europe, peaking at certain periods of the day and often resulting in flight delays. The situation has steadily persisted since the recovery of air traffic as air travels resume after the COVID pandemic. There are several contributing factors that compounded to the capacity constraints and delays. This paper proposes for States/Administration to collaborate on developing ATFM solutions to improve predictability and to optimize traffic regulation in the region.

## 1. INTRODUCTION

1.1 The aviation industry is rapidly recovering from the COVID-19 pandemic and air traffic levels have quickly resumed to a point where air traffic congestions can be observed specifically for the westbound traffic from Southeast Asia to Europe.

1.2 There are ongoing efforts in the Asia Pacific region to identify requirements and improvements for optimizing airspace capacity and maintaining an efficient Air Traffic Services (ATS) route network across the Bay of Bengal. However, the limited availability of ATS routes further downstream beyond the Asia Pacific region had created a knock-on effect on the utilisation of ATS routes over the Bay of Bengal. This have led to an increased delays encountered by aircraft operations especially during the peak air traffic flow from Southeast Asia to Europe.

1.3 The challenges faced by aircraft operators presents an opportunity for States/Administrations to come together to collaborate and develop ATFM solutions based on existing tried and tested methods to provide better predictability and to optimize air traffic flow.

## 2. DISCUSSION

Current Situation

2.1 The South Asia and Central Asia regions are critical areas that connects the Southeast Asia and East Asia regions to Europe. In 2019, before the pandemic, approximately 50 flights transit through the Kabul Flight Information Region (FIR) daily. With night curfews at most European airports, the flow of westbound traffic from Asia to Europe that operates through Kabul FIR would peak between 2000 and 2359UTC. The limited ATS routes and flight level in Kabul FIR resulted in a knock-on effect for Air Navigation Service Providers (ANSPs) upstream to apply extended procedural longitudinal spacing on the routes through the Bay of Bengal area.

2.2 Since August 2021, with the non-availability of ATS over Kabul FIR, flights between the Asia and Europe regions had to circumnavigate the Kabul FIR resulting in additional flying times and fuel burn.

2.3 The situation was further exacerbated since February 2022 with constraints to operate through certain FIRs over Eastern Europe. This resulted in the increased demand on the remaining ATS routes for aircraft operators to plan on. Most aircraft operators have been observed opting to fly on ATS route N571 which had consequential impacts on upstream and downstream air traffic regulation requirements.

2.4 It also remains vital to be mindful of other capacity-reducing factor which include severe weather conditions, space launches and other ad-hoc conditions. The presence of these factors may cause significant deviations in flight trajectories that could further implicate merging of routes and induce severe reduction in capacity.

Effects of Demand-Capacity Imbalance

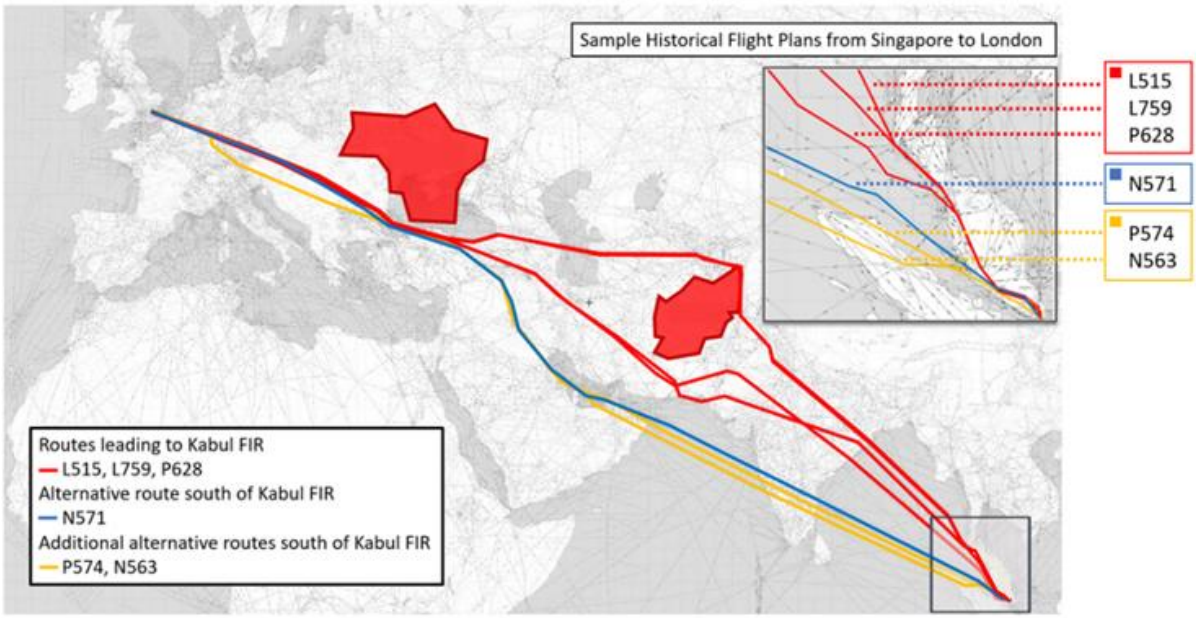


***Figure 1:*** *ATS routes utilization to avoid Kabul and Ukraine*

2.5 The unavailability of airspace for aircraft operators to plan over these areas resulted in the heavy utilization on ATS route N571 over the Bay of Bengal which created a demand capacity issue leading to extensive delays for flights departing from Southeast Asia.

2.6 Flights departing from airports in Southeast Asia utilising ATS route N571 had to queue on the ground to be spaced 10 minutes apart (based on Mach Number Technique for similar cruising speed). Although alternative ATS routes such as P574 and N563 are available, most aircraft operators have provided feedback that those alternatives routes were not considered due to longer flying times and additional fuel burn en-route which negates the benefits of lesser delays on the ground. The statistics on the route usage by flights departing from Singapore (shown in the chart below) illustrates that the utilisation of ATS route N571 continues to be high, suggesting that aircraft operators generally prefer to delay their flights on the ground to operate on N571.

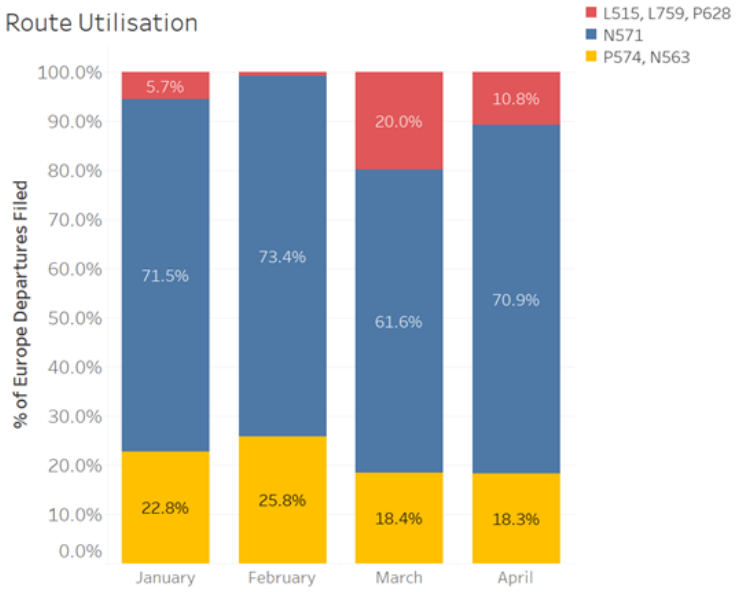


***Figure 2:*** *Chart illustrating high utilization of ATS route N571*

2.7 To further analyse the contributing factor of separation requirements, Singapore had also been monitoring the situation of westbound departures to Europe which includes the monthly delay statistics of westbound departures to Europe and the percentage of delay attributed to en-route separation (i.e. flights given the ground queue).

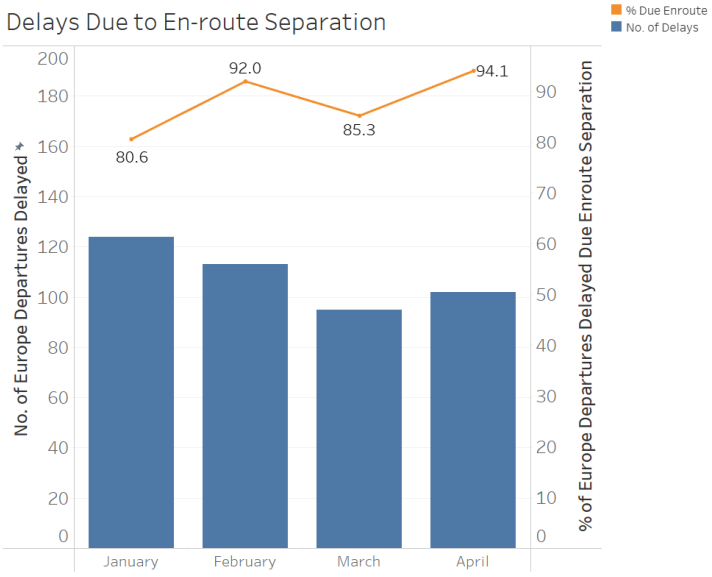


*Figure 3: Delays due to en-route separation on N571*

Efforts to Enhance Capacity on ATS Routes

2.8 There have been efforts to enhance capacity on ATS routes over the Bay of Bengal including new designs for directional routes in 2023 which now provide more options of flight plannable airways changes over the oceanic airspace. While this increased flexibility has been beneficial for airlines, with the continued increased demand, especially during the Asia to Europe peak in the (local) late evening hours, airlines are still reporting the need for a significant increase in capacity for the availability of preferred routes and levels, and reduction of the waiting time on the ground, as the

implementation of 50NM separation for suitably equipped aircraft with RNP10 approval is not always being utilised in some airspace. The first of a series of agreed steps within the ICAO Bay of Bengal Traffic Flow Review Group (BOBTFRG) was to introduce 50NM as the standard as soon as possible as capabilities showed it could be achieved immediately at that time.

2.9 The BOBTFRG also agreed to further reduce the longitudinal separation minima to 30NM between PBCS capable aircraft (trials planned to commence prior to the end of March 2024), effectively increasing the airspace capacity and efficiency over the area. Airlines have volunteered to participate however, due to certain challenges related to CRA facility establishment, the commencement of the trial is still pending.

2.10 However, despite these efforts, enhancing capacity may not be able to keep up with the burgeoning traffic growth in the future and unexpected capacity reduction situations due to ad-hoc activities could require certain ATFM collaboration, as a form of contingency.

Experiences with Demand-Capacity Balancing initiatives

2.11 The APAC region has had almost two decades of experience to manage demand-capacity imbalance on ATS routes. Since the successful implementation of BOBCAT in 2007, the region had successfully validated the proof-of-concept for the monitoring and management of regional load through the allocation of entry slots into FIRs of limited capacity where aircraft operators could be advised at flight departure point.

2.12 BOBCAT is an Air Traffic Flow Management (ATFM) system managed by Thailand to calculate and assign Calculated Take-Off Time (CTOT) to flights intending to fly from Southeast Asia to Europe through the Kabul FIR between 2000 and 2359 UTC. The flights are pre-tactically managed through issuing of CTOTs by BOBCAT to regulate air traffic flow in Kabul FIR during the peak traffic hours while providing predictability to aircraft operators.

2.13 The APAC Cross-Border Multi-Nodal ATFM Collaboration (AMNAC) had conducted numerous ATFM measures to address constraining situations in the region since June 2015. With the cross-border ATFM processes, the key objective to manage the amount of traffic ensures a smooth flow of flights and maintains the balance between traffic demand and capacity, upkeeping the level of safety and benefits to all stakeholders involved.

Next Steps

2.14 Remaining consistent with previous reminders from ICAO APAC Regional Office, States should apply the most efficient separation standards according to their CNS/ATM infrastructure and aircraft capabilities available in the airspace. Application of the most efficient separation standards will help increase airspace / air-route capacity and reduces the need for delays resulting from implementing ATFM measures.

2.15 Additionally, States/Administrations managing the traffic transiting through the Bay of Bengal area should evaluate – or conduct a study into – the causes of airspace constraints within the area with the aim of implementing solutions to address them. One possible solution is a collaborative ATFM process to manage air traffic flow into the constrained or congested airspace predictably. This can help to reduce the operational complexity by cutting down on the need for ATS Units to perform pre-departure clearance coordination (for every departure) with the upstream ATS Units.

2.16 ATFM/SG is encouraged to consider incorporating this scope of work into its work programme, bringing the relevant States/Administrations and stakeholders together to develop a viable collaborative solution, for the Bay of Bengal area.

Conclusion

2.17 The rapid recovery of the aviation industry from the COVID-19 pandemic has resulted in a substantial increase in air traffic, leading to congestions and delays, particularly for westbound traffic originating from Southeast Asia to Europe. While efforts to optimize airspace capacity in the Asia Pacific region have been ongoing, the increasing delays encountered during peak traffic periods have highlighted the need for closer collaborations to find resolutions.

2.18 Collaborations between airport operators, airspace users and ANSPs can lead to improved efficiency and reduced delays. States/Administrations should consider collaborating on capacity enhancement and cross-border ATFM to reduce delays and increase predictability for aircraft operators through application of optimized separation standards and pre-tactical traffic regulation.

## 3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Note the information contained in this paper;

b) Recognize the existing efforts and encourage further actions to increase airspace capacity and efficiency over the Bay of Bengal area;

c) Discuss on how cross-border ATFM collaboration can potentially provide better predictability and mitigate delays for the aircraft operators while reducing operational complexity for ATS Units during capacity constraint period;

d) Discuss on the proposal for ATFM SG to conduct a study on the causes for airspace constraints and a potential collaborative ATFM solution for the Bay of Bengal area,

e) Discuss any relevant matters as appropriate.

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