*International Civil Aviation Organization*

**The Fifth Meeting of the South Asia, Indian Ocean and Southeast Asia ATM Coordination Group (SAIOSEACG/5)**

Bangkok, Thailand, 13 – 16 January 2026

**Agenda Item 3: Review of Current Operations and Problem Area**

# BOBCAT ATFM OPERATIONAL UPDATES

(Presented by Thailand)

**SUMMARY**

This paper presents post-operations analysis of the BOBCAT operations following the reactivation of the procedure on 4 September 2025, with the system parameters – including aircraft spacing and flight level allocation – configured based on the current Afghanistan Contingency Arrangement. The analysis covers traffic demand and delay impact assessment, ATFM measure (CTOT) compliance, and effectiveness analysis based on achievable flight levels by BOBCAT traffic for the period of 4 September – 21 December 2025. This paper also includes a study on the compliance to potential 2- and 5-minute CTO windows.

## 1. INTRODUCTION

1.1 The meeting is invited to recall the Bay of Bengal Cooperative ATFM (BOBCAT) operations, an international long-range cross-border ATFM procedure to support the management of westbound nighttime traffic flow through the Afghanistan airspace (Kabul FIR) which had been in operations since 2007. The service, provided by AEROTHAI (Thailand), was suspended in September 2021 following the cessation of Kabul Area Control Center (Kabul ACC).

1.2 Despite the contingency procedure still being in effect, airspace users have in the past year elected to route their nighttime westbound flights from South/Southeast Asia to Europe through Kabul FIR again, especially considering the efforts by Afghanistan ATS authorities to provide additional flight levels on the contingency arrangement to enhance the airspace capacity.

1.3 At the SAIOSEACG/4 (March 2025) and the ATFM/SG/15 (April 2025) meetings, discussions on the reactivation of BOBCAT system and operations were conducted, culminating in an agreement to reactivate the operations starting AIRAC 4 September 2025. Coordinated AIP publication by relevant States in July 2025 helped to ensure relevant information were made available to stakeholders in an organized and timely manner.

1.4 The BOBCAT system configuration with respect to aircraft spacing and flight level allocation through Kabul FIR is based on the current Afghanistan ATM Contingency Arrangement and relevant NOTAMs.

1.5 In keeping with the tradition of reporting BOBCAT operational updates, focusing on post-operations analysis, at relevant forums, Thailand has resumed conducting the analysis based on data collected by the BOBCAT system along with monthly traffic sample data provided by relevant States. This paper provides such operational analysis between 4 September – 21 December 2025.

## 2. DISCUSSION

BOBCAT Traffic Demand

2.1 The meeting is invited to note the level of traffic demand based on the number of BOBCAT slot requests for the period between 4 September 2025 and 21 December 2025 as shown in **Figure 1**.

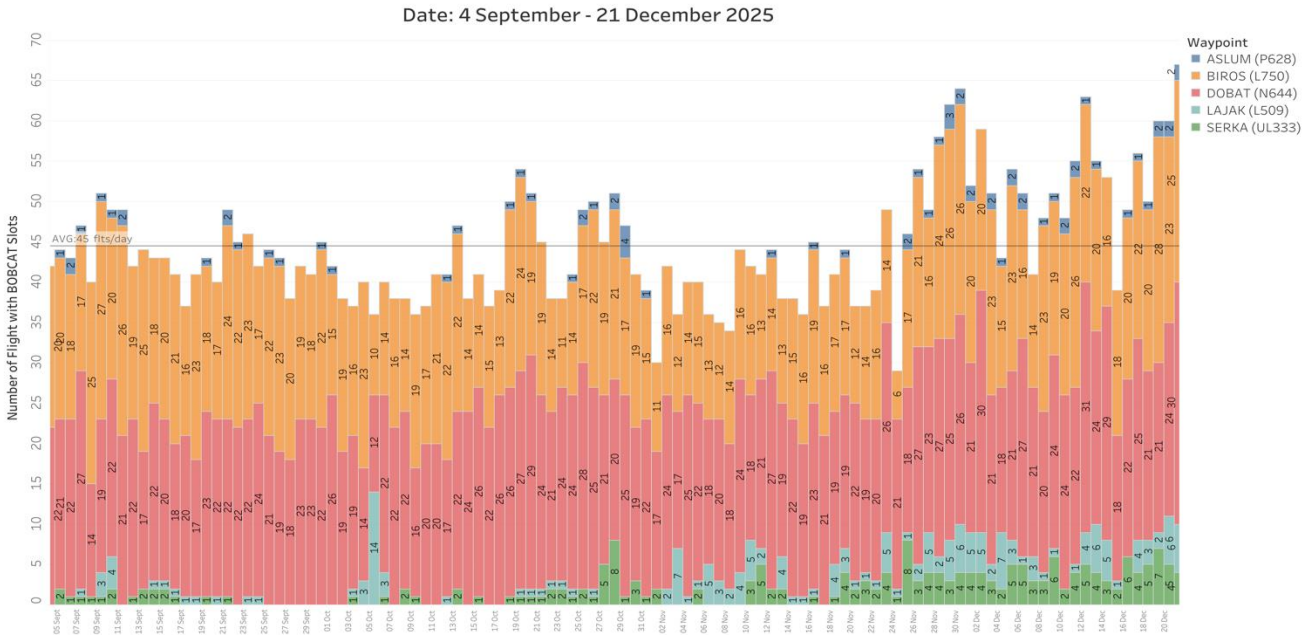


***Figure 1** : BOBCAT Traffic Demand from Slot Request: 4 Sep - 21 Dec 2025*

2.2 BOBCAT traffic demand during this 108-day period totalled 4,851 flights, averaging 45 flights/night. It is noted that flights securing BOBCAT slots significantly increased since late November 2025 with a peak of 67 flights/night observed on 21 December 2025. Based on the daily traffic distribution, categorized by entry waypoints (ASLUM, BIROS, DOBAT, LAJAK, and SERKA) as shown in **Figure 1**, the distribution of entry waypoints remained relatively consistent, with significant traffic volume utilizing DOBAT (via route N644) and BIROS (via route L750) as their entry waypoints into the Kabul FIR, which link Pakistan airspace with Turkmenistan airspace through Afghanistan airspace.

2.3 In terms of departure aerodromes contributing BOBCAT traffic, 24 aerodromes were found to have supplied traffic during the analysis period as shown in **Figure 2**. Suvarnabhumi Airport (VTBS), Singapore Changi Airport (WSSS), Indira Gandhi International Airport (VIDP), and Taoyuan International Airport (RCTP) were the primary contributors to the BOBCAT traffic, with averages of 6 – 14 departures/night securing BOBCAT slots.

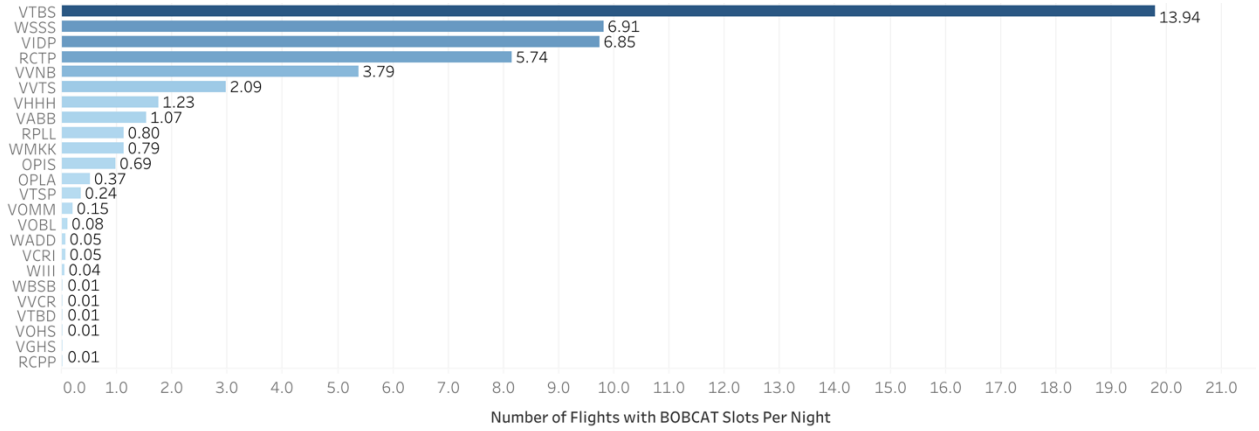


***Figure 2** : Average Daily BOBCAT Slot Allocation by Departure Aerodrome: 4 Sep - 21 Dec 2025*

2.4 In terms of the airspace users, 28 airlines participated in the BOBCAT operation between 4 September – 21 December 2025. Thai Airways (THA / TG) constituted the largest number of BOBCAT flights at 24.4 % (average of 11 flights/night), followed by Vietnam Airline (HVN / VN) at 11.0 % (average of 5 flights/night) and Lufthansa (DLH / LH) at 9.5 % (average of 4 flights/night), as illustrated in **Figure 3**.

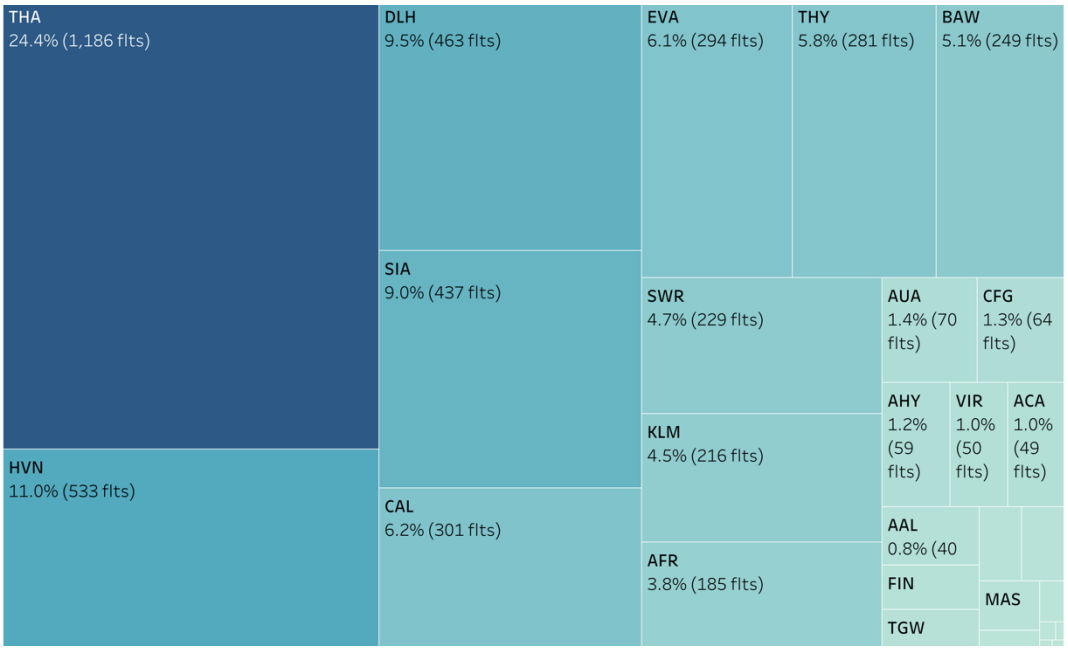


***Figure 3** : BOBCAT Slot Allocation by Airlines: 4 Sep - 21 Dec 2025*

ATFM Delay

2.5 ATFM delay is another figure of merit providing insight into the degree of demand-capacity imbalance. In BOBCAT operations, the ATFM delay is defined as the difference between the Estimated Take-Off Time (ETOT) derived from the Estimated Off-Block Time (EOBT) provided by the airline, and the initial departure slot time (CTOT) assigned by the BOBCAT system. The meeting is invited to note the analysis of average daily ATFM delay assigned by the BOBCAT system due to Kabul FIR capacity shortfall as shown in **Figure 4**. The figure displays the daily average ATFM delay per flight (red line) against the number of flights (blue bars).

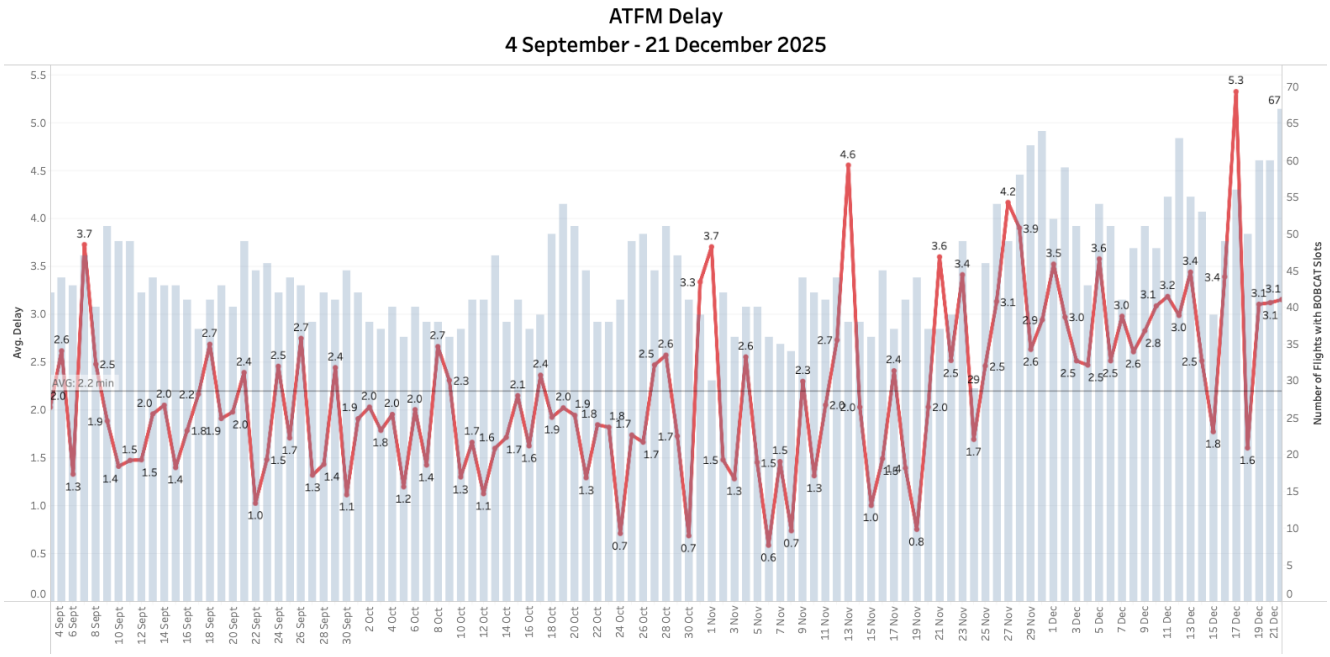


***Figure 4*** *: Daily Average ATFM Delay: 4 Sep - 21 Dec 2025*

2.6 The average ATFM delay for the period was 2.2 minutes per flight, with a total delay of 10,945 minutes over the 108-day period. Peaks in ATFM delays, such as the spike to 4.6 minutes on 13 November 2025 and 3.7 minutes on 1 November 2025 and 7 September 2025, generally correlate with specific operational constraints or demand surges. It is also to be noted that the delay trended higher when specific waypoints and flight levels were requested more than the available capacity.

2.7 To provide further granularity, **Figure 5** illustrates the distribution of ATFM delays for each entry waypoint. This helps identify if specific routes (e.g., L509 via LAJAK or N644 via DOBAT) are experiencing disproportionate delays compared to others. The result shows variability, with waypoints such as SERKA (UL333) experiencing isolated spikes in delay (e.g., up to 6.0 minutes) on some days. Regarding the high-density waypoints, BIROS (L750) shows 2.2 minutes of ATFM delay per night on average, with occasional delay peaks reaching 6.1 minutes correlating with traffic surges of up to 28 flights. Similarly, DOBAT (N644) shows average ATFM delays of 2.6 minutes with occasional delay peaks reaching 9.1 minutes.

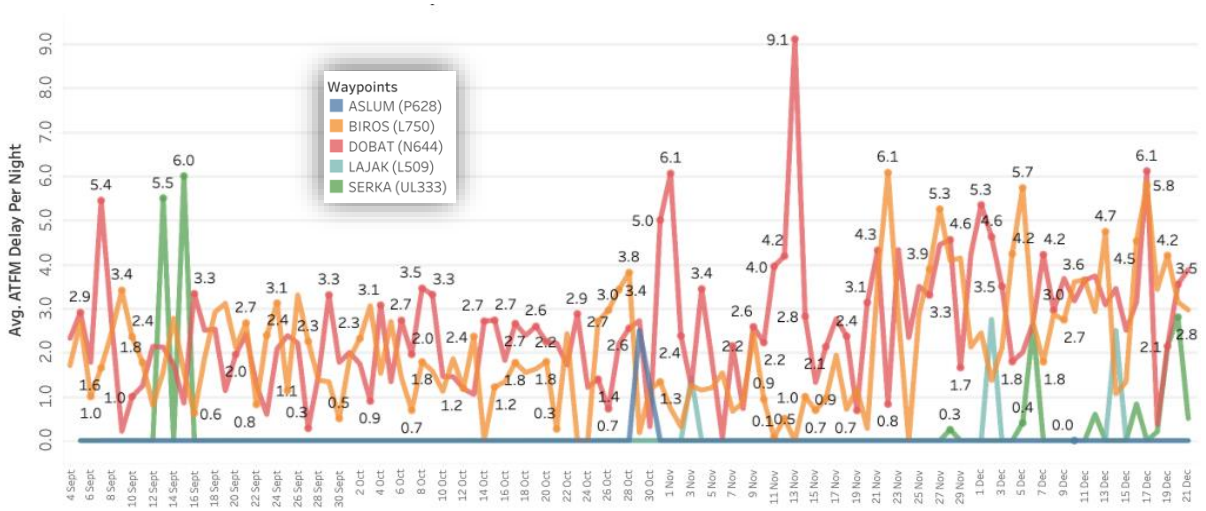


Figure 5 : Distribution of ATFM Delay by Entry Waypoints: 4 Sep - 21 Dec 2025

2.8 Assuming that the ATFM delays assigned by the BOBCAT system equate to the airborne delays reduction for BOBCAT flights, BOBCAT operations over the 108-day period resulted in an initial estimate of **approximately 1,060 tons of fuel savings** and an initial estimate of **approximately 3,350 tons of $CO_2$ emissions reduction**.

Addressing of Flight Movement Message

2.9 The meeting should be reminded that Air Traffic Services (ATS) movement messages should continue to be forwarded to the Bangkok ATFMU via AFTN address VTBBZDZX. It should also be noted that States failing to ensure proper transmission of ATS movement messages, in particular the departure messages (DEP), will impact the accuracy of post-operational analysis.

2.10 **Figure 6** shows the analysis on non-receipt of DEP messages for BOBCAT traffic during the analysis period. While most major aerodromes showed low rates of missing DEP messages, several aerodromes with significant BOBCAT traffic such as Islamabad International Airport (OPIS), Allama Iqbal International Airport (OPLA), Noi Bai International Airport (VVNB) and Kuala Lumpur International Airport (WMKK) showed significant percentages of non-receipt of DEP messages. The missing messages may result in inaccuracy of analysis and lack of data visibility for BOBCAT flights from these departure aerodromes. It should be noted that the number shown on bar graphs on the left-hand side of **Figure 6** indicates number of non-receipt of DEP messages during the 108-day period.

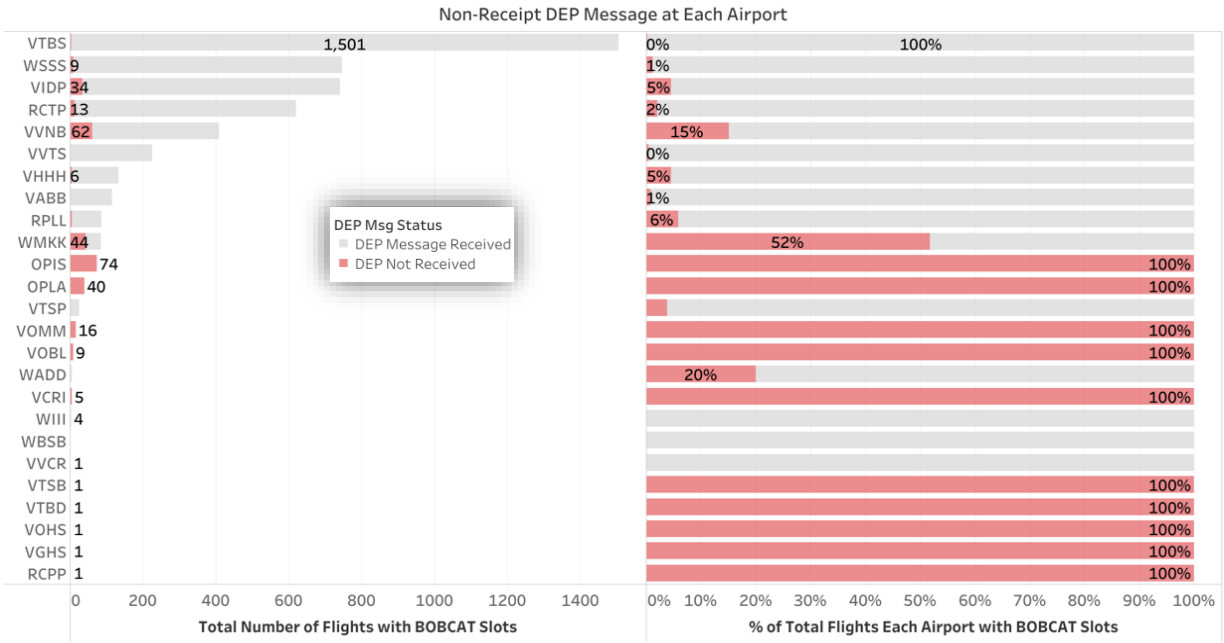


***Figure 6** : Non-Receipt of DEP Messages: 4 Sep - 21 Dec 2025*

CTOT Compliance

2.11 The basis of BOBCAT operations is in the allocation of departure ATFM slots in the form of Calculated Take-Off Times (CTOTs) corresponding to the entry slots into Kabul FIR. Successful operation hinges upon high compliance to CTOTs being facilitated by the departure aerodromes. In that regard, compliance to CTOT is also being monitored. **Figure 7** summarizes the BOBCAT CTOT compliance rates in the context of departure (DEP) messages received for major aerodromes in the Asia/Pacific region during the analysis period. The figure shows that CTOT compliance performance still varies among the aerodromes, and there are rooms for improvements.

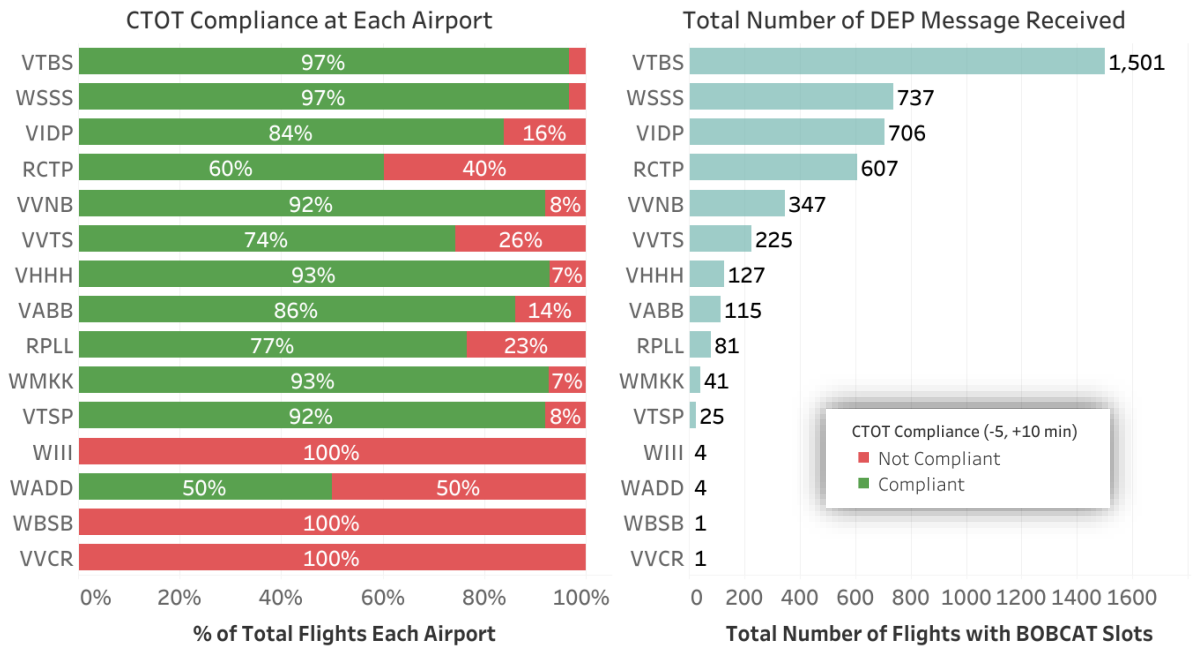


***Figure 7** : BOBCAT CTOT Compliance at Major Aerodromes: 4 Sep - 21 Dec 2025*

Traffic Sample Data and Post-Operational Analysis of Kabul FIR Entries

2.12 In analysing the operations focused on actual entry times and flight levels achieved at the Kabul FIR, Traffic Sample Data (TSD) were agreed to be provided by relevant States on the week starting with the third Sunday of each month. For this round of analysis, Pakistan supplied the TSD for the period between the following dates, which were used for analyses discussed in the following sections;

- 4 – 27 September 2025 (includes the first weeks of BOBCAT reactivation),
- 21 – 27 October 2025,
- 16 – 22 November 2025, and;
- 14 – 20 December 2025

Flight Level and Entry Time Compliance

2.13 Based on the analysis into the TSD supplied by Pakistan, a high percentage of flights were able to enter the Kabul FIR at the same or higher flight levels as those assigned by the BOBCAT system. **Figure 8** illustrates the daily comparison of actual flight levels versus BOBCAT Slots during the study period. The daily breakdown shows that on most days, approximately 93% of flights achieved the same or higher flight levels than allocated. Moreover, **Figure 9** summarizes the overall monthly flights achieved the same or higher flight levels when compared to slot allocation; approximately 94% in September, 92% in October, 92% in November, and 91% in December 2025.

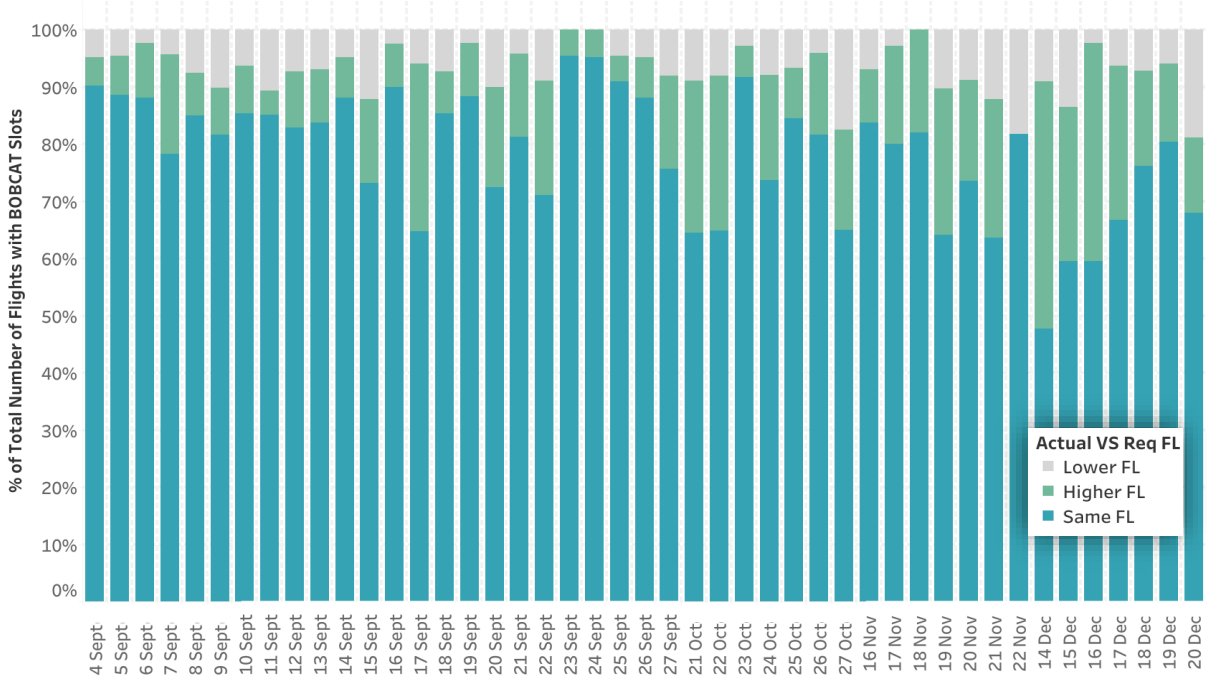


***Figure 8*** *: Comparison of Flight Levels Achieved vs Flight Levels Allocated: 4 Sep - 21 Dec 2025*

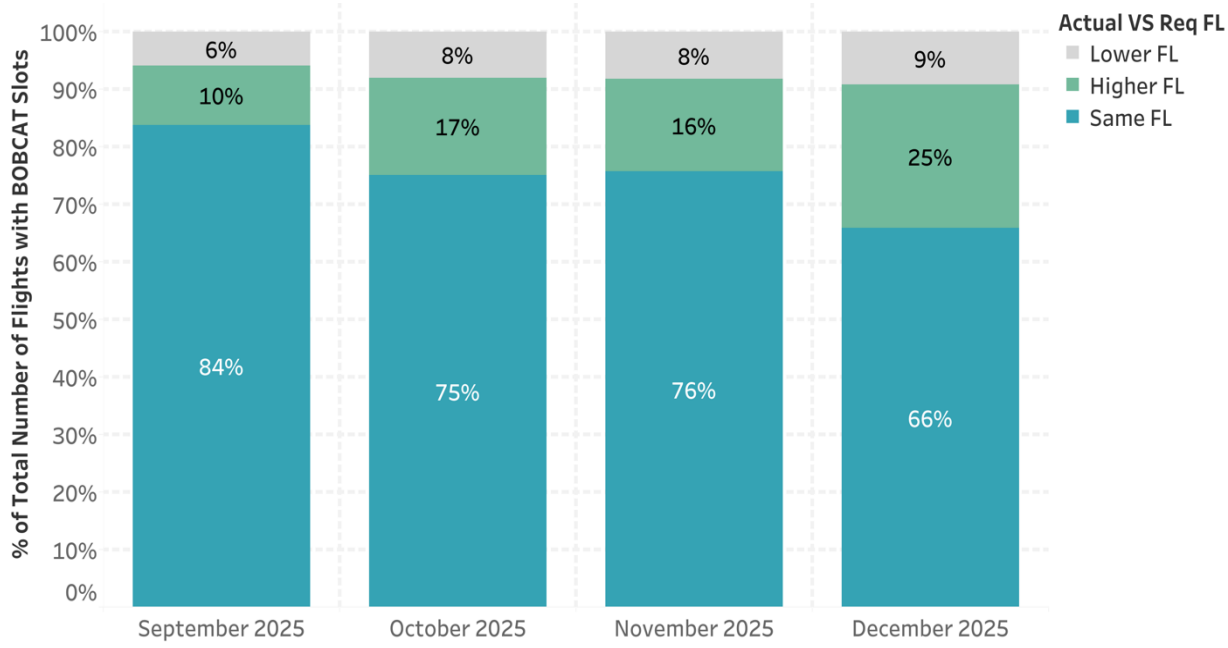


***Figure 9*** *: Overall Monthly Flight Levels Achieved vs Flight Levels Allocated: 4 Sep - 21 Dec 2025*

CTO Window Impact Study

2.14 A study was conducted to analyze the impact of different CTO window configurations on flight compliance, using the provided TSD. **Figure 10** illustrates the distribution of Actual Time Over (ATO) vs Calculated Time Over (CTO) at the Kabul FIR entry waypoints achieved by the flights.

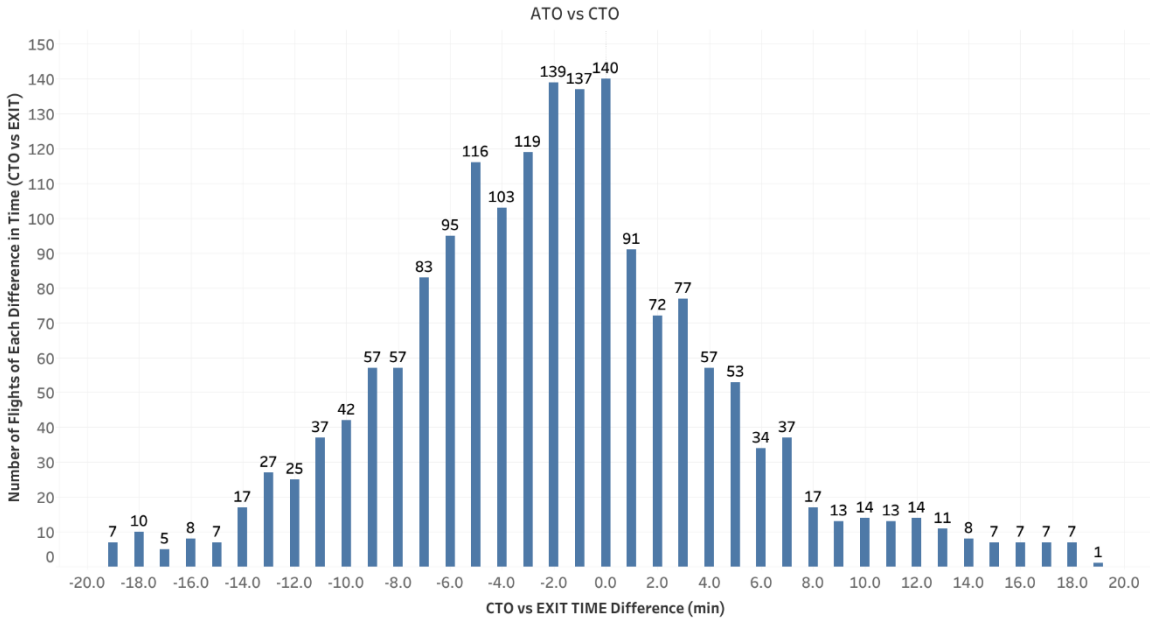


***Figure 10**: Distribution of ATO vs CTO: 4 Sep - 21 Dec 2025*

2.15 An analysis into the distribution illustrates the number and percentage of flights that would fall within specific CTO compliance windows, as summarized in **Table 1**.

- No CTO Window (Current Configuration): Flights achieving an entry time at the same time as their assigned CTO (+0 minute).
- 2-minute CTO Window: Flights achieving an entry time within 2 minutes of their assigned CTO.
- 5-minute CTO Window: Flights achieving an entry time within 5 minutes of their assigned CTO.

| CTO Window | Flight Count | Percentage of Total Flights (1,887 flights) |
|---|---|---|
| No CTO Window | 140 | 7.42 % |
| 2-minute CTO Window (0, +2 min) | 303 | 16.06 % |
| 5-minute CTO Window (0, +5 min) | 490 | 25.97 % |

***Table 1** : Flight Distribution for CTO Window Options*

2.16 **Table 1** indicates that only about 7% of the total flights with BOBCAT slots were able to comply with no CTO window. By widening the window to 2 minutes, the number of compliant flights could increase to approximately 16%, while a 5-minute window could capture about 26% of the flights.

Summary and Next Steps

2.17 In summary, the reactivation of BOBCAT operations since 4 September 2025 has been successful, with good support from relevant States/Administrations and airspace users. The operation

has proven effective in the balancing of traffic demand with available airspace capacity during the peak nighttime period in the Kabul FIR with flights achieving same or higher flight level when transiting Afghanistan airspace with minimal delay. Thailand remains committed to providing the ATFM service to enhance flight operations safety and efficiency.

2.18 BOBCAT ATFM post-operations analysis will continue to be conducted with support of Traffic Sample Data being provided by relevant States, with the results reported at relevant regional forums accordingly.

## 3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

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