International Civil Aviation Organization

Eleventh Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/11)

Video Teleconference, 02 – 06 August 2021

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

BOBCAT OPERATIONAL UPDATES

(Presented by Thailand)

SUMMARY

The purpose of this paper is to present an operational analysis and overview of westbound flights through the Kabul FIR associated with the BOBCAT system for the two-year period between July 2019 to June 2021.

1. INTRODUCTION

1.1 The meeting would recall that on AIRAC 5 July 2007, international long-range cross-border ATFM procedure using the BOBCAT system became fully operational.

1.2 It was agreed at the ATFM/TF/13 meeting held in September 2009 that monthly traffic sample data would be collected by all affected States in the third week of each month, sent to Bangkok ATFMU and analyzed by the Bangkok ATFMU for presentation to the periodic meetings of the ATFM/TF, which was later dissolved by APANPIRG/20 decision. Thenceforth, BOBCAT matters were followed up at SAIOACG meetings.

1.3 It was discussed at the SAIOACG/5 that Action Items related to ATFM Operations for Afghanistan airspace (Kabul FIR) should be reported to the ATFM/SG meetings. Accordingly, the latest post-operations analysis results are presented here for information and discussion.

2. DISCUSSIONS

2.3 In the period of almost 14 years from the start of operational implementation of BOBCAT in July 2007 to June 2021; BOBCAT operations, based on IATA estimate, has contributed to over 166 million kilograms of fuel saving or approximately 680 million kilograms of carbon dioxide emissions.

2.4 The meeting is invited to note the summary of BOBCAT Slot Request volume received between July 2019 and June 2021 in **Figure 1**.

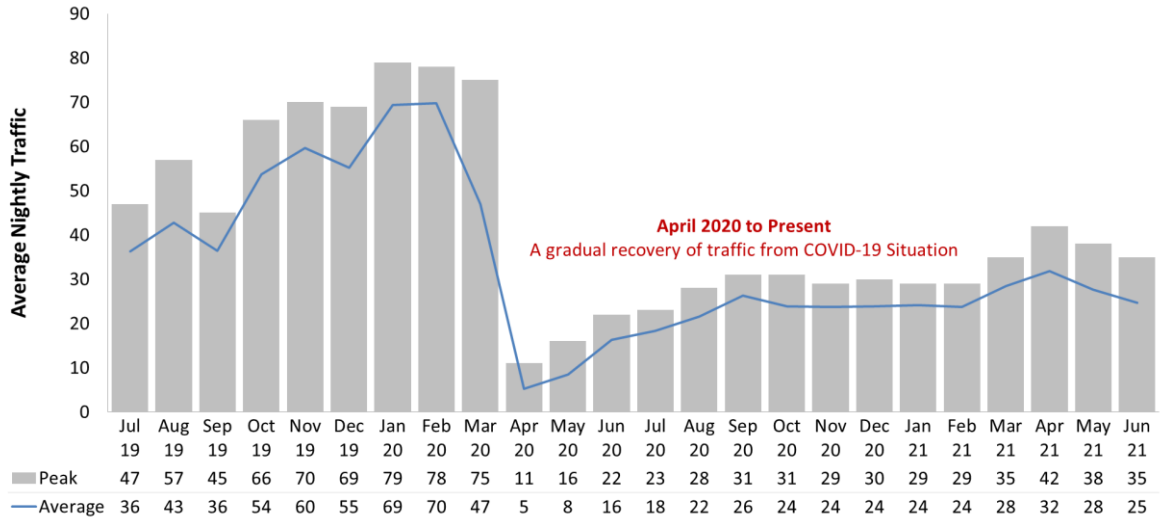

Figure 1: BOBCAT Traffic Demand from Slot Request: July 2019 – June 2021

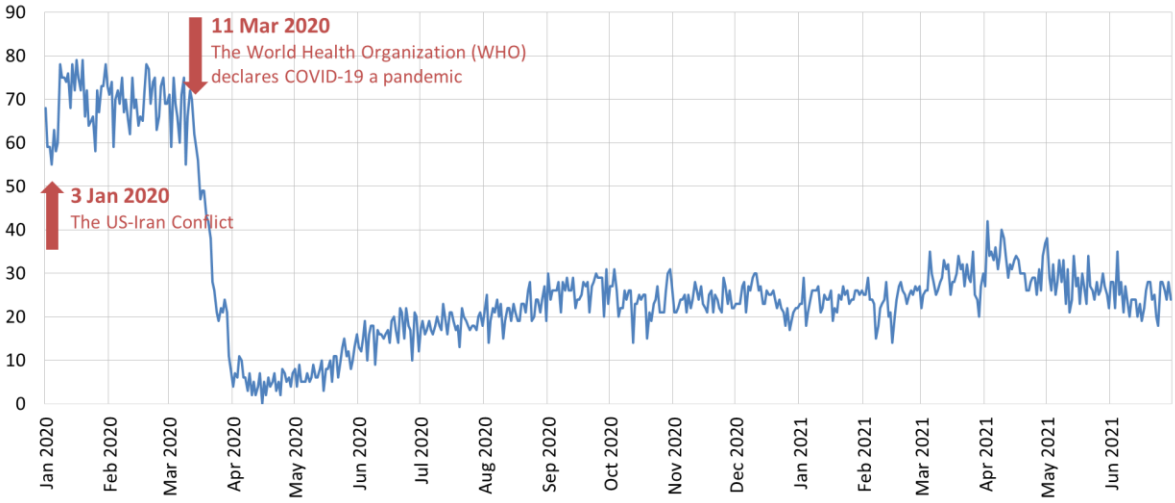

Figure 2: BOBCAT Traffic Demand from Slot Request: 1 January 2020 – 28 February 2021

2.5 As can be observed from **Figure 2**, traffic through Afghanistan airspace faced significant reduction in April 2020 due to the initial COVID-19 surge. While there were signs of recovery between May 2020 – April 2021, the average BOBCAT traffic demand in May – June 2021 returned to 25 – 28 flights during the four-hour BOBCAT operational period; the numbers which were less than half of the peak record in January 2020, despite the January – February 2020 period being affected by the regional conflict affecting the Iraqi and Iranian airspace at the time.

2.6 The meeting is also invited to note that 38 airlines participated in the BOBCAT process between July 2019 and June 2021. Top 10 participating airlines are illustrated in **Figure 3**.

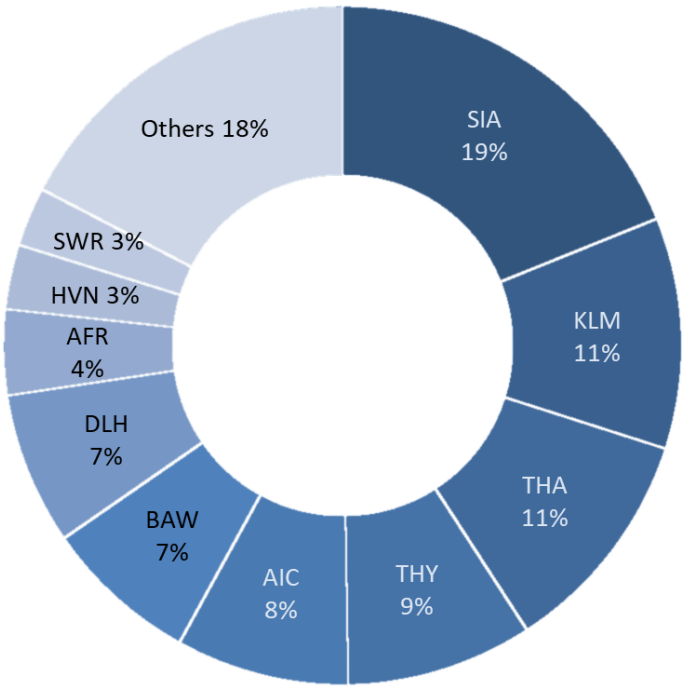

Figure 3: BOBCAT Airline Participation: July 2019 – June 2021

2.7 The meeting is invited to note the 47 airports that have continued contributing to the BOBCAT traffic based on July 2019 and June 2021 data as illustrated in **Figure 4**.

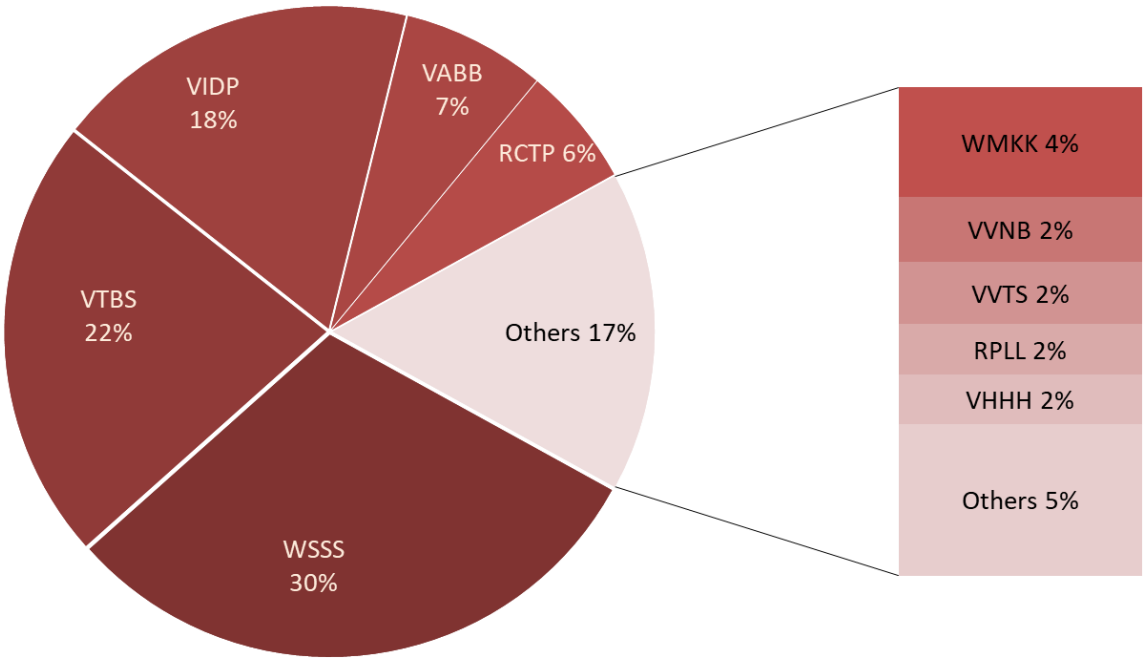

Figure 4: BOBCAT Slot Request by Departure Airports: July 2019 - June 2021

Timeliness of Slot Allocation Release

2.8 As more major airports involved in facilitating flight departures based on BOBCAT CTOT began to adopt Airport Collaborative Decision Making (A-CDM), the demand for timely release of BOBCAT Slot Allocation increased to ensure aircraft operators can submit flight plans at least 3 hours before Estimated Off-Block Time (EOBT). Accordingly, Bangkok ATFMU began monitoring, as an additional performance indicator, the percentage of days in each month in which BOBCAT Slot Allocation is released within 10 minutes after the cut-off time. The data for the period between July 2019 and June 2021 is shown in **Figure 5**.

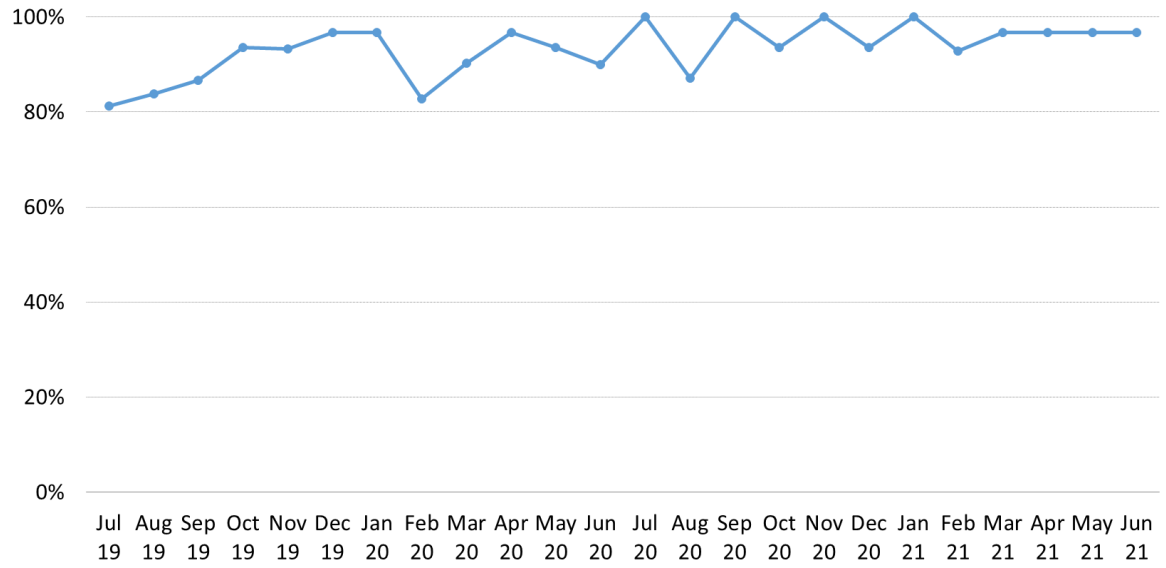

Figure 5: Ten-Minute Cut-off Time Slot Allocation Release Performance:
July 2019 - June 2021

Traffic Sample Data and Post-Operational Analysis

2.9 The meeting should be advised that one-week Traffic Sample Data used in post-operational analyses described in subsequent sections is collected from member ANSPs on the week starting with the third Sunday of each month.

Addressing of Flight Movement Message

2.10 In accordance to Action Item BBACG-20/1 (updated at SAIOACG/3), States were requested to ensure that flight plans and movement messages (e.g. DEP, CHG, CNL) for flights subjecting to ATFM measures – specifically the BOBCAT process –are sent via AFTN to Bangkok ATFMU (VTBBZDZX).

2.11 The meeting should be reminded that flight movement messages should continue to be forwarded to the Bangkok ATFMU via AFTN (VTBBZDZX). It should also be noted that States failing to ensure proper transmission of movement messages, in particular, departure messages (DEP), may be given APANPIRG Air Navigation Deficiencies as per APANPIRG Conclusion 27/12. Additionally, for Post-Operation Analysis purpose, monthly one-week Traffic Sample Data from concerned ANSPs should also contain departure times from relevant aerodromes.

2.12 The summary of the percentage of flights whose DEP messages have been sent to Bangkok ATFMU, from the monthly one-week traffic sample data between July 2019 and June 2021, is illustrated in **Figure 6**.

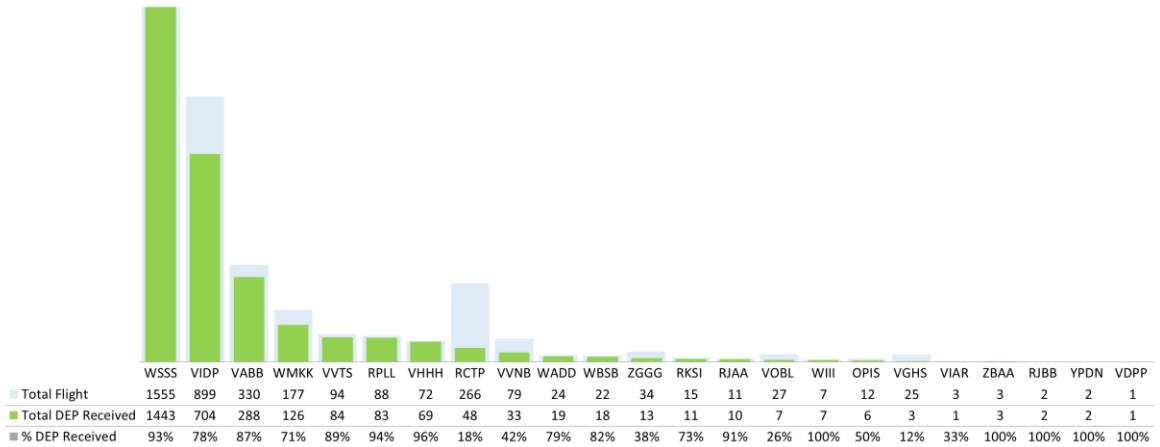

Figure 6: Average Percent of Flights with DEP Message Received: July 2019 - June 2021

Preferred Flight Levels

2.13 Post-Operations Analysis continues to indicate high percentage of flights operating through Kabul FIR with the same or better flight levels as those requested, as indicated in **Figure 7**. Overall, the percentage of flights with the same or better flight levels continued to be in the range of 84 – 95 percent

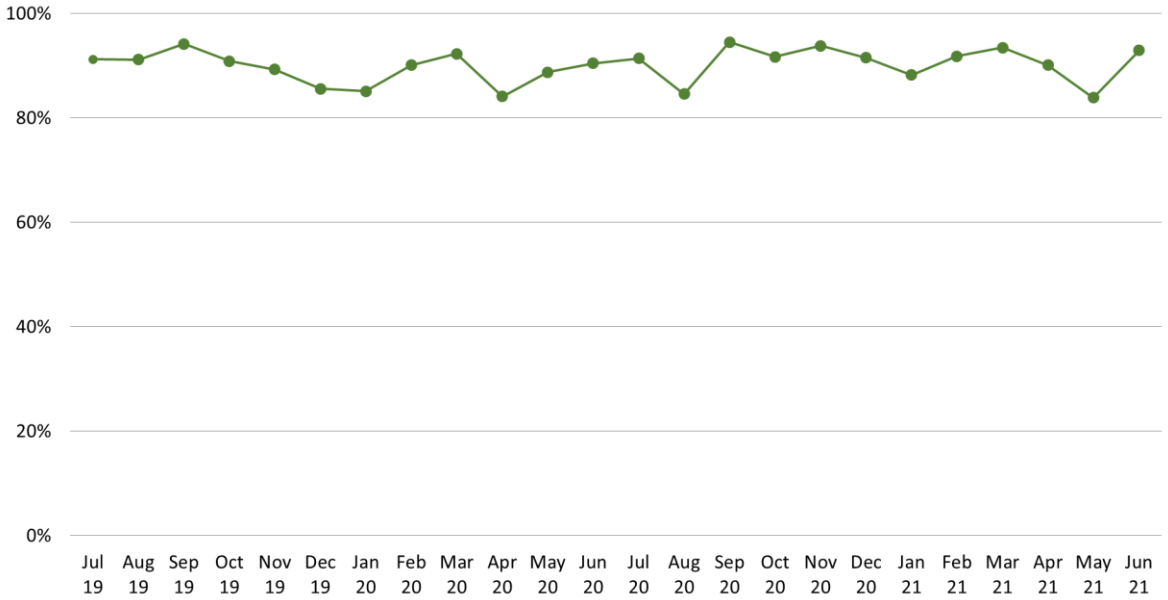

Figure 7: Percentage Achieving Same or Better FL: July 2019 - June 2021

2.14 **Figure 8** shows the analysis result on major causes of flights not being able to enter Kabul FIR at the flight levels in accordance with those specified by BOBCAT Slot Allocation between July 2019 and June 2021.

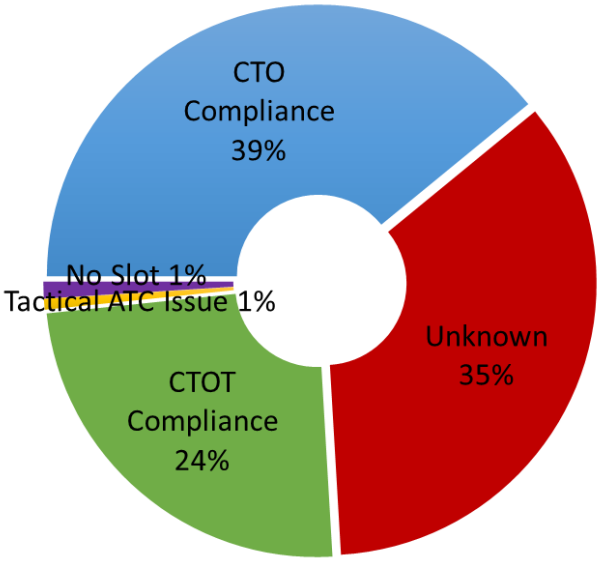

Figure 8: Causes of Flight Not Entering Kabul FIR at Slot Allocation FL: July 2019 - June 2021

2.15 As shown in **Figure 8**, major causes for aircrafts being unable to achieve allocated flight levels are:

a) Kabul FIR Entry Time (CTO) Compliance: 39 percent

b) Unknown (more data required): 35 percent

c) Departures Punctuality (CTOT Compliance): 24 percent

d) Tactical ATC issues: 1 percent

e) Departure without Slot Allocation: 1 percent

2.16 The figure shows that leading major cause for FL difference is Kabul FIR entry-time (CTO) compliance (39%). This situation may arise from factors such as weather variations, tactical ATC operations, or inaccurate provision of estimate elapse time in the flight plan.

2.17 Airlines and ANSPs should note the importance of compliance with allocated Kabul FIR entry-time slot. **Flights should, where possible, attempt to cross the entry waypoint into Kabul FIR within the 5-minute window after the Calculated Time Over (CTO) specified by BOBCAT Slot Allocation (CTO+5)**.

CTOT Compliance

2.18 Prior to this round of Post-Operations Analysis, the major cause of flights not being able to enter Kabul FIR at the allocated flight levels was due to departure punctuality with respect to CTOT. The analysis on departure punctuality continues to be carried out for the July 2019 - June 2021 dataset in accordance with Action Item BBACG-20/3 (updated in SAIOACG/5 and transferred to ATFM/SG). The result is shown in **Figure 9**.

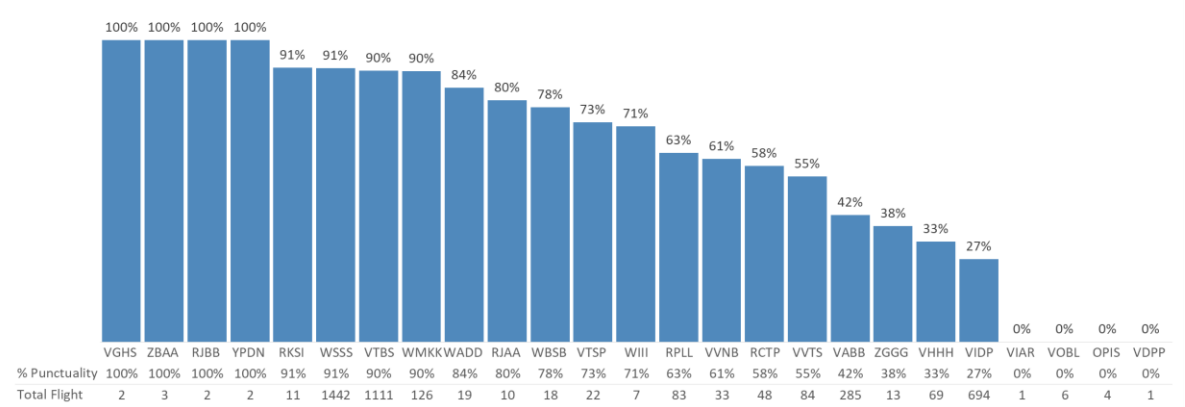

Figure 9: Average CTOT Compliance: July 2019 - June 2021

2.19 It should be noted that departure compliance at various airports can still be improved.

Afghanistan Airspace Entry Compliance (CTO Compliance)

2.20 The meeting would recall that BOBCAT Slot Allocation is generated on the basis that flights are expected to enter Afghanistan airspace at the specified entry waypoints within the window of 5 minutes after Calculated Time Over (CTO).

2.21 **Figure 10** shows this result from the traffic sample data provided in the period of July 2019 - June 2021. The data shows a low (29%) CTO compliance rate, despite high percentage of CTOT compliance rate at top departure airports (**Figure 9**). This indicates that actual flight times may still differ significantly from planned EET in the FPLs, which may be due to factors such as weather variations, tactical ATC instructions, or variations of flight performance. It also indicates that the current CTO compliance window should not be further reduced. Further information on the list of flights not complying to CTO window can be provided on request.

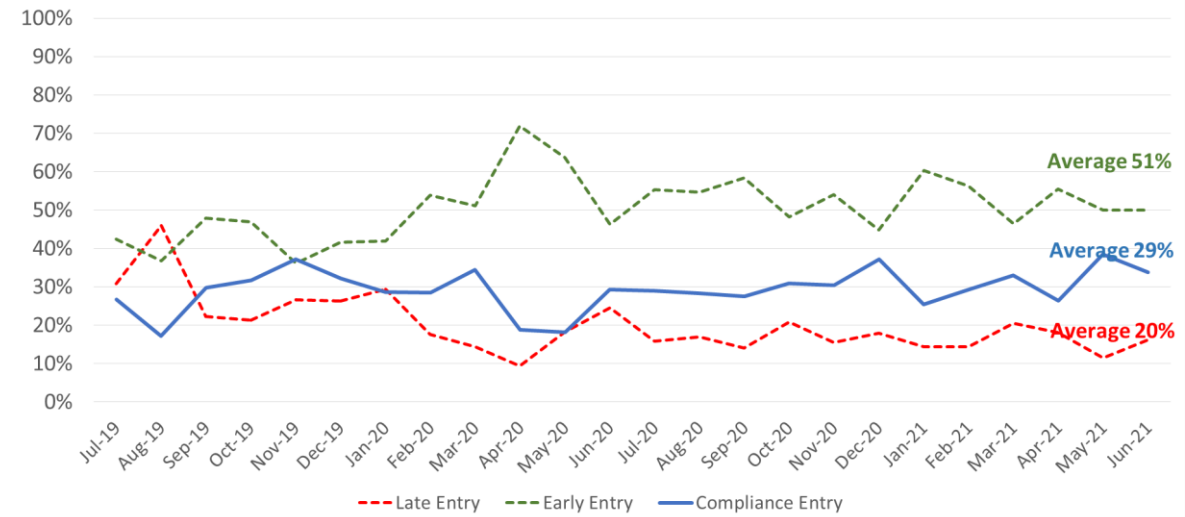

Figure 10: Afghanistan Airspace Entry Compliance: July 2019 - June 2021

2.22 It should also be noted, however, that despite low CTO compliance rates, a majority of flights are still able to achieve the same or better flight levels compared to those allocated by the BOBCAT system; as shown in **Figure 7**.

2.23 Further study correlating CTOT Compliance and CTO Compliance was carried out using Traffic Sample Data from July 2019 – June 2021. **Figure 11** summarizes CTOT and CTO Compliance from Traffic Sample Data in 2-year period.

CTOT Compliance	Overall	Early Entry	Compliance Entry	Late Entry
Early Take-Off	**11%**	88%	10%	2%
Compliance Take-Off	***60%***	51%	*37%*	12%
Late Take-Off	**12%**	5%	19%	76%
No DEP Received	**17%**	46%	24%	30%

Figure 11: Correlation of CTOT Compliance and CTO Compliance: July 2019 – June 2021

2.24 It can be observed from **Figure 11** that aircraft that departed early outside CTOT window are likely to enter Afghanistan airspace earlier than CTO window. Similarly, aircraft that departed late outside CTOT window are likely to enter Afghanistan airspace later than CTO window.

2.25 A significant finding from the study indicates that, while 60% of flights in the Traffic Sample Data departed within the CTOT window, only 29% of those flights entered Kabul FIR within the CTO window. Significant portion of flights departed within the CTOT window but entered Kabul FIR earlier than the CTO window.

2.26 Further investigation was carried out as CTOT window was constructed with the assumption that flights are capable to speed up or slow down at the rate of one minute per flight hour. Therefore, further study correlating CTOT compliance perfornace and CTO compliance performance is carried out with result summarized in **Figure 12**.

CTOT \ CTO Compliance	Overall	Early Entry	Compliance	Late Entry
CTOT Compliant – expected to slow down	**39%**	77%	20%	3%
CTOT Compliant – no speed modification needed	**45%**	*41%*	49%	10%
CTOT Compliant – expected to speed up	**16%**	11%	51%	38%

Figure 12: CTOT Compliant Flights and CTO Compliance Correlation: July 2019 - June 2021

2.27 **Figure 12** indicated that flights that departed within CTOT window with expectation to slow down were largely unsuccessful in slowing down. Similarly, flights expected to speed up to ensure compliance with CTO window are also largely unsuccessful in speeding up. In addition, it is noted that significant portion of CTOT compliant flights (44%) ended up entering Afghanistan airspace earlier than CTO window. This situation may be due to short-cuts obtained in flight.

2.28 In response to ATFM/SG Action Item 6/2 requesting Thailand to provide detailed list of non-compliance with BOBCAT entry times (CTO Compliance), fully analysed traffic sample data for the months of January 2018 – December 2019 can be downloaded from:

http://tinyurl.com/bobcat-analysis-2021-06.

ATFM Delay

2.29 Another figure of merit continuously monitored by Bangkok ATFMU is the ATFM delay due to Afghanistan airspace constraint as assigned by the BOBCAT system. The analysis result on ATFM delay for the reference period of July 2019 - June 2021 is shown in **Figure 13**.

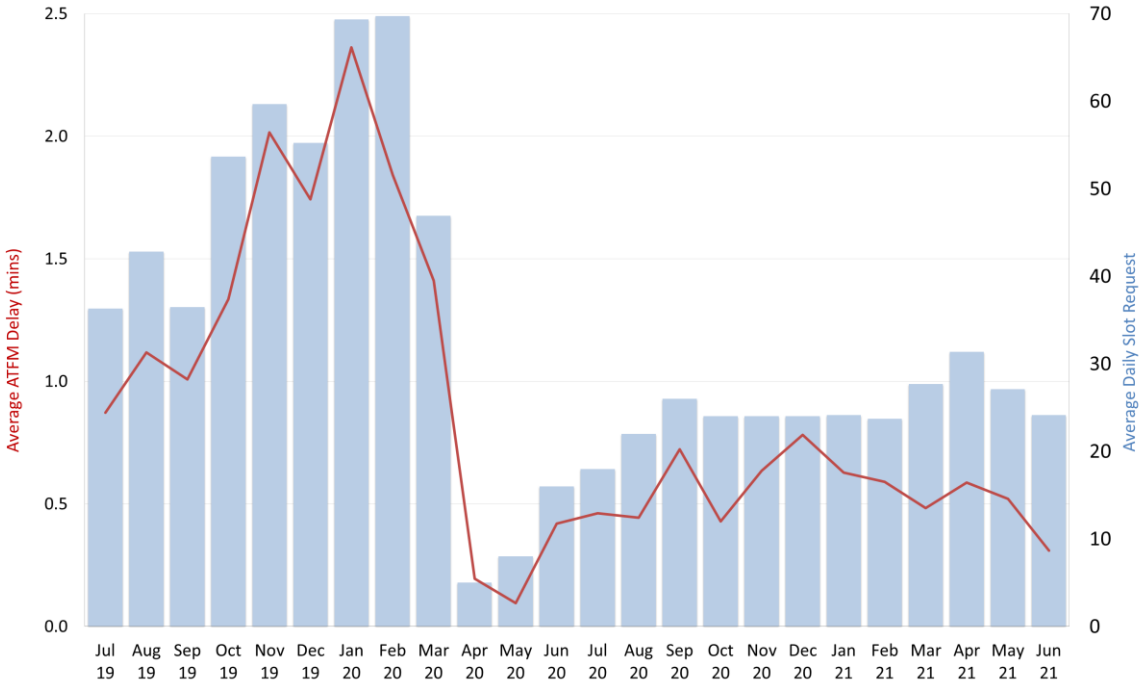

Figure 13: ATFM delay: July 2019 - June 2021

2.30 Reviewing **Figure 13** would indicate that ATFM delay increases along with increase of average number of slot allocation per night.

Distribution of Flight Level Operated in the Afghanistan Airspace

2.31 In response to requests from some stakeholders operating through the Afghanistan airspace, additional chart was prepared to show evolution of westbound flight level used by aircraft operating through the airspace over time. Resulting chart is shown in **Figure 14**.

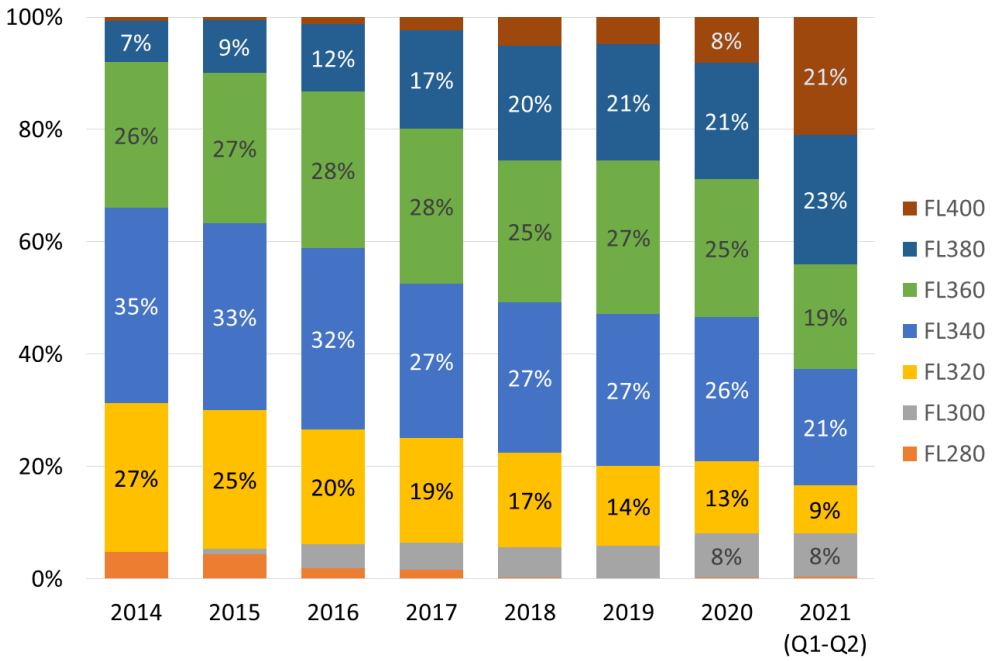

Figure 14: Distribution of Flight Level Operated in Afghanistan Airspace: 2014 – 2021

2.32 Based on **Figure 14**, it can be observed that in 2014, 88 percent of flights through Afghanistan airspace operated on FL320 – FL360 as top 3 FLs operated. The band of top-3 flight levels used then changed upwards, so that FL340 – FL380 were operated by 72 percent of flights in 2020. Meanwhile, the use of FL280 decreased from 5 percent in 2014 to almost no use in 2020, largely replaced by the use of FL300. Upward change of flight level usage in Afghanistan airspace may be due to changing fleet mix operating through Afghanistan as more modern aircraft with higher optimal operating altitudes such as Boeing 787 and Airbus A350 now operate through the airspace. It is expected that, as COVID-19 pressured airlines to retire older aircraft, the trend on the usage of higher flight levels will continue.

2.33 Moreover, in 2021 Q1-Q2, there was a significant increase in the percentage of flights operating at FL400. This may be related to COVID-19 impact in reducing aircraft passenger / freight load factor, resulting in flights able to operate through the Afghanistan airspace at higher flight levels.

COVID-19 Impact on Bangkok ATFMU Operations

2.34 While COVID-19 started impacting air traffic in Asia/Pacific in late January 2020, its impact on BOBCAT slot request started in mid-March 2020 with BOBCAT slot requests falling to 38-56 flights/night on the week of 15-21 Mar 2020. By 31 Mar 2020, the BOBCAT system registered less than 10 slot requests.

2.35 In addition to daily slot request information in **Figure 2**, number of slot request between 1 – 19 Apr 2020 averages at 5 slot requests/night with no slot request submitted on 15 Apr 2020. The maximum number of slot requests in April 2020 was on 4 Apr 2020 with 11 slot requests received.

2.36 In response to the Thai government's requirement for State Enterprises to consider as much as practicable Work from Home arrangement in late March 2020, Bangkok ATFMU reduced the hours that the unit would be physically manned to **0100-1300UTC**. Outside these hours, a contingency mobile phone number is provided should there be a need to contact Bangkok ATFMU staff for assistance. The BOBCAT system itself continues to function H24, and airlines are able to lodge slot requests, receive slots, and manage their slots round-the-clock.

2.37 As COVID-19 traffic decrease continued to drag on and COVID-19 impact on Thailand increased in 2021 Q2, Bangkok ATFMU operations hour were further adjusted to 2330 – 1430UTC. This time period was adjusted to cover post-cutoff time slot allocation changes until slot allocation stabilizes. After 1430UTC, about 98-99 percent of slot allocation changes have been carried out by airline staff. Historically, airlines that requested Bangkok ATFMU support to change slot allocation after 1430UTC had history of changing slot allocation within the BOBCAT system on their own.

2.38 During this period of significant traffic reduction, the needs for ATFM operations also decreases. In order to maintain the currency of Bangkok ATFMU staff, online refresher trainings are provided to ensure staff are kept up-to-date with current operating procedures. The unit also supported Hong Kong China in their GDP operational trials which will be presented by the Asia-Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC) and Hong Kong China in separate working papers. The "recency of experience" requirements – similarly to those of the airline pilots – are also being explored to determine the preparation required before Bangkok ATFMU returns to full-service.

Improved Afghanistan Airspace Access (Aug 2020, Mar 2021, July 2021)

2.39 In late July 2020, Bangkok ATFMU received information from the Kabul ACC that, as a consequence of the agreement between Lahor ACC and Kabul ACC, more flight levels are becoming available for entry waypoints LAJAK (L509) and SITAX (M875) as shown in **Figure 15**.

Entry Waypoint (Route)	Pre-August 2020	August 2020 onwards
LAJAK (L509)	FL280 (1 FL)	FL280 – FL400 (7 FLs)
SITAX (M875)	FL300 – FL400 (6 FLs)	FL280 – FL400 (7 FLs)

Figure 15: Increase in Flight Level Availability for LAJAK (L509) and SITAX (M875)

2.40 In coordination with the Kabul ACC, the Bangkok ATFMU configured the BOBCAT system to provide access to additional flight levels on 4 August 2020, while also updating relevant system documents and coordinated with States involved to amend national AIPs affected accordingly.

2.41 Furthermore, subsequent to publication of Afghanistan AIP Amendment 002-2021 with effect from AIRAC Date 25 Mar 2021, more flight levels became available for entry waypoints ASLUM (P628) and SERKA (N636-P628) as shown in **Figure 16**.

Entry Waypoint (Route)	Pre-25 March 2021	25 March 2021 onwards
ASLUM (P628)	FL320 – FL400 (5 FLs)	FL300 – FL400 (6 FLs)
SERKA (N636-P628)	FL280 – FL300 (2 FLs)	FL280 – FL400 (7 FLs)

Figure 16: Increase in Flight Level Availability for ASLUM (P628) and SERKA (N636-P628)

2.42 Following the coordination with Kabul ACC, Bangkok ATFMU will configured the BOBCAT system to provide access to additional flight levels on 25 March 2021, with relevant system documents national AIPs amended.

2.43 On AIRAC Date 15 July 2021, in coordination with Kabul ACC, Bangkok ATFMU published the revised ATFM Users Handbook to reflect additional route requiring BOBCAT ATFM slots and renaming of routes within the Afghanistan airsapce, which can be summarized in **Figure 17**. The change did not require BOBCAT system configuration change.

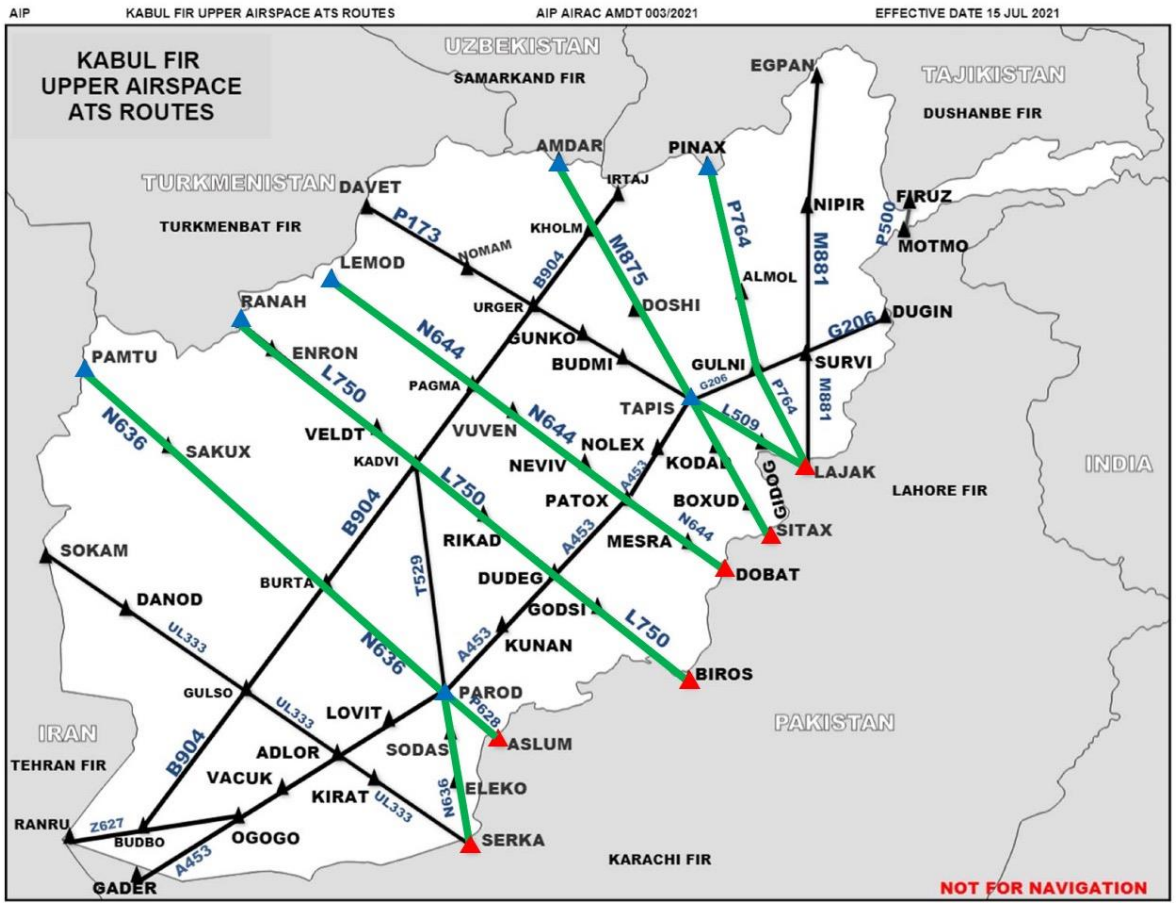

Figure 17: Afghanistan BOBCAT Slot Requirements – 15 July 2021
(Required waypoints in red; required routes in green)

Yangon ACC Contingency Situation

2.44 The meeting would recall that in the early February (8-16 February 2021), there was a contingency situation concerning the Yangon ACC which required the activation of Myanmar ATS Contingency Plan as well as the formation of Yangon FIR Contingency Coordination Team (CCT).

2.45 During the contingency event, traffic departing Bangkok Suvarnabhumi International Airport (VTBS) were facing significant departure delays due to the required increase in spacing between aircraft entering Yangon FIR and lesser number of Flight Levels available as part of the contingency route structure. The delays were additional to the ATFM delay assigned as part of the BOBCAT process.

2.46 In analyzing the situation among Bangkok ACC, Bangkok ATFMU, ICAO and IATA, it was decided that departures from Bangkok Suvarnabhumi International Airport (VTBS) during BOBCAT hours would be exempted from the BOBCAT ATFM procedure between 12-16 February 2021. In effect, this reduced the number of flights requesting BOBCAT slots by 3-4 flights/night on the affected days. Nevertheless, exemption of VTBS departures from BOBCAT ATFM procedure did not affect the overall traffic requesting BOBCAT slots in February 2021, which continued to average at 24 flights/night, as can be observed in **Figure 2**.

2.47 In addition to the exemption from the BOBCAT ATFM procedure, departures from Bangkok Suvarnabhumi International Airport (VTBS) bound for Europe were also asked to fly out via CRMMR001 (L507) instead of the usual CRMMR003 (L301). According to one of the airlines operating the affected flights, this re-routing scenario added a significant 8 minutes to their flight times. However, the additional flight time was welcomed as an alternative to the departure delay otherwise being experienced for CRMMR003 (L301), which – on some occasions – were reported to approach one hour.

2.48 Fortunately, through collaboration among members of the Yangon FIR CCT and previous publication of Myanmar ATS Contingency Plan in addition to pre-establishment of contingency procedures with at least some neighboring ANSPs, the contingency situation was managed relatively smoothly and concluded in less than two weeks.

3 ACTION BY THE MEETING

3.3 The meeting is invited to:

a) note the data collated and analyzed by the Bangkok ATFMU;

b) discuss data collection results; and,

c) discuss any relevant matters as appropriate.

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