International Civil Aviation Organization

Tenth Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/10)

Video Teleconference, 04 – 08 May 2020

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 January 2018 to December 2019, with some partial information on the period between January – March 2020.

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 During the 13-year period from the start of operational implementation of BOBCAT in July 2007 to March 2020; BOBCAT operations, based on IATA estimate, has contributed to over 155 million kilograms of fuel saving or approximately 635 million kilograms of carbon dioxide emissions.

2.4 The meeting is invited to note the summary of BOBCAT Slot Request volume received between April 2018 and March 2020 in **Figure 1**.

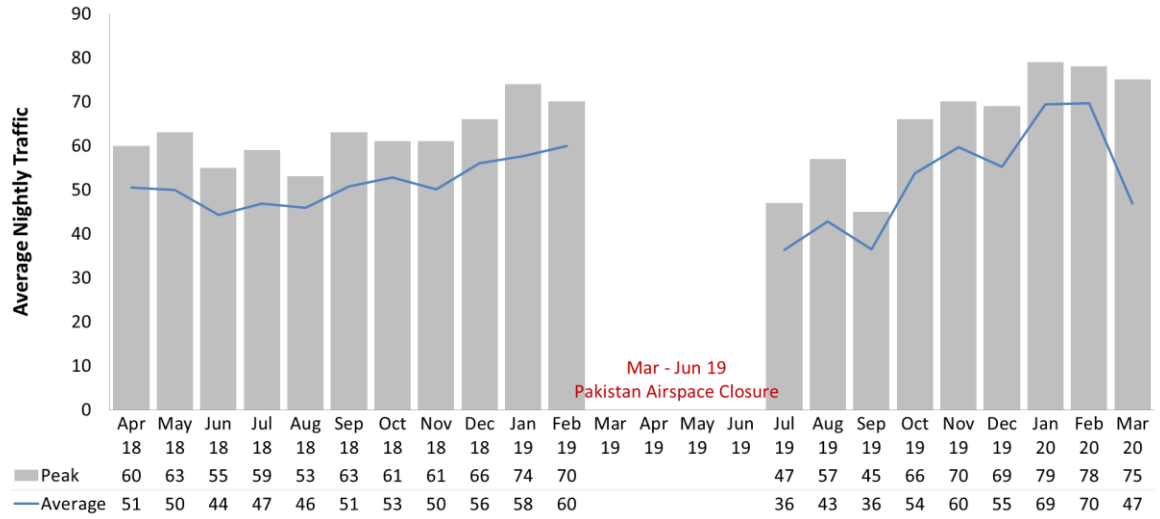


Figure 1: BOBCAT Traffic Demand from Slot Request: April 2018 – March 2020

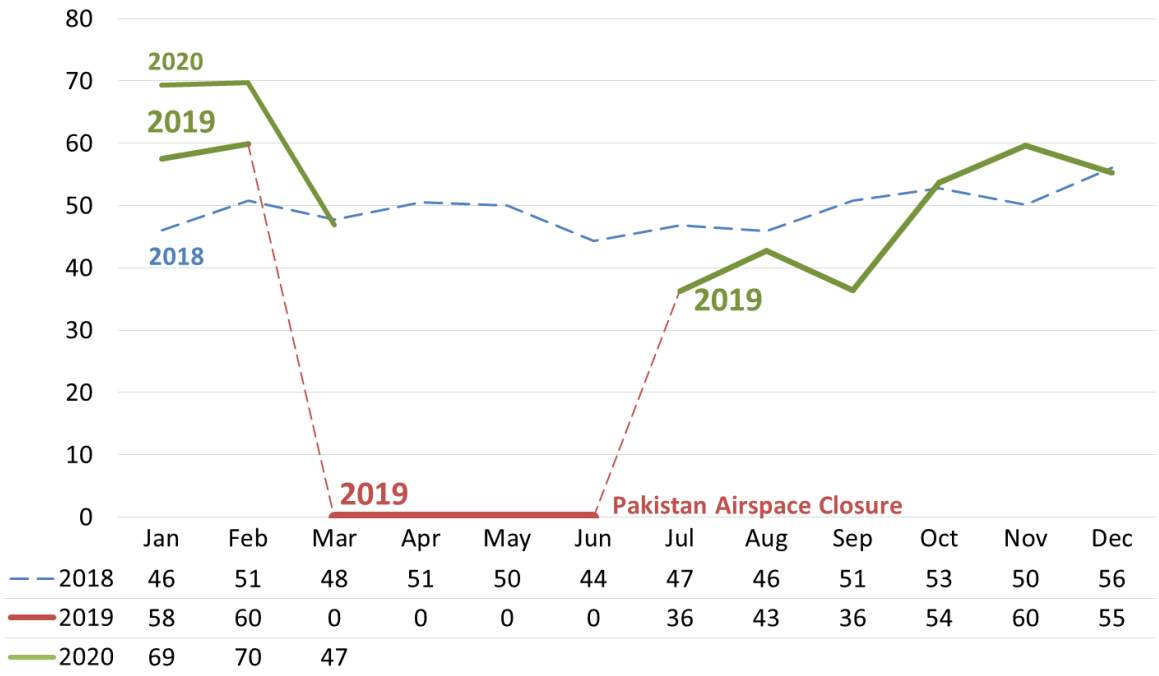


Figure 2: BOBCAT Traffic Demand from Slot Request: January 2018 – March 2020

Note: Pakistan Airspace Closure: 27 Feb 19 – 15 Jul 19

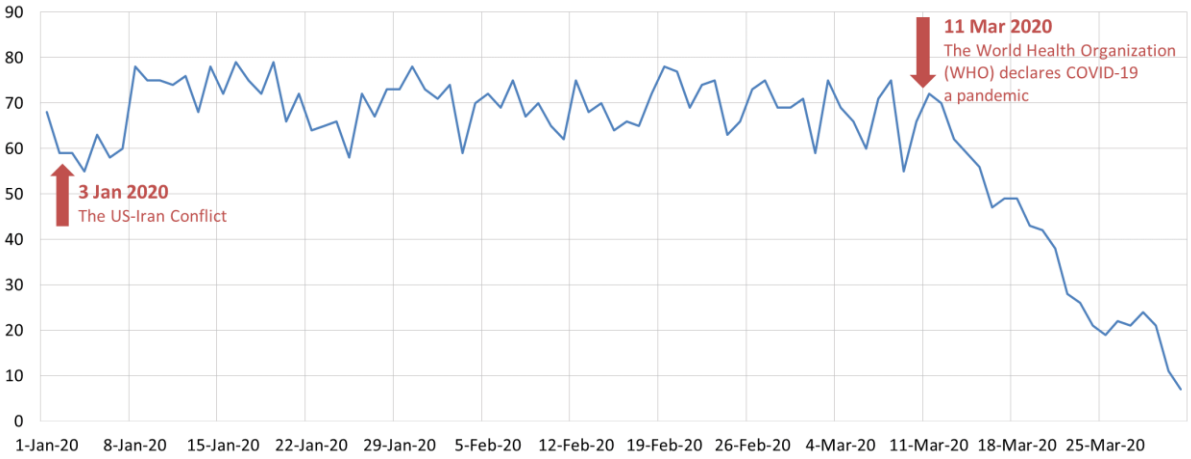


Figure 3: BOBCAT Traffic Demand from Slot Request: 1 January 2020 – 31 March 2020

2.5 As can be observed from **Figure 2**, traffic through Afghanistan airspace, when compared to traffic in 2018, completed recovery in October 2019. Subsequently, traffic in Afghanistan opened 2020 with significant increase vis-à-vis 2019 in January as Iraq / Iran conflict started, with record-high number of slot request of 79 slot request/night in January 2020. However, as COVID-19 spread globally, number of slot request in the BOBCAT system plummeted starting in mid-March 2020 as can be observed from **Figure 3**.

2.6 The meeting is also invited to note that the number of airlines involved between January 2018 and March 2020 are 30 airlines. Top 10 airlines involved are illustrated in **Figure 4**.

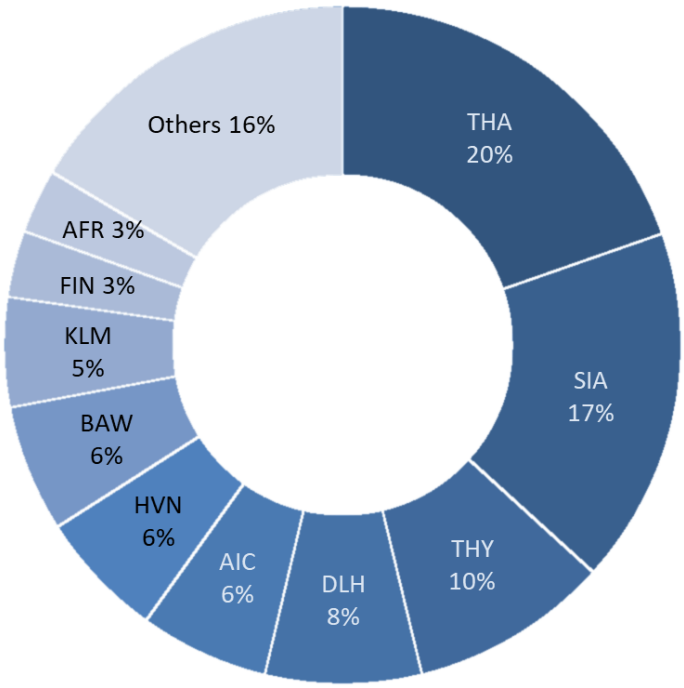


Figure 4: BOBCAT Airline Participation: April 2018 – March 2020

2.7 The meeting is invited to note that 42 airports continue to contribute total BOBCAT traffic based on April 2018 and March 2020 data as illustrated in **Figure 3**.

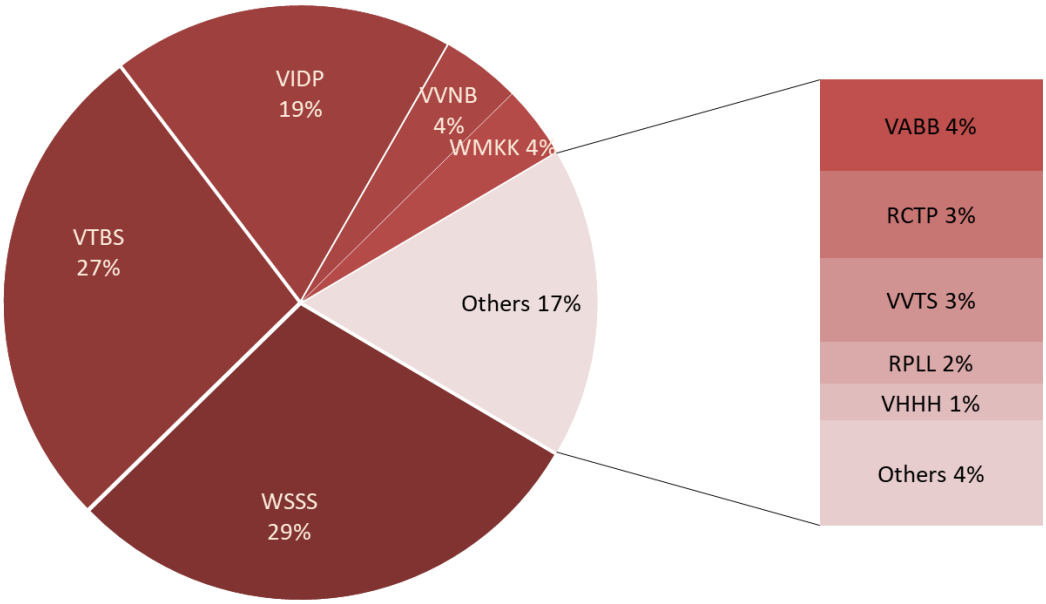


Figure 5: BOBCAT Slot Request by Departure Airports: April 2018 - March 2020

Timeliness of Slot Allocation Release

2.8 As more major airports involved in facilitating flight departures based on BOBCAT CTOT begin to adopt Airport Collaborative Decision Making (A-CDM), the demand for timely release of BOBCAT Slot Allocation increases 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 April 2018 and March 2020 is shown in **Figure 6**.

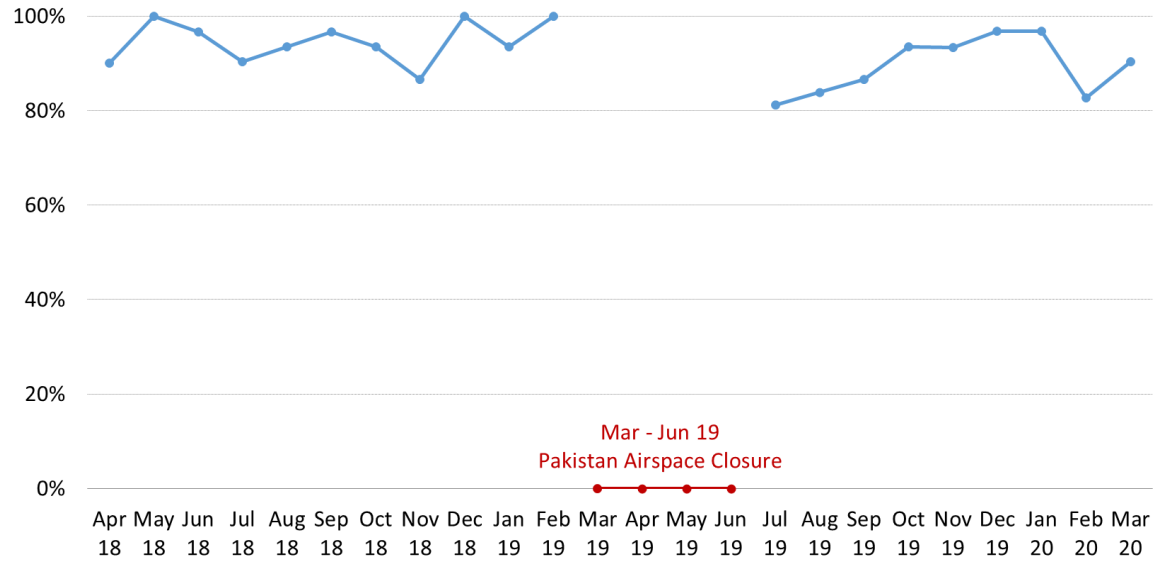


Figure 6: Ten-Minute Cut-off Time Slot Allocation Release Performance

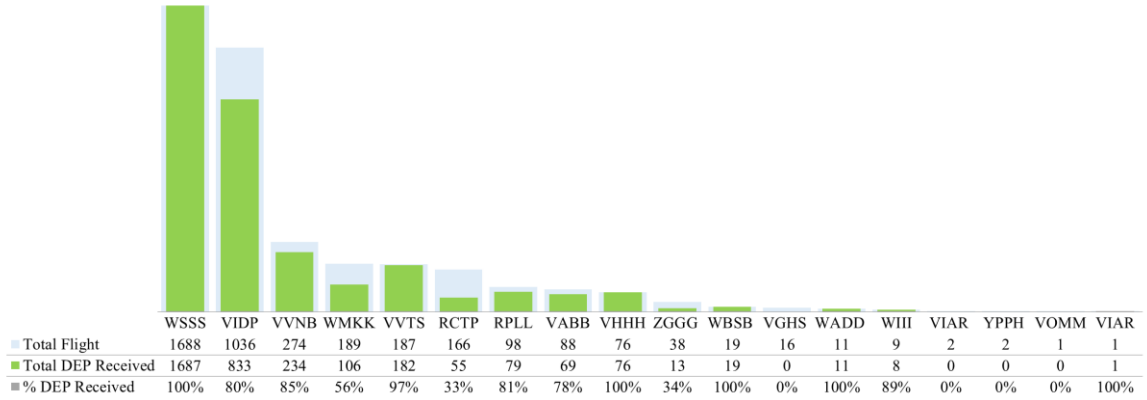
Traffic Sample Data and Post-Operational Analysis

2.9 The meeting should be advised that one-week Traffic Sample Data used in post-operational analyses 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 (e.g. BOBCAT GDP Airspace) 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-Operational Analysis purpose, monthly one-week Traffic Sample Data from concerned ANSPs should also contain departure times from relevant aerodromes.



	WSSS	VIDP	VVNB	WMKK	VVTS	RCTP	RPLL	VABB	VHHH	ZGGG	WBSB	VGHS	WADD	WIII	VIAR	YPPH	VOMM	VIAR
Total Flight	1688	1036	274	189	187	166	98	88	76	38	19	16	11	9	2	2	1	1
Total DEP Received	1687	833	234	106	182	55	79	69	76	13	19	0	11	8	0	0	0	1
% DEP Received	100%	80%	85%	56%	97%	33%	81%	78%	100%	34%	100%	0%	100%	89%	0%	0%	0%	100%

Figure 7: Average Percent of Flights with DEP Message Received: January 2018 - December 2019 (excluding January – June 2019)

Data Source: Monthly one-week Traffic Sample Data in 2018 - 2019

Preferred Flight Levels

2.12 Post-Operational Analysis continues to indicate high percentage of flights operating through the Kabul FIR with the same or better flight levels as those requested, as indicated in **Figure 6**. Overall, the percentage of flights with same or better flight levels are continuously in the range of 73 – 94 percent

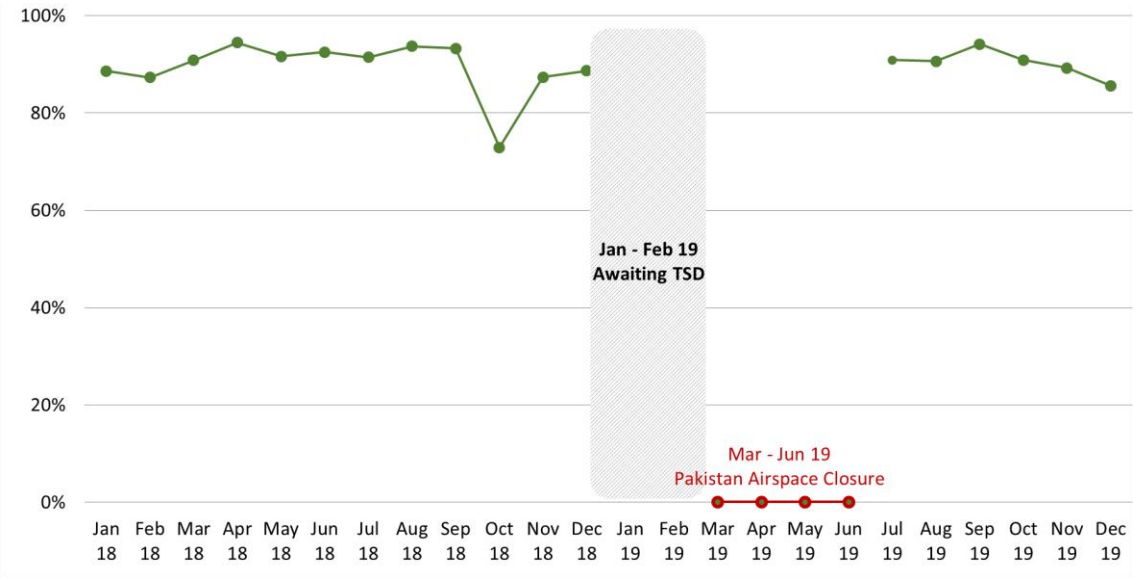


Figure 8: Percentage Achieving Same or Better FL: January 2018 - December 2019 (excluding January – June 2019)

2.13 **Figure 9** shows the analysis result on major causes of aircrafts not being able to enter Afghanistan at flight levels in accordance to those specified by BOBCAT Slot Allocation between January 2018 and December 2019.

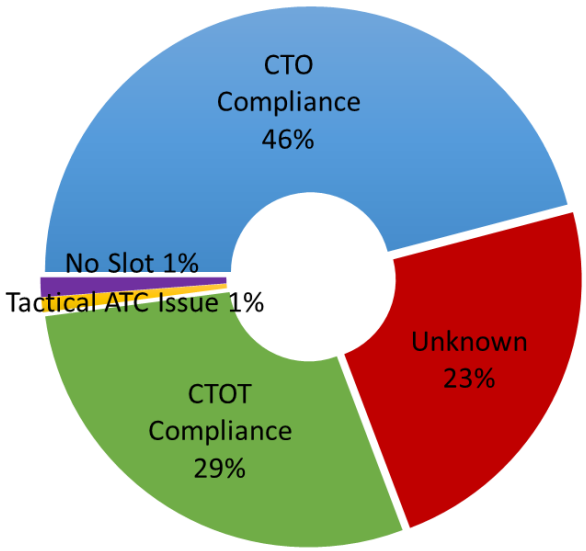


Figure 9: Causes of Flight Not Entering Kabul FIR at Slot Allocation FL: January 2018 - December 2019 (except January – June 2019)

2.14 As shown in **Figure 9**, major causes for aircrafts being unable to achieve preferred flight levels are:

a) Kabul FIR Entry Time (CTO) Compliance: 46 percent

b) Unknown (more data required): 23 percent

c) Departures Punctuality (CTOT Compliance): 29 percent

d) Tactical ATC issues: 1 percent

e) Departure without Slot Allocation: 1 percent

2.15 The figure shows that leading major cause for FL difference is Kabul FIR entry-time (CTO) compliance (46%). This situation may arise from factors such as weather variations, tactical ATC operations, or inaccurate provision of estimate elapse time in the flight plan.

2.16 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

2.17 Prior to this round of Post-Operational 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 January 2018 - December 2019 in accordance to Action Item BBACG-20/3 (updated in SAIOACG/5 and transferred to ATFM/SG), with summary shown in **Figure 10**.

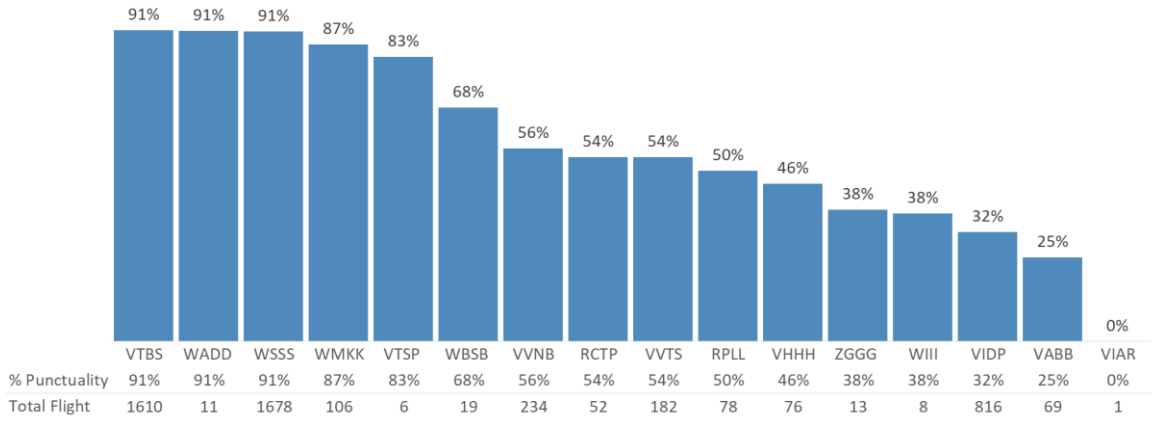


Figure 10: Average CTOT Compliance: January 2018 - December 2019 (except January – June 2019)

Data Source: Monthly one-week Traffic Sample Data with DEP messages record

2.18 It should be noted that departure compliance at various airports can still be improved. However, for airports with less amount of traffic, CTOT adherence responsibility may fall on aircraft operators.

Afghanistan Airspace Entry Compliance (CTO Compliance)

2.19 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).

2.20 **Figure 11** shows this result from the traffic sample data provided in the period of January 2018 - December 2019. The data shows a low 32% CTO compliance rate, despite high percentage of CTOT compliance rate at top departure airports (**Figure 10**). This indicates that actual flight time still differs significantly from planned EET in the FPLs, which may be due to factors such as weather variations, tactical ATC, or variances on flight performance. It also indicates that the current CTO compliance window should not be further reduced. Further information on list of flights not complying to CTO window can be provided on request.

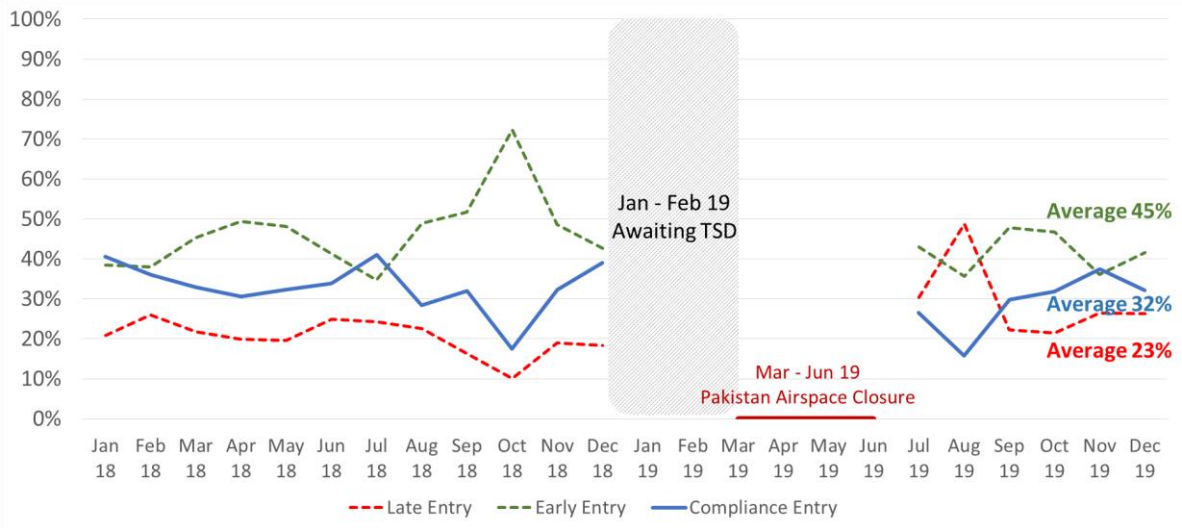


Figure 11: Afghanistan Airspace Entry Compliance: January 2018 – December 2019 (except January – June 2019)

2.21 It should also be noted, however, that despite low CTO compliance rate, a majority of flights are still able to achieve the same or better flight levels compared to those allocated by BOBCAT system; as shown in **Figure 8**.

2.22 Further study correlating CTOT Compliance and CTO Compliance was carried out using Traffic Sample Data from January 2018 – December 2019. **Figure 12** 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	**10%**	88%	8%	4%
Compliance Take-Off	***68%***	47%	*40%*	13%
Late Take-Off	**12%**	3%	17%	79%
No DEP Received	**10%**	39%	23%	38%

Figure 12: Correlation of CTOT Compliance and CTO Compliance: January 2018 – December 2019 (except January – June 2019)

2.23 It can be observed from Figure 12 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.

2.24 A significant finding from the study indicates that, while 68% of flights in the Traffic Sample Data departed within CTOT window, only 40% of those flights enter Afghanistan within CTO window. Significant portion of flights departed within CTOT window but entered Afghanistan earlier than CTO window.

2.25 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 Compliant flight and CTO Compliance performance is carried out with result summarized in **Figure 13**.

CTOT \ CTO Compliance	Overall	Early Entry	Compliance	Late Entry
CTOT Compliant – expected to slow down	**37%**	76%	21%	3%
CTOT Compliant – no speed modification needed	**45%**	*38%*	53%	9%
CTOT Compliant – expected to speed up	**19%**	11%	49%	40%

Figure 13: CTOT Compliant Flights and CTO Compliance Correlation: January 2018 – December 2019 (except January – June 2019)

2.26 **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 (33%) ended up entering Afghanistan airspace earlier than CTO window. This situation may be due to short-cuts obtained in flight.

2.27 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-2020-03>.

ATFM Delay

2.28 Another figure of merit continuously monitored by Bangkok ATFMU is the ATFM delay due to Afghanistan airspace constraint as assigned by BOBCAT system. The analysis result on ATFM delay for the reference period of January 2018 - December 2020 is shown in **Figure 12**.

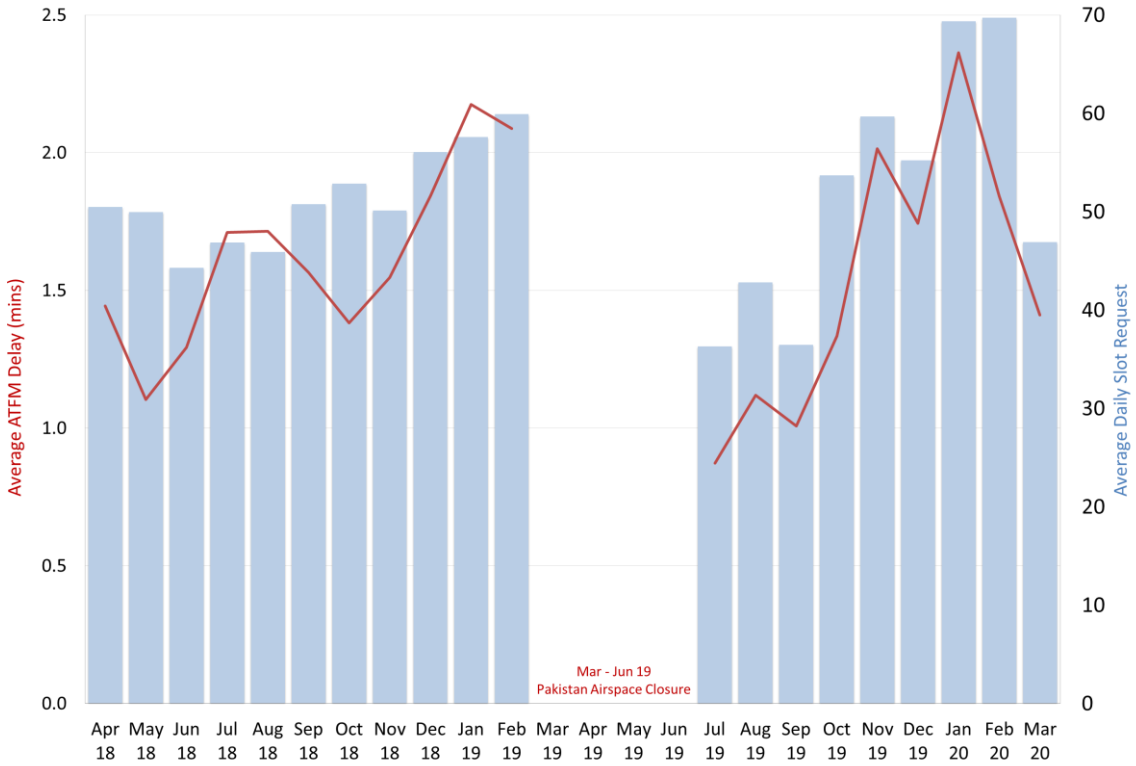


Figure 12: ATFM delay: April 2018 - March 2020

2.29 When **Figure 12** is reviewed with **Figure 2** and **Figure 3**, it can be observed that as Afghanistan airspace recovers from Pakistan Airspace Closure, ATFM delay was increasing from below 1 minute/flight to approximately 2 minutes/flight. ATFM delay further increased in January 2020 following Iraq / Iran Airspace Conflict, triggering flights that would have operated through Iranian Airspace (Tehran FIR) to reroute into Afghanistan airspace. ATFM delay peaked at average of close to 2.5 minutes/flight in January 2020 prior to decreasing further as COVID-19 pandemic expanded impact throughout February 2020 and March 2020.

Distribution of Flight Level Operated in Afghanistan Airspace

2.30 In response to requests from some stakeholders operating through Afghanistan airspace, additional chart was prepared to show evolution of westbound flight level used by aircraft operating through Afghanistan airspace over time. Resulting chart is shown in **Figure 13**.

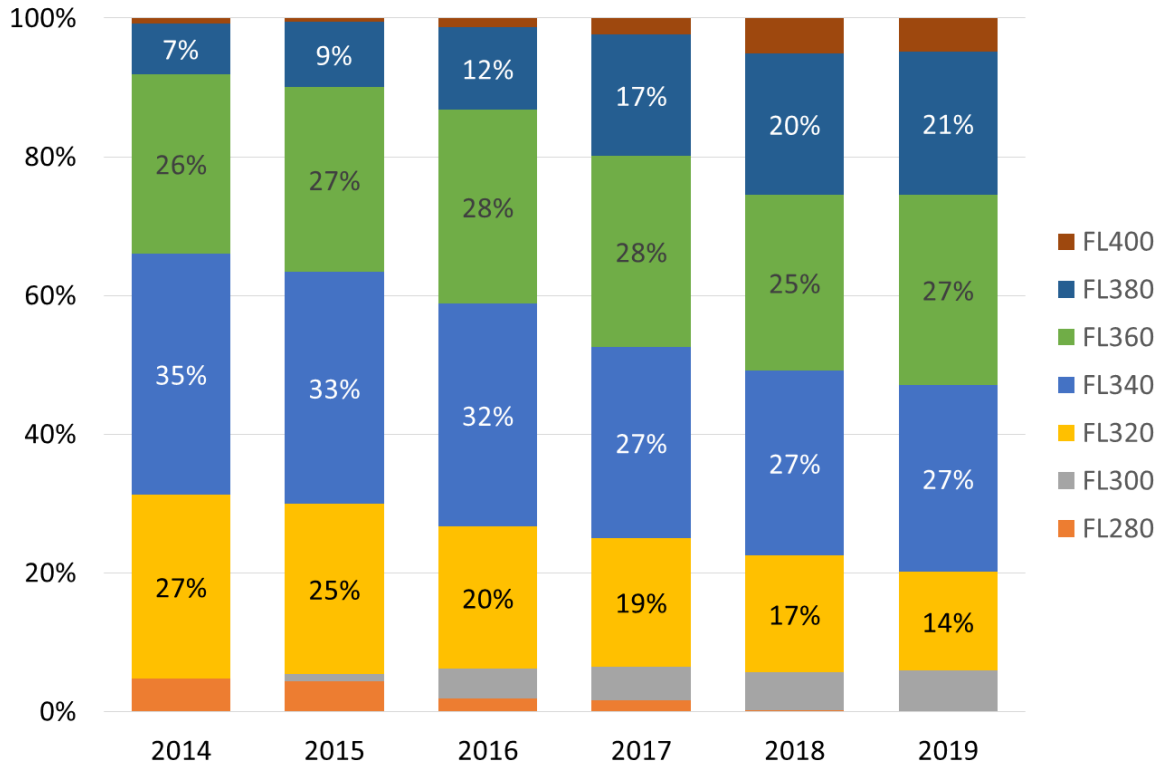


Figure 13: Distribution of Flight Level Operated in Afghanistan Airspace: 2014 – 2019

2.31 Based on **Figure 13**, it can be observed that in 2014, 88 percent of flights through Afghanistan airspace operated on FL320 – FL360 as top 3 FLs operated. Band of top-3 flight levels used changed upwards, so that FL340 – FL380 were operated by 75 percent of flights. Meanwhile, use of FL280 decreased from 5 percent in 2014 to almost no use in 2018, largely replaced by 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 operate through the airspace.

Iraq / Iran Airspace Conflict

2.32 In early January 2020, Iraq / Iran airspace conflict resulted in significant portion of Southeast/South Asia – Europe traffic that would have operated through Iranian airspace being re-routed into Afghanistan airspace. This manifested in traffic increase (refer to **Figure 2** and **Figure 3**) and incrased ATFM delay (**Figure 12**). Since conflict escalation from 3 Jan 2020 up to 31 Mar 2020, only 5 flights were observed in the BOBCAT system and confirmed to have operated through Iranian airspace. The last flight that obtained BOBCAT slot allocation and operated through Iranian airspace operated on 15 Mar 2020.

2.33 In response to traffic increase in Afghanistan airspace, AEROTHAI, in response to request from ICAO APAC Regional Office, established two contingency BOBCAT systems configured to support additional westbound daytime traffic and additional estabound traffic from Europe. Configuration of these contingency BOBCAT systems were based on distribution of traffic entering Afghanistan airspace in Kabul FIR Traffic Sample Data in December 2020. Fortunately, these contingency BOBCAT systems have not been activated.

COVID-19 Impact

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

2.35 In addition to daily slot request information in **Figure 3**, number of slot request between 1 – 19 Apr 2020 averages at 5 slot requests/night with no slot request submitted on 15 Apr 2020. Maximum number of slot requests in April 2020 was on 4 Apr 2020 with 11 slot requests received.

2.36 In response to Thai government's requirement for State Enterprises to consider as much as practicable Work from Home arrangement in late March 2020, Bangkok ATFMU reduced hour that the Bangkok ATFMU would be physically manned to 0100-1300UTC. Outside these hours, contingency mobile phone number is provided.

2.37 During the period when air traffic decreased significantly, need for ATFM operations also decreased. In order to maintain currency of Bangkok ATFMU staff, social media group was setup with membership from operational Bangkok ATFMU staff. Bangkok ATFMU staff were informed to review ATFM User Manual with online quizzes to be delivered to ensure ATFMU staff are kept up-to-date with current operating procedures. Other recurrent training arrangements are also being developed.

3 ACTION BY THE MEETING

3.3 The meeting is invited to:

a) note the data collated by the Bangkok ATFMU;

b) discuss data collection results; and,

c) discuss any relevant matters as appropriate.

……