INTERNATIONAL CIVIL AVIATION ORGANIZATION

TWENTY SEVENTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/27)

Bangkok, Thailand, 5 to 8 September 2016

Agenda Item 3: **Performance Framework for Regional Air Navigation Planning and Implementation**

3.2: **ATM**

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 Bay of Bengal Cooperative Air Traffic Flow Management System (BOBCAT) from the commencement of its ATFM operation in July 2007 to June 2016, encompassing implementation of enhanced Flexible Use of Airspace (FUA) in Afghanistan and full implementation of RNP10 50NM Separation on 30 September 2015.

Strategic Objectives:

A: ***Safety*** *– Enhance global civil aviation safety*

B: ***Air Navigation Capacity and Efficiency****—Increase the capacity and improve the efficiency of the global aviation system*

E***: Environmental Protection*** *— minimize the adverse environment effects of civil aviation activities.*

1. INTRODUCTION

1.1 The meeting would recall that on AIRAC 5 July 2007, international long range Cross-Border Air Traffic Flow Management (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 sample monthly traffic data would be collected by all States in the third week of each month, sent to the Bangkok Air Traffic Flow Management Unit (ATFMU) and analyzed by the BOBCAT Development Team 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.

2. DISCUSSIONS

2.1 During the nine (9) year period from the start of operational implementation of BOBCAT in July 2007 to June 2016; BOBCAT operations, based on IATA estimate, has contributed to 120 million kilograms of fuel saving or approximately 480 million kilograms of carbon dioxide emissions.

2.2 The meeting is invited to note the summary of BOBCAT Slot Request volume received between July 2014 and June 2016 in **Figure 1**.

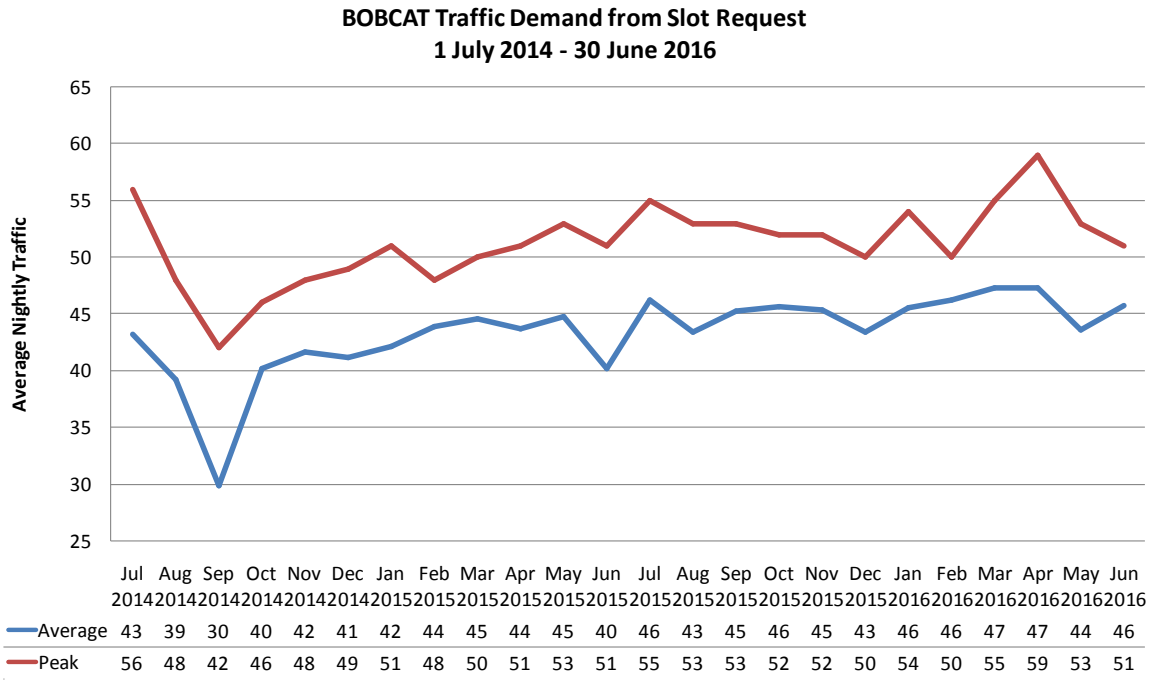


***Figure 1**: BOBCAT Traffic Demand from Slot Request*

2.3 The meeting is also invited to note that the number of airlines involved has increased slightly to 62 airlines. Top 12 airlines involved are illustrated in **Figure 2**.

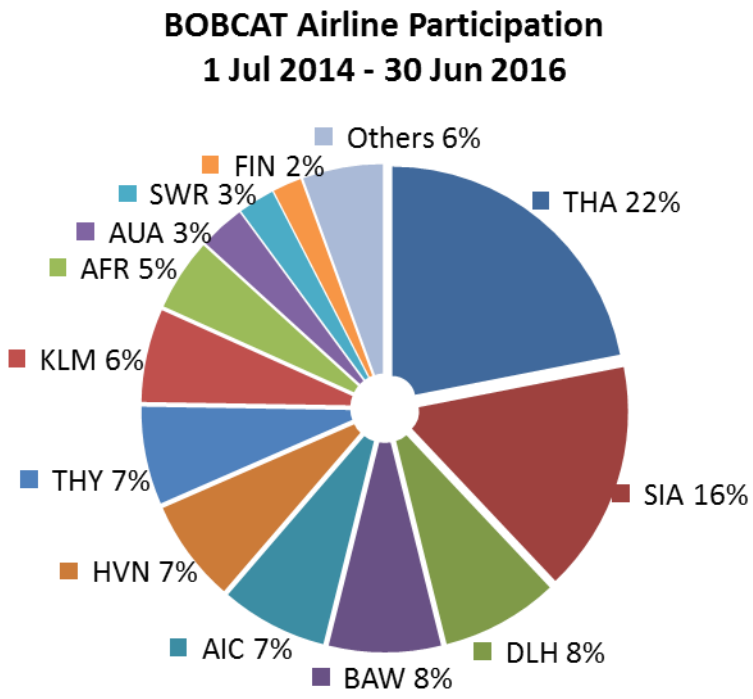


***Figure 2:** BOBCAT Airline Participation*

2.4 The meeting is invited to note that 8 major airports contribute 97 percent of total BOBCAT traffic based on July 2014 – June 2016 data as illustrated in **Figure 3**.

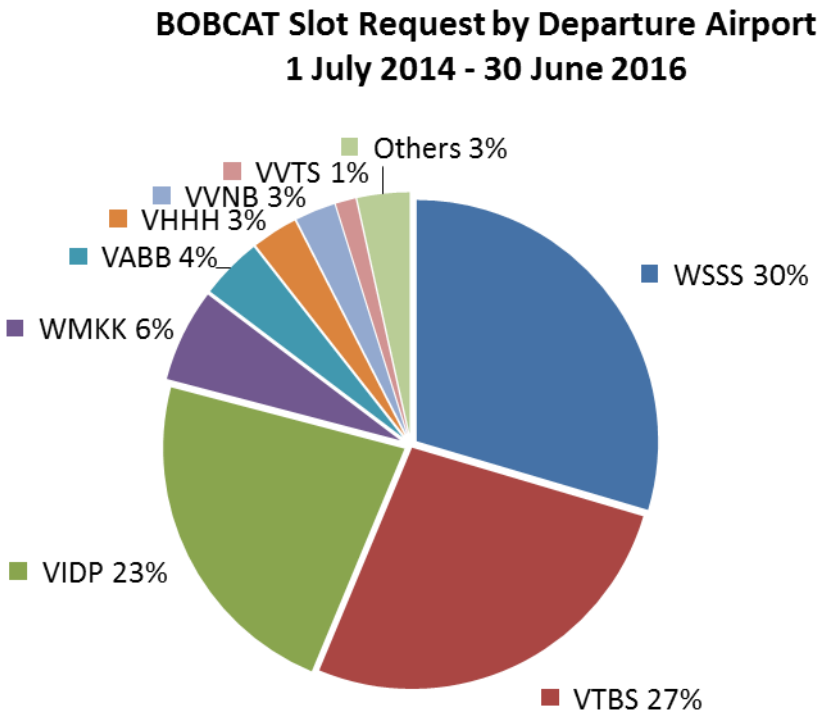


Figure 3: *BOBCAT Slot Request by Departure Airports*

Cut-off Time Slot Allocation Release Performance

2.5 As more major airports involved in facilitating flight departures based on BOBCAT AWUT 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 January – June 2016 is shown in **Figure 4**.

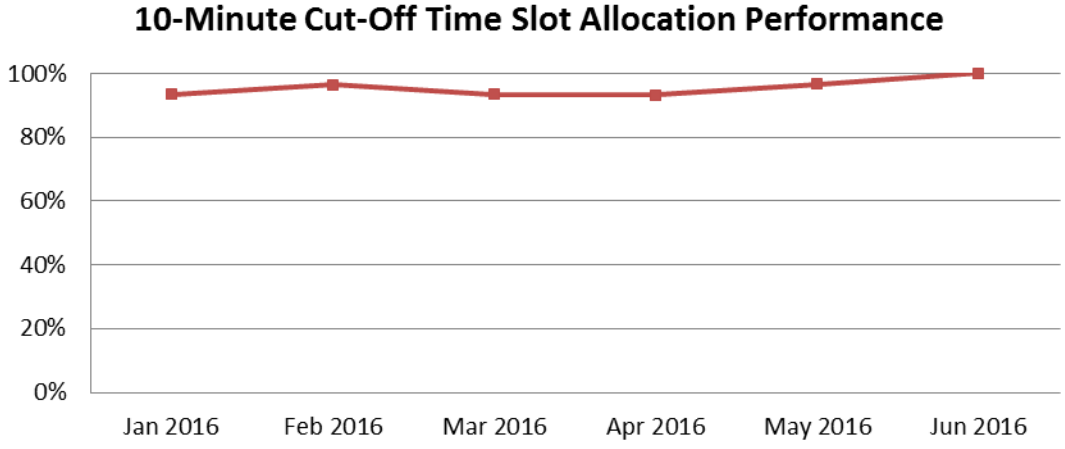


Figure 4: *Ten-Minute Cut-off Time Slot Allocation Release Performance*

Traffic Sample Data and Post-Operational Analysis

2.6 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

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

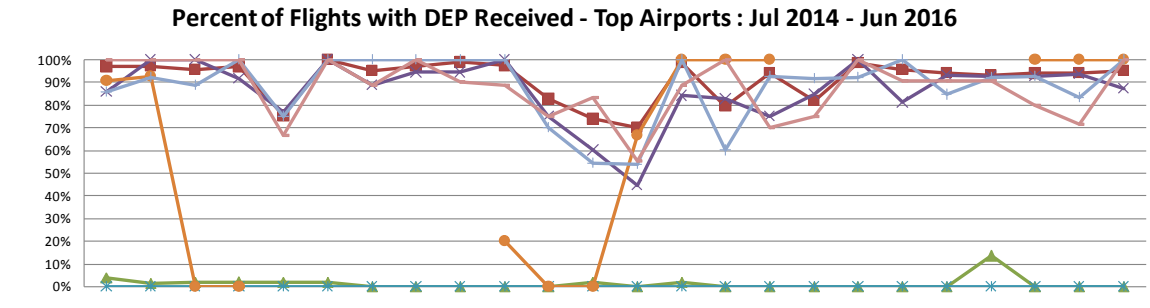
2.8 Moreover, transmission of flight plans and movement messages (FPL, CHG, DLA, CNL) are in accordance to ICAO Asia/Pacific Regional Framework for Collaborative ATFM. There is also a Draft Conclusion ATM/SG/4-5 agreed to during ICAO ATM/SG/4 meeting in Jul 2016.

2.9 In addition, origination and distribution of Departure (DEP) Messages are in accordance to ICAO Doc 4444 Section 11.4.2.2. Draft Conclusion ATM/SG/4-6 is agreed to during ICAO ATM/SG/4 meeting in Jul 2016 to conduct analysis of incidence of non-receipt of DEP messages, and potentially raise APANPIRG Air Navigation Deficiencies against failure to comply by States at APANPIRG/28.

2.10 Accordingly, as part of the Post-Operational Analysis, Bangkok ATFMU continuously monitors the percentage of flights whose DEP messages were received with data summarized in **Figure 5** and **Figure 6**.

2.11 The meeting should be reminded that flight movement messages should continue to be forwarded to the Bangkok ATFMU via AFTN (VTBBZDZX). Additionally, for Post-Operational Analysis purpose, monthly one-week Traffic Sample Data from concerned ANSPs should also contain departure times from relevant aerodromes.

2.12 Additionally, it should be noted that there are flights departing Hong Kong (VHHH) to / through Afghanistan only during summer season (April – October) with 1 – 2 departures with BOBCAT Slot Allocation per night. This results in substantial fluctuation of VHHH DEP message statistics as shown on the figures.



	Jul 2014	Aug 2014	Sep 2014	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016
WSSS	97%	97%	96%	97%	75%	100%	95%	97%	99%	98%	83%	74%	70%	99%	79%	94%	82%	99%	96%	94%	93%	94%	94%	95%
VIDP	4%	1%	2%	2%	2%	2%	0%	0%	0%	0%	0%	2%	0%	2%	0%	0%	0%	0%	0%	0%	13%	0%	0%	0%
WMKK	86%	100%	100%	92%	77%	100%	89%	94%	94%	100%	75%	60%	44%	84%	83%	75%	85%	100%	81%	93%	93%	93%	94%	88%
VABB	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
VHHH	91%	93%	0%	0%						20%	0%	0%	67%	100%	100%	100%						100%	100%	100%
VVNB	86%	92%	89%	100%	75%	100%	100%	100%	100%	100%	70%	55%	54%	100%	60%	93%	92%	92%	100%	85%	92%	93%	83%	100%
VVTS	100%	100%	100%	100%	67%	100%	89%	100%	90%	89%	75%	83%	56%	89%	100%	70%	75%	100%	91%	91%	91%	80%	71%	100%

Figure 5: *Percent of Flights with DEP Message Received - Top Airports: July 2014 - June 2016*

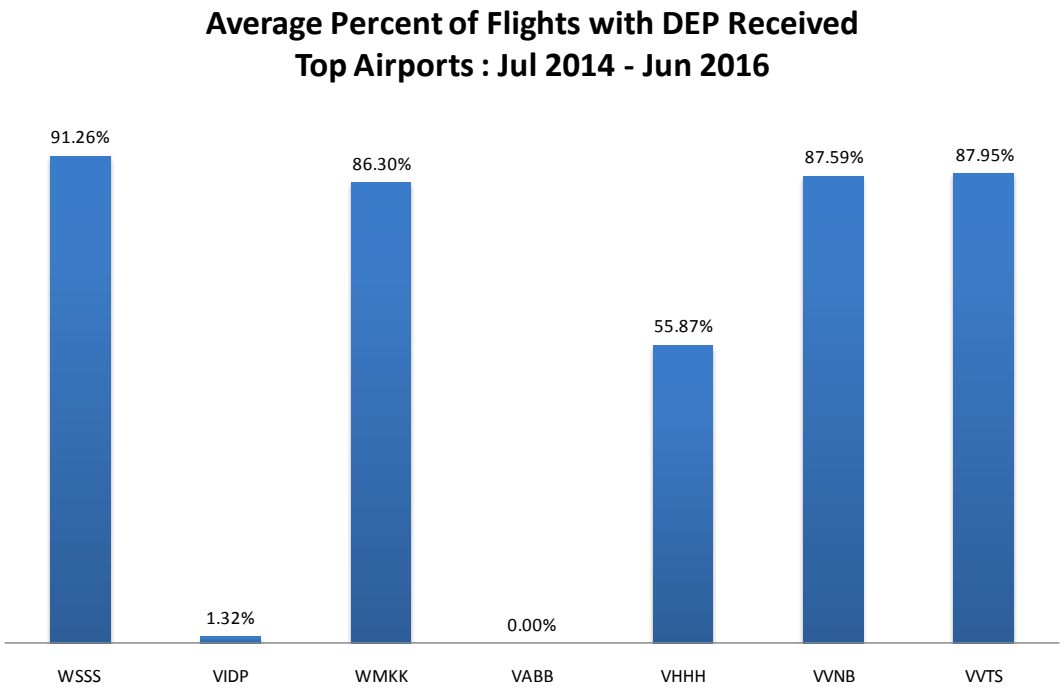


Figure 6: *Average Percent of Flights with DEP Message Received - Top Airports: July 2014 - June 2016*

Preferred Flight Levels

2.13 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 7**. Overall, the percentage of flights with same or better flight levels are continuously in the range of 83 – 93 percent

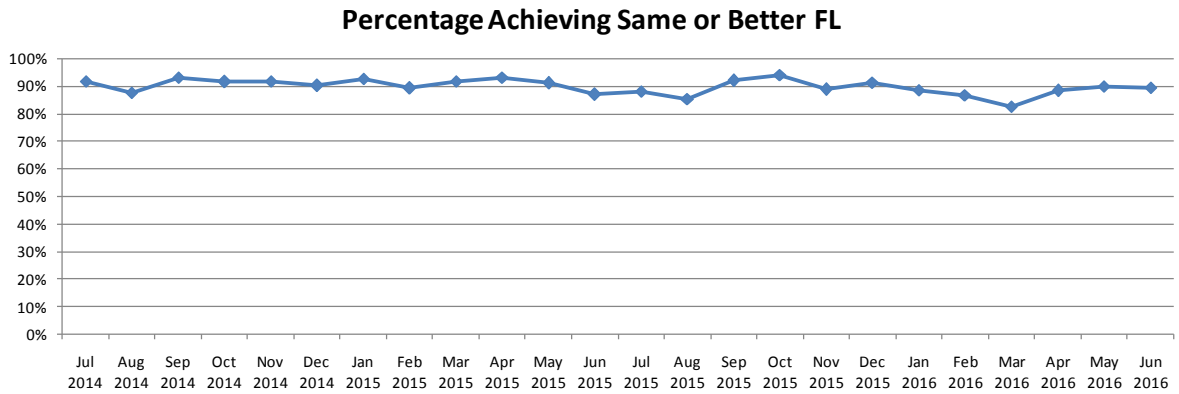
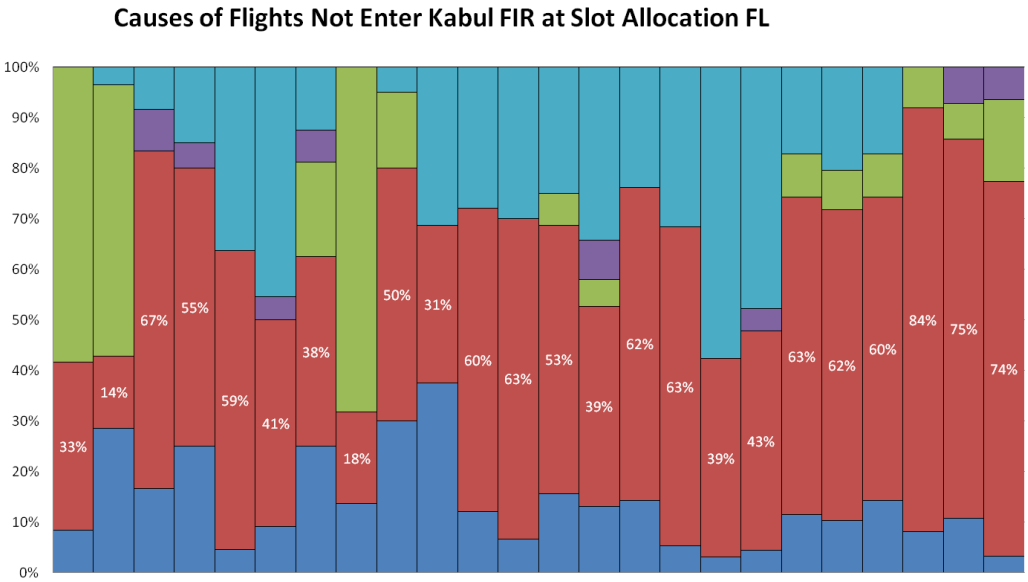


Figure 7: *Percentage Achieving Same or Better FL (July 2014 – June 2016)*

2.14 **Figure 8** 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 July 2014 – June 2016.



	Jul 2014	Aug 2014	Sep 2014	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016
Unknown	0%	4%	8%	15%	36%	45%	13%	0%	5%	31%	28%	30%	25%	34%	24%	32%	58%	48%	17%	21%	17%	0%	0%	0%
No Slot	0%	0%	8%	5%	0%	5%	6%	0%	0%	0%	0%	0%	0%	8%	0%	0%	0%	4%	0%	0%	0%	0%	7%	6%
Tactical ATC Issue	58%	54%	0%	0%	0%	0%	19%	68%	15%	0%	0%	0%	6%	5%	0%	0%	0%	0%	9%	8%	9%	8%	7%	16%
Kabul FIR Entry Time Compliance	33%	14%	67%	55%	59%	41%	38%	18%	50%	31%	60%	63%	53%	39%	62%	63%	39%	43%	63%	62%	60%	84%	75%	74%
Departures Punctuality	8%	29%	17%	25%	5%	9%	25%	14%	30%	38%	12%	7%	16%	13%	14%	5%	3%	4%	11%	10%	14%	8%	11%	3%

Figure 8: *Causes of Flight Not Entering Kabul FIR at Slot Allocation FL*

2.15 As shown, major causes for aircrafts being unable to achieve preferred flight levels are:

a) Kabul FIR Entry Time Compliance: 52 percent

b) Tactical ATC issues: 12 percent

c) Departures punctuality: 14 percent

d) Departure without Slot Allocation: 2 percent

e) Unknown (more data required): 20 percent

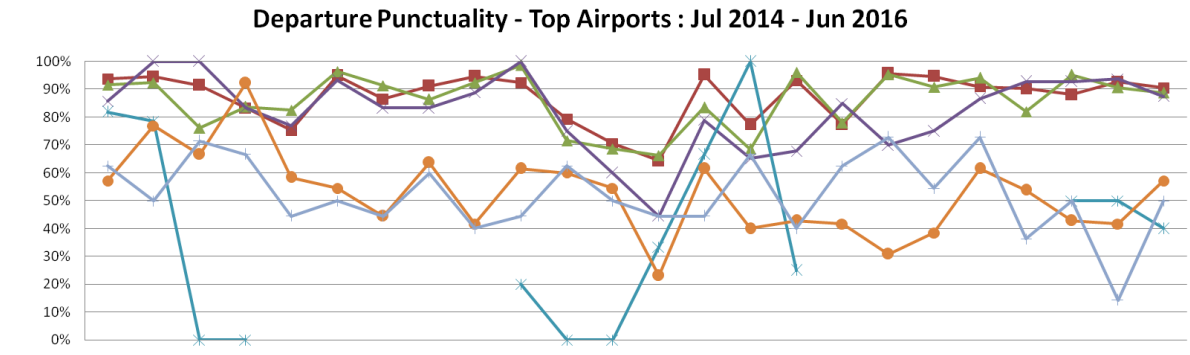
2.16 It can be observed from **Figure 8**, there is a significant trend that Kabul FIR Entry Time Compliance is the major cause of flights not being able to enter Afghanistan airspace at the flight levels specified by Slot Allocation. This is a significant trend change from previous reports in 2015 when departures punctuality was the major cause of flights not operating in accordance to Slot Allocation Flight Level.

2.17 In this particular case, Kabul FIR Entry Time Compliance can be defined as aircraft being unable to enter Afghanistan airspace within 5-minute CTO window after the CTO in BOBCAT Slot Allocation. This is separate from departure punctuality where aircraft depart early or late when compared to CTOT in BOBCAT Slot Allocation.

2.18 Accordingly, Airlines and ANSPs should thus be reminded of the importance of accurate flight performance. **Aircrafts should, where possible, attempt to cross the entry waypoint into Afghanistan airspace within the 5-minute window after the Calculated Time Over (CTO) specified by BOBCAT Slot Allocation**.

Departures Punctuality

2.19 Prior to Post-Operational Analysis presented to ICAO SAIOACG/6 (Feb 2016), the major cause of flights not being able to enter Afghanistan airspace at the allocated flight levels was due to departure punctuality. The analysis on departure punctuality continues to be carried out for this period of July 2014 – June 2016 in accordance to Action Item BBACG-20/3 (updated in SAIOACG/5 and transferred to ATFM/SG), with summary shown in **Figure 9** and **Figure 10**.



	Jul 2014	Aug 2014	Sep 2014	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016
WSSS	94%	95%	91%	83%	75%	95%	87%	91%	95%	93%	79%	70%	64%	95%	77%	93%	78%	96%	95%	91%	90%	88%	93%	91%
VTBS	92%	93%	76%	84%	83%	96%	91%	86%	93%	99%	72%	69%	66%	84%	68%	96%	78%	95%	91%	94%	82%	95%	91%	89%
WMKK	86%	100%	100%	83%	77%	93%	83%	83%	89%	100%	75%	60%	44%	79%	65%	68%	85%	70%	75%	87%	93%	93%	94%	88%
VHHH	82%	79%	0%	0%						20%	0%	0%	33%	67%	100%	25%						50%	50%	40%
VVNB	57%	77%	67%	92%	58%	55%	44%	64%	42%	62%	60%	55%	23%	62%	40%	43%	42%	31%	38%	62%	54%	43%	42%	57%
VVTS	63%	50%	71%	67%	44%	50%	44%	60%	40%	44%	63%	50%	44%	44%	67%	40%	63%	73%	55%	73%	36%	50%	14%	50%

Figure 9: *Departure Punctuality - Top Airports: July 2014 – June 2016*

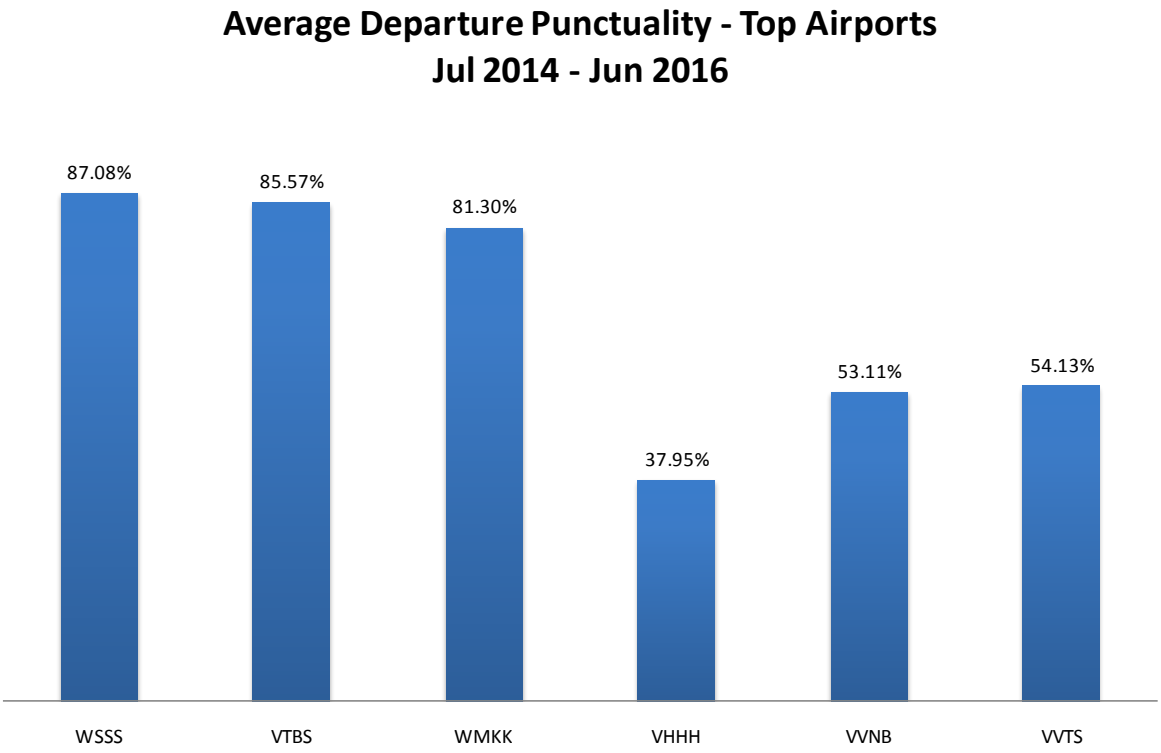


Figure 10: *Average Departure Punctuality - Top Airports: July 2014 – June 2016*

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

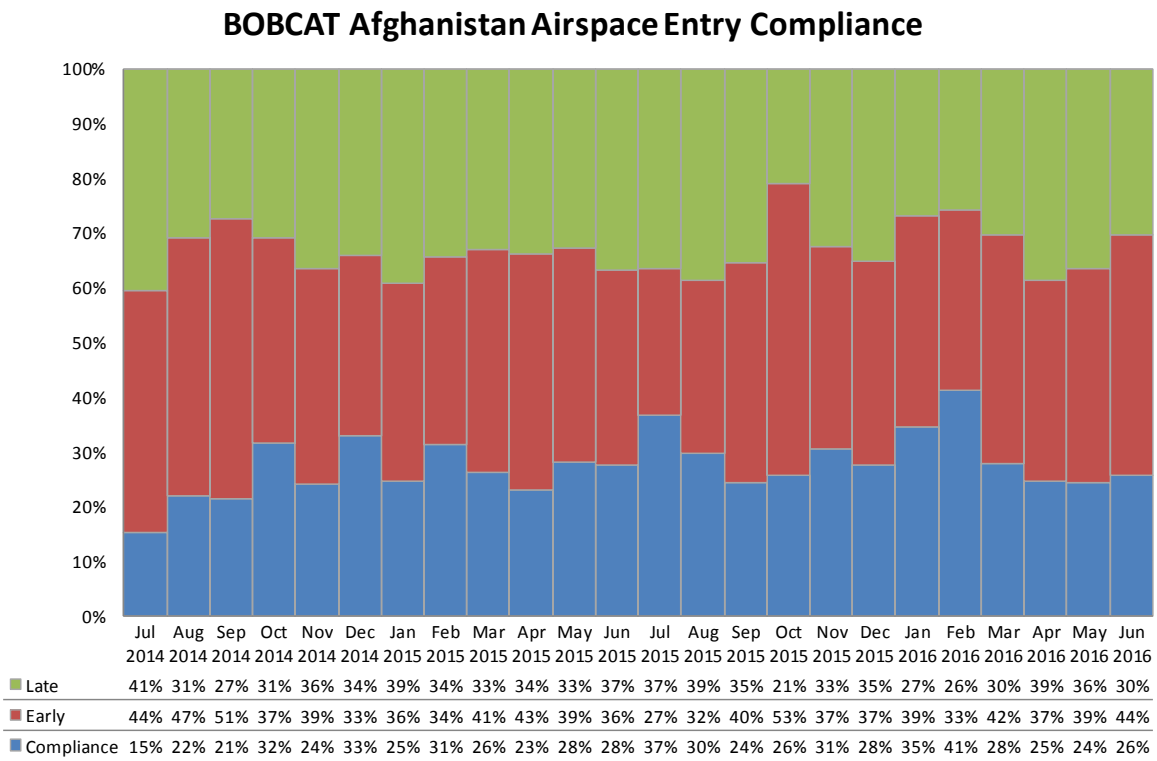
Afghanistan Airspace Entry Compliance

2.21 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).

2.22 **Figure 11** shows the statistical analysis summary of entry compliance on the traffic sample data between the period of July 2014 – June 2016.

2.23 It can be seen that, on average, only 28 percent of flights enter Afghanistan airspace within 5 minutes after CTOs. This is largely in line with indication that Kabul FIR Entry Time Compliance has become the most significant cause of flights not entering the Kabul FIR in accordance to allocated flight levels.

2.24 This implies that, in the short term, the current 5-minute buffer window cannot be further reduced. Despite low level of entry time compliance, however, over 80 – 90 percent of flights are still able to achieve the same or better flight levels compared to those allocated by BOBCAT upon entering Afghanistan airspace.



	Jul 2014	Aug 2014	Sep 2014	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016
Late	41%	31%	27%	31%	36%	34%	39%	34%	33%	34%	33%	37%	37%	39%	35%	21%	33%	35%	27%	26%	30%	39%	36%	30%
Early	44%	47%	51%	37%	39%	33%	36%	34%	41%	43%	39%	36%	27%	32%	40%	53%	37%	37%	39%	33%	42%	37%	39%	44%
Compliance	15%	22%	21%	32%	24%	33%	25%	31%	26%	23%	28%	28%	37%	30%	24%	26%	31%	28%	35%	41%	28%	25%	24%	26%

Figure 11 : *Afghanistan Airspace Entry Compliance: July 2014 – June 2016*

ATFM Delay

2.25 Recalling that ATFM Delay is defined as the difference between last estimated take-off time submitted with Slot Request and first allocated take-off time through Slot Allocation (CTOT), **Figure 12** shows average nightly ATFM Delays and associated average traffic demand volume based on the number of slot requests.

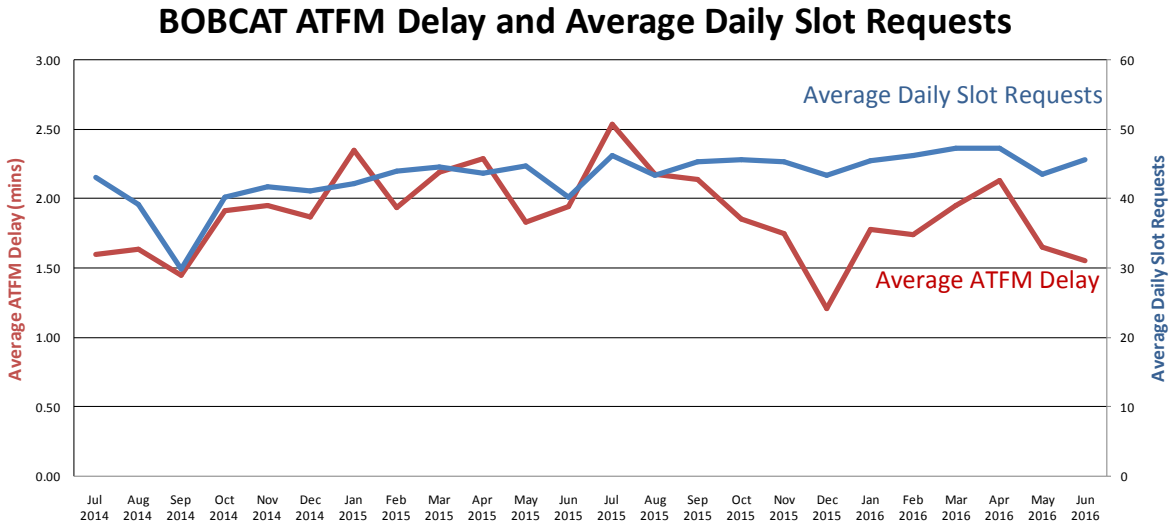


Figure 12: *ATFM Delay and Average Daily Slot Request Traffic Demand: July 2014 – June 2016*

2.26 It can be observed that there is some correlation between the traffic volume (slot requests) and the amount of ATFM Delay. A decrease in slot request count seems to be correlated with reduced average ATFM delay.

2.27 The meeting should be reminded that Flexible Use of Airspace (FUA) in Afghanistan came into effect starting 30 September 2015, resulting in FL300 being available for civil flights and Special Use Airspace becoming active only with 3-hour advance notification. Additionally, RNP10 50NM longitudinal separation was also introduced on all routes through the airspace. Both the use of FUA and the reduced separation have enhanced the airspace capacity significantly.

2.28 In order to support increased airspace access, the BOBCAT system was reconfigured to enable slot allocation as shown in **Figure 13**.

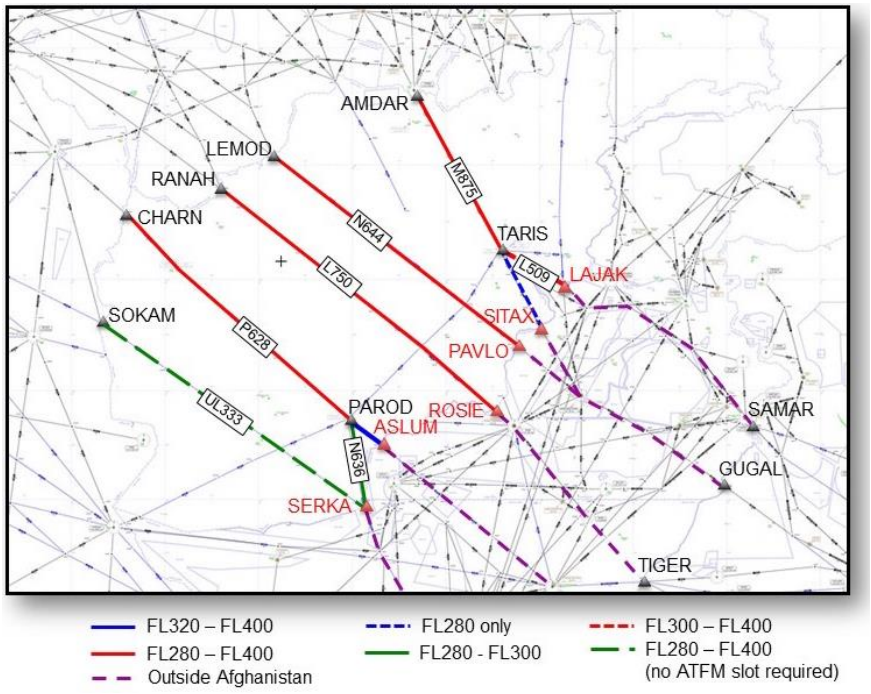


Figure 13: *Afghanistan Airspace Configuration: 30 September 2015*

2.29 Accordingly, analysis of ATFM Delay in October 2015 – June 2016 showed an **average of 15 percent decrease of ATFM Delay** when compared to the same period in 2014-2015. This is **associated with an average of 7 percent increase of slot request traffic demand** from same period in 2014-2015.

Terminology Standardization

2.30 Following agreement at ICAO ATFM/SG/6 meeting (Jun 2016), Thailand is in the process of collaborating with States/Administrations involved in standardizing BOBCAT terminology in line with ATFM terminology specified in ICAO Asia/Pacific Regional Framework for Collaborative ATFM and upcoming third edition of ICAO Manual on Collaborative ATFM (Doc 9971), which will integrate ATFM terminology adopted in regional framework document. Accordingly, terminology such as Allocated Wheels-Up Time (AWUT) will be changed to Calculated Take-Off Time (CTOT) in accordance to the new standard. Further information on terminology standardization is being presented separately in APANPIRG/27 IP/10.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the data collated by the Bangkok ATFMU;

b) discuss data collection results; and

c) discuss relevant matters as appropriate.

— END —