International Civil Aviation Organization

The Twelfth Meeting of the FANS Implementation Team, Bay of Bengal (FIT-BOB/12) and the Second Meeting of the Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF/2)

Bangkok, Thailand, 22-26 February 2010

Agenda Item 8: Any Other Business

BOBCAT DATA COLLECTION AND ANALYSIS

(Presented by Thailand)

SUMMARY

The purpose of this working paper is to present an analysis and overview of operational data on Westbound flights operating through the Kabul FIR associated with the ATFM BOBCAT process from the commencement of the ATFM Operational Trials in July 2007 to December 2009. As the next BBACG has been deferred to a later date, opportunity is being taken to distribute the working paper to this meeting which has many of the States concerned with ATFM/BOBCAT operations attending.

1. INTRODUCTION

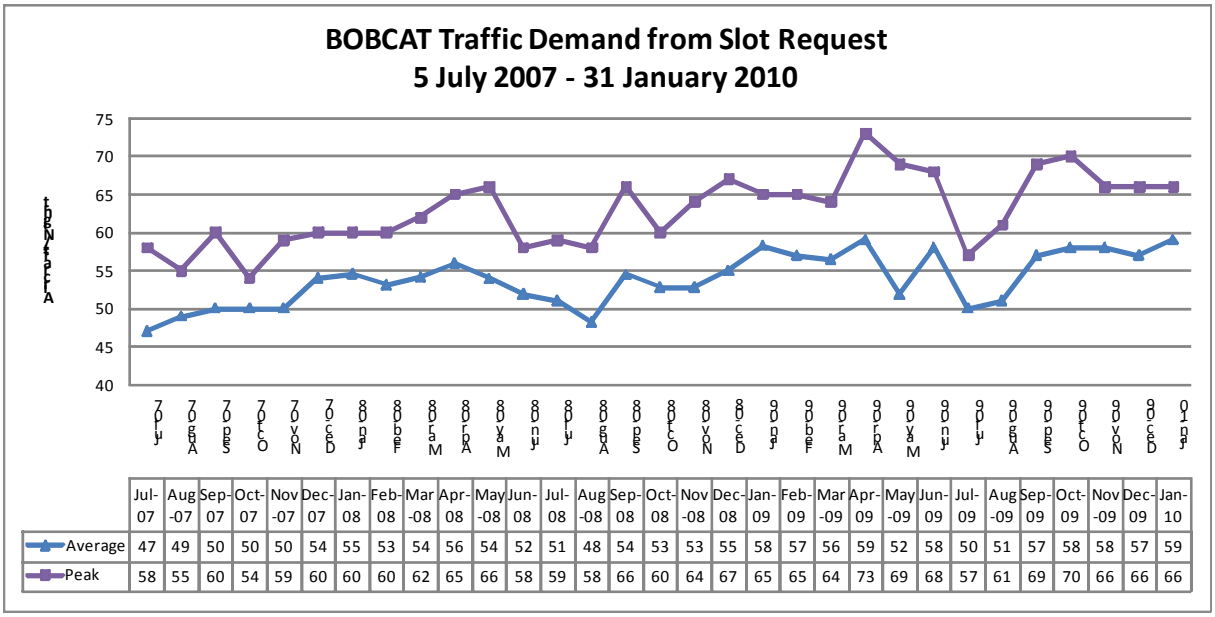
1.1 The meeting would recall that on AIRAC 5 July 2007, international long range ATFM procedure using the BOBCAT system became fully operational.

1.2 It was agreed at the 13th meeting of the ATFM Task Force held in September 2009 that monthly traffic data would be collected by all States for one agreed week each month, sent to the ATFMU and analyzed by the BOBCAT Development Team for presentation to the periodic meetings of the ATFM Task Force.

2. DISCUSSIONS

2.1 The meeting is invited to note that throughout the 31 months since operational implementation of the ATFM procedures between AIRAC 5 July 2007 and 31 January 2010, 50,720 aircraft submitted slot request, with 93.42 percent (47,382 aircraft) accepting slot allocation. These aircraft may have various reasons for not accepting their slot allocations such as delay factor, route availability and sometimes weather which allowed a more efficient and cost-effective route outside the Kabul FIR.

2.2 The meeting should also note that, the average traffic per night have increased from 38 since operational trial's commencement in July 2006, to 59 in January 2010, with peak traffic on 1 April 2009 of 73 aircraft requesting slot allocation. Thus, it can be inferred that westbound traffic demand through the Kabul FIR has been growing at 16% per annum since operational trials' commencement in July 2006. Further information on Slot Request statistics, potentially reflecting westbound traffic demand through the Kabul FIR is shown in Figure 1.



	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10
Average	47	49	50	50	50	54	55	53	54	56	54	52	51	48	54	53	53	55	58	57	56	59	52	58	50	51	57	58	58	57	59
Peak	58	55	60	54	59	60	60	60	62	65	66	58	59	58	66	60	64	67	65	65	64	73	69	68	57	61	69	70	66	66	66

Figure 1: BOBCAT Slot Request Statistics (5 July 2007 – 31 January 2010)

2.3 While slot requests continue to increase, the number of airline involved has also increased to 48 airline operators in January 2010. The updated airline participation since operational trials is shown in Figure 2.

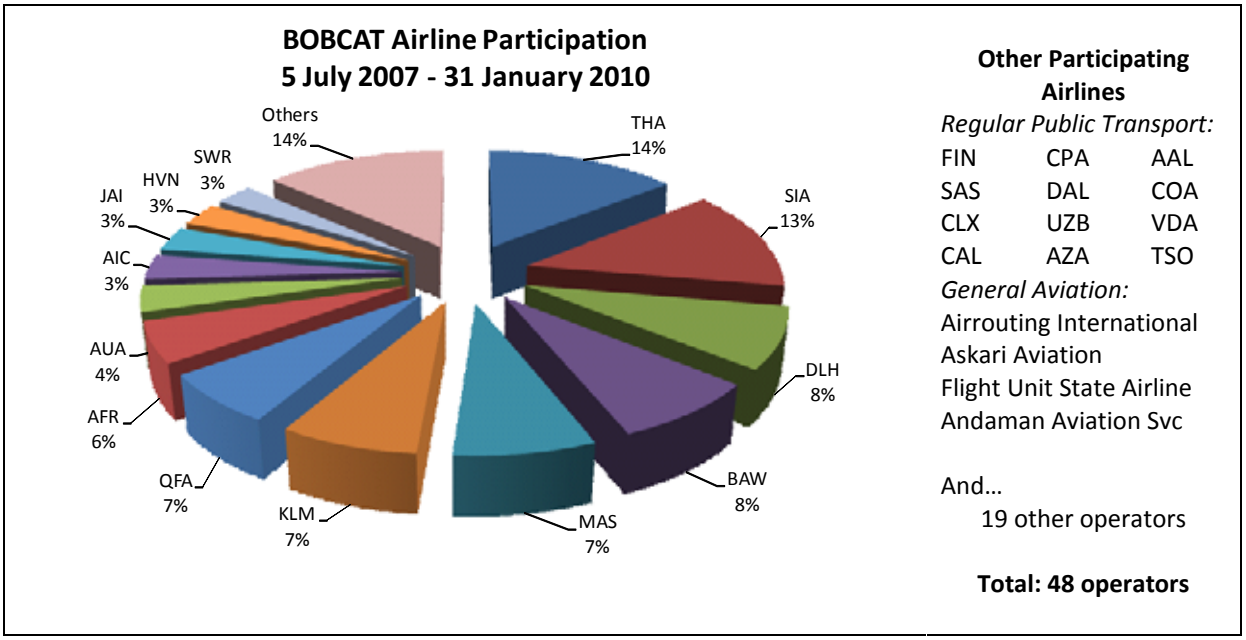


Figure 2: BOBCAT Airline Participation since ATFM Implementation (5 July 2007 – 31 January 2010)

Overall Data Analysis – Traffic Distribution by Airport

2.4 The meeting is invited to note weekly traffic number from Top-9 airports entering the Kabul FIR between May 2007 and January 2010 in Figure 3.

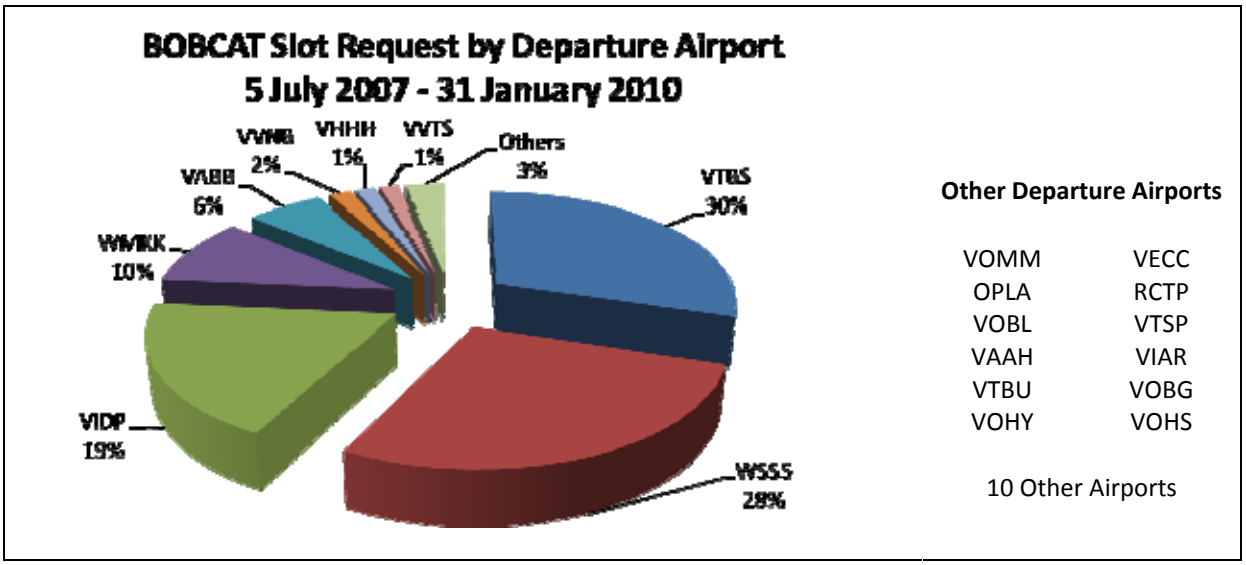


Figure 3: BOBCAT Traffic Demand from Slot Request Information organized by Departure Airport (5 July 2007 – 31 January 2010)

2.5 Based on traffic distribution by departure airports in Figure 3, the top-8 airport providing most traffic to the BOBCAT system are:

a) **VTBS:** Bangkok, Thailand

b) **WSSS:** Singapore

c) **VIDP:** Delhi, India

d) **WMKK:** Kuala Lumpur, Malaysia

e) **VABB:** Mumbai, India

f) **VVNB:** Ha Noi, Viet Nam

g) **VHHH:** Hong Kong, China

h) **VVTS:** Ho Chi Minh, Viet Nam

Overall Data Analysis – Flight Level Allocation

2.6 The meeting is advised that the number of flights achieving same or higher preferable flight level varied between 80.90% in August 2009 and 93.02% in May 2009. Figure 4 shows further information on percentage of traffic achieving higher preferable flight level between October 2008 and August 2009. The meeting is advised of the unfortunate downward trend of average number of flights achieving same or higher preferable flight level from May 2009 to August 2009. It is perplexing to also observe simultaneously slight decrease in traffic through the Kabul FIR from data collection.

Number of Flights Transiting the Kabul FIR at a Same or Higher Preferable Flight Level

Avg Nightly Traffic	Oct 08	Nov 08	Dec 08	Jan 09	Feb 09	Mar 09	Apr 09	May 09	Jun 09	Jul 09	Aug 09	Sept 09	Oct 09	Nov 09	Dec 09
	52	51	48	49	49	52	56	46	54	44	39	53	N/A	50	45
Days/ Week	6	7	6	7	7	7	7	7	6	7	7	7	0	7	7

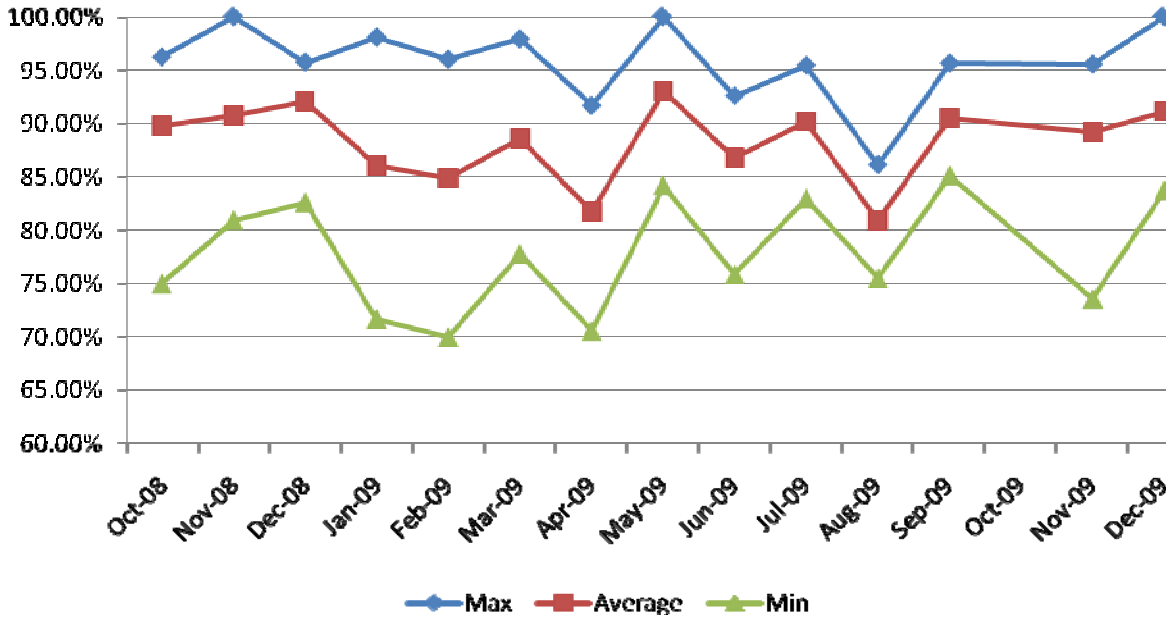


Figure 4: Percentage of Aircraft Achieving Same or Higher Preferable Flight Level

Flights Transiting the Kabul FIR at a Flight Level Lower than Slot Allocation

2.7 The meeting is invited to note number of flights transiting the Kabul FIR at a flight level lower than slot allocation flight level between October 2008 and December 2009in Figure 5. While the percentage of aircraft transiting the Kabul FIR at a flight level lower than slot allocation reached lowest point in May 2009 at 4.69% and peaked in August 2009 at 15.25%, the percentage reduces to approximately 7% in from September 2009 to December 2009.

Number of Flights Transiting the Kabul FIR at a Flight Level Lower than Slot Allocation

	Oct 08	Nov 08	Dec 08	Jan 09	Feb 09	Mar 09	Apr 09	May 09	Jun 09	Jul 09	Aug 09	Sep 09	Oct 09	Nov 09	Dec 09
Traffic/ Night	52	51	48	49	49	58	56	46	54	44	39	53	N/A	50	45
Lower FL / Night	4	4	3	4	5	4	7	2	5	3	6	3	N/A	4	3
Days/ Week	6	7	6	7	7	7	7	7	6	7	7	7	0	7	7

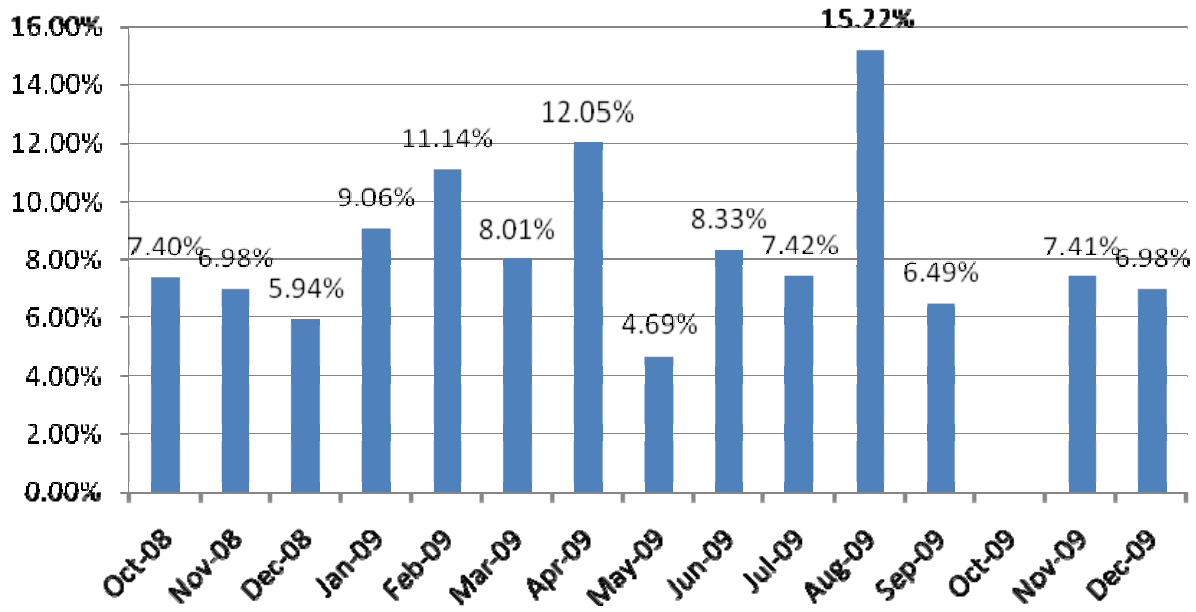


Figure 5: Number of Flights Transiting the Kabul FIR at a Flight Level Lower than Slot Allocation

2.8 From analysis of data collection, there are four major reasons for aircraft to be unable to achieve slot allocation flight level:

a) Early or Late departures of the aircraft or other aircraft;

b) EET inaccuracy;

c) VIDF tactical ATC issue;

d) Eastern Bay of Bengal tactical ATC issue;

e) FL390 Slot Allocation;

f) Departures without slot allocation; and,

g) Unknown reason due to insufficient data.

2.9 Percentage breakdown of aircraft unable to achieve slot allocation flight level is shown in Figure 6.

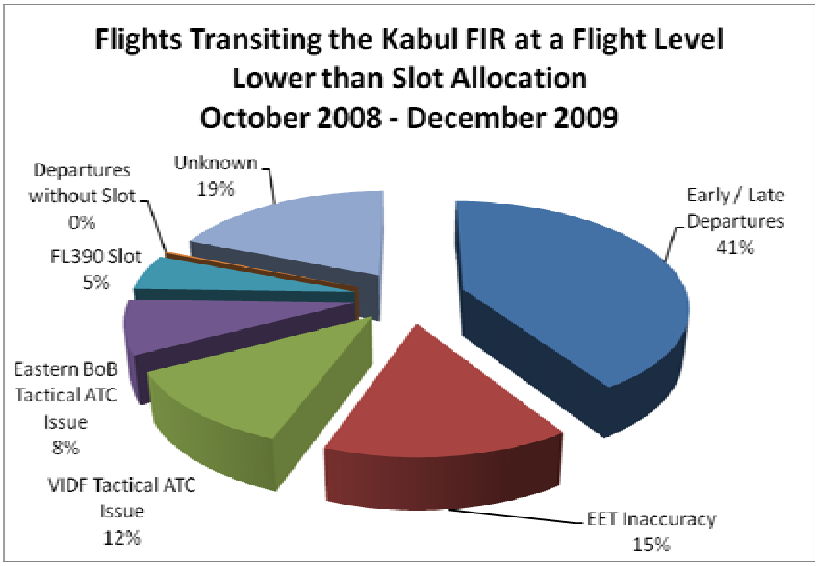


Figure 6: Breakdown of Aircraft Unable to Achieve Slot Allocation Flight Level (October 2008 – December 2009)

Early and Late Departures

2.10 The meeting is advised that, within October 2008 – April 2009 data collection, highest number of aircraft (approximately 41 percent) transited the Kabul FIR at a flight level lower than slot allocation due to early or late departure of the aircraft or other aircraft. Most of these occurrences feature an aircraft transiting the Kabul FIR excessively early or late.

2.11 Statistics of aircraft analyzed to have potentially caused other aircraft to transit the Kabul FIR at a flight level lower than slot allocation is shown in Figure 7 and Figure 8 organized by airline operator and departure airport.

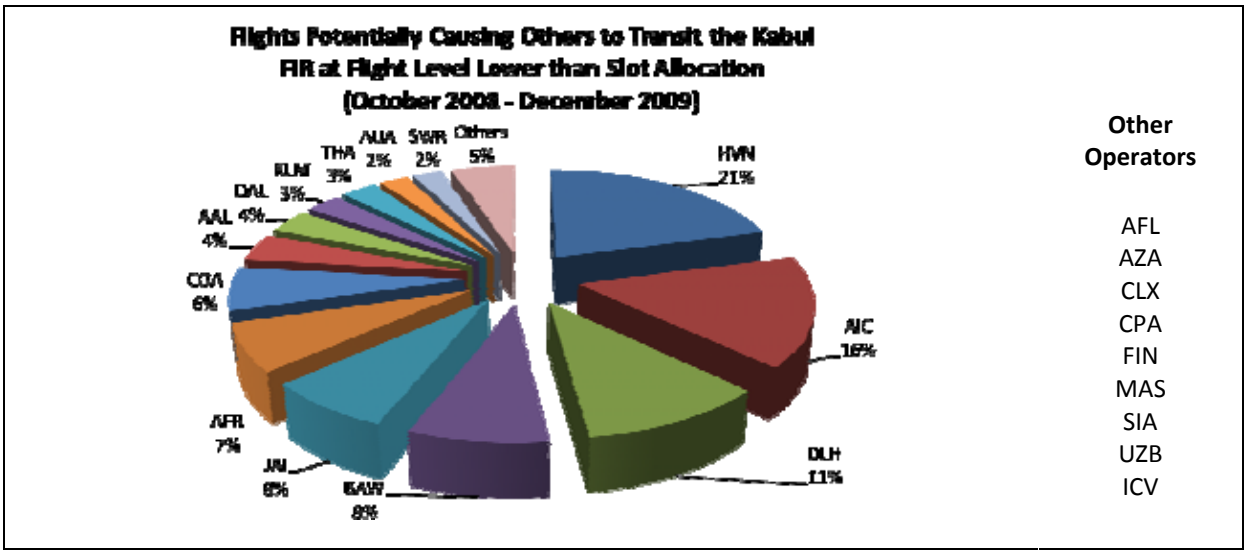


Figure 7: Flights Potentially Causing Others to Transit the Kabul FIR at a Flight Level Lower than Slot Allocation (October 2008 – December 2009) Organized by Operator

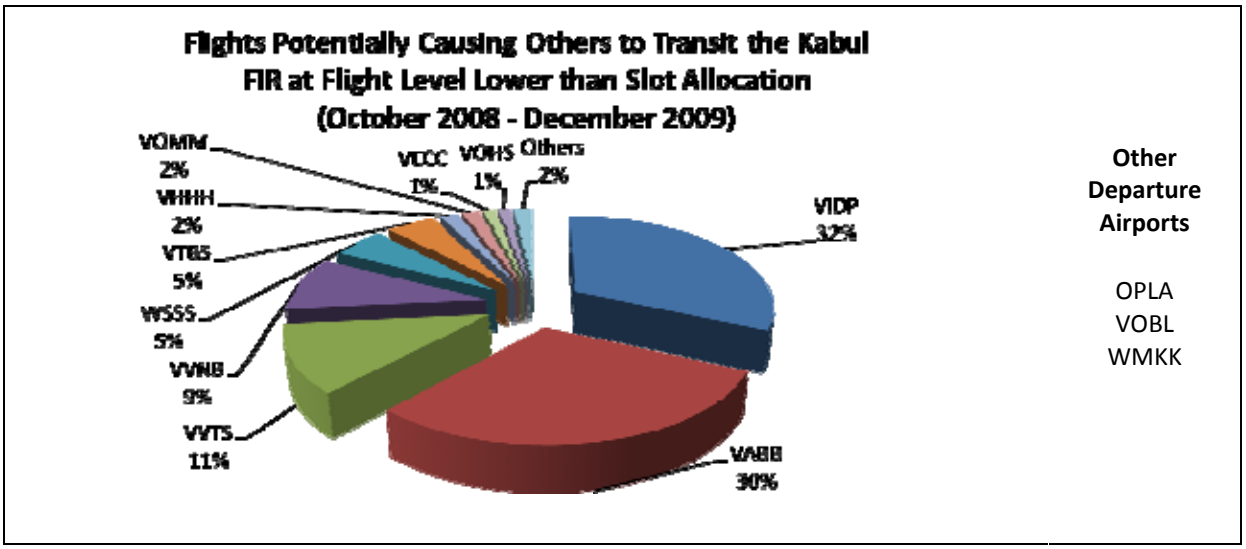


Figure 8: Flights Potentially Causing Others to Transit the Kabul FIR at a Flight Level Lower than Slot Allocation (October 2008 – December 2009) Organized by Departure Airport

2.12 The meeting is invited that information in Figure 7 and Figure 8 may also be viewed relative to the amount of traffic each airline operator and departure airport contributes to the overall system. This information is shown in Figure 9 for operators with significant traffic (more than 1% of total traffic) and Figure 10 for departure airports with significant traffic (more than 1% of total traffic).

Ratio Comparison of Percentage of Flights Potentially Causing Others to Transit the Kabul FIR at Flight Level Lower than Slot Allocation to Traffic Contribution by Airline Operator (October 2008 – December 2009)

	HVN	COA	AIC	DAL	JAI	AAL	DLH	AFR	BA …	SWR	AUA	KLM	CPA	FIN	THA	MAS	SIA
Early Late Issues	20.81%	6.36%	16.18%	3.47%	7.51%	4.05%	10.98%	6.94%	8.09%	2.31%	2.31%	2.89%	0.58%	0.58%	2.89%	0.58%	0.58%
Traffic	3.11%	1.02%	3.31%	1.16%	3.13%	1.79%	8.11%	5.42%	8.05%	2.87%	3.44%	7.25%	1.88%	2.06%	14.36%	7.42%	13.32%

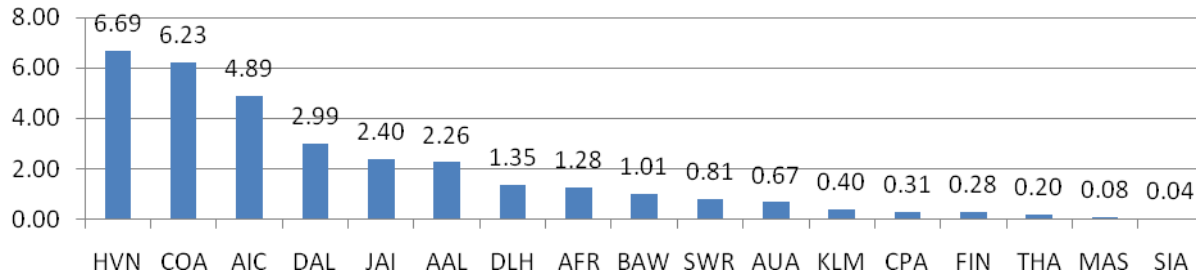


Figure 9: Ratio Comparison of Percentage of Flights Potentially Causing Others to Transit the Kabul FIR at Flight Level Lower than Slot Allocation to Traffic Contribution by Departure Airport (October 2008 – December 2009)

Ratio Comparison of Percentage of Flights Potentially Causing Others to Transit the Kabul FIR at Flight Level Lower than Slot Allocation to Traffic Contribution by Departure Airport (October 2008 – December 2009)

	VVTS	VVNB	VABB	VIDP	VHHH	WSSS	VTBS	WMKK
Early Late Issues	11.56%	9.25%	30.06%	31.79%	1.73%	5.20%	4.62%	0.58%
Traffic	1.49%	1.67%	6.08%	18.93%	1.59%	27.75%	29.79%	9.61%

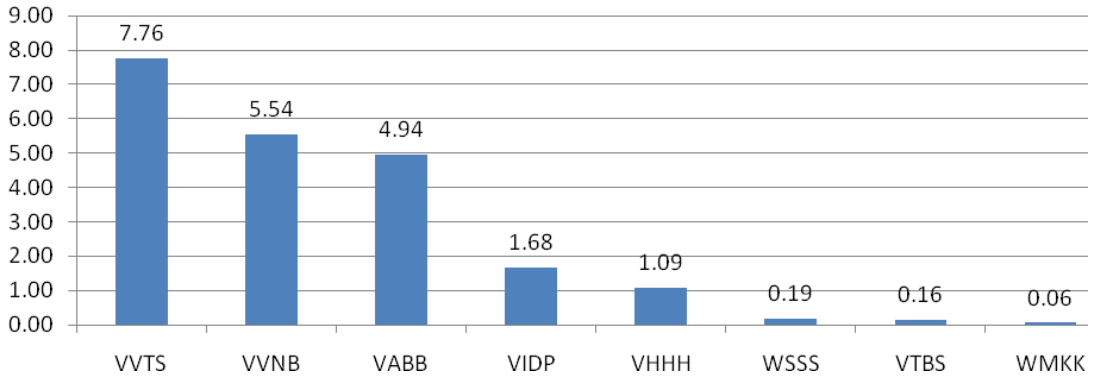


Figure 10: Ratio Comparison of Percentage of Flights Potentially Causing Others to Transit the Kabul FIR at Flight Level Lower than Slot Allocation to Traffic Contribution by Departure Airport (October 2008 – December 2009)

2.13 The meeting is also advised that, as traffic increases, it is likely that cases of early and late departures in respect to Allocated Wheels-Up Time (AWUT) would have more impact on the overall performance of the system. In effect, everyone pays more for the lack of compliance.

2.14 In addition, it should also be noted that the main issue is aircraft departing early or late compared to the Allocated Wheels Up Time (AWUT) which causes aircraft to transit the Kabul FIR at a Flight Level lower than slot allocation or the affected aircraft having to reroute to another Kabul FIR entry point than planned.

2.15 While tactical air traffic management by en route ACCs has so far been able to limit this effect of early/late departures to the early/late departures themselves, these tactical measures appear to have increased ATC workload for the en route ACCs involved.

2.16 In summary, as the meeting would note that early/late departures represent the major cause of aircraft transiting the Kabul FIR at flight level lower than slot allocation, the meeting may consider revising the AIP Supplement related to ATFM implementation to address the issues specified.

Departures Punctuality

2.17 The meeting is advised that due to current issues with early/late departures causing the aircraft or others to transit the Kabul FIR at flight level lower than slot allocation, it would be worthwhile diagnosing punctuality of departures from major airports between October 2008 and December 2009 based on submitted information and ATS messages received by the Bangkok ATFMU.

Departures Punctuality: VABB (Mumbai)

2.18 The meeting is invited to note departures punctuality for the Mumbai Airport between October 2008 and December 2009 in Figure 11.

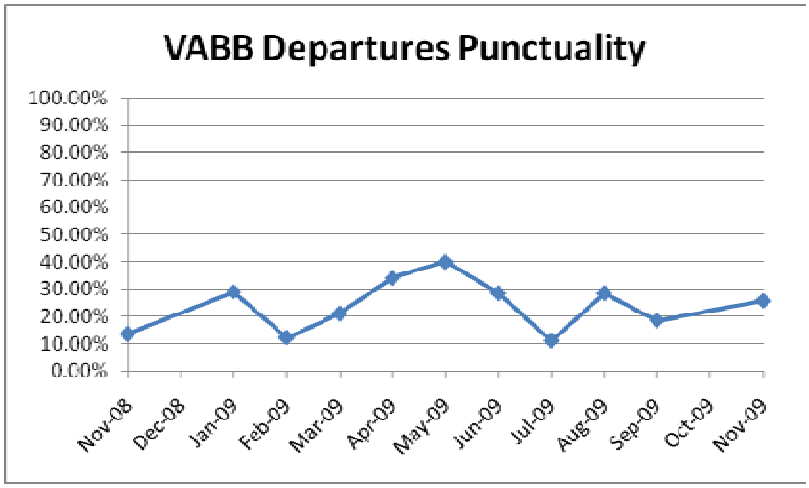


Figure 11: Departures Punctuality for Mumbai Airport (October 2008 – December 2009)

2.19 It should be noted that since Mumbai is about two hours from entry into the Kabul FIR, "punctual" departures from Mumbai is considered as departures that are between 2 minutes ahead of AWUT and 7 minutes after AWUT.

2.20 The meeting is advised that based on collected information, average departures punctuality for the Mumbai Airport is 23.86%.

Departures Punctuality: VIDP (Delhi)

2.21 The meeting is invited to note departures punctuality for the Delhi Airport between October 2008 and December 2009 in Figure 12.

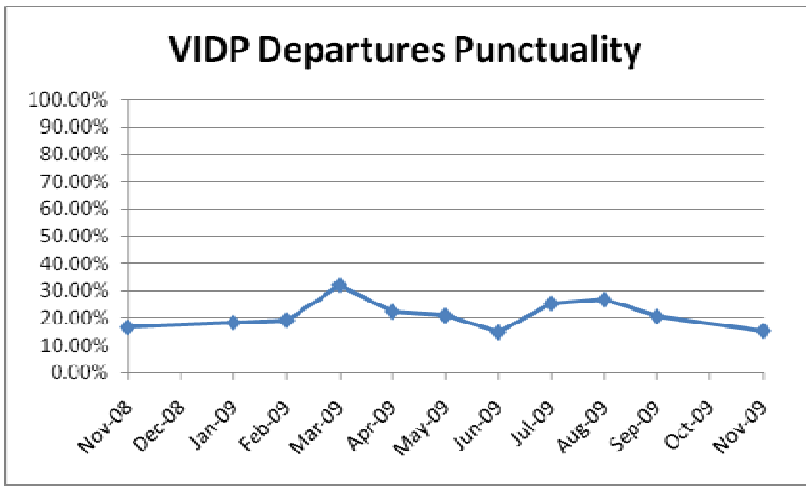


Figure 12: Departures Punctuality for Delhi Airport (October 2008 – December 2009)

2.22 It should be noted that since Delhi is about less than one hour from entry into the Kabul FIR, "punctual" departures from Delhi is considered as departures that are between AWUT and 5 minutes after AWUT.

2.23 The meeting is advised that based on collected information, average departures punctuality for the Delhi Airport is 21.15%.

Departures Punctuality: VTBS (Bangkok, Suvarnabhumi)

2.24 The meeting is invited to note departures punctuality for the Bangkok Suvarnabhumi Airport between October 2008 and December 2009 in Figure 13.

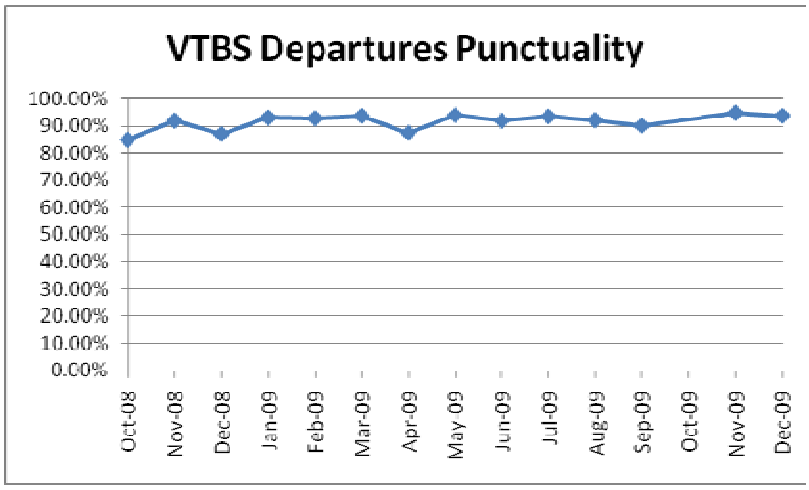


Figure 13: Departures Punctuality for Bangkok Suvarnabhumi Airport (October 2008 – December 2009)

2.25 It should be noted that since Bangkok is approximately four hours from entry into the Kabul FIR, "punctual" departures from Bangkok is considered as departures that are between 4 minutes ahead of AWUT and 9 minutes after AWUT.

2.26 The meeting is advised that based on collected information, average departures punctuality for the Bangkok Suvarnabhumi Airport is 91.54%.

Departures Punctuality: VVNB (Ha Noi)

2.27 The meeting is invited to note departures punctuality for the Ha Noi (Noi Bai) Airport between October 2008 and December 2009 in Figure 14.

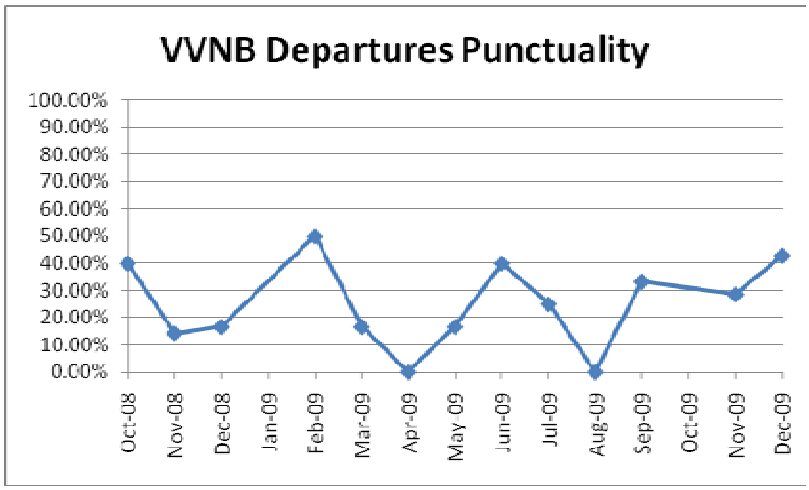


Figure 14: Departures Punctuality for Ha Noi (Noi Bai) Airport (October 2008 – December 2009)

2.28 It should be noted that since Ha Noi is approximately five hours from entry into the Kabul FIR, “punctual” departures from Ha Noi is considered as departures that are between 5 minutes ahead of AWUT and 10 minutes after AWUT.

2.29 The meeting is advised that based on collected information, average departures punctuality for the Ha Noi (Noi Bai) Airport is 24.93%.

Departures Punctuality: VVTS (Ho Chi Minh)

2.30 The meeting is invited to note departures punctuality for the Ho Chi Minh Airport between October 2008 and December 2009 in Figure 15.

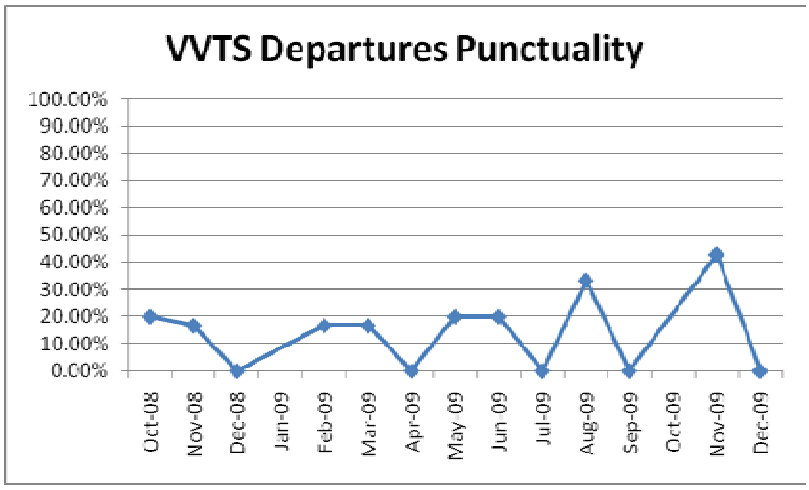


Figure 15: Departures Punctuality for Ho Chi Minh Airport (October 2008 – December 2009)

2.31 It should be noted that since Ho Chi Minh is approximately five hours from entry into the Kabul FIR, “punctual” departures from Ho Chi Minh is considered as departures that are between 5 minutes ahead of AWUT and 10 minutes after AWUT.

2.32 The meeting is advised that based on collected information, average departures punctuality for the Ho Chi Minh Airport is 14.32%.

Departures Punctuality: WMKK (Kuala Lumpur)

2.33 The meeting is invited to note departures punctuality for the Kuala Lumpur Airport between October 2008 and December 2009 in Figure 16.

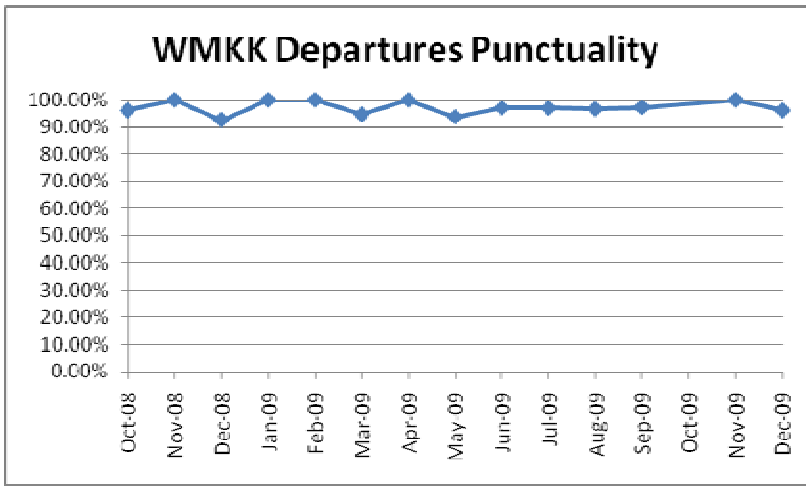


Figure 16: Departures Punctuality for Kuala Lumpur Airport (October 2008 – December 2009)

2.34 It should be noted that since Kuala Lumpur is approximately six hours from entry into the Kabul FIR, "punctual" departures from Kuala Lumpur is considered as departures that are between 6 minutes ahead of AWUT and 11 minutes after AWUT.

2.35 The meeting is advised that based on collected information, average departures punctuality for the Kuala Lumpur Airport is 97.23%.

Departures Punctuality: WSSS (Singapore)

2.36 The meeting is invited to note departures punctuality for the Singapore Airport between October 2008 and December 2009 in Figure 17.

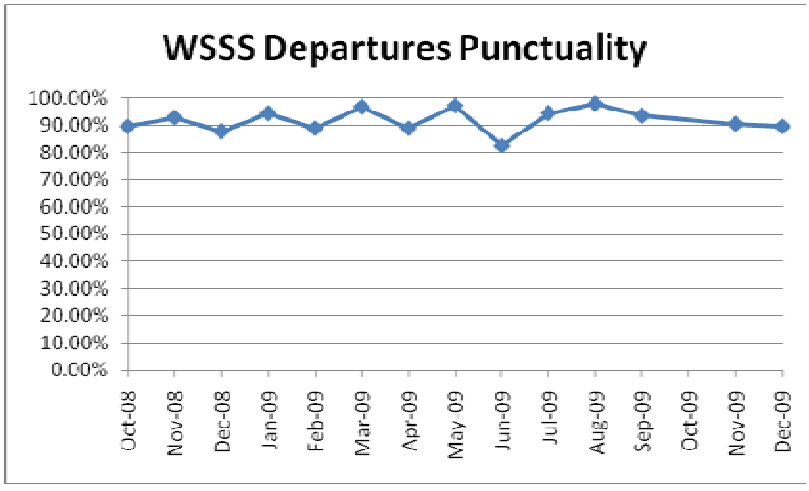


Figure 17: Departures Punctuality for Singapore Airport (October 2008 – December 2009)

2.37 It should be noted that since Singapore is approximately six hours from entry into the Kabul FIR, "punctual" departures from Kuala Lumpur is considered as departures that are between 6 minutes ahead of AWUT and 11 minutes after AWUT.

2.38 The meeting is advised that based on collected information, average departures punctuality for the Singapore Airport is 91.81%.

Participation in Data Collection

2.39 The meeting is informed of participation in ATFM Data Collection between September 2009 and December 2009 in Figure 18.

	September 2009	October 2009	November 2009	December 2009
WSFC	7 days	7 days	7 days	7 days
WMKK	7 days	7 days	7 days	7 days
VTBB	7 days	7 days	7 days	7 days
VYYY	7 days	7 days	7 days	7 days
VOMF	7 days	7 days	7 days	7 days
VECF	7 days	7 days	7 days	7 days
VABF	7 days	7 days	7 days	N/A
VIDF	7 days	7 days	7 days	7 days
OPKR	7 days	7 days	7 days	7 days
OPLR	7 days	N/A	7 days	7 days
OAKX	N/A	N/A	N/A	N/A

Figure 18: Participation in Data Collection by FIR

2.40 According to Figure 19, AEROTHAI would like to express gratitude to all States involved in providing data required for data analysis. Nevertheless, on some occasions, there were some issues with integrity of data submitted from certain FIRs which may have rendered reliable data analysis on some days of the data collection.

Operational Messages Sent to the Bangkok ATFMU

2.41 The meeting is reminded that, according to the ATFM Users Handbook, "[aircraft] operators shall also address flight plan and related ATS messages (e.g. DEP, DLA, CNL, CHG) to the Bangkok ATFMU." Nevertheless, some flight plans and ATS messages are still not transmitted to the Bangkok ATFMU, especially for departures west of the Bay of Bengal.

2.42 The meeting is informed of the Bangkok ATFMU's receipt of Flight Plan and ATS messages by departure airport in Figure 19.

	September 2009	October 2009	November 2009	December 2009
OPLA	No FPL No DEP	No FPL No DEP	N/A	No FPL No DEP
RCTP	No FPL No DEP	No FPL No DEP	N/A	N/A
VABB	Some FPL No DEP	Some FPL No DEP	Some FPL No DEP	No FPL No DEP
VECC	All FPL No DEP	All FPL No DEP	N/A	N/A
VHHH	Most FPL Most DEP	Most FPL Most DEP	Most FPL Most DEP	Most FPL Most DEP
VIDP	Most FPL Sparse DEP	Most FPL Sparse DEP	Most FPL Sparse DEP	Most FPL Sparse DEP
VOBL	Most FPL	Most FPL	N/A	N/A

	September 2009	October 2009	November 2009	December 2009
	No DEP	No DEP		
VOMM	No FPL No DEP	Sparse FPL No DEP	Sparse FPL No DEP	Sparse FPL No DEP
VTBS	All FPL All DEP	All FPL All DEP	All FPL All DEP	All FPL All DEP
VTSP	All FPL All DEP	All FPL All DEP	All FPL All DEP	All FPL All DEP
VVNB	Most FPL Most DEP	Most FPL Most DEP	All FPL All DEP	All FPL All DEP
VVTS	All FPL Most DEP	Most FPL Most DEP	All FPL All DEP	Most FPL Most DEP
WMKK	All FPL All DEP	All FPL Most DEP	All FPL Most DEP	All FPL Most DEP
WSSS	All FPL Most DEP	All FPL Most DEP	All FPL Most DEP	All FPL Most DEP

Figure 19: Summary of FPL and DEP messages received by the Bangkok ATFMU by Departure Airport

2.43 The meeting would note from analysis of ATFM data collection, aircraft departure punctuality is a crucial cause of aircraft transiting the Kabul FIR at a flight level lower than slot allocation.

2.44 The meeting is advised that these ATS messages can be used in future ATFM data analysis, namely in determining potential cause of aircraft transiting the Kabul FIR at flight level lower than slot allocation as well as alerting potential issues arising from aircraft departing early or late outside AWUT window.

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) consider appropriate remedial actions.

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