Bay of Bengal Cooperative Air Traffic Flow Management System (BOBCAT)

BBACG/21

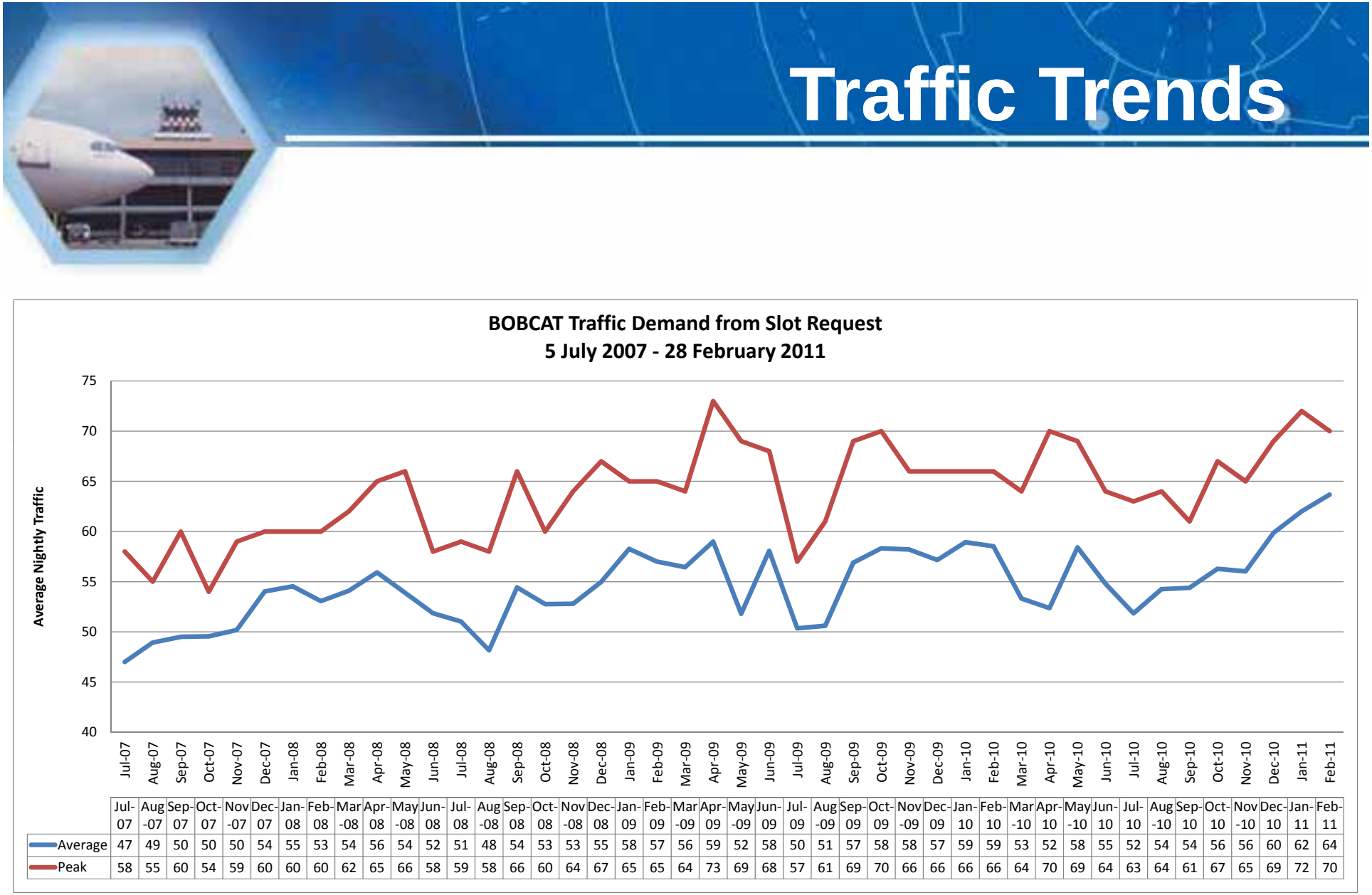
BOBCAT Operational Updates and Future Enhancements

7-10 March 2011

Traffic Analysis

BOBCAT System Data and ATFM Traffic Sample Data

Traffic Trends

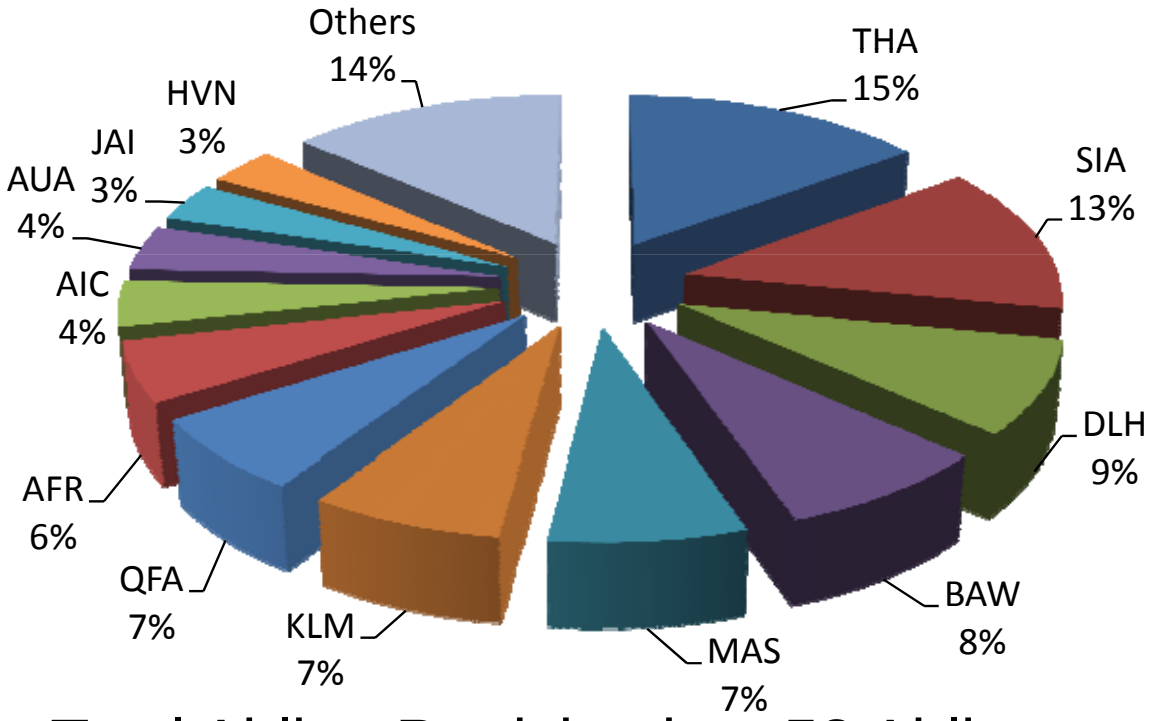


	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11
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	59	53	52	58	55	52	54	54	56	56	60	62	64
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	66	64	70	69	64	63	64	61	67	65	69	72	70

Source: BOBCAT System

Airline Participation

BOBCAT Airline Participation
5 July 2007 - 28 February 2011



Total Airline Participation: 53 Airlines

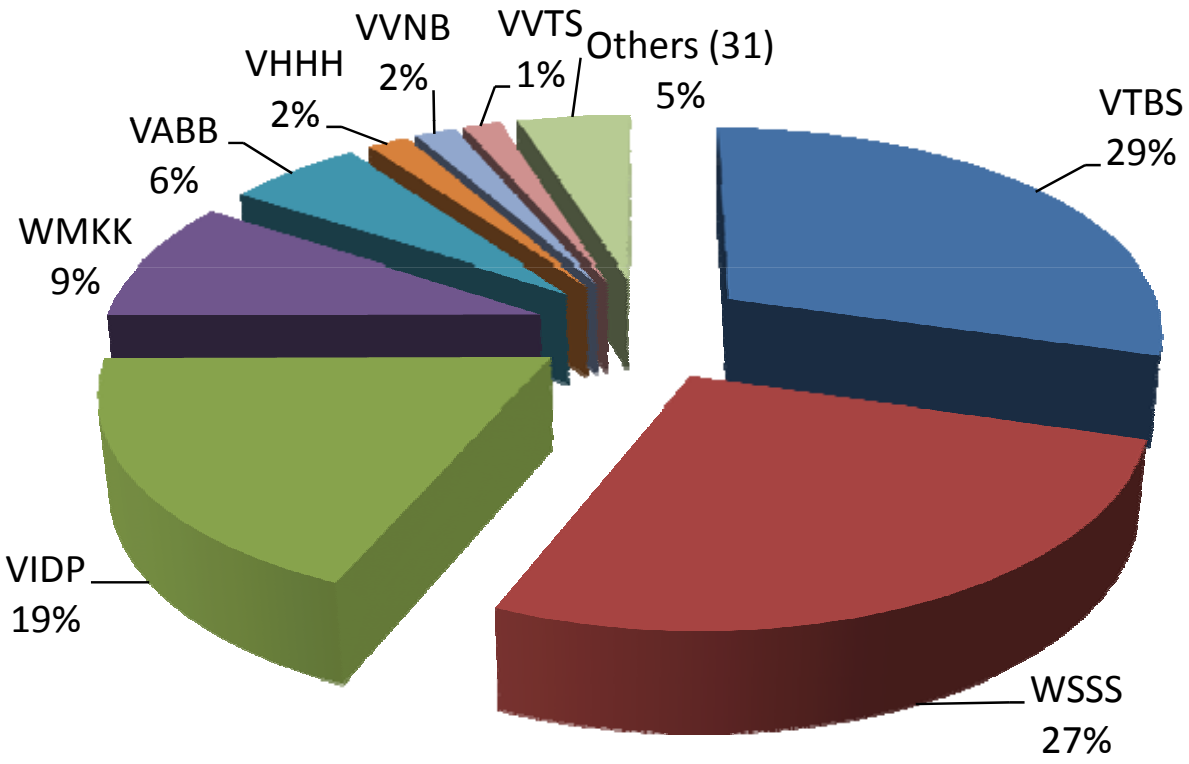
Other Airlines

Swiss Air (SWR)	Cathay Pacific (CPA)
FinnAir (FIN)	American Airlines (AAL)
SAS	Continental Airlines (COA)
Uzbekistan Airways (UZB)	Volga (VDA)
CargoLux (CLX)	China Airlines (CAL)
Transaero (TSO)	Alitalia (AZA)
Blue Panorama (BPA)	XL Airways (XLF)
AirAsiaX (XAX)	Malev (MAH)
North Wind (NWS)	Corsairfly
22 Other Aircraft Operators	

*Data: 5 July 2007 – 28 February 2011

Traffic Distribution: Airports

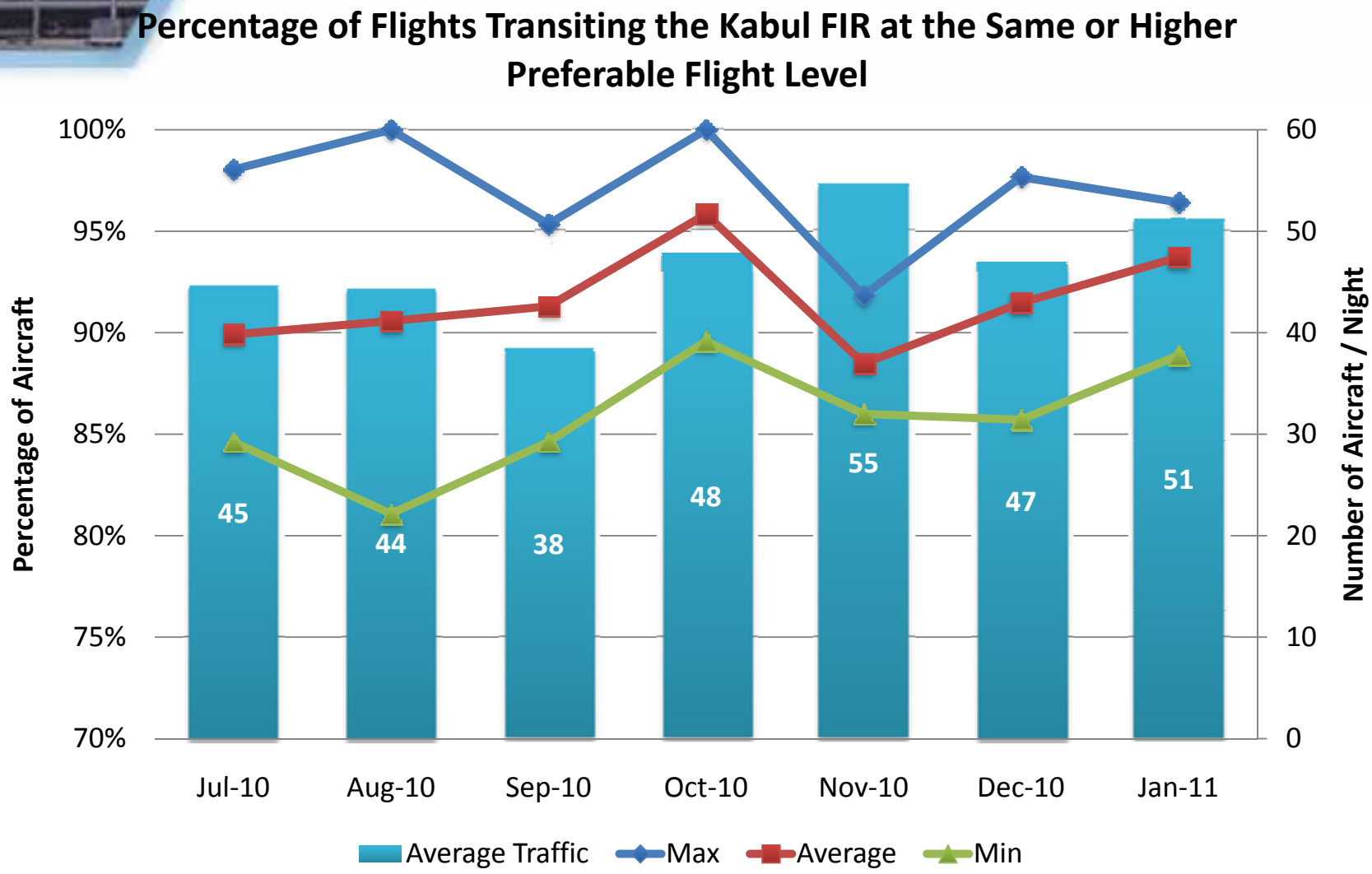
BOBCAT Slot Request by Departure Airport
5 July 2007 - 28 February 2011



Other Airports

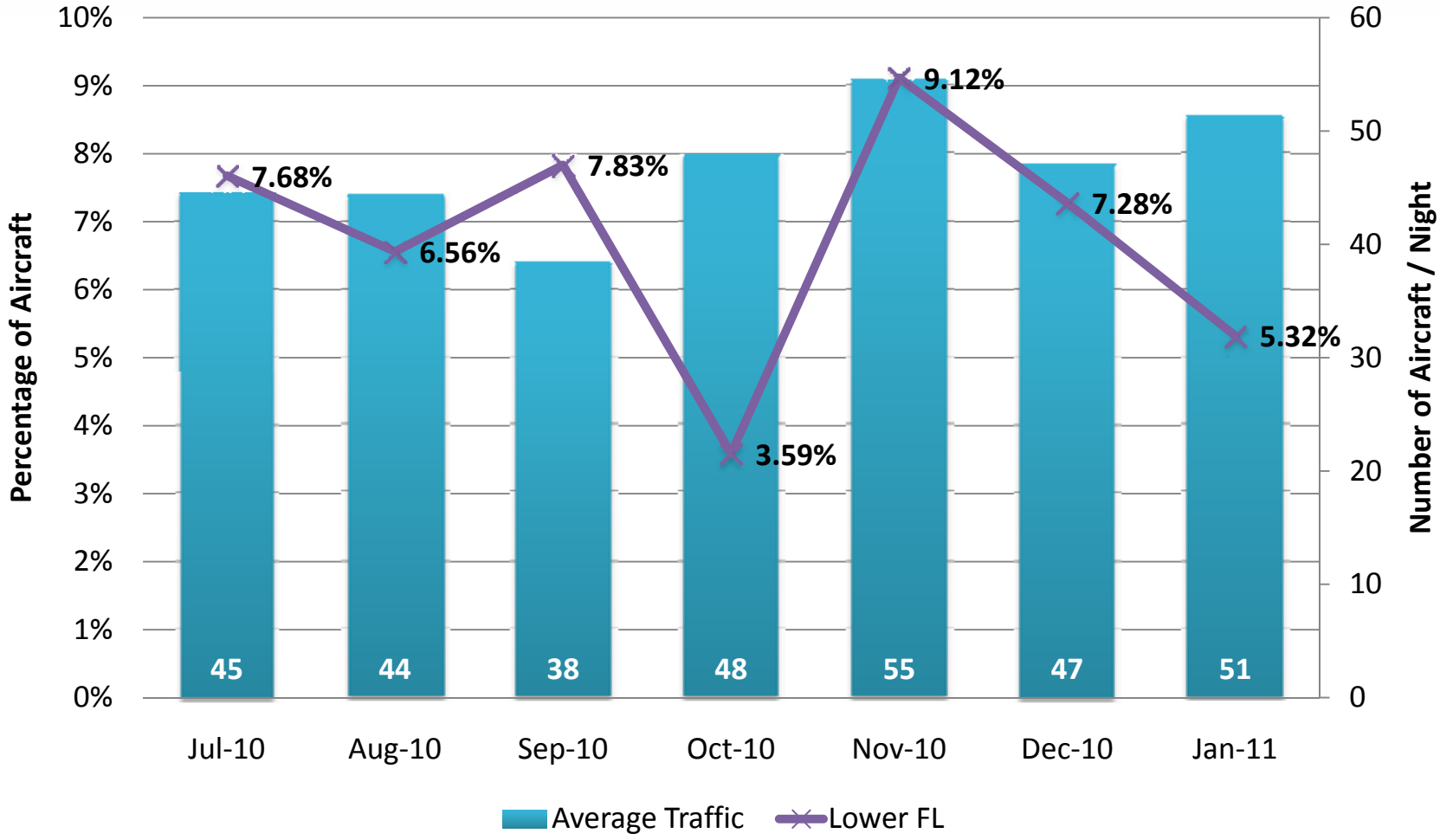
VOMM
VECC
RCTP
OPLA
VTSP
VOBL
VAAH
VIAR
VTBU
VOHS
VOBG
VOHY
WBSB
VGZR
VTCC
VAAB
OPRN
9 Others

Transit at Same or Higher Preferred FL



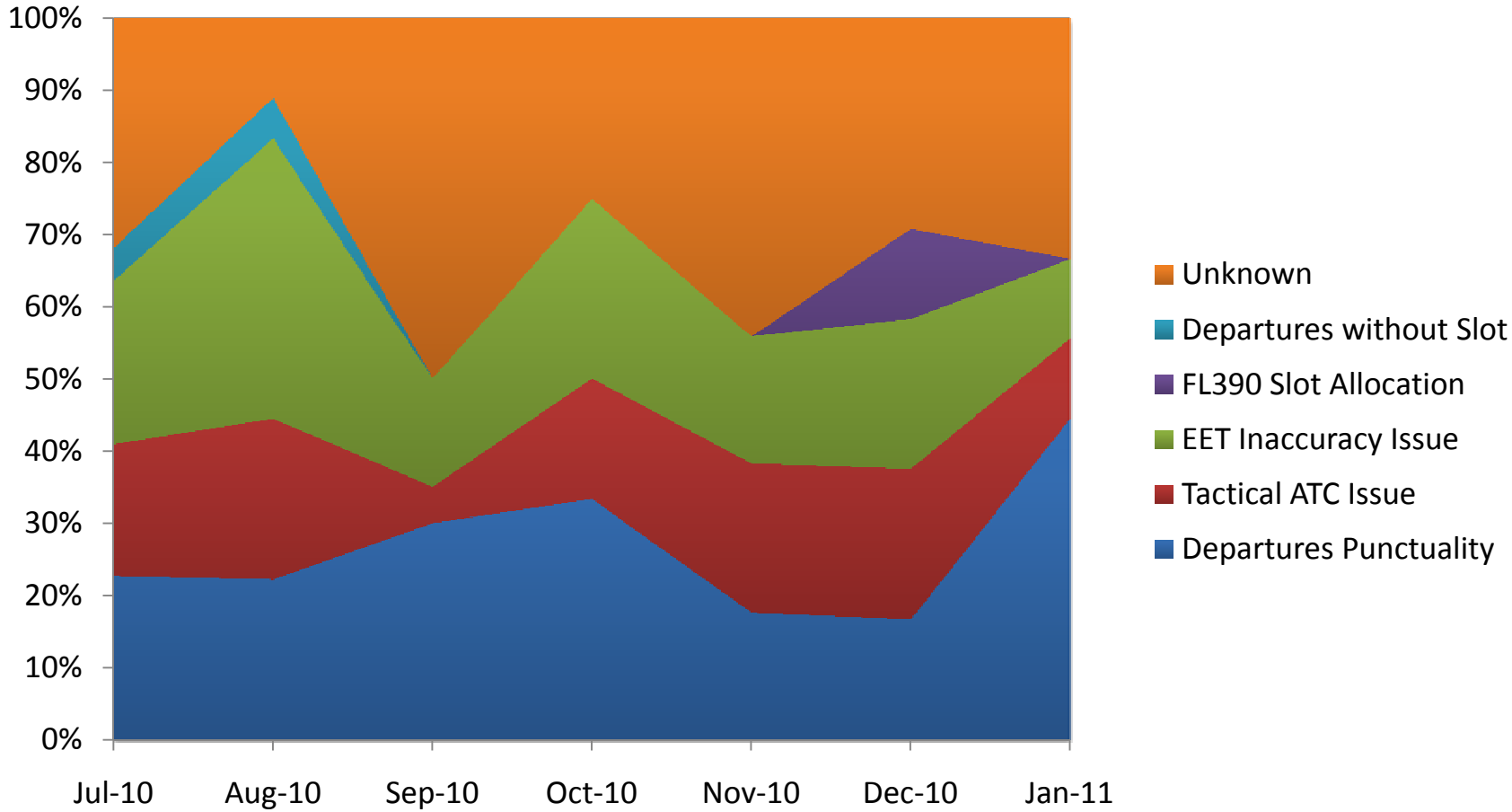
Transit at Lower FL than Slot Allocation

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

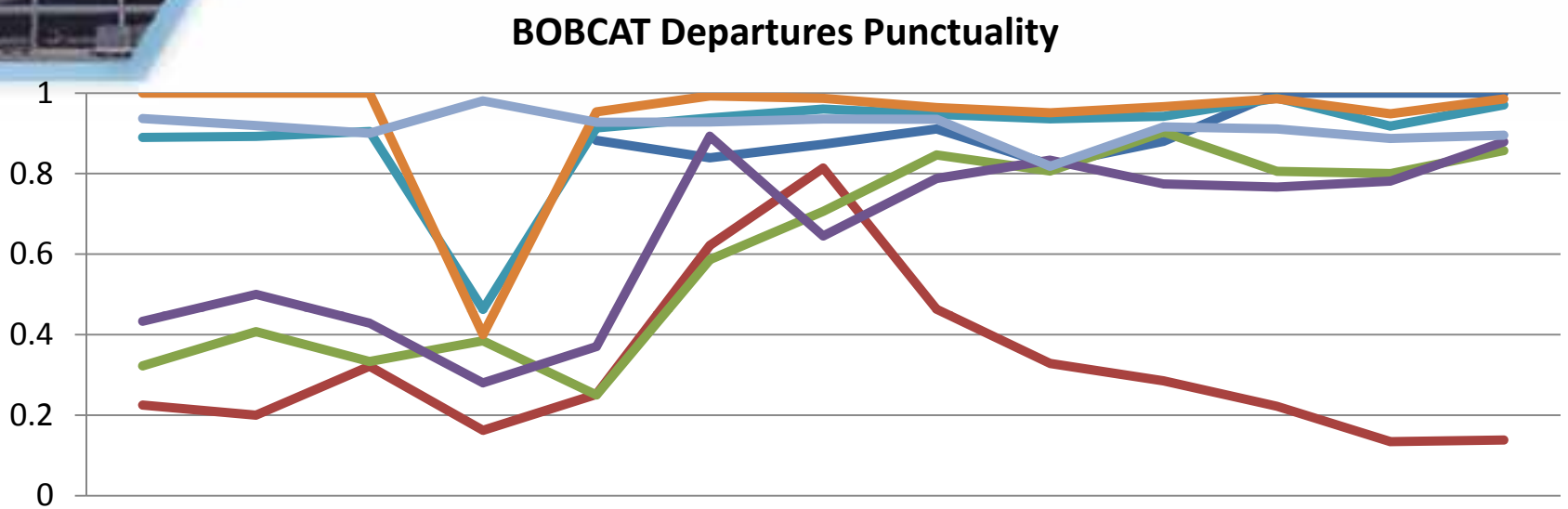


Transit at Lower FL: Reasons

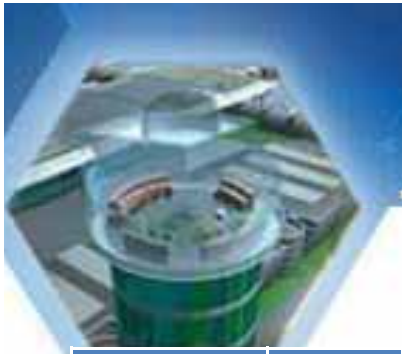
Flights Transiting the Kabul FIR
at a Flight Level Lower than Slot Allocation
July 2010 - January 2011



Departures Punctuality



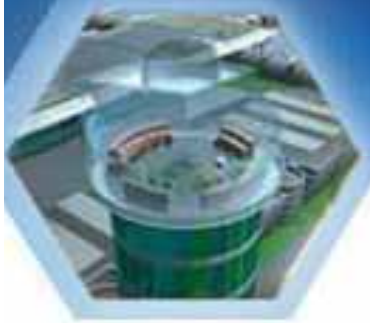
	Jan 2010	Feb 2010	Mar 2010	Apr 2010	May 2010	Jun 2010	Jul 2010	Aug 2010	Sep 2010	Oct 2010	Nov 2010	Dec 2010	Jan 2011
VHHH					88%	84%	87%	91%	82%	88%	100%	100%	100%
VIDP	23%	20%	32%	16%	25%	62%	81%	46%	33%	29%	22%	13%	14%
VVNB	32%	41%	33%	38%	25%	59%	71%	85%	81%	90%	81%	80%	86%
VVTS	43%	50%	43%	28%	37%	89%	65%	79%	83%	77%	77%	78%	88%
VTBS	89%	89%	90%	46%	91%	94%	96%	95%	94%	94%	99%	92%	97%
WMKK	100%	100%	100%	40%	95%	99%	99%	96%	95%	97%	99%	95%	99%
WSSS	94%	92%	90%	98%	93%	93%	94%	93%	82%	92%	91%	89%	90%



Data Collection Participation

	Feb 2010	Mar 2010	Apr 2010	May 2010	Jun 2010	Jul 2010	Aug 2010	Sep 2010	Oct 2010	Nov 2010	Dec 2010	Jan 2011
WSFC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WMKK	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VTBB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VYYY	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
VOMF	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
VECF	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
VABF	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
VIDF	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
OPKR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OPLR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OAKX	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗

Operational Messages to ATFMU

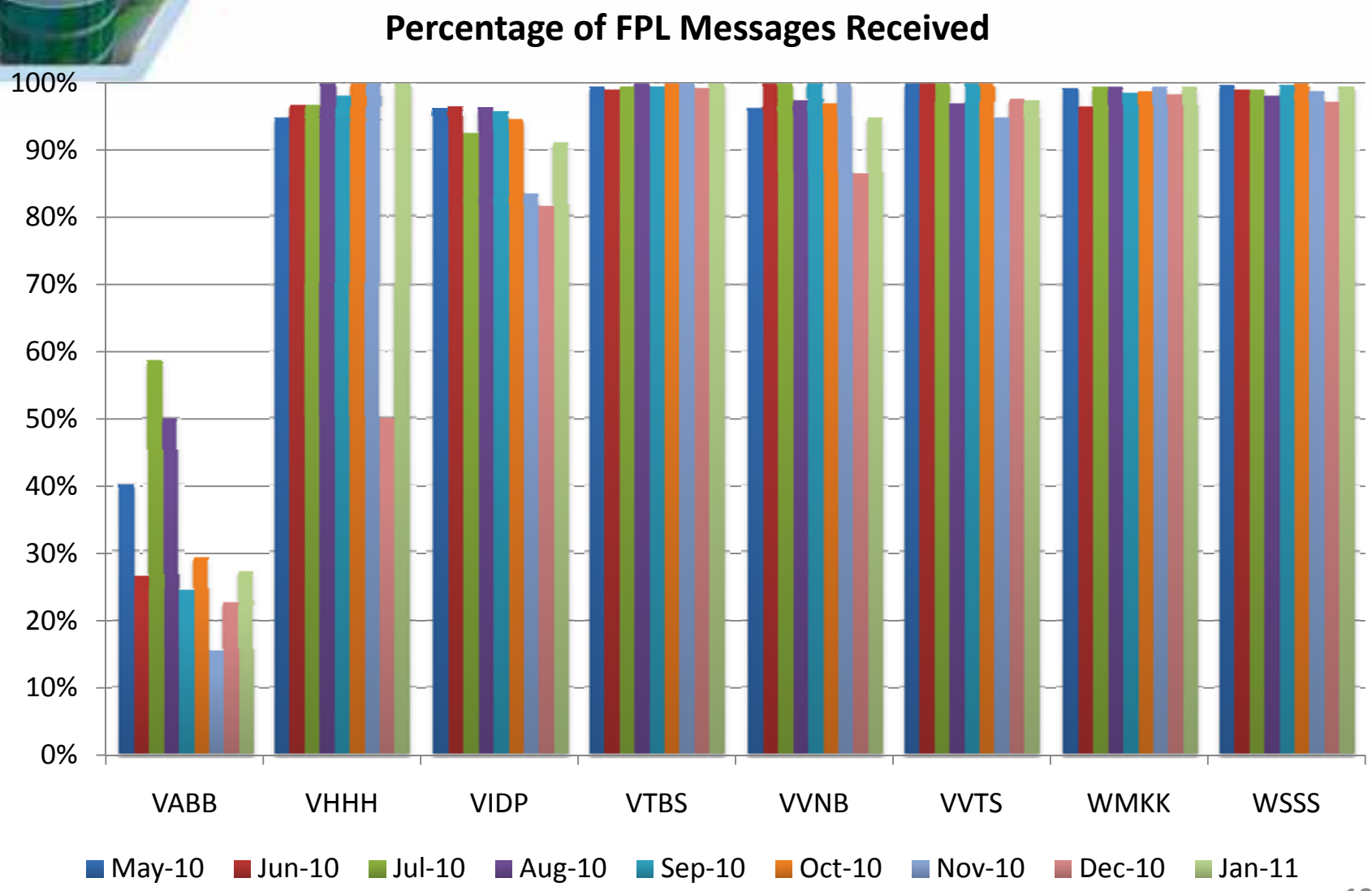


- “[aircraft] operators shall also address flight plan and related ATS messages (e.g. DEP, DLA, CNL, CHG) to the Bangkok ATFMU.” – ATFM Users Handbook

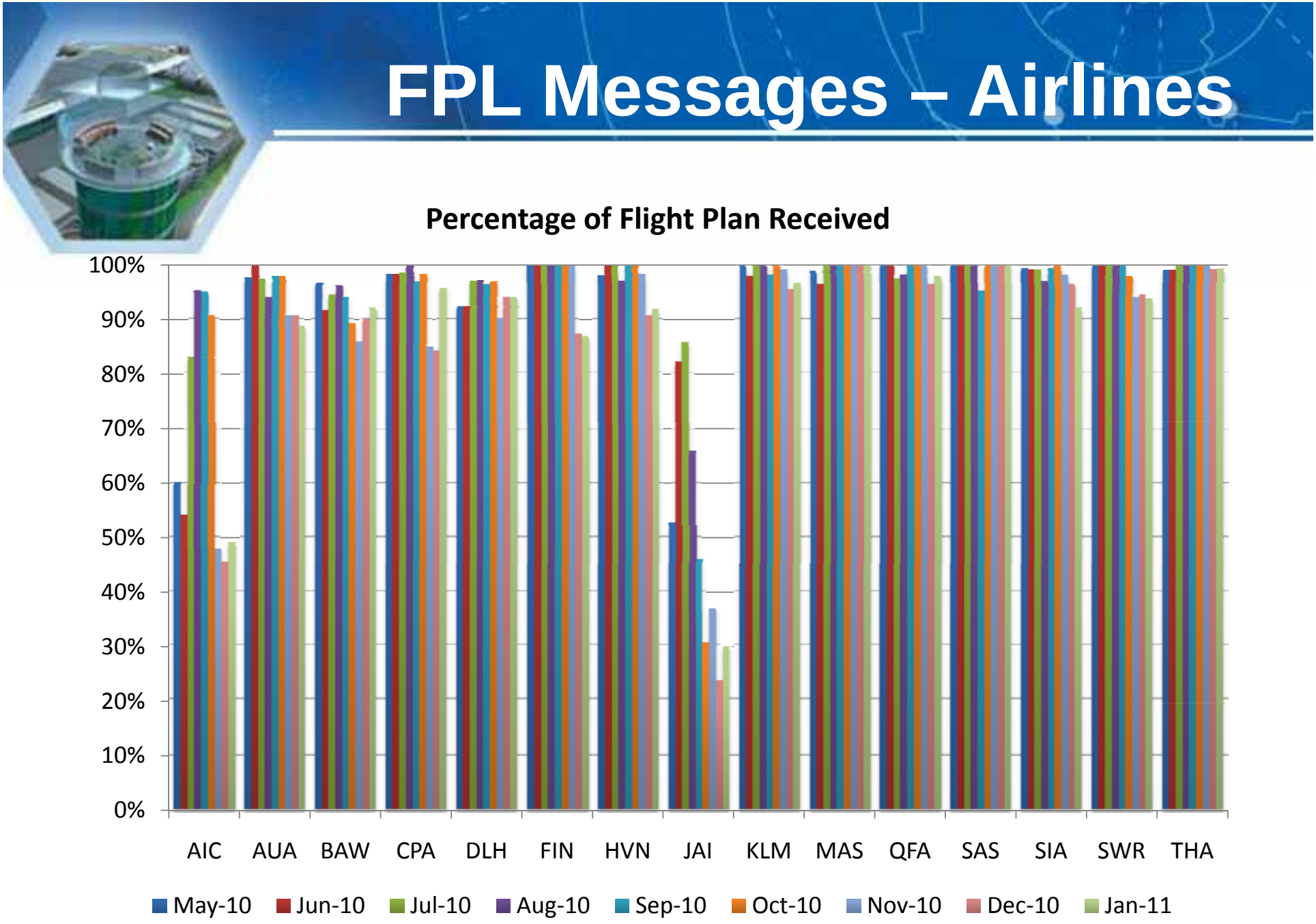
- Some flight plans and ATS messages are not transmitted to the ATFMU
  - Especially for departures west of the Bay of Bengal

- FPL and ATS Messages are key enabler for future version of BOBCAT to display target handover information between en route FIRs and related CDM processes

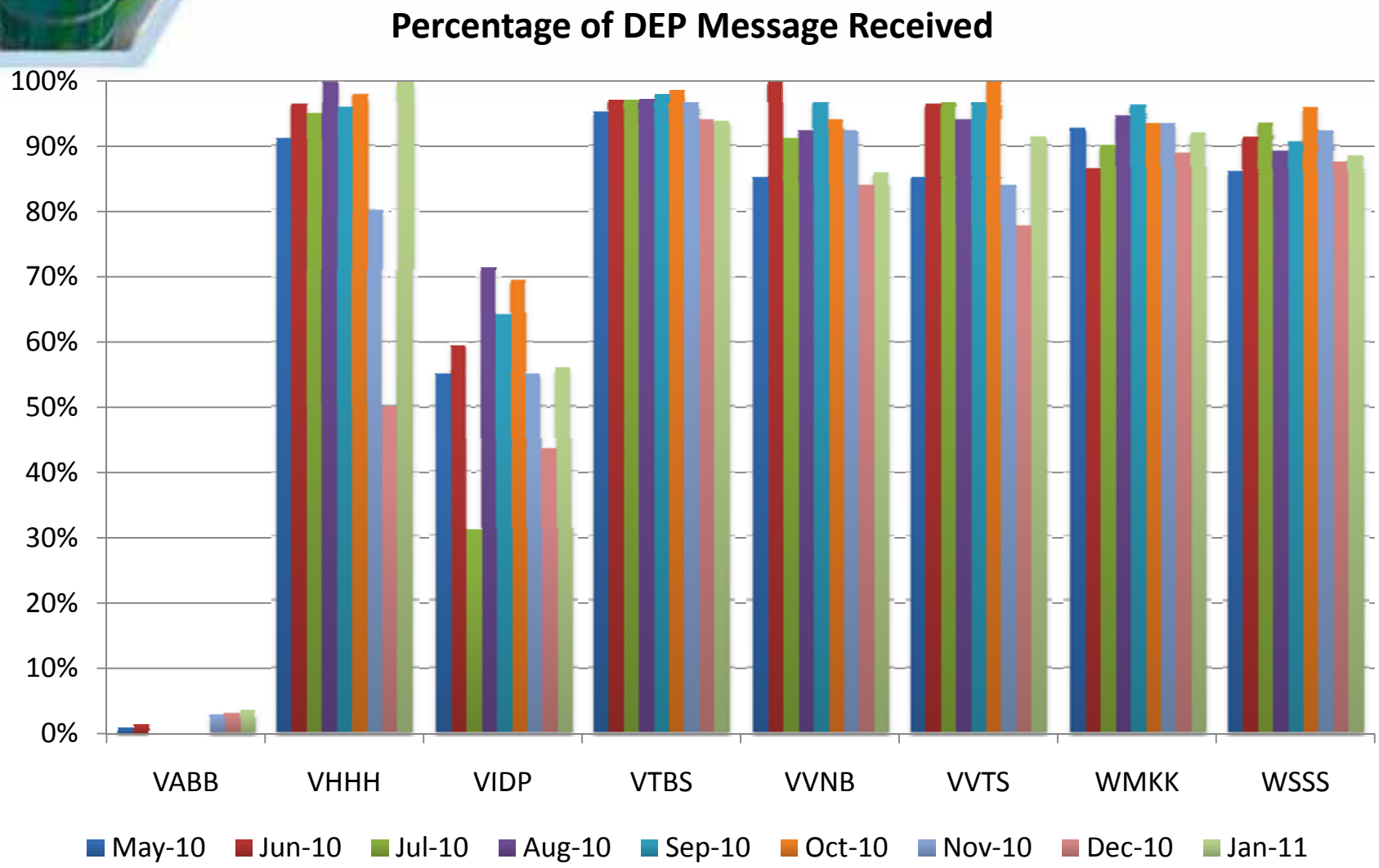
FPL Messages – Departure

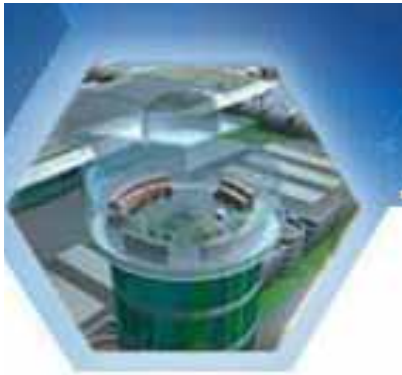


FPL Messages – Airlines



DEP Messages Received





Actions by the Meeting

- Note data collected by the Bangkok ATFMU
- Discuss data collection results
- Consider appropriate remedial actions
- Encourage all involved to submit flight plans and ATS messages on flights related to BOBCAT slot allocation to the Bangkok ATFMU
- Encourage ANSPs to provide ATFM Traffic Sample Data in original format or MAAR TSD format
- Congratulate all involved on AWUT compliance progress, while there remains room for further enhancements

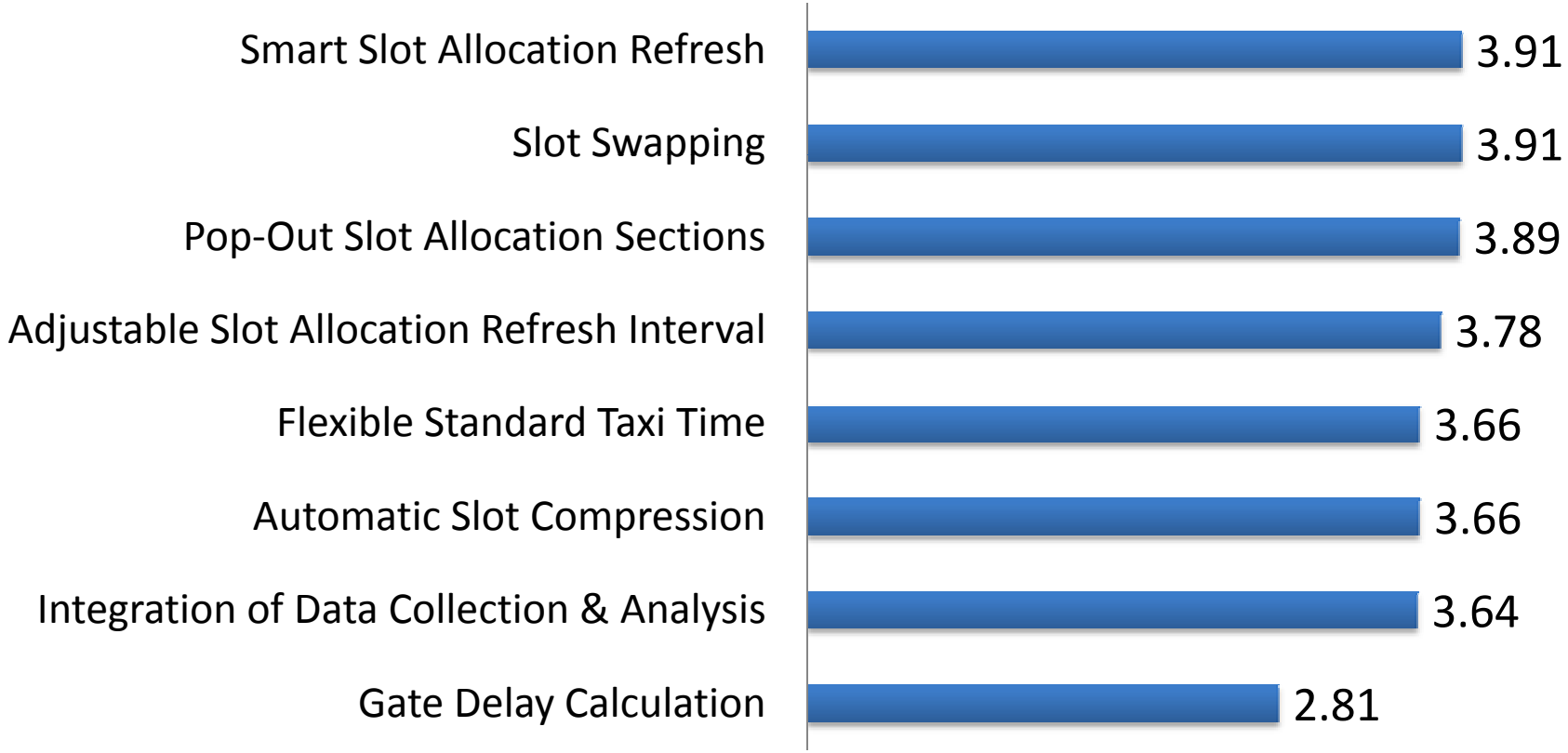
Q & A

Software Update

New Feature Popularity

Feature Request Popularity

(Higher score is more important)



New Feature Grouping

- **Group 1**
  - Slot Swapping
  - Automatic Slot Compression
- **Group 2**
  - Flight Plan and ATS Messages Processing
- **Group 3**
  - Slot Allocation Page Changes
  - Gate Delay Calculation
- **Group 4**
  - Integration of data collection and analysis
- **Group 5**
  - Flexible Taxi Time

Feature Group 1 (1)

- Slot Swapping: conditions
  - Both aircraft “controlled” by user performing swap
    - Allows Bangkok ATFMU to make cross-operator swap provided both airlines accept the swap proposal
  - In case that slot includes more than one waypoint (DI/PAVLO and DI/SITAX), EET difference between the two waypoints must be practical after change (see example)
  - New ETD and AWUT of the two aircraft must be practical for air traffic management purpose
    - Potential requirement that new ETD and AWUT must be at least some time (xx minute) after time of swap

Slot Swapping – Example

Before Swap at 1500UTC

C/S	AWUT	WP	FL	ETO
ABC1	1700	DI	350	2100
		PAVLO	350	2115
ABC2	1600	DI	350	2117
		PAVLO	350	2130

After Swap at 1500UTC

C/S	AWUT	WP	FL	ETO
ABC1	1715	DI	350	2117
		PAVLO	350	2130
ABC2	1545	DI	350	2100
		PAVLO	350	2115

Observations:

- ABC1 inherits both slots at DI and PAVLO from ABC2, but EET from AWUT to PAVLO follows that of the original slot:
  - *Old Slot:* 2115 – 1700 = 0415
  - *New Slot:* 2130 – 1715 = 0415
- EET to DI uses difference between ABC2's slot allocation, 13 minutes instead of 15 minutes from original slot in order to qualify for a swap:
  - ABC1 must be able to fly DI – SITAX in 13 minutes (from 0400 to 0402 from AWUT)
  - ABC2 must be able to fly DI – SITAX in 15 minutes (from 0517 to 0515 from AWUT)

Feature Group 1 (2)

- Automatic Slot Compression
  - Airline needs to select “Optimize my slot up to xx minutes before AWUT” on Slot Allocation details page for each aircraft
  - Timeout of xx minutes can be selected by airlines, but can be defaulted to a figure to be suggested by IATA RCG
  - Slot Compression would be processed on a first-Kabul-entry-first-served basis

Slot Compression – Example 1

Before ABC1 Slot Change

C/S	WP	FL	R-ETO	A-ETO	DLA
ABC1	ROSIE	350	2100	2100	0
ABC2*	ROSIE	350	2110	2115	5
ABC3*	ROSIE	350	2115	2130	15

After ABC1 Slot Change

C/S	WP	FL	R-ETO	A-ETO	DLA
ABC2*	ROSIE	350	2110	2110	0
ABC3*	ROSIE	350	2115	2125	10

Note:

- R-ETO denotes requested ETO from slot request
- A-ETO denotes allocated ETO from slot allocation
- DLA denotes delay from slot allocation
- "*" denotes aircraft requesting Automatic Slot Compression
- Both ABC2 and ABC3 request compression, change of ABC1 slot would automatically trigger compression, reducing delays

Slot Compression – Example 2

Before ABC1 Slot Change

C/S	WP	FL	R-ETO	A-ETO	DLA
ABC1	ROSIE	350	2100	2100	0
ABC2*	ROSIE	350	2110	2115	5
ABC3	ROSIE	350	2115	2130	15

After ABC1 Slot Change

C/S	WP	FL	R-ETO	A-ETO	DLA
ABC2*	ROSIE	350	2110	2110	0
ABC3	ROSIE	350	2115	2130	15

Note:

- R-ETO denotes requested ETO from slot request
- A-ETO denotes allocated ETO from slot allocation
- DLA denotes delay from slot allocation
- “*” denotes aircraft requesting Automatic Slot Compression
- ABC3 did not request compression, so slot was not changed

Slot Compression – Example 3

Before ABC1 Slot Change

C/S	WP	FL	R-ETO	A-ETO	DLA
ABC1	ROSIE	350	2100	2100	0
ABC2	ROSIE	350	2110	2115	5
ABC3*	ROSIE	350	2115	2130	15

After ABC1 Slot Change

C/S	WP	FL	R-ETO	A-ETO	DLA
ABC2	ROSIE	350	2110	2115	5
ABC3*	ROSIE	350	2115	2130	15

Note:

- R-ETO denotes requested ETO from slot request
- A-ETO denotes allocated ETO from slot allocation
- DLA denotes delay from slot allocation
- "*" denotes aircraft requesting Automatic Slot Compression
- While ABC3 requested compression, ABC2 did not; thus, ABC3's slot allocation cannot be compressed

Feature Group 2

- Flight Plan and ATS Message Processing
  - Processes Flight Plan and Departure messages into FIR Boundary Crossing times from departures to Kabul FIR entry time
  - FIR boundary crossing times can be used for monitoring and air traffic management purposes
  - FIR boundary crossing times will enable tactical phase Collaborative Decision Making process such as those at Bangkok Suvarnabhumi Airport
  - Can be implemented in phases:
    - Phase 1: initial implementation, no FPL correction
    - Phase 2: FPL correction capability

Feature Group 3

- Features
  - Smart Slot Allocation Refresh
  - Pop-Out Slot Allocation Sections
  - Adjustable Slot Allocation Refresh Interval
  - Gate Delay Calculation
- Changes are minor, mostly concern slot allocation pages

Feature Group 4

- Integration of Data Collection and Analysis
- Mostly concern ANSPs
- Can be delayed until other higher-impact changes are implemented

Feature Group 5

- Flexible Taxi Time
- Can be implemented in the form of “Minimum Taxi Time”
  - Provided by departure ANSP concerned
  - Airline has the ability to reduce “Standard Taxi Time” as long as it is above “Minimum Taxi Time”
  - Implementation depends on participation from departure ANSP in providing “Minimum Taxi Time”
- May need to be implemented in combination with Airport CDM of some form

Impact and Development Time

Feature Group	Expected Impact	Development Time
1	More flexible and responsive slot allocation mechanism	High
2	Higher chance of obtaining slot allocation Flight Levels	Medium
3	Lower slot allocation monitoring workload	Low
4	More visible comparison of slot allocation result and real traffic	Medium – High
5	More flexible off-block, taxiing and departures from major airports	Low - Medium

Initial IATA RCG Response

- Proposed Prioritization:
  - High Priority
    - **Group 2:** FPL and ATS Message Processing
    - **Group 5:** Flexible Taxi Time
  - Medium Priority
    - **Group 1:** Slot Swapping & Automatic Slot Compression
  - Low Priority
    - **Group 3:** Slot Allocation Page changes and gate delay calculations
    - **Group 4:** Integration of data collection and analysis

Actions by the Meeting

- Confirm Slot Swapping Requirements
  - Minimum time difference between latest new AWUT / ETD and time of slot swapping
- Confirm Automatic Slot Compression Requirements
  - Default no-compression timeout
- Confirm development priority order among five proposed feature groups

Q & A

CDM Plans for Suvarnabhumi Departures

Idea

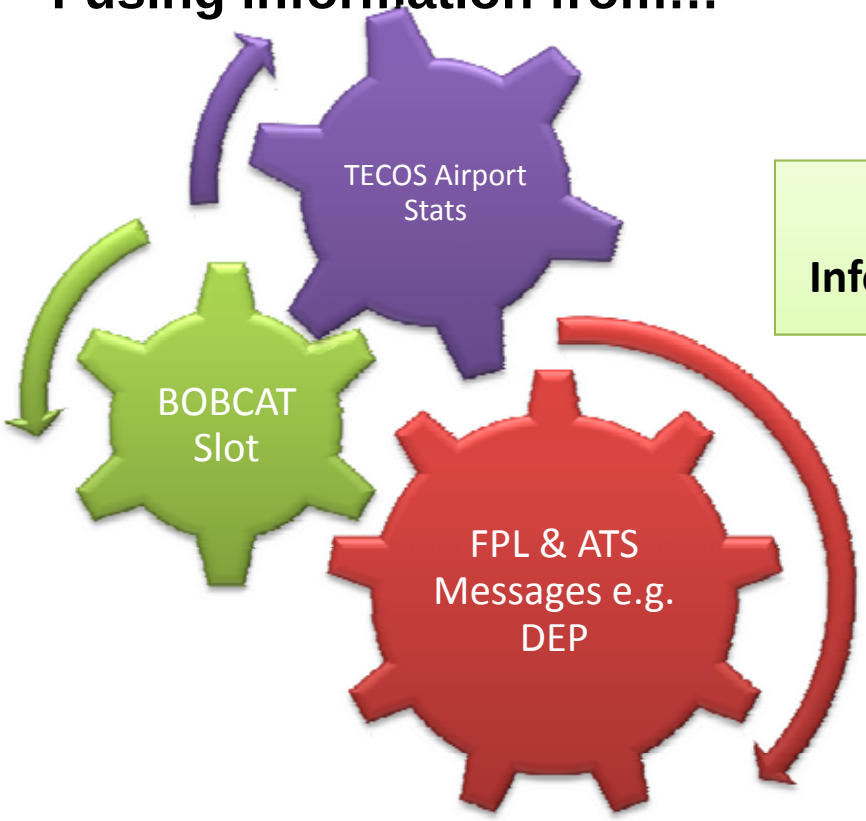
- Share departures planning information among Bangkok Suvarnabhumi Tower, Bangkok ACC and Bangkok ATFMU in accordance to CDM principle

- Use web-based technology to enable real-time data exchange

How?

…to enable CDM information sharing

Fusing information from…



Fused Information

Bangkok ATFMU

Web

Bangkok ACC

VTBS Tower

Goal

- Streamline planning of off-block time for BOBCAT departures from Suvarnabhumi Airport
- Streamline BOBCAT departures from Suvarnabhumi Airport
- Streamline planning of FL used for exiting the Bangkok FIR for BOBCAT departures
- **Trial Timeframe:** Q2 2011

What's Next & Actions Required

- Potential Changes after CDM plans in place
  - Provide facility for airlines to provide information such as "Departures Flexibility Window" (earliest and latest departure), which would still allow airlines to reach Kabul FIR in accordance to BOBCAT slot
  - Airlines may be provided with Target Take-Off Time (TTOT) Window to assist further planning
  - Trials may need to be run along with BOBCAT software changes when available
- Actions by the Meeting
  - Note development of Collaborative Departures Planner for Suvarnabhumi Airport
  - Advise airlines to be prepared to provide "Departures Flexibility Window"

Q & A