

Supporting
European
Aviation



Airport - Collaborative Decision Making Information sharing

Dave Booth

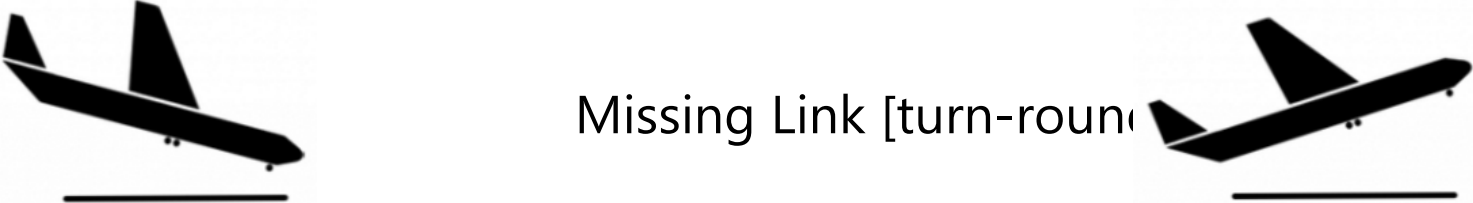
A-CDM Implementation Manager



NETWORK
MANAGER

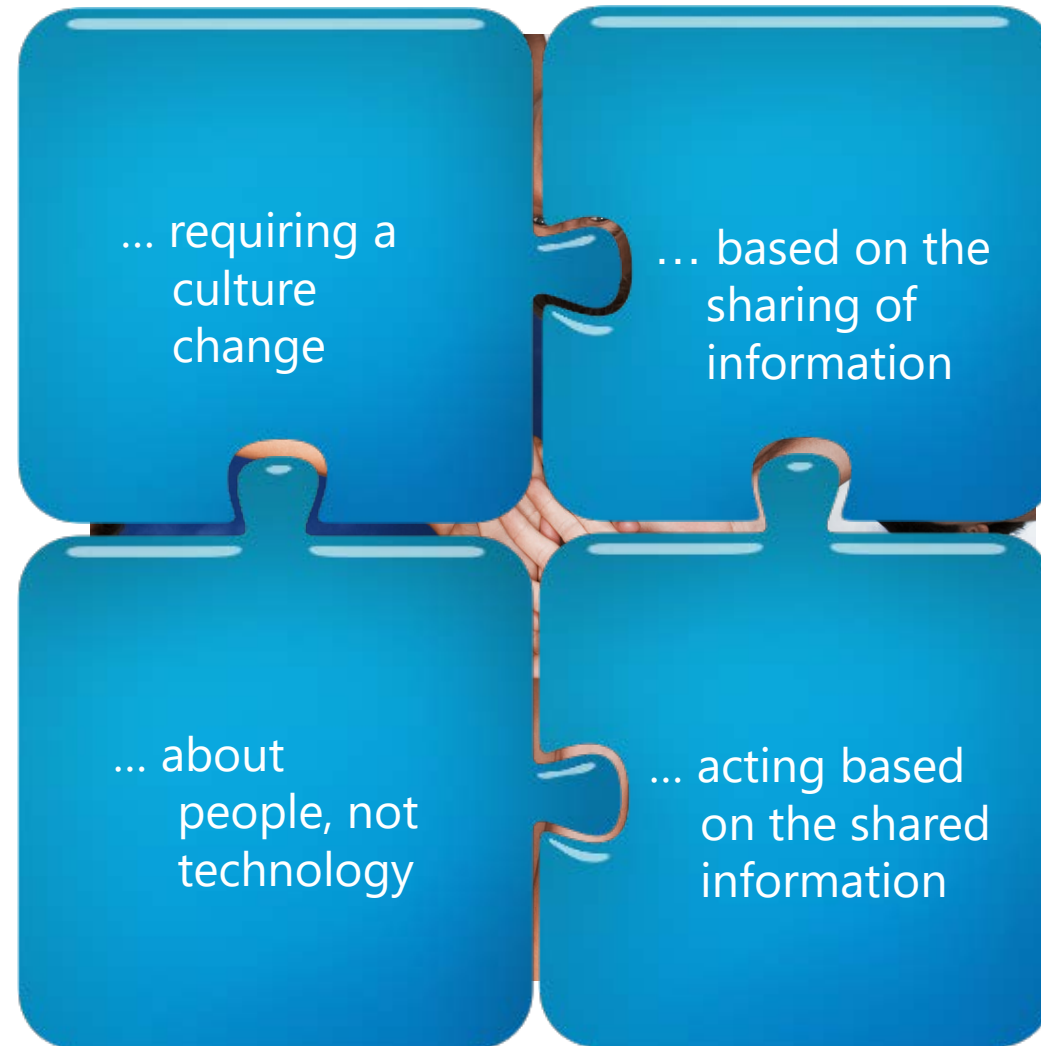


Challenges

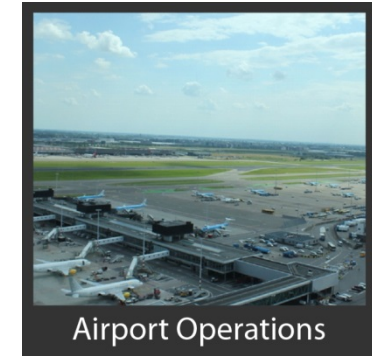
-  Missing Link [turn-around]
- No complete & common picture on the flight progress
- Partners are dealing with the flight independently from each other
- Conflicting decisions



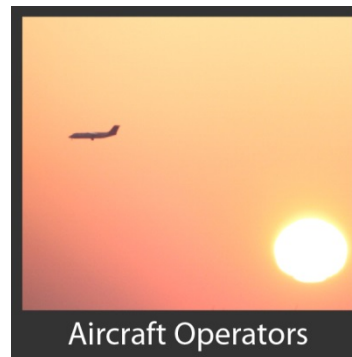
Airport-CDM is...



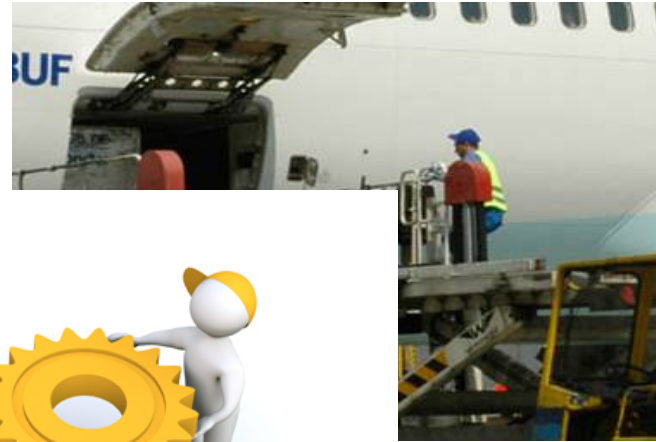
Airport CDM



- Improve predictability
- Reduce ground movement costs
- Optimise use of infrastructure & reduce congestion
- Reduce ATFM slot wastage
- Flexible pre-departure planning
- Reduce apron & taxiway congestion



Aim of A-CDM



A-CDM is about people working together, not technology!

A-CDM - Elements



Collaborative Management of Flight Updates

**Variable Taxi
Time
Calculation**

**Collaborative
Pre-Departure
Sequencing**

**CDM in
Adverse
Conditions**

Milestone Approach

Airport CDM Information Sharing

Information Sharing



Late arrival = late departure?

Foundation for Airport CDM



The **right** information



To the **right** people



At the **right** time

Information Sharing

If a realistic departure time is available...

SEPL-Dialog DFS North (FLP700)

Application Edit View Sort MDI

utc Runway Capacity CTOT Off

SUG On CAB Warning Off Line

NR	MAS	CSN	* TSAT	TOBT	▲CTOT	SID	MDI	E0BT
1	<	BAG82C	06:28	06:26*		GIV		06:30
2	<	GWI081	06:30	06:30		GIV		06:30
3	▲	DLH828	06:35	06:35*		GIV		06:35
4	-	SvR1121	06:40	06:40*		RID		06:40
5	▲	RUS1531	06:42	06:40		EVI	07:01	06:40
6	*	LGL9722	06:56	06:55		RID		06:55
7	>	DLH1372	06:55	06:55		RID		06:55
8	+	DLH040	07:01	07:00*		MIQ		07:00
9	*	DLH9EH	07:03	07:03		ANK		07:00
10	+	DLH6UX	07:10	07:05*		MIQ		07:05
11	+	DLH1YK	07:05	07:05*		MIQ		07:05
12	+	LTU414	07:12	07:10*	07:40	GIV		07:00
13	+	DLH8UJ	07:15	07:10*		MIQ		07:10
14		DLH362	07:14	07:10*		MIQ		07:10
15	+	DLH9JX		07:15*		GIV		07:15
16		DLH7AJ		07:15*		GIV		07:15
17		DAT56V		07:20*		GIV		07:20
18	+	DLH55P				GIV		07:05
19	+	DLH2JC				ANK		07:05
20		DLH8PP				GIV		07:15
21	+	DLH4KJ				ANK		07:05
22	+	DLH967				GIV		07:20
23		DLH8FF				GIV		07:20
24		DLH9TK				GIV		07:20
25		DLH7PL				MIQ		07:20

+ DLH6UX -DACHF -LH : 10 (RMT) =10 (TXT) +0 (RDY) +0 (DCT)
CAP: 30 POS: 326E SID: MIQ6N

08:30 GWI081 : CAB expired!



...the information should be shared!

Information Sharing

If an accurate take off
time can be estimated...



...the network can benefit from it!

Requirement for Information Sharing

Airport Operator

- Airport slot data
- Stand & gate allocation
- Special events
- Reduction in airport capacity

ATC

- Real-time updates of LDG
- Taxi times & SIDs
- Runway operational capacity
- A-SMGCS data/radar information

Other service providers

- De-icing companies (de-icing times)
- Met office (met info)

Network Operations

- Flight plan data
- ATFM departure slots
- Arrival information (Flight Status/ELDT)

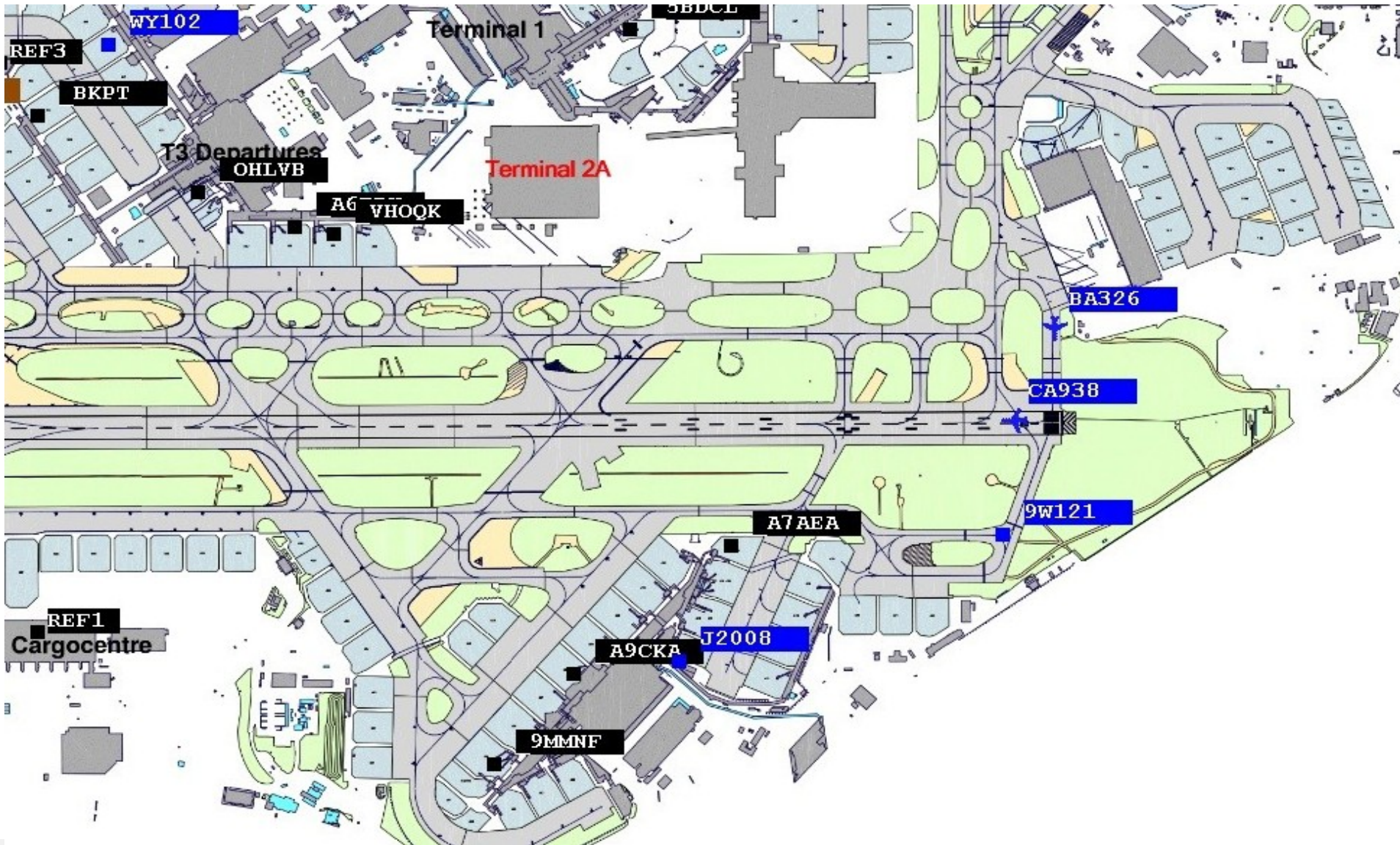
AO/GH

- Flight plans
- Turn-round times
- Priority of flights
- Aircraft registration
- Aircraft movement data



Single Platform

Information Sharing - example



Information Sharing – LHR example

Home **Departures** Turn-round

Auto-Refresh Off Last Updated: 31/3/2016 11:55:25 UTC

Filters

Save Filter Carriers Terminals Has Alert Hide CX & DV
 Flights Handlers End Status Time **Current** Hide Off-Block Hide Airborne

Alert	Flt	Call Sign	Reg	Typ	Std	Status	SOBT	EOBT	TOBT	Strt Req	TSAT [▲]	AOBT	TOT	Rwy	Lnk Flt	Dest	SID
	BA1342	SHT20B	GEUPW	A319	508	Taxied	11:45	11:45	11:40 D	▼	11:45	11:47	12:12 T	27R	BA977	LBA	WOBUN3F
	BA9171E	BAW9171	GBNWM	B763	568	Taxied	11:30	11:30	11:40 D	▼	11:49	11:49	12:20 T	27R	BA228	CWL	CPT3F
	BA434	BAW2JA	GEUPH	A319	511	Taxied	10:50	11:50	11:50 D	▼	11:50	11:50	12:14 T	27R	BA919	AMS	BPK7F
	BA816	BAW816	OYJTT	B737	531	Taxied	11:55	11:55	11:55 D	▼	11:55	11:54	12:24 T	27R	BA1479	CPH	BPK7F
	BA766	BAW766	GEUOF	A319	527	Taxied	11:55	11:55	11:55 D	▼	11:55	11:57	12:34 T	27R	BA949	OSL	BPK7F
	BA1416	SHT86Y	GEUUK	A320	505	Taxied	11:55	11:55	11:55 D	▼	11:55	11:55	12:24 T	27R	BA1477	BHD	WOBUN3F
011	BA874	BAW874	GEUUS	A320	351	Gate Closed	11:50	11:50	11:55 D	3	12:00		12:21 T	27R	BA799	BUD	BPK7F
008	BA510	IBE31YC	ECJDM	A321	517	Start Req	10:35	11:13	11:55 D	▼	12:00		12:26 C	27R	IB3160	MAD	MID4F
	ME202	MEA202	T7MRE	A320	329	Taxied	12:00	12:00	12:00 E	▼	12:00	11:58	12:20 C	27R	ME201	BEY	DET2F
	DL029	DAL29	N831MH	B764	412	Start Req	11:50	11:50	11:45 D	▼	12:02		12:21 T	27R	DL018	ATL	CPT3F
	BA632	BAW82GR	GBNWX	B763	556	Start Req	11:55	11:55	11:55 D	▼	12:04		12:32 C	27R	BA903	ATH	DET2F
011	AA081	AAL81	N759AN	B772	305	Gate Closed	11:50	11:50	11:55 D	3	12:04		12:27 T	27R	AA104	DFW	CPT3F
	V5005	VIR5C	GVWKD	A346	317	Start Req	12:00	12:00	11:55 D	▼	12:05		12:27 T	27R	V5010	MIA	CPT3F
	BA169	BAW169	GYMML	B772	535	Gate Closed	12:05	12:05	12:05 D		12:05		12:31 T	27R	BA114	PVG	BPK7F
	AC865	ACA865	CGFAH	A333	141	Gate Closed	12:00	12:00	12:00 E	-2	12:05		12:31 T	27R	AC864	YUL	CPT3F
	AA087	AAL87	N784AN	B772	365	Gate Closed	11:25	12:10	12:00 D	-2	12:07		12:33 T	27R	AA078	ORD	CPT3F
	BA984	BAW984G	GEUXE	A321	532	Gate Closed	12:00	12:00	12:00 D	-2	12:09		12:37 T	27R	BA431	TXL	BPK7F
	QF010	QFA10	VHOQB	A388	301	Gate Closed	12:05	12:05	12:05 E		12:11		12:37 C	27R	QF001	DXB	DET2F
	AC851	ACA851	CGHQY	B788	233	Gate Closed	12:05	12:05	12:05 E		12:14		12:41 T	27R	AC850	YYC	CPT3F
	V5011	VIR11B	GVEIL	A346	322	Start Req	12:05	12:05	12:00 D	▼	12:14		12:38 T	27R	V5012	BOS	CPT3F
	LO282	LOT282	SPLRE	B788	218	Gate Closed	09:15	12:00	12:05 D		12:15		12:42 T	27R	LO281	WAW	BPK7F
	BA035	BAW35	GZBJH	B788	545	Last Call	12:10	12:10	12:10 D		12:15		12:41 C	27R	BA188	MAA	DET2F
	BA177	BAW04A	GCIVV	B744	542	Last Call	12:10	12:10	12:10 D		12:19		12:44 T	27R	BA262	JFK	CPT3F
	BA081	BAW81	GCIVA	B744	303	Last Call	12:20	12:20	12:20 D		12:20		12:50 C		BA054	ACC	GOGSI
	FI451	ICE451	TFISZ	B752	241	Last Call	12:10	12:10	12:10 E		12:21		12:43 T	27R	FI450	KEF	WOBUN3F

Rows: 26-50

Information Sharing – CDG example



LISTE DES VOLS DÉPARTS

Pre departure sequence août 22 2013 - 09:30 UTC - 11:30LT

Listed : 166 Sequenced with Flight Plan : 166 Ready for departure : 16 On Taxi : 21

Short List +03:00 Long List -00:05 to 18:00 [Add Column](#) Show cancelled

Period Listed from 08/22/2013 at 09:25 to 08/22/2013 at 12:30 Period displayed : [] to [] [Display period](#) [Reset](#)

Page 1 of 2 (166 items) [1] [2] [3]

AO	Flight No	CallSign	Dest	SOBT	TOBT	CTOT	TSAT	AOBT	Stand Area	Term	Rw	Status	Milestone	Detail
AF	368	AFR368	CCS	08/22/2013 08:45	08:55	---	08:55	08:57	F	2F	S	Sequenced Plan	TAKEOFF	Detail
AF	012	AFR012	JFK	08/22/2013 08:35	09:11	---	09:05	09:08	K	2E	N	Sequenced Plan	TAKEOFF	Detail
SK	566	SAS566	CPH	08/22/2013 09:05	---	---	09:05	09:17	W	1	N	Sequenced Plan	TAKEOFF	Detail
AF	1224	AFR715U	LIS	08/22/2013 09:00	08:58	---	09:09	09:04	F	2F	S	Sequenced Plan	TAKEOFF	Detail
UA	986	UAL986	ORD	08/22/2013 09:15	---	---	09:15	09:13	Z	1	N	Sequenced Plan	TAKEOFF	Detail
AF	514	AFR514	ABV	08/22/2013 09:10	09:30	---	09:30	---	K	2E	S	Alert NOCLR	HOLDSTA...	Detail
BR	088	EVA88	TPE	08/22/2013 09:20	09:30	---	09:30	---	Y	1	N	Alert NOCLR	HOLDSTA...	Detail
TN	907	THY907	LAX	08/22/2013 09:30	---	---	09:30	---	M	2A	N	Sequenced Plan	OKSTART	Detail
FPO	255R	FPO255R	KUF	08/22/2013 09:30	---	---	09:30	---	P	T3	N	Sequenced Plan	OKSTART	Detail
TS	357	TSC357	YYZ	08/22/2013 09:30	---	---	09:30	---	Q	T3	N	Sequenced Plan	OKSTART	Detail
NO	8917	NOS8917	VRN	08/22/2013 08:20	09:30	---	09:30	09:21	Q	T3	S	Sequenced Plan	OFFBLOCK	Detail
QR	022	QTR022	DOH	08/22/2013 09:20	---	09:49	09:30	09:29	V	1	N	Sequenced Plan	OFFBLOCK	Detail
QC	101	CRC101	NSI	08/22/2013 09:20	---	---	09:31	---	R	1	S	Sequenced Plan	OKSTART	Detail
EY	032	ETD032	AUH	08/22/2013 09:20	---	09:44	09:35	---	A	2A	S	Sequenced Plan	OKSTART	Detail

PDS MODE

Flight Log Flight Msg Flight Alert

Data Alert

AF368 **AFR368**

Date : 08/22/2013

Aircraft type : 343

Registration : FGL23

Stand : F15

QFU : 08L

EXOT : 00:12

Holding Time : 00:03

TTOT : 09:30

CFMU Taxitime: 00:00

SID : LGL3H

PDS Delay : 00:00:00

Last Alert : ----- --:--

Last DPI : A_DPI

TTOT DPI: 08:58

TTOTsh : 09:12

TTOTsh : -N/A-

Arrival

Flight No : AF697

From : MSP

SEBT : 09:25

EIBT : 09:05

ALDT : 08:58

AIBT : 09:11

[PDS](#) [PDS](#) [PDS](#)

Requirements A-CDM ISP HMI



Ciss Staffpages (Operational)

COMBINED ARRIVALS AND DEPARTURES

FLT-A	STA	LDT	IBT	ACREG	FLT-D	STD	TOBT	TSAT	TOT
JT7417	0720	0719 A	0730 A	B2440	JT7404	0935	0933 I	0935 I	0948 E
NW0067R	1040	1050 E	1057 E	N810NW	NW0067	1040	1038 I	1046 E	1108 E
SK2551	0945	0940 A	0947 A	LNROU	SK552	1025	1023 I	1057 A	1111 A
KL0562	0540	0450 A	0503 A	PHAOI	KL0561	1050	1048 I	1057 A	1112 E
KL0612	0715	0613 A	0625 A	PHBFH	KL0611	1035	1033 I	1058 A	1115 E
FV0277	0940	0936 A	0941 A	EICDG	FV0278	1040	1038 I	1058 A	1118 E
AF1340	0920	0900 A	0904 A	FGRXF	AF1341	1105	1103 I	1059 A	1120 E
				PHKZG	KL7313	0900	0858 I	1102 A	1112 A
KL0810	0530	0524 A	0536 A	PHBFY	KL0661	1010	1008 I	1104 A	1116 E
				PHBQB	KL0605	1110	1108 I	1108 A	1128 E
KL0872	0545	0539 A	0551 A	PHBFN	KL0871	1105	1103 I	1109 A	1127 E
SQ324	0645	0648 A	0701 A	9VSVI	SQ323	1115	1113 I	1124 E	1143 E
SU229	1040	1014 A	1024 A	VPBQX	SU230	1135	1133 I	1151 E	1208 E
AY841	0945	0949 A	0954 A	OHLXD	AY842	1155	1153 I	1158 E	1215 E
MH0016	0555	0610 A	0622 A	9MMPJ	MH0017	1200	1158 I	1158 E	1215 E
KF831	1115	1125 E	1130 E	OHSAL	KF832	1155	1153 I	1207 E	1224 E
KL1224	1105	1107 A	1112 A	PHBDP	KL1113	1220	1218 I	1218 E	1235 E
AZ108	1155	1129 E	1133 E	IBIMF	AZ109	1245	1243 I	1245 I	1257 E
NW0060	1100	1012 A	1018 A	N545US	NW0035	1245	1243 I	1245 I	1301 E
RJ151	1155	1220 E	1227 E	JYAYI	RJ152	1240	1238 I	1246 E	1258 E
KL1126	1130	1131 E	1133 E	PHJCT	KL1327	1255	1253 I	1255 I	1307 E
GTI812	1255	1248 E	1255 I	N499MC	GTI931	1300	1258 I	1300 I	1313 E

11:14 30-01-08 woensdag Connected 310 Page: 310

Clearly link arrivals & departures

Avoid information overload

Create consistent look and feel

Avoid extra display

Tailor to each partner's needs

Airport database: the best platform to store, process and share Airport CDM information

Exercise

- Explain the following term

EOBT

- What are the rules for updating this information?
- What does the NMOC use EOBT for?

Estimated off-block time. The estimated time at which the aircraft will commence movement associated with departure.

Field 13 of the ICAO FPL

Definitions

- **Target Off-Block Time (TOBT):**

The time that an **Aircraft Operator** or **Ground Handler** estimates that an aircraft will be ready to be released, boarding bridge removed, push back vehicle removed and ready to start up / push back immediately upon receiving clearance from the Tower

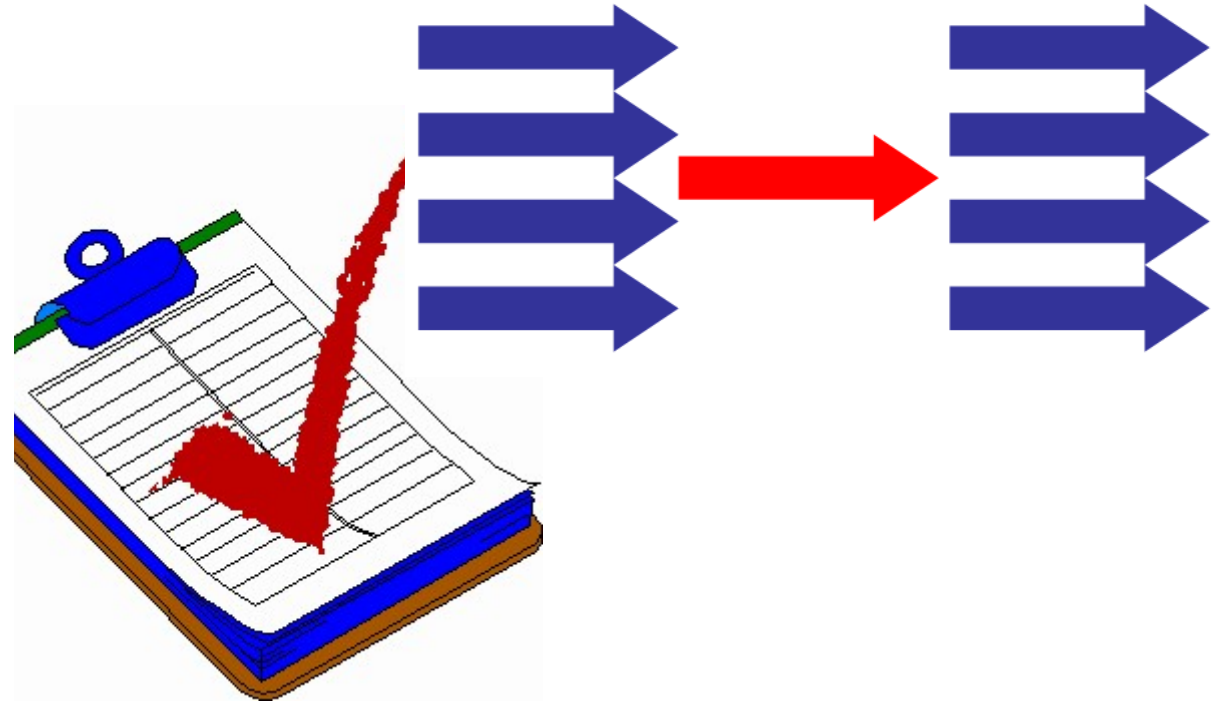
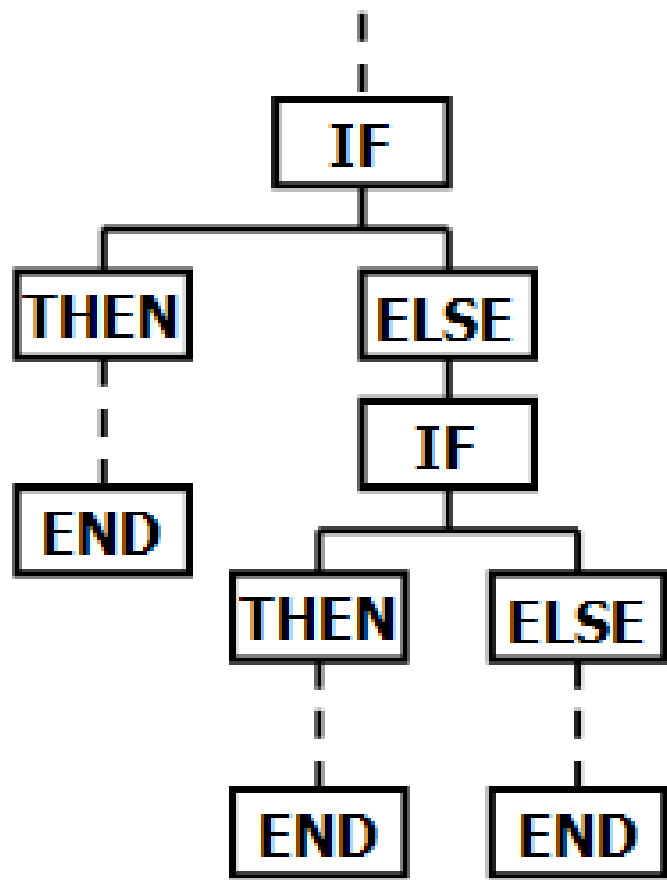


- **Target Start Up Approval Time (TSAT):**

The time provided by ATC taking into account TOBT, CTOT and / or the traffic situation that an aircraft can expect start up / push back approval



Airport CDM Generic Processes and Alerts



Why do we need processes?

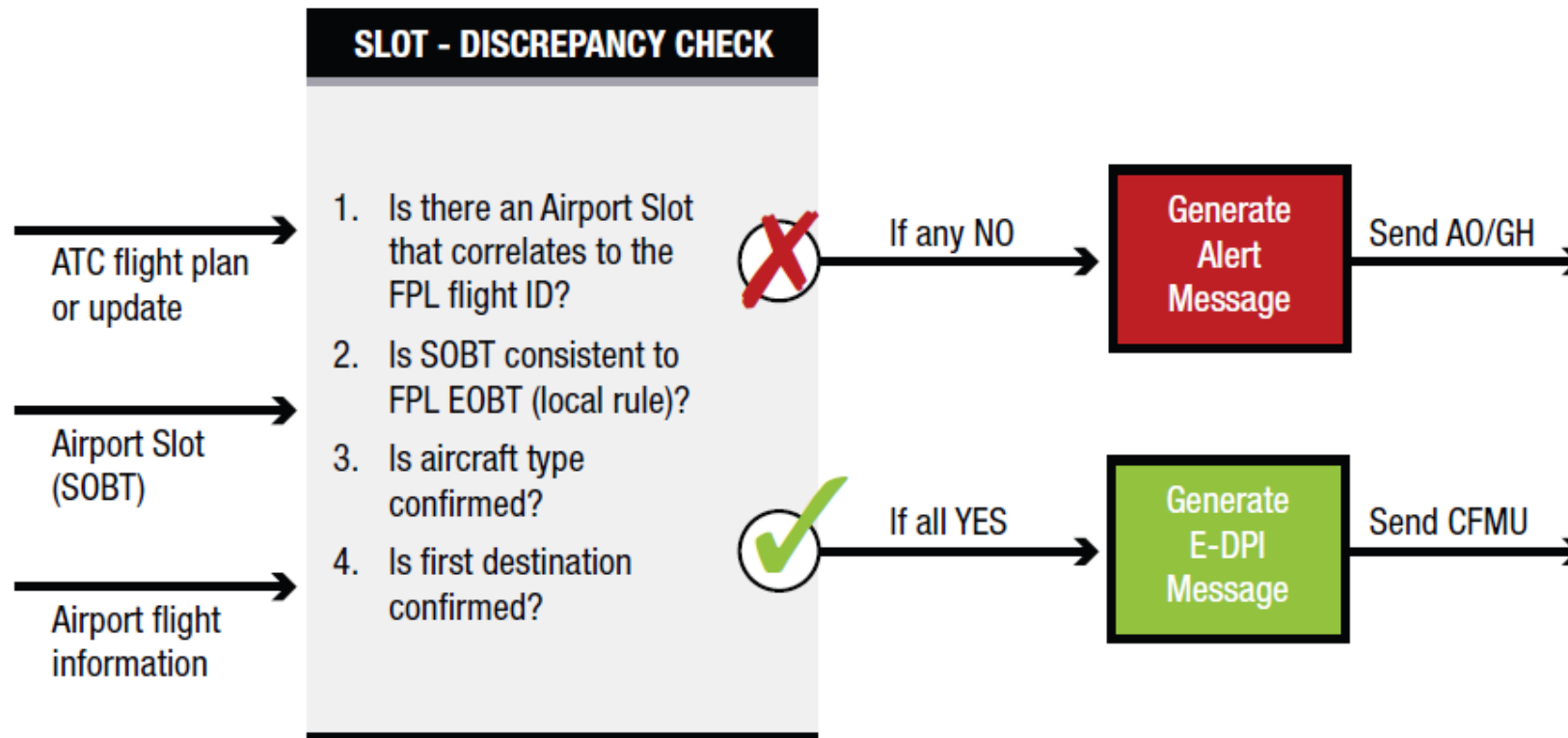


Generic Processes and Output

- **Processes** are time information checks related to Milestone **events**
- **Alerts** are outcome of the processes, and trigger **actions** in case inconsistencies are detected
- **DPI messages** are an outcome of the processes and **inform ATFM** on predicted take-off time

Airport CDM Generic Procedures and Alerts

- **Example:** Milestone 1 process (ATC FPL activated)



Airport CDM Generic Procedures and Alerts

- **Example:**
- **Airport CDM Alert Message – SOBT vs. EOBT Discrepancy (CDM01)**



FLT ID/CDM02/Timestamp

ATC Flight Plan EOBT is not consistent with Airport Slot SOBT. Immediate update of Airport Slot or ATC Flight Plan EOBT needed.

Note: The Airport CDM process will be suspended until reception of your rectification.



Airport CDM Generic Procedures and Alerts

ID	Code	Description	Link with Network Management Operations DPI Error Reply Messages*	Applicable on Milestone Process
1.	CDM01	No Airport Slot Available, or Slot already correlated	N/A	1

Codes	Group Description
1-14	Existing allocated codes (basic + 7a, 11a, 12a)
15-29	Flight phase (Departure, Arrival, Diversion, etc.)
30-39	Stand and Gate Management
40-49	De-icing
50+	Local airport codes

10.	CDM10	TOBT Rejected or Deleted	N/A	9-14
11.	CDM11	Flight not Compliant with TOBT/TSAT	N/A	12-13
12.	CDM12	TSAT not respected by ATC	N/A	13
13.	CDM13	No ATC Flight Plan Available	Not existing flight	1-14
14.	CDM14	Automatic TOBT Generation not Possible	N/A	4-9

Information Sharing

- **Benefits**
- **Bringing Partners together**
 - → Promotes trust
- **Common situational awareness**
 - → Enables monitoring of operations
 - → Optimises the use of resources
- **Improved predictability**
 - → Improves runway planning
 - → Maximises operational efficiency



Information Sharing

- **Key messages**
- **Information sharing** through a transparent platform
- **Link** arrivals, turn-round and departures
- **Monitor progress** of a flight using adapted procedures and alerts – linked to Milestones
- **Target times:**
 - **TOBT** = flight ready to leave the block
 - **TSAT** = flight authorised to move by ATC



Thank you



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