

A-CDM: boosting the airport turnaround process *“The Roissy CDG experience”*

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THALES



Content of the presentation

- ❑ Brief overview of Roissy CDG Airport (5mn)
- ❑ CDM Programme organisation and activities (10mn)
- ❑ CDM Tools and process (10mn)
- ❑ Benefits (5mn)
- ❑ THALES innovative approach (5mn)

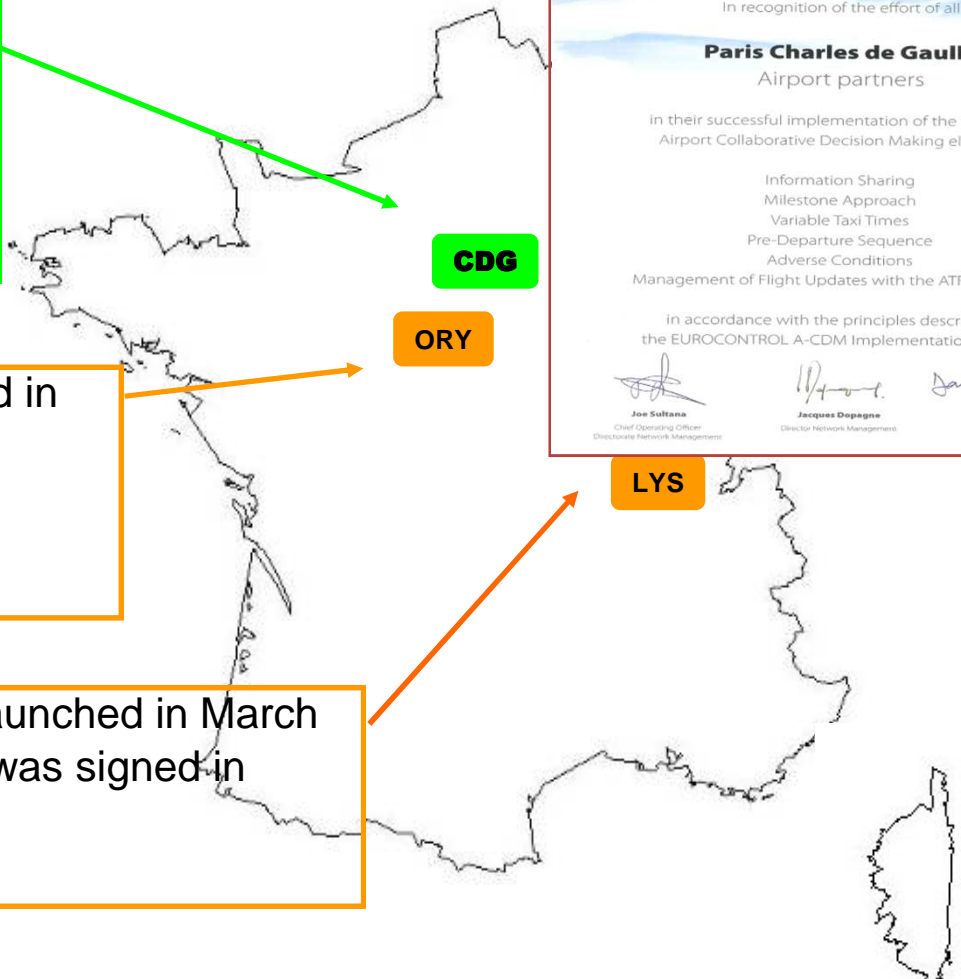
A-CDM Implementation Status in France



CDG: A-CDM in 2010
Phase 2 in progress (De-icing functions will be integrated in C-PDS)
UDPP (User Driven Prioritisation Process) ongoing concept

ORY: Programme has been launched in November 2011
Draft preliminary in progress
Objective: A-CDM in 2014

LYON: Programme has been launched in March 2011: MoU with ADL and AO's was signed in October
Objective: A-CDM in 2014



Courtesy of CDM@CDG



Roissy Charles de Gaulle

- Surface area :3200 ha
- 4 RWYs : East / West
- 80 km Taxiways
- 8 ILS CAT 3

Statistics:

- ≈ 525 000 ops (ARR/DEP)
- APP: ≈ 606 000 ops (with Le Bourget)
- Peak day: 1773 ops / 2091 ops (App)
- Peak hour: 120 ops
- Capacity: ARR 69 / DEP 75

Weather conditions:

Low Visibility Procedures (LVP)
less than 4% of time

Snowy days (winter 2010/11: 25
days continuously)

Courtesy of CDM@CDG

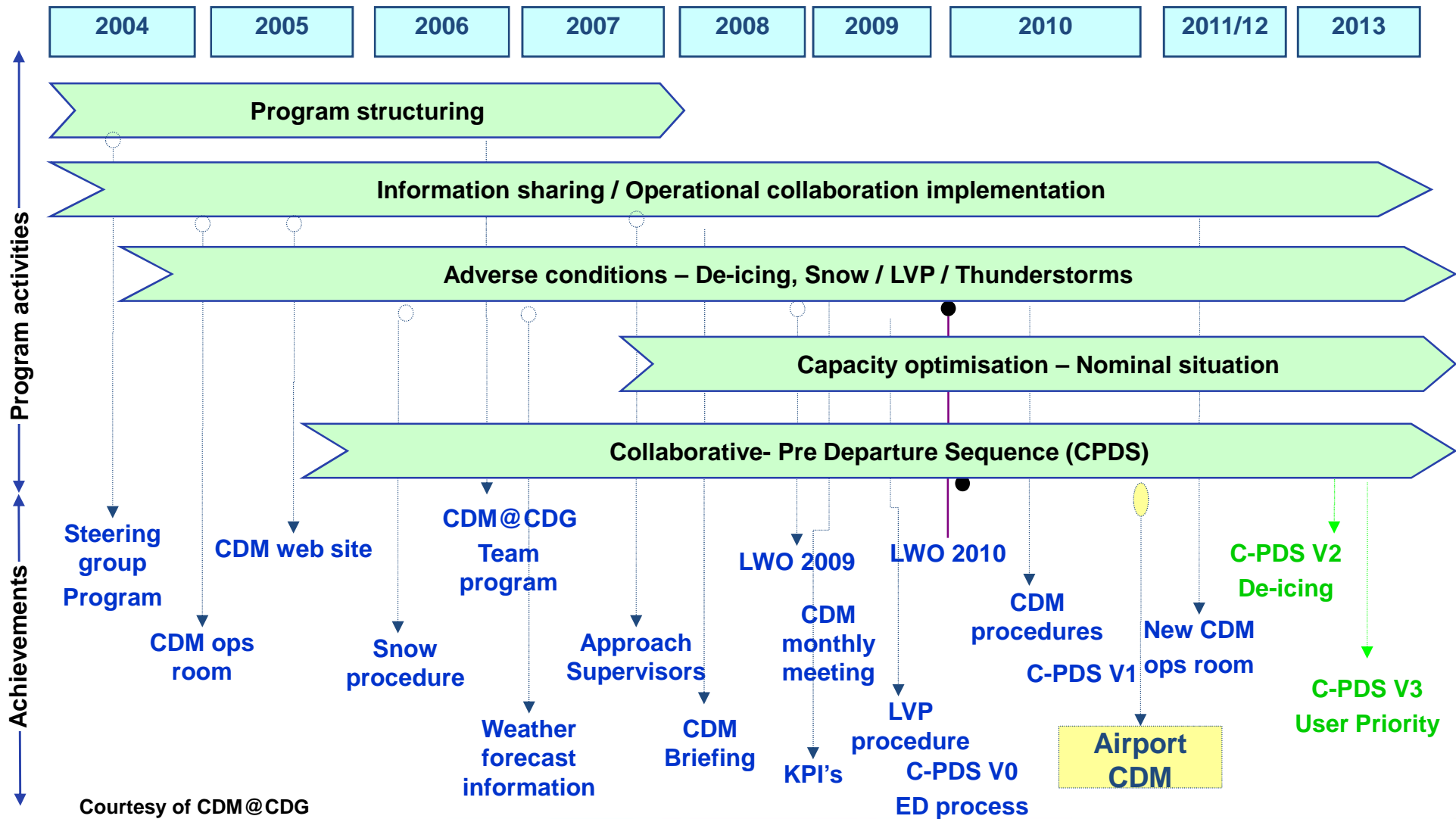


Organisation and stakeholders



Courtesy of CDM@CDG

CDM Programme activities



Courtesy of CDM@CDG

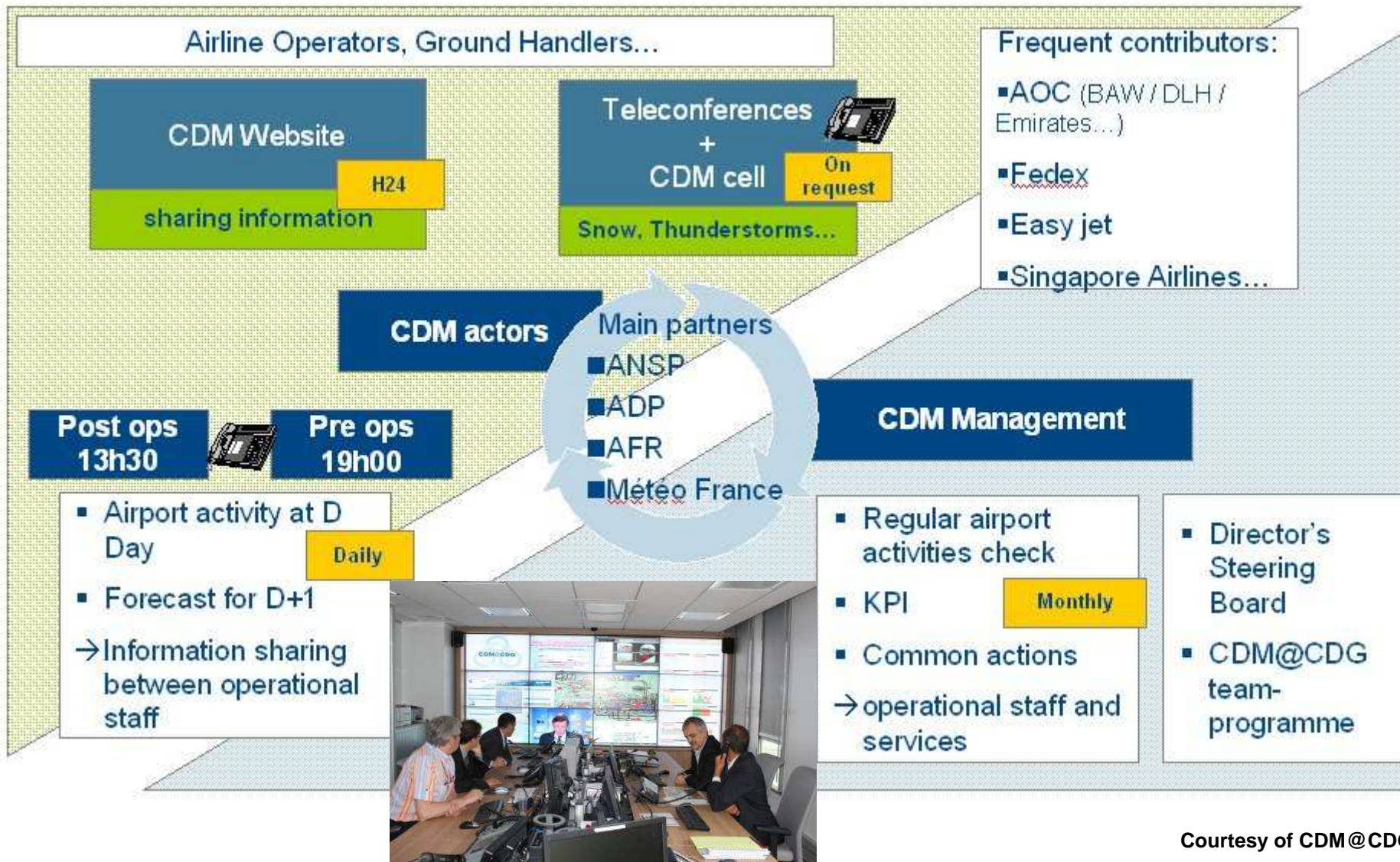


Roissy CDM experience

C-PDS Process

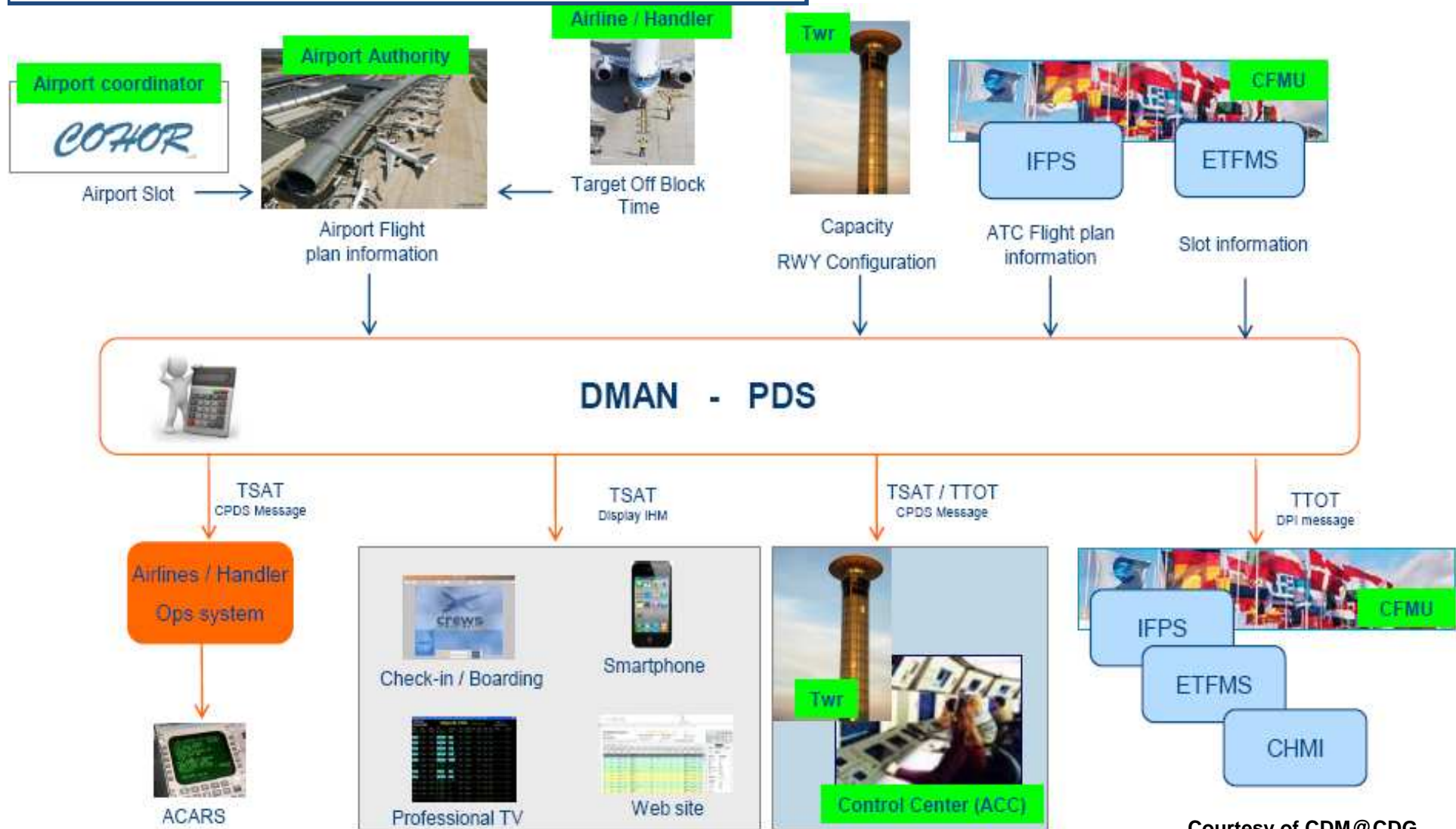


Information sharing process



Courtesy of CDM@CDG

C-PDS connexion



Courtesy of CDM@CDG

C-PDS process



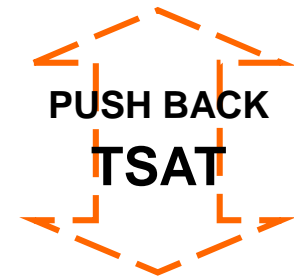
Airlines
Handlers



TWR supervisor



DMAN



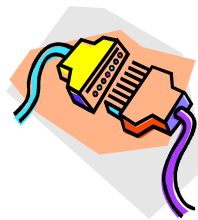
PDS Airport Operator (ADP)



ATC
data



Slot
Coordinator

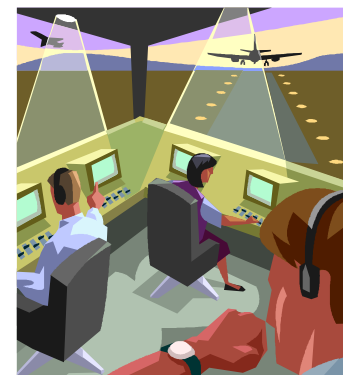


DELIVERY POSITION



DMAN

APRON or GROUND POSITION



DNM / CFMU

Courtesy of CDM@CDG

Roissy CDM experience

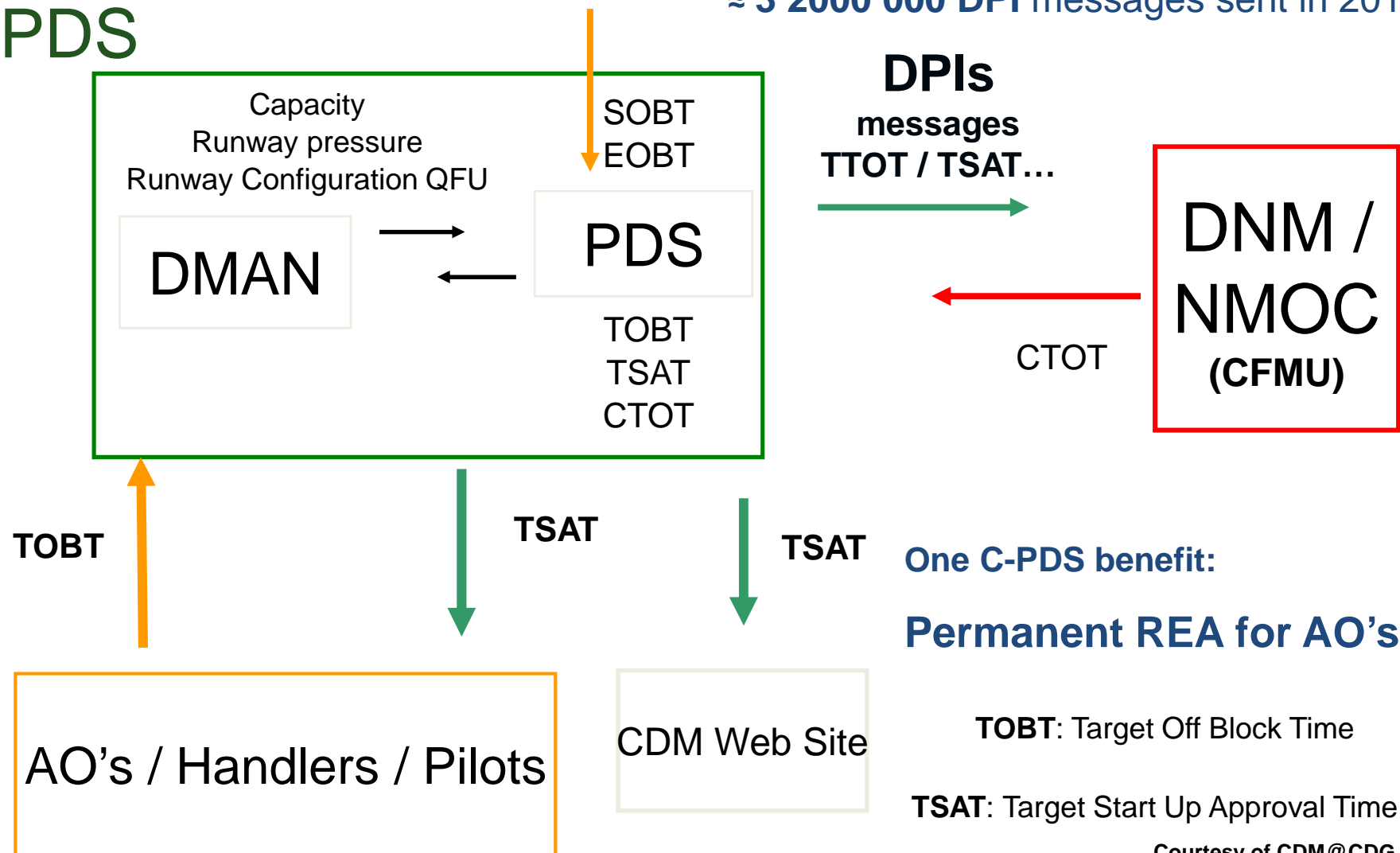
C-PDS Tools: PDS and DMAN



C-PDS Overview

C-PDS

≈ 3 2000 000 DPI messages sent in 2011



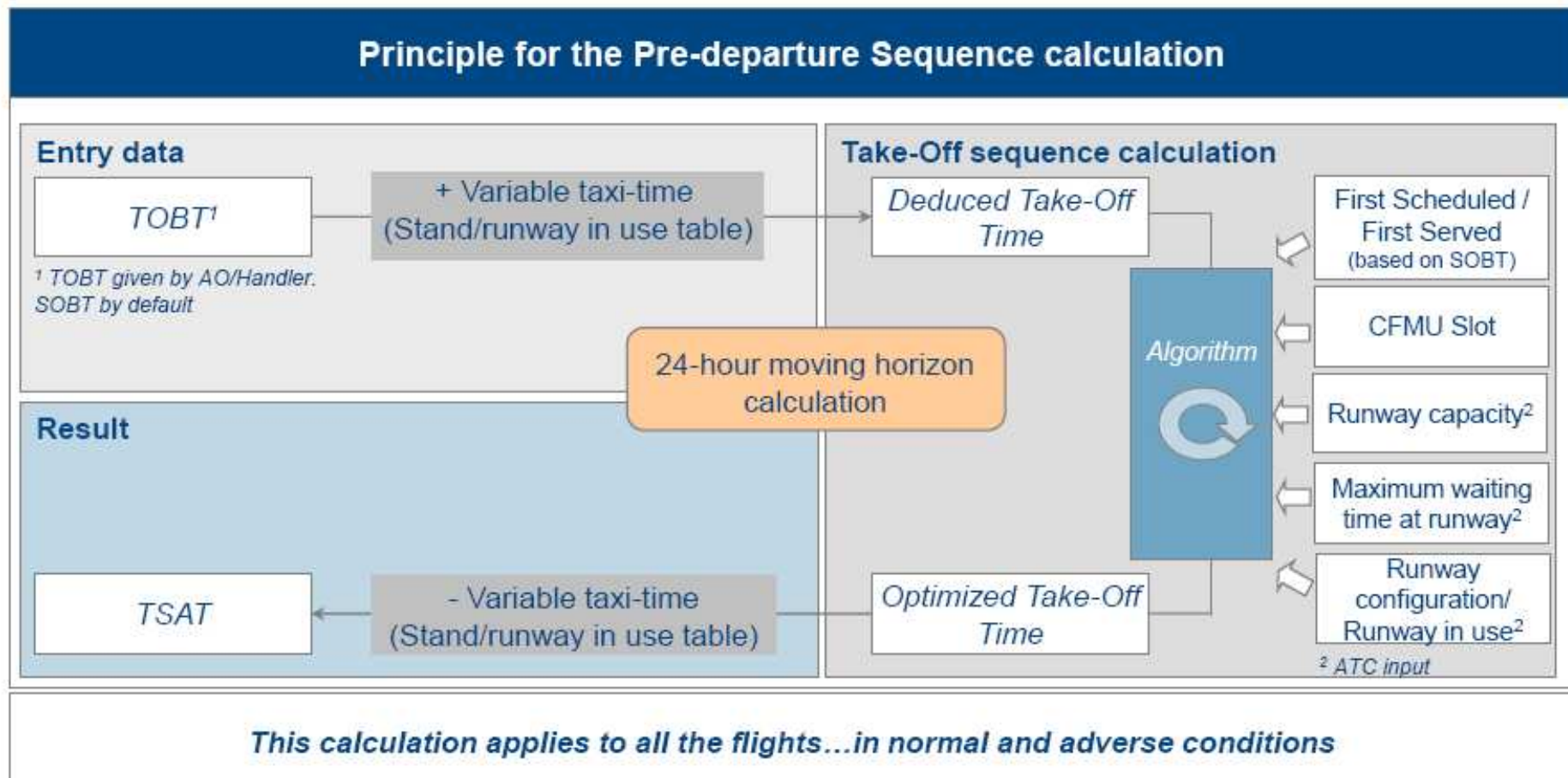
One C-PDS benefit:
Permanent REA for AO's

TOBT: Target Off Block Time

TSAT: Target Start Up Approval Time

Courtesy of CDM@CDG

C-PDS: TSAT calculation



The Pre-departure Sequence calculation is based on Off-Block Time calculation taking into account airport, aircraft operators and DNM constraints

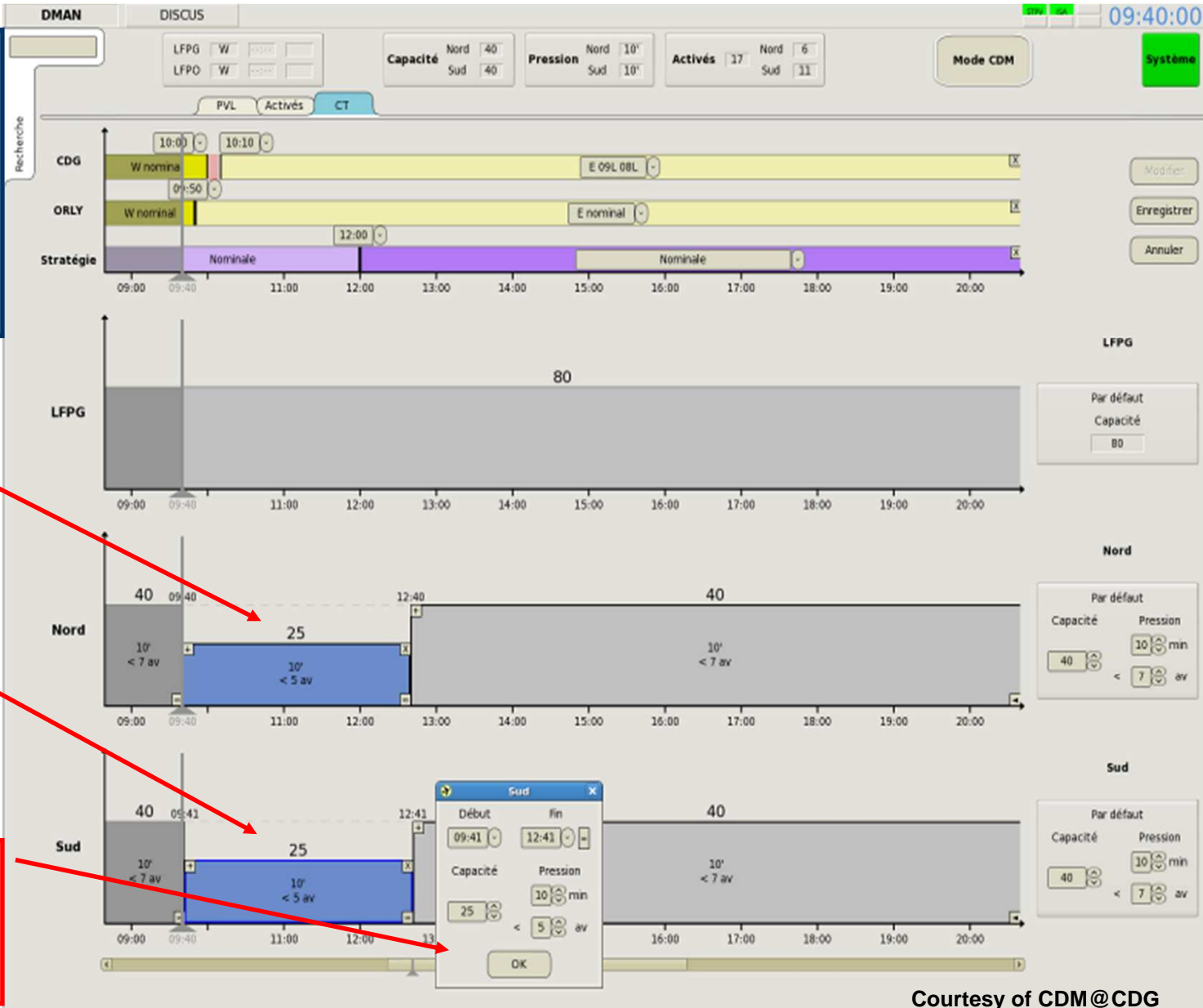
Courtesy of CDM@CDG

DMAN supervisor HMI

North
RWY
capacity

South
RWY
capacity

Pressure and
Capacity
configuration
window



Courtesy of CDM@CDG

DHMI Discus 09:40:17

Capacité Nord 30 Sud 30 Pression Nord 5' Sud 5' Activés 6 Nord 2 Sud 4

PVL Activés

Recherche

41 Eveillés 21 Nord 20 Sud 3 En attente 2 Nord 1 Sud

CTM0001	EBBR NIPOR	EXEM	BMI30A	EGNX OPALE	09:57E
AFR999A	LEBL ERIXU	09:34	BCY132L	EGBB OPALE	09:56
AFR1300	LEMD AGOPA	09:44E	AFR1426	LIPZ LANVI	10:53
AFR195D	DAAG ERIXU	09:40	BEE1252	EGHI OPALE	09:58
SMX5997	LIML LANVI	09:40	AFR5960	LEBB LGL	10:00
BCY5032	ESGG NURMO	09:53	BZ707NS	LFRN LGL	10:00
AFR1450	EKCH NURMO	09:47	BEE1502	EGTE EVX	10:05
TSC187	CYUL ATREX	10:00	COA57	KEWR ATREX	10:13
KLM1228	EHAM NURMO	09:44	SWR633	LSZH BUBLI	10:18
IYE749	OYSN OKASI	09:45	BLE546P	LFLC MONOT	10:04
BEE7032	EGBB OPALE	09:50	AFR2698	ULLI NURMO	10:05
AFR1606	EDDL NIPOR	09:48	AAL45	KJFK EVX	10:06
AFR1254	LDZA LANVI	09:49	RAE518	EDDN NIPOR	10:08E
BAW305	EGLL OPALE	09:50	AFR184L	LSGG PILUL	10:06
RAE494	EDDV NIPOR	09:50	CSA759	LKPR NIPOR	10:11
AFR5572	LEVX LGL	09:51	AFR1590	LTBA LANVI	10:10
AFR618K	EDDF NIPOR	09:55	BCY5040	EIDW OKASI	10:10

2 Alertes LDAS

AF736HF AFR1532

DMAN Delivery HMI

This view is available on the delivery controller position and apron management position

Courtesy of CDM@CDG

Pre departure sequence

mai 01 2011 - 16:13 UTC - 18:13LT

Listed : 163

Sequenced with Flight Plan : 171 Ready for departure : 12 On Taxi : 10

Add Column

Alert / State

Capacity / Pressure

Flight information

PDS
HMI

Flight identification

Time information

Commercial ID
Airline/Airport

ATC ID

TSAT
Target Startup Approval Time

TOBT
Estimated Departure

CTOT
CFMU Slot

TTOT
Target Take Of Time

ATOT
Actual Take Of Time

AOBT
Actual Of Bloc Time

EXOT
Estimated Taxi Time

Holding Time
Threshold waiting time

PDS Delay
Stand waiting time

DPI information
Last DPI sent

Inbound information

Courtesy of CDM@CDG

AO	Flight No	CallSign	De	SOBT / EOBT Airport/ATC Slot	IBT	TSAT	AOBT	CTOT	TTOT	ATOT	Stand Ar	Term	Rw	Status	Milestone	Detail	
XLF	756		SVQ	05/01/... 17:30	--	21:30	--	--	--	--	Q	T3	N	Seque...	ONBL...	Detail	
		EZY78	MXP	05/01/... 16:05	16:05	16:10	16:10	--	16:19	--	B	2B	S	Seque...	OFFB...	Detail	
AF	1080	AFR10	LHR	05/01/... 16:00			16:03	--	16:24	--	E	2E	N	Seque...	OFFB...	Detail	
SK	1560	SAS15	CPH	05/01/... 16:10	16:10	--	16:10	16:03	--	16:13	--	Y	1	N	Seque...	OFFB...	Detail
SU	25		SVO	05/01/... 16:10					16:30	--	E	2E	N	Seque...	OFFB...	Detail	
LS	31		LBA	05/01/... 16:10					16:25	--	Q	T3	N	Seque...	OKST...	Detail	
WW	5252	BMI30	EMA	05/01/... 16:10	16:10	--	16:10	16:13	--	16:21	--	T	1	N	Seque...	OFFB...	Detail
AF	2112	AFR21	LIN	05/01/... 16:15	16:15	--			16:25	--	E	2F	S	Seque...	OKST...	Detail	
AF	7708	AF708	NCE	05/01/... 16:15	16:25	16:15	--		16:26	--	F	2F	S	Seque...	OKST...	Detail	
AF	2482	AFR24	PRG	05/01/... 16:15	16:15	--	16:15	--	--	--	D	2D	N	Seque...	OKST...	Detail	
AF	2226	AFR02	VCE	05/01/... 16:15	16:15	--	16:15	--	16:29	--	F	2F	S	Seque...	OKST...	Detail	
LG	8020	LGL802	LUX	05/01/... 16:15	16:15	--	16:15	--	--	--		2D	N	Seque...	OKST...	Detail	
VY	8246	VLG82	ALC	05/01/... 16:15	16:15	--	16:15	--	--	--		T3	S	Alert NOCLR	ONBL...	Detail	
AF	2522	AFR25	MUC	05/01/... 16:15	16:15	16:20	16:20	--	16:28	--	E	2D	S	Seque...	OKST...	Detail	

PDS MODE

Flight Log Flight Msg Flight Alert

Data Alert

AF2214 AFR2214

Date : 05/01/2011

Aircraft type : 320

Registration : FGKXV

Stand : F34

QFU : 08L

EXOT : 00:13

Holding Time : 00:03

TTOT : 16:46

CFMU Taxitime: 00:00

SID : LANV11H

PDS Delay : 00:00:00

Last Alert : -----

Last DPI : T_DPI_s
15:50

TTOT DPI: 16:45

TTOTsh : -N/A-

Arrival

Flight No : AF1739

From : VIE

SIBT : 15:40

EIBT : 15:31

ALDT : 15:22

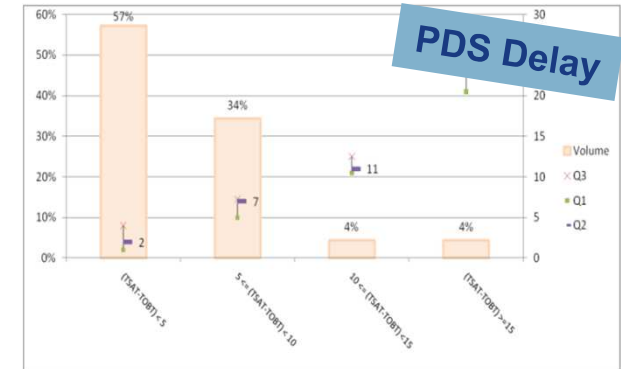
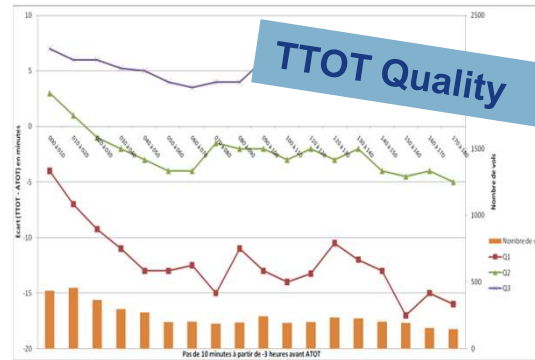
AIBT : 15:33

SARIA SWAN

Roissy CDM programme Key Performance Indicators

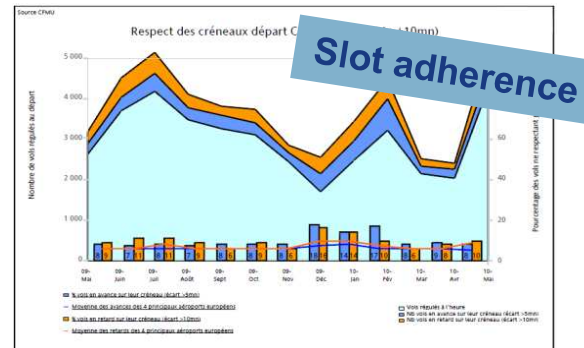
CPDS indicators (Followed by the operational & CDM programme team):

- TTOT & Taxi-Time Quality
- PDS delay (TSAT – SOBT/TOBT)
- TOBT quality



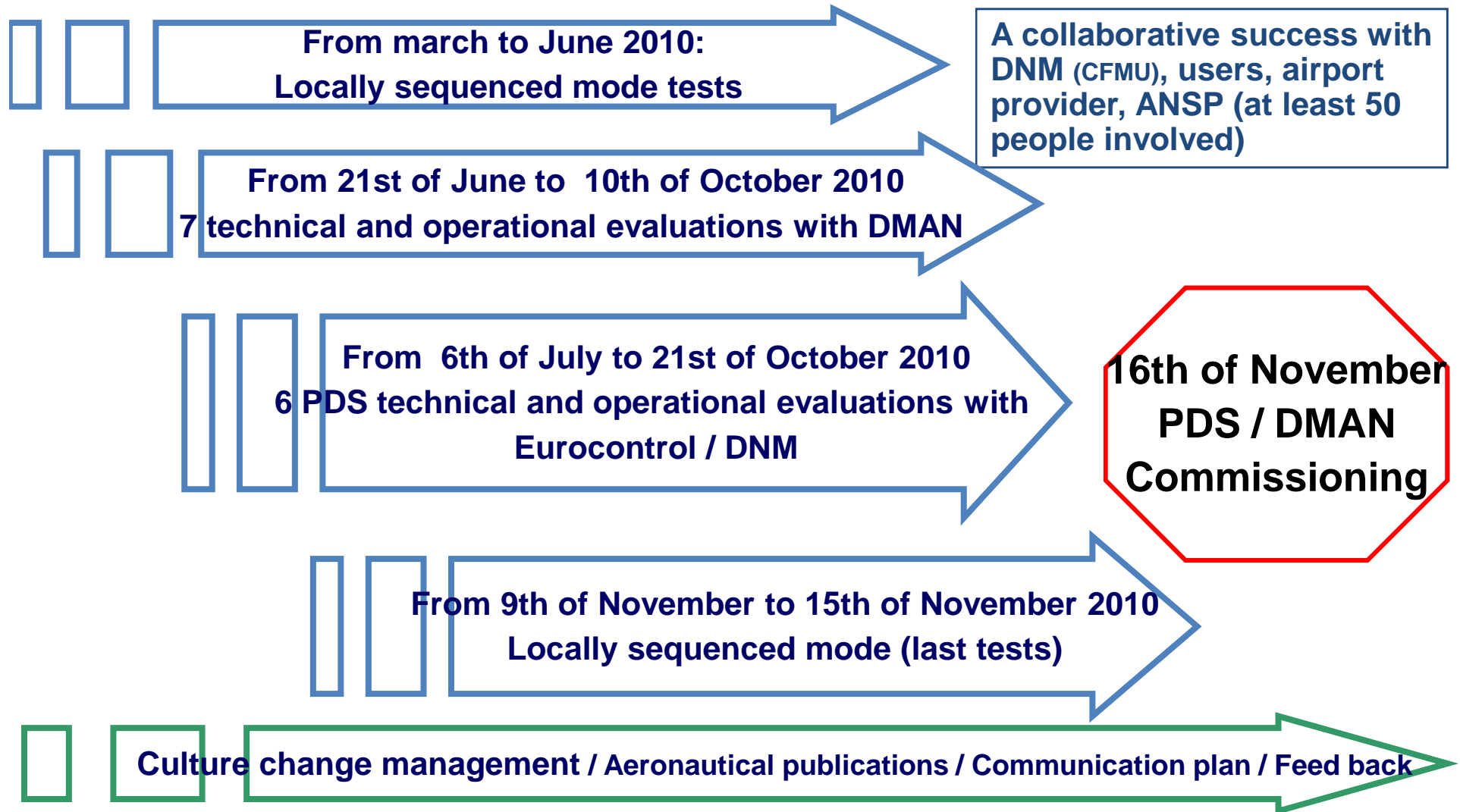
CDG@CDG performances KPIs (Followed by the steering committee):

- Slot adherence (ATOT – CTOT)
- Peak capacity utilization
- Punctuality
- Taxi time



Courtesy of CDM@CDG

Connexion to the Network Management Ops Centre



Courtesy of CDM@CDG

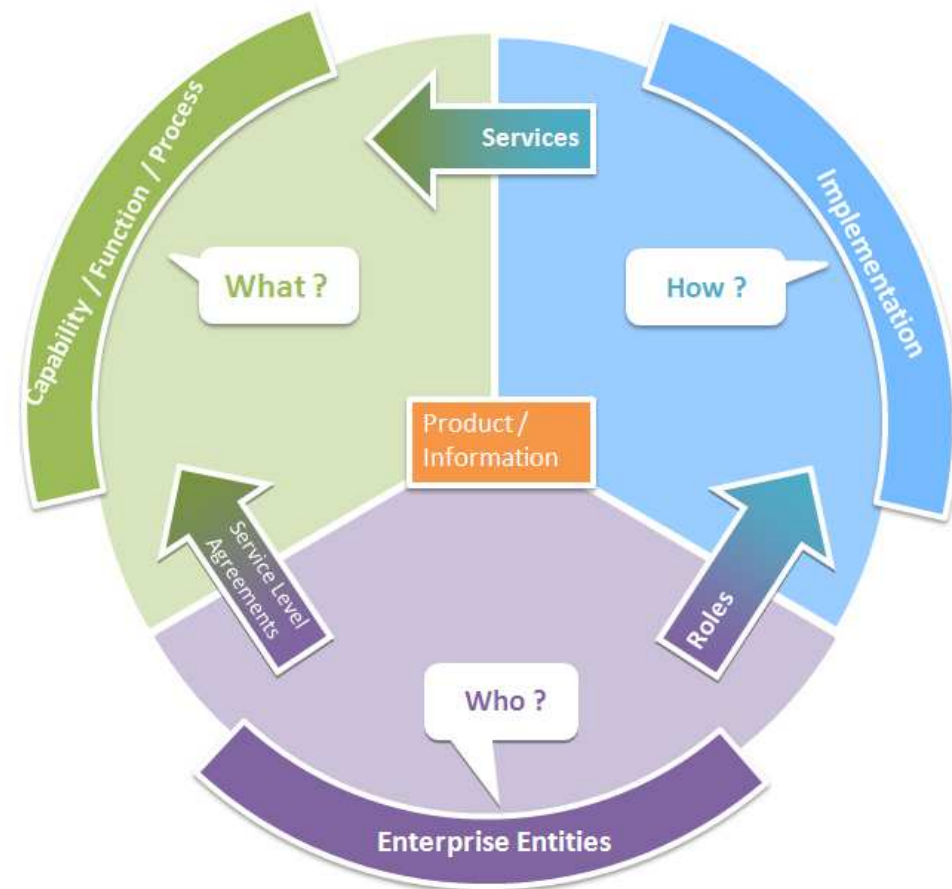
Benefits thanks CDM programme

- **Shorter taxi time: up to 4 minutes** (in adverse condition)
- **Reduced fuel consumption: 4 000t** per year
- **Reduced gas emissions: 12 000t CO²** per year
- **Improved global punctuality: +10% vs 2011 (>85%)**
- **Enhance predictability to the Network thanks to the PDS: TTOT-3H** (Target Take Off Time)
- **Better DNM (CFMU) slot adherence (CTOT): +9% vs 2011 (> 80%)**
- **Enhance reliability airport slots and improve transparency (web site CDM@CDG)**
- **Reduced apron and taxiway congestion: reduction of waiting time at threshold: - 40% (peak hour)**
- **Keep airport operations as efficient as possible in adverse condition thanks to the CDM ops room** (e.g.: only 86 flights cancelled the 23rd of December 2010 / Heathrow was closed)

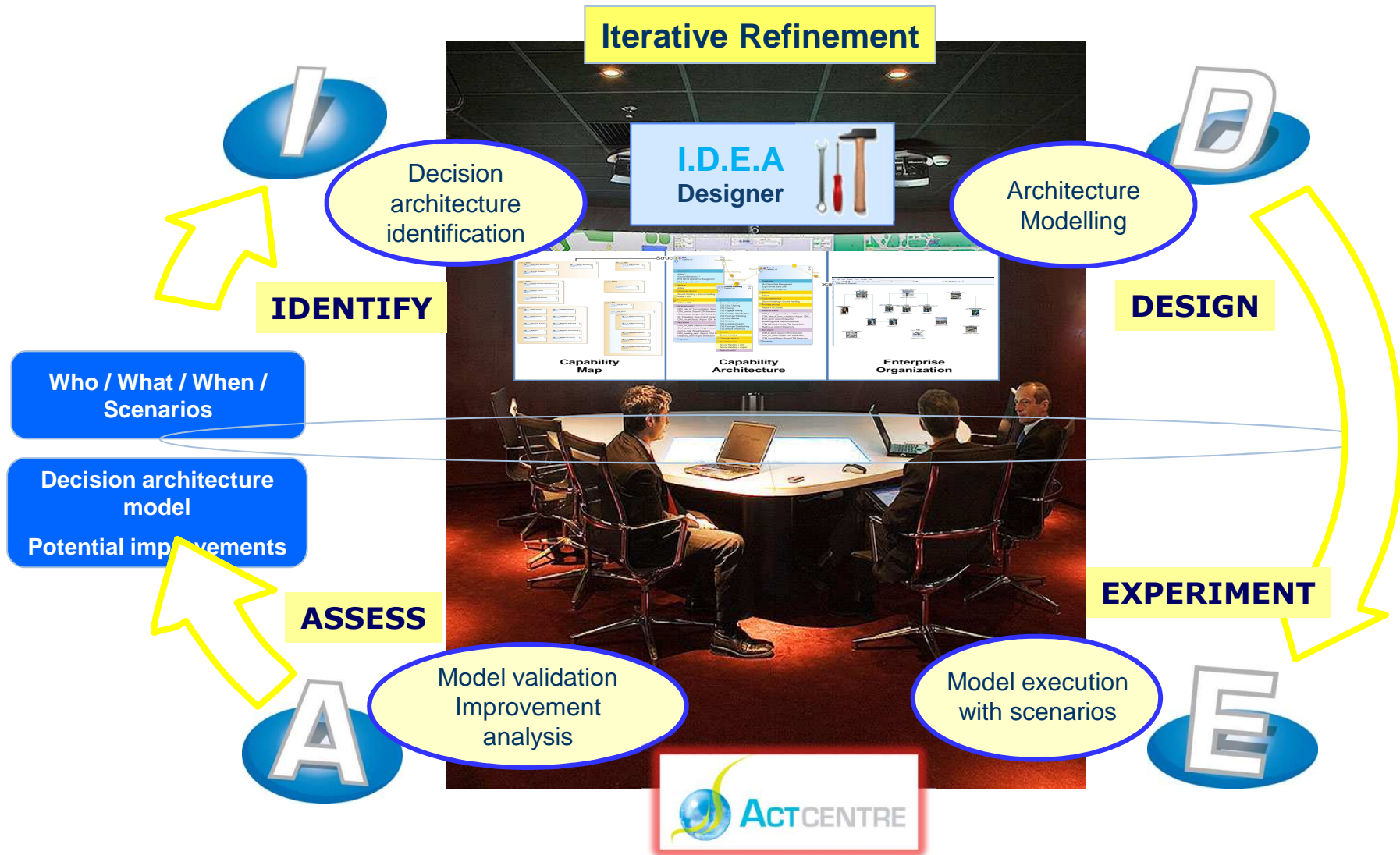
Courtesy of CDM@CDG

Example of Innovative Approach to Accelerate the CDM Implementation

THALES CD&E
for designing
decision-making
architecture



THALES CD&E method and tooling



Addressing multi-criteria decision-making

Based on interviews and workshops with the CDM stakeholders and decision-makers

- Formalization of KPIs, metrics or satisfaction criterias
- Building of a model with aggregation of satisfaction criterias
 - conflicts of interest identification
 - complex situation assessment
- Trade-off analysis and consensus building

Traditional method without model

- ▶ Evaluation highly subjective
- ▶ Complex situation hard to assess
- ▶ Justification often difficult
- ▶ Reproducibility of analysis very limited

MYRIAD *

- ▶ Scientific & rigorous with explicit evaluation rules
- ▶ Reproducibility with choice justification
- ▶ Continuous improvement based on past experience
- ▶ Complex trade-off capability

* Thales Tool

Example of THALES CDM Support Solution

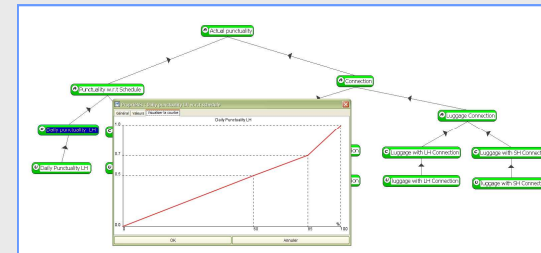
I.D.E.A Designer

- Decision architecture analysis
- Modeling



MYRIAD Designer

- KPIs analysis
- Multi-criteria decision model

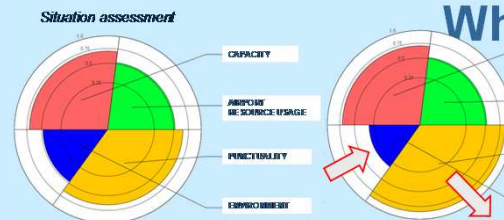


I.D.E.A Performer

- Modeling with performance & metrics assessment
- Model execution

E- MYRIAD

- Model execution
- Situation assessment
- Solution assessment & What-if



CDM Attitude:



Think Global, Act local!



**THANK YOU
FOR YOUR
ATTENTION!**

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