A-CDM: boosting the airport turnaround process

“The Roissy CDG experience”
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)
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

ORLY: 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
- 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)
Organisation and stakeholders

CDM Steering committee
- ADP
- DSNA
- Air France

Up to 10 people involved

Up to 4 people involved

350 ATCO
DSNA
Up to 20 people involved

Programme leader
ADP

Programme leader
DSNA/CDG

Programme leader
Air France

Programme manager
CDM@CDG
DSNA

Workshop C-PDS

Workshop Information Sharing

430 AO’s
6 Ground handlers
8000 Pilots...

Courtesy of CDM@CDG
Roissy CDM experience

C-PDS Process
Information sharing process

Airline Operators, Ground Handlers...

CDM Website
- CDM Website
- H24 sharing information

Teleconferences + CDM cell
- Snow, Thunderstorms...
- On request

Frequent contributors:
- AOC (BAW / DLH / Emirates...)
- FedEx
- Easyjet
- Singapore Airlines...

CDM actors
- Post ops 13h30
- Pre ops 19h00
- Main partners
  - ANSP
  - ADP
  - AFR
  - Météo France
- Airport activity at D Day
- Forecast for D+1
- Information sharing between operational staff

CDM Management
- Regular airport activities check
- KPI
- Common actions
- operational staff and services
- Director's Steering Board
- CDM@CDG team-programme

Courtesy of CDM@CDG
C-PDS process

Airlines
Handlers

TOBT

PDS Airport Operator (ADP)

DMAN

START UP CLEARANCE

TOBT - 10mn

DMAN

PUSH BACK
TSAT

DELIVERY POSITION

APRON or GROUND POSITION

SOBT

PDS

CTOT

Slot Coordinator

ATC

data

TSAT

ATC

data

DMAN

TOBT

Courtesy of CDM@CDG
Roissy CDM experience

C-PDS Tools: PDS and DMAN
C-PDS Overview

C-PDS

DMAN

Capacity
Runway pressure
Runway Configuration QFU

PDS

TOBT
TSAT
CTOT

DPIs

messages

TTOT / TSAT...

DNM / NMOC
(CFMU)

 TOBT: Target Off Block Time
TSAT: Target Start Up Approval Time

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

≈ 3 2000 000 DPI messages sent in 2011

AO’s / Handlers / Pilots

CDM Web Site

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.

Entry data

TOBT\(^1\)

+ Variable taxi-time (Stand/runway in use table)

Take-Off sequence calculation

Deduced Take-Off Time

First Scheduled / First Served (based on SOBT)

CFMU Slot

Runway capacity\(^2\)

Maximum waiting time at runway\(^2\)

24-hour moving horizon calculation

Algorithm

Runway configuration/ Runway in use\(^2\)

2 ATC input

Result

TSAT

- Variable taxi-time (Stand/runway in use table)

Optimized Take-Off Time

This calculation applies to all the flights…in normal and adverse conditions

Courtesy of CDM@CDG
This view is available on the delivery controller position and apron management position.

Courtesy of CDM@CDG
This view is available on the website and on the airport network (handlers, users...)

- **Flight Identification**
- **Time Information**
- **Alert / State**
- **Flight Information**

**PDS HMI**

- **Capacity / Pressure**
- **EXOT** Estimated Taxi Time
- **Holding Time** Threshold waiting time
- **Threshold waiting time**
- **DPI Information**
- **Last DPI sent**
- **PDS Delay**
- **Inbound information**

**Flight Information**

- **SOBT / EOBT** Airport/ATC Slot
- **TOBT** Estimated Departure
- **TSAT** Target Startup Approval Time
- **AOBT** Actual Of Bloc Time
- **CTOT** CFMU Slot
- **TTOT** Target Take Of Time
- **ATOT** Actual Take Of Time

**Commercial ID**

- **Airline/Airport**

**This view is available on the website and on the airport network (handlers, users...)**

**Courtesy of CDM@CDG**
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
From March to June 2010: Locally sequenced mode tests

From 6th of July to 21st of October 2010
6 PDS technical and operational evaluations with Eurocontrol / DNM

From 9th of November to 15th of November 2010
Locally sequenced mode (last tests)

16th of November
PDS / DMAN
Commissioning

Culture change management / Aeronautical publications / Communication plan / Feedback

A collaborative success with DNM (CFMU), users, airport provider, ANSP (at least 50 people involved)
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

Iterative Refinement

I.D.E.A Designer

Architecture Modelling

Decision architecture identification

Who / What / When / Scenarios

Decision architecture model
Potential improvements

Model validation Improvement analysis

Model execution with scenarios

IDENTIFY

DESIGN

ASSESS

EXPERIMENT

Roles

Architecture Modelling

Decision architecture identification

I.D.E.A

Designer

ActCENTRE

THALES

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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

<table>
<thead>
<tr>
<th>Traditional method without model</th>
<th>MYRIAD *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation highly subjective</td>
<td>Scientific &amp; rigorous with explicit evaluation rules</td>
</tr>
<tr>
<td>Complex situation hard to assess</td>
<td>Reproducibility with choice justification</td>
</tr>
<tr>
<td>Justification often difficult</td>
<td>Continuous improvement based on past experience</td>
</tr>
<tr>
<td>Reproducibility of analysis very limited</td>
<td>Complex trade-off capability</td>
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</tbody>
</table>

* 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!

Questions?

herve.breton@thalesgroup.com
Francois-xavier.rivoisy@adp.fr