CDM

Collaborative Decision Making

January 2015

Reminder: ATFCM

ATFCM : Air Traffic Flow and Capacity Management

Handwritten annotations:

CDM cell/people

calcu → TOBT → DMAN → TSAT

- Aircraft operations
- ATC
- ATFM (CFMU)
- Ground handlers
- Airport Authorities
- Service providers

Goals of CDM
- information sharing
- collaborative decision
- best use of ressources
- fast Recovery if unexpected events
- increased punctuality

How ?
- sharing info
- Milestone approach ; predeparture Sequence
- Recovery plans in adverse conditions
  ⇓
  weather

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ATFM Reminder

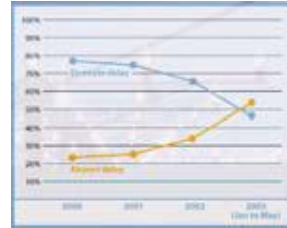| CAPACITY SHORTFALLS		OPTIMISE UTILISATION OF AVAILABLE CAPACITY

	UTILISE OTHER AVAILABLE CAPACITY	→ Sector Management
		  - Configuration
		  - N° of Sectors
		→ Civil/Military Co-ordination
		→ Reduce Traffic Complexity
		→ Review Capacity Value
		→ Holding Pattern
		→ Balancing Arrival / Departure Capacity

REGULATE THE DEMAND	→ Re-routeing
	  - Flows
	  - Flight
	→ FL Management
	→ Advancing Traffic	

→ Restrictions → Acting on Airborne Traffic		

ATFCM
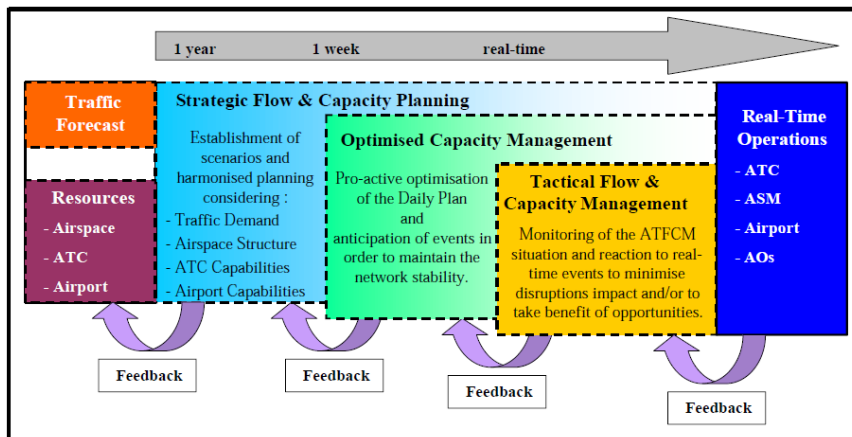
Airport and ATFCM

- Since 2003, airports become bottlenecks
    - Following strong growth in traffic
    - Following capability improvements En-Route
- Genesis of the CDM in Europe
- Launch of the Eurocontrol program "Airport CDM"
  Objective: To provide pragmatic solutions optimizing capabilities airports
    - Improve collaboration between all partners involved
    - Strengthen decision-making based on information shared
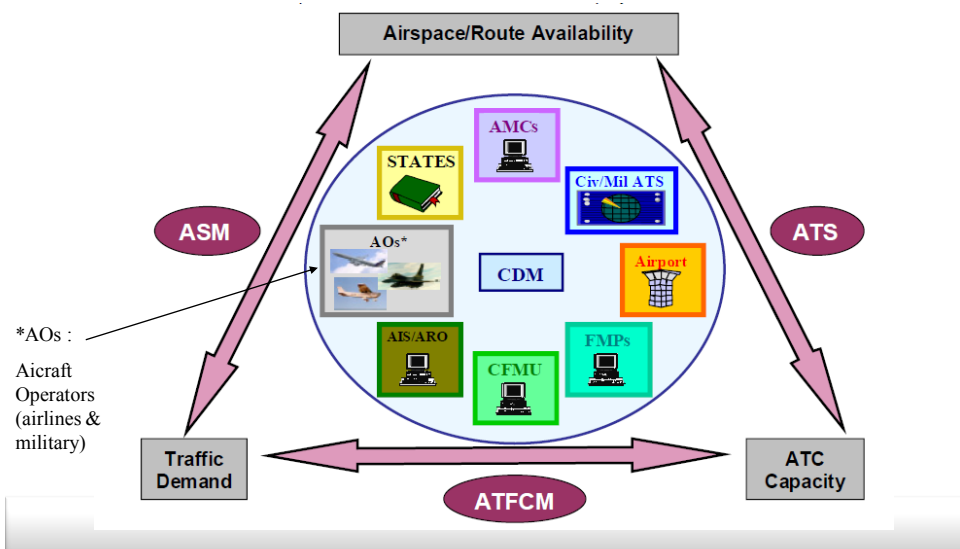   - Increase the performance of each actor

  CDM Introduction video   →

EUROCONTROL

Collaborative Decision Making (CDM)

CDM :
collaborative decision-making

Airspace/Route Availability

AMCs

STATES

Civ/Mil ATS

ASM

AOs*

CDM

Airport

ATS

*AOs :

Aircraft
Operators
(airlines &
military)

AIS/ARO

CFMU

FMPs

Traffic
Demand

ATC
Capacity

ATFCM

What is CDM ?

- ATFCM delegates to airports the management of their own departure capacity
  - Better capacity assessment (rwy basis vs airport basis)
  - More accurate taxi time and take-off time
- Aircraft operators benefit of a more flexible slot management
  - AO provide accurate Target Off Block Times
  - Not ATFCM slot for the airport regarding its departure capacity
  - Enables AOs to manage priorities within their own fleet → tranparent for ATC
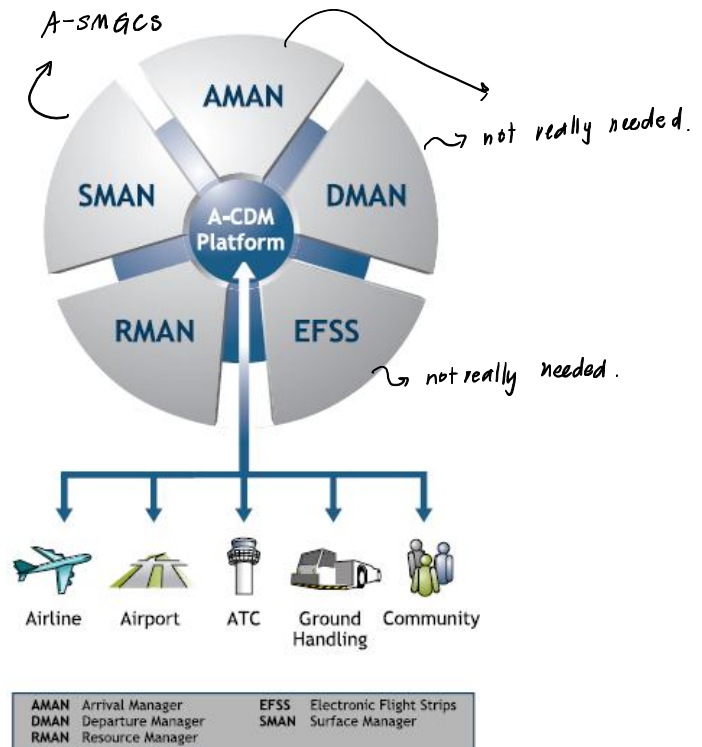- A-CDM certified airports = win/win collaboration

Airport Collaborative Decision Making

Local departure management (delegation from ATFCM to airport)

- Improve predictability
- Improve on-time performance
- Reduce ground movement costs
- Optimise/enhance use of ground handling resources
- Optimise/enhance use of stands, gates and terminals
- Optimise the use of the airport infrastructure and reduce congestion
- Reduce wastage of ATFM slots
- Flexible predeparture planning
- Reduce apron and taxiway congestion

Air Traffic Control — Aircraft Operators — Ground Handling — Airport Operations — CFMU

CDM tools

A-SMGCS

AMAN

→ not really needed.

SMAN   A-CDM Platform   DMAN

RMAN   EFSS

→ not really needed.

Airline   Airport   ATC   Ground Handling   Community

AMAN	Arrival Manager	EFSS	Electronic Flight Strips
DMAN	Departure Manager	SMAN	Surface Manager
RMAN	Resource Manager		

Who does what ?

- ATFCM
  - Predict traffic for a large region (whole contry).
  - Manage sector capacity and fixed flow capacities
  - Strategic, pre-tactical and tactical negotiation with military
  - From D-7 to H-2 hours
  - Maintain the aircraft to the ground: slot system
- AMAN
  - Sequence the traffic converging to one or several airports
  - Plan the arrival flow according to a TMA configuration → reduce arrival delay
  - Adjust flow at feeder fixes (generally IAFs)
- Airport CDM   who is leading
  - Takes into account airport and airlines priorities→ off-block sequence
  - Better departure predictability and event handling
- DMAN
  - Greatly reduce queue at runway threshold → less fuel consumption
  - Manage Flow rates at SID exit points → better departure splitting
  - Improve the predictability of the trajectory → gain for ATC and ATFCM

Dedicaced tools vs A-SMGCS
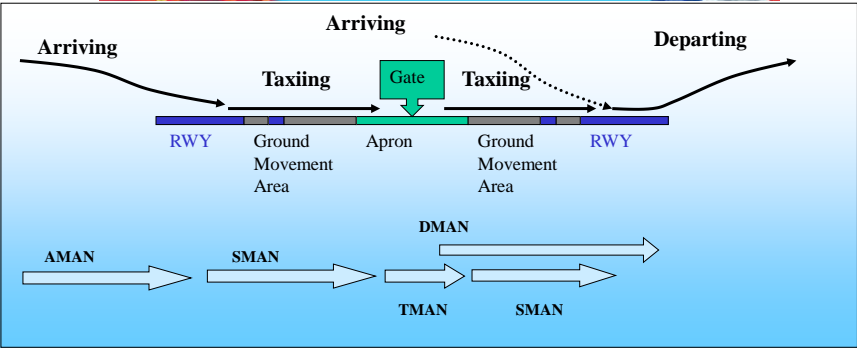
AMAN : arrival manager

DMAN : departure manager

SMAN : surface manager

~~TMAN : taxiing manager~~

A-SMGCS

Advanced Surface movements guidance and control system

A-SMGCS (DSNA/*Thales*)

Qblue for departures (light blue for south, dark blue for north)

Qred for arrivals (light red for south, dark red for north).

Resource Allocation Manager

CDM in Europe

EUROCONTROL

Interactive video on CDM

Case study : Paris CDG

CDM@CDG

NATS - demo

CDM in France

CDM@CDG

Launched in 2004, certified A-CDM in 2010, now dealing with degraded situations

ORLY : **CDM@ ORY**

CDG

ORY

LYS

LYON: A-CDM expected in 2015
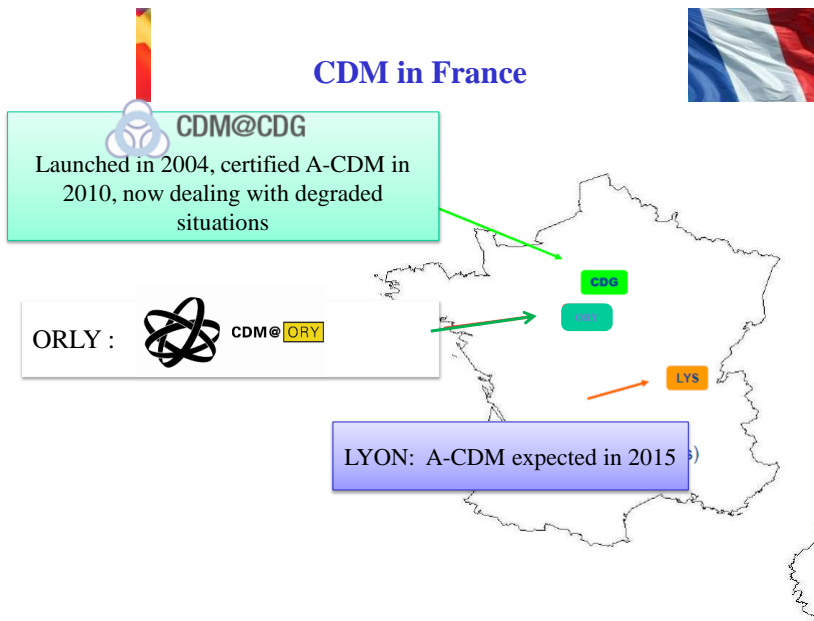
Paris CDG airport

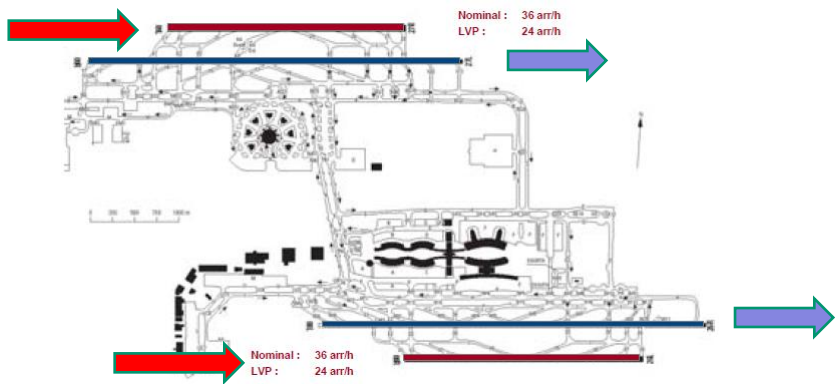•1st European airport by the number of movements (2nd for passengers)

•8th world platform by movements, 5th by passengers

•4 runways (2 doublets) East-west

•8 ILS CAT 3

•In 2010 :

•500 000 ARR/DP (-5%)

•484 000 movements for the Approach center (managing several close airports)

•58 Million passengers (+0.4%)

•Peak day :
•1773 movemnets
•2091 approaches

•Peak Hour : 120 movements

« Facing west » configuration
(nominal situation)

Nominal : 36 arr/h
LVP : 24 arr/h

Nominal : 36 arr/h
LVP : 24 arr/h
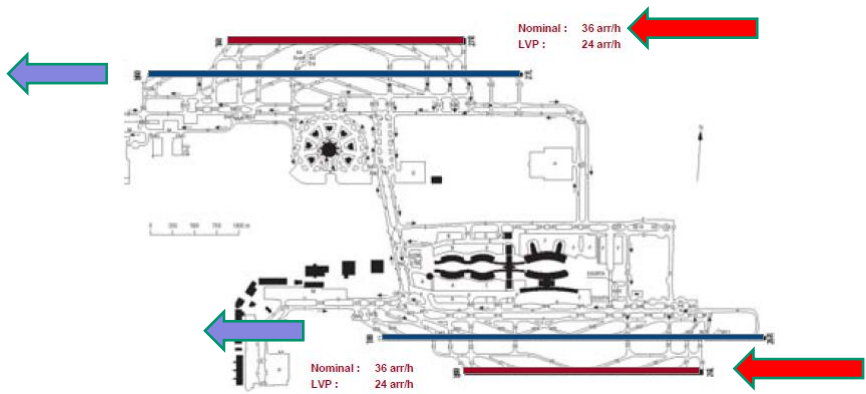
« Facing East » configuration

Nominal : 36 arr/h
LVP : 24 arr/h

Nominal : 36 arr/h
LVP : 24 arr/h

CDM@CDG

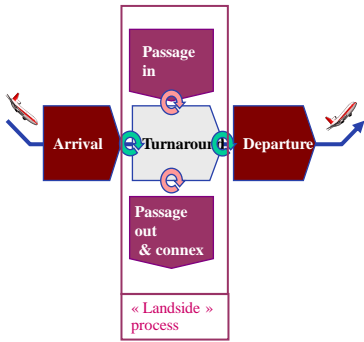**CDM@CDG Project objective**

- The objective is to improve capacity utilization at <u>nominal and disturbed</u> conditions
  - It allows to make improvements, have a better shared understanding of the situation, and effective and appropriate responses.

    It processes all disturbed situation and helps prevent the consequences of severe weather.

    It also takes into account the case of so-called nominal situations.

CDM@CDG Project perimeter

Passage in

Arrival   Turnaround   Departure

Passage out & connex

« Landside » process

Processus et interfaces concernés par CDM@CDG

The proposed CDM @ CDG perimeter aims to optimize the arrivals and departures processes and all interfaces with the turnaround

CDM@CDG project organization

ADP

ATC

Air France

DSNA

Steering comitee

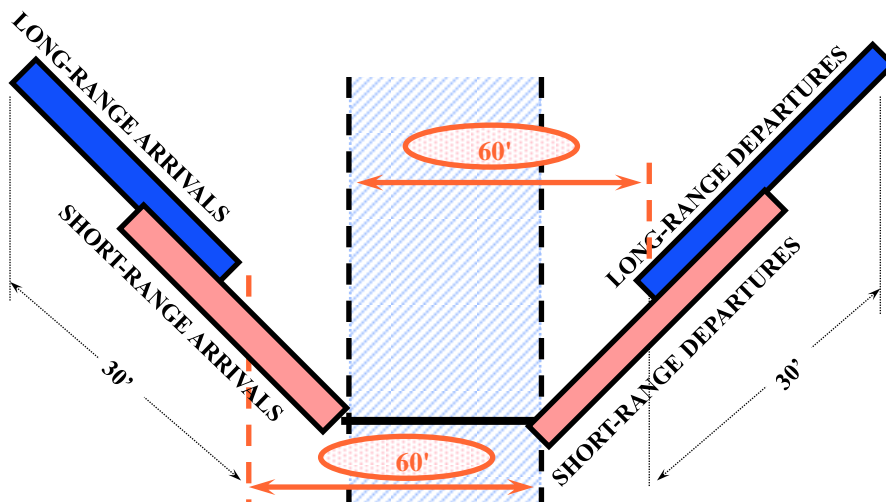Tools conception, creation and deployment
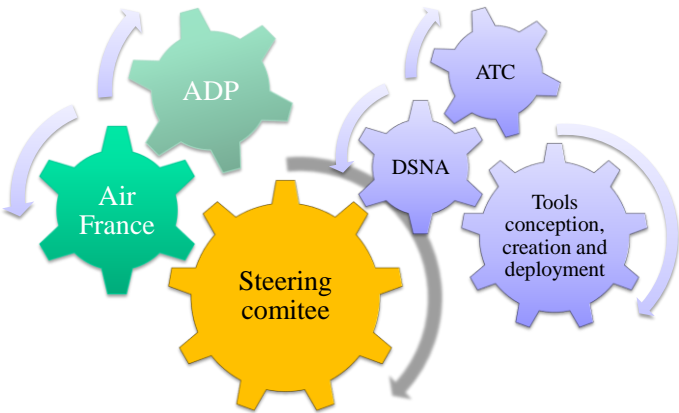
Degraded conditions are triggering events and key to the advances of CDM. Their control is a challenge that the program must meet whatever the event.
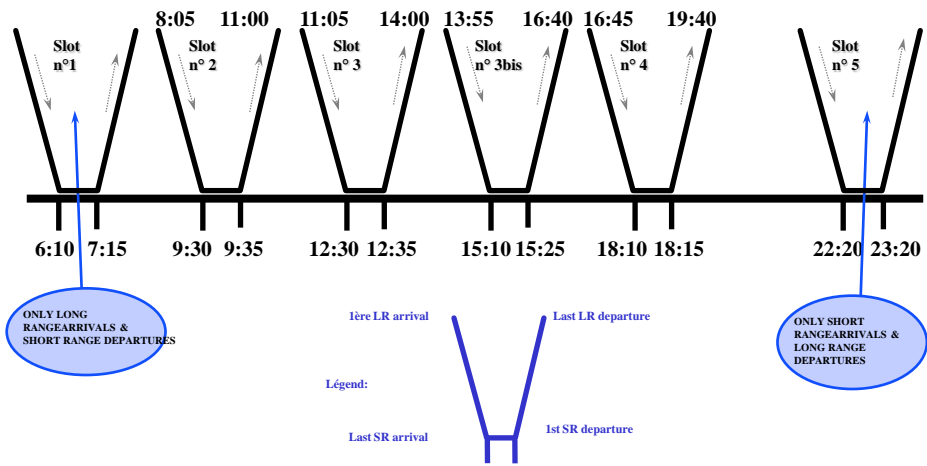
Snow plan
AdP invested deeply in de-icing and snow removal engines
Definition of a shared AdP / ATC Snow Plan defining snow scenarios

Low Visibility plan (LVP)
Implementation of the scenario PARADE: postpone as long as possible the installation of a departure ATFM regulation because LVP
Implementation of the scenario "LVP Surprise" Removal of precautionary regulation because LVP and specialization of a doublet for landing if necessary to pass the arrival flow

CDG Winter Operation / Local departure management
Implementation of a scenario for Winter management of departures coordinated with CFMU in case of snow
With the commissioning of the Local departure management, adapting the procedure for more efficient local management by removing departure regulation

Paris area release plan
Implementation of a plan to release Paris region in case of storms, snow, ... integrating CDM and in collaboration with Paris ACC

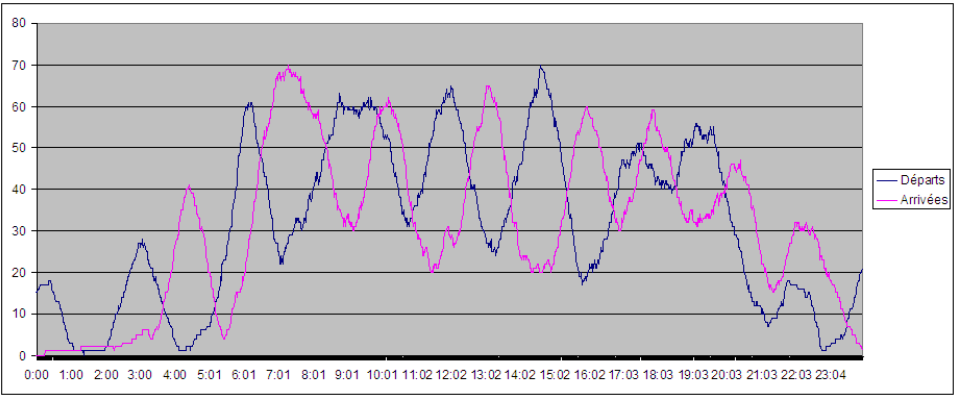# Air France HUB : very time-critical, 6 times a day !

LONG-RANGE ARRIVALS

SHORT-RANGE ARRIVALS

LONG-RANGE DEPARTURES

SHORT-RANGE DEPARTURES

60'

60'

30'

30'

Daily Hub Slot sequence

	8:05	11:00	11:05	14:00	13:55	16:40	16:45	19:40		

Slot n°1 Slot n° 2 Slot n° 3 Slot n° 3bis Slot n° 4 Slot n° 5

6:10 7:15   9:30 9:35   12:30 12:35   15:10 15:25   18:10 18:15   22:20 23:20

ONLY LONG RANGE ARRIVALS & SHORT RANGE DEPARTURES

ONLY SHORT RANGE ARRIVALS & LONG RANGE DEPARTURES

1ère LR arrival   Last LR departure

Légend:

Last SR arrival   1st SR departure

Traffic structure, summer 2009

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Local Departure Management (LDM)

LDM is divided into several operational objectives achieved incrementally in successive versions

Better departure estimates from airlines
V0

Adopt a 1st scheduled / 1st served rule
V1

Better equity
Non-cumulative delays

Manage runway pressure and runway treshold waiting time
V1

Limit runway waiting time to reduce rolling time

Operationnal Objectives

Send reliable information to CFMU to have more precise slots
V1

Improve CFMU slot compliance
Reduce en-route capacity losses

Take airline priorities into account
V2

Manage de-icing locally
V3

Paris CDG CDM Website

•Airport Status   cdm@cdg

Current situation

Item	Status	Observation - English
Weather		normal situation
Runway configuration	East	
Outbound capacity	75	load covered
Inbound capacity	66	load covered
Outboud Traffic		
Inbound Traffic		
SSLIA Airport protection	9	
Parking Apron		
Taxi time		
De-icing		ONE DE ICING APRON OPENED TO THE SOUTH P
Road traffic		
Rail traffic		
Terminal use		

Modify current situation: [Edition]

Add a news item: [Add a news item]

Caption :

normal situation   disrupted situation   worsening situation   critical situation   no data

Current time: 10/11/2006 11:42 (UTC Time)
Last current situation update : 08:40 UTC
Runway Configuration - Capacity
Facing:East
Outbound capacity: 75
Inbound capacity: 66

Latest news
Nothing to notice.

Visitors connected
0 Subsriber(s)
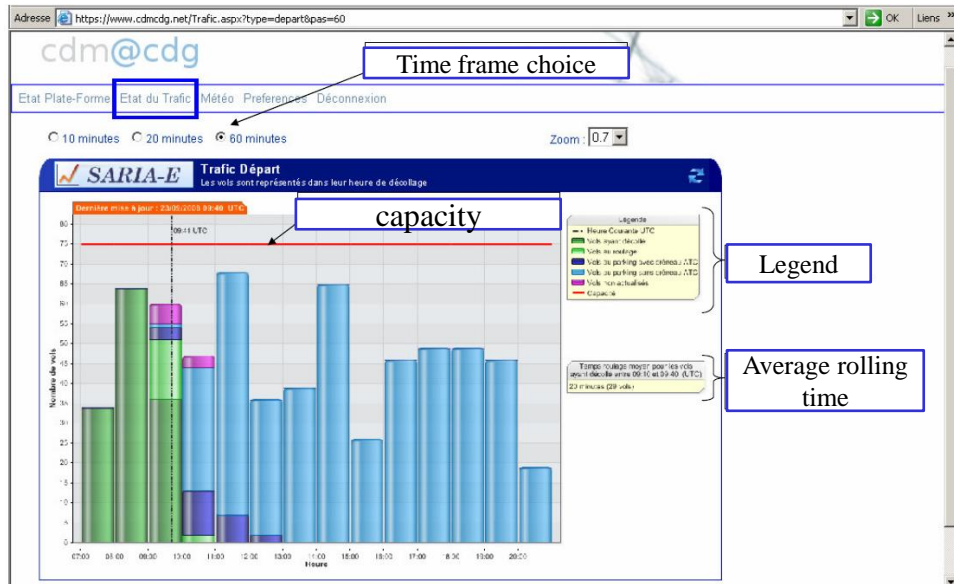0 Operators(s)
1 Administrator(s)
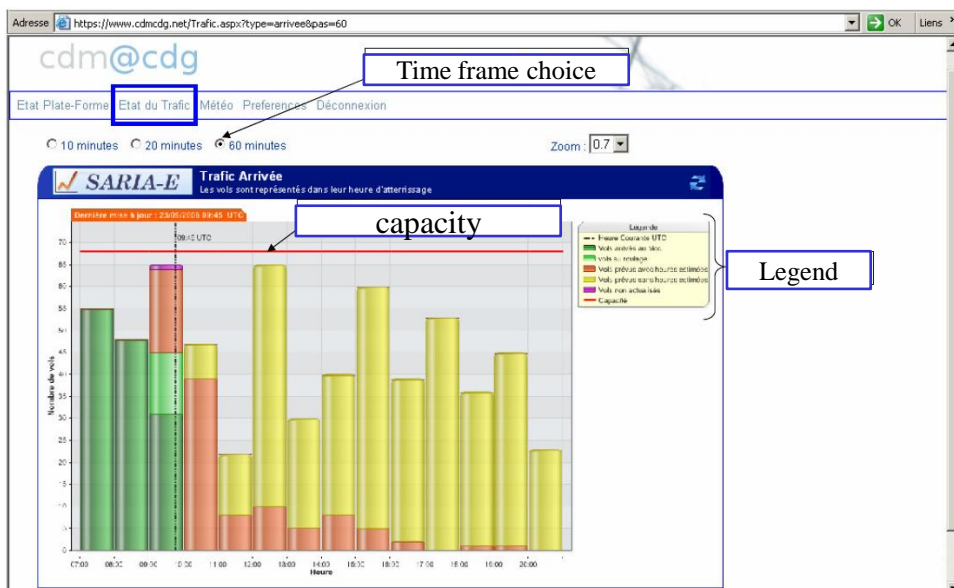
Contact
Name: Plateau CDM
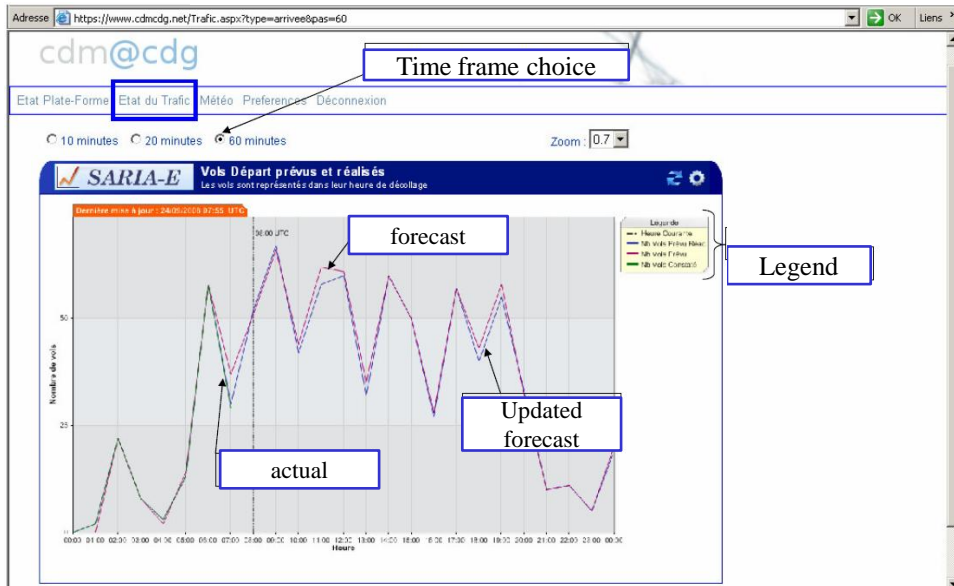**Tel:** 01.48.16.00.48

Departure traffic

Arrival traffic

Forecast vs actual traffic

Pre-departure sequence

News and events

Adresse https://www.cdmcdg.net/ConfTel.aspx OK Liens »

cdm@cdg

Etat Plate-Forme Etat du Trafic Météo Conf.Tel Preferences Déconnexion

Debriefing 13 H 30	04/02/2009	Prévision 19 H 00
PCR CCH CCO DSNA	Participants	CA+CT+IPCDM REPCDGR CCO+CCH
The regulation implemented this early morning on arrivals from 07h00 to 08h20 ZT has been kept and caused 246 minutes of delay to 23 planes. For this afternoon, 2 deicing bays remain opened as a low risk of few snow has been forecasted. This phenomena is monitored and we haven't taken any drastic measure, begging for no effect on traffic. Anyway we are ready for any appropriate action if needed. Best regards. david cros	Compte-rendu	Vehicle rime forecast until 2130Z. Tonight, Southern twin parallel runways closed from 2330Z to 0400Z. Expect a runway configuration change at early morning, into a westbound configuration during all day. For tomorrow early morning, no other weather forcast : capacity should stay at a nominal rate.
Debriefing 13 H 30	03/02/2009	Prévision 19 H 00
SNA CDGR AFCCO&CCH	Participants	AOC CCO CCHUB ADP DSNA
Today morning, de-icing at nominal rate. No impact of weather on capacity value. As demand of arriving traffic was close to capacity, no CFMU regulation implemented.	Compte-rendu	TONIGHT SOUTH RUNWAYS WILL BE CLOSED FROM 23.30 TO 04.00 UTC; LOW TEMPERATURES EXPECTED; ROMEO DE ICING BAY WILL BE AVAILABLE ALL THE NIGHT LONG; APRON TAXIWAYS AND RUNWAYS DEICING MACHINES AVAILABLE FROM 20.30 UTC. AIR FRANCE PLAN TO ANTI-ICE MOST OF ITS FLGHTS. NO CFMU REGULATION ON ARRIVALS EXPECTED FOR TOMORROW MORNING. EASTERLY CONFIGURATION IS FORECASTED ALL DAY LONG.
Debriefing 13 H 30	02/02/2009	Prévision 19 H 00
SNA CDGR AFCCO&CCH AOC	Participants	CA, CDGR, CCO, CCHub,PCNeige, AOC
This morning, Snow at CDG. CFMU Regulations		

05/02/2009 11:52 (UTC)
MàJ: 05/02/2009 10:54:02
Capacité pistes
Face à l'Ouest
Départ: 75
Arrivée: 69

Nouvelles
05/02/2009 10:55:38
vent fort

Connectés
3 Abonné(s)
0 Exploitant(s)
1 Administrateur(s)

Contact
Nom: Plateau CDM
Tel: 01.48.16.00.48

Reports of daily phone conferences

CDM @ Paris CDG

•Airport Status History

cdm@cdg

Daily airport conditions for the 06/11/2006.

Date: (dd/mm/yyy) Go

	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
Runway Configuration	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Outbound Capacity	50	50	50	75	75	75	75	50	50	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Inbound Capacity	35	35	35	35	35	44	44	44	55	55	40	40	50	50	55	55	55	55	55	55	55	55	55	55
Outbound Traffic																								
Inbound Traffic																								
SSLIA Airport protection	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Parking Apron																								
Taxi time																								
De-icing																								
Road Traffic																								
Rail Traffic																								
Terminal Use																								

Caption:

normal situation	disrupted situation	worsening situation	critical situation	no data

CDM @ Paris CDG

•Weather OBS

METEO-FRANCE ROISSY LFPG
TABLEAU DE BORD OBSERVATION
mercredi 24 septembre 2008 à 08:06 UTC (10:06 LT)
(indications relatives aux 6 dernières minutes écoulées)

Visibilité (RVR)	Plafond	Vitesse Vent	Composante Vent Travers	Températures Chaudes	Températures Froides
>=1500m	> 500ft	<=20kt	<=20kt	< 32°C	> 3°C
< 1500m	<=500ft	> 20kt	> 20kt	>=32°C	<=3°C
< 1000m	<=300ft	> 40kt	> 25kt	>=35°C	<=1°C
< 600m	<=200ft	> 55kt		>=40°C	<=-7°C

Phénomènes divers

Forte Pluie	Orage < 5km	Grain (ou Trombe) proche	Brouillard givrant	Pluie&Neige mêlées	Neige	Pluie verglaçante

Informations

Paris CDG CDM Website

•Weather Forecast

cdm@cdg

▸ Barcelona Airport CDM HMI

▸ Munich Airport CDM Sequence Planner for ATC

▸ Athens Airport CDM HMI

▸ Brussels Airport CDM TOBT/TSAT HMI for ATC

Eurocontrol CDM implementation Guide

THE MANUAL

Airport CDM Implementation

http://www.eurocontrol.int/documents/airport-cdm-implementation-manual-version-4

http://www.euro-cdm.org/

• Questions ?

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