CDM@CDG

GROUPE ADP

Meteorology in Collaborative Decision Making at Paris Charles de Gaulle Airport

July 23rd, 2018

WMO COMMISSION FOR AERONAUTICAL METEOROLOGY

16th SESSION – TECHNICAL CONFERENCE

Exeter, UK

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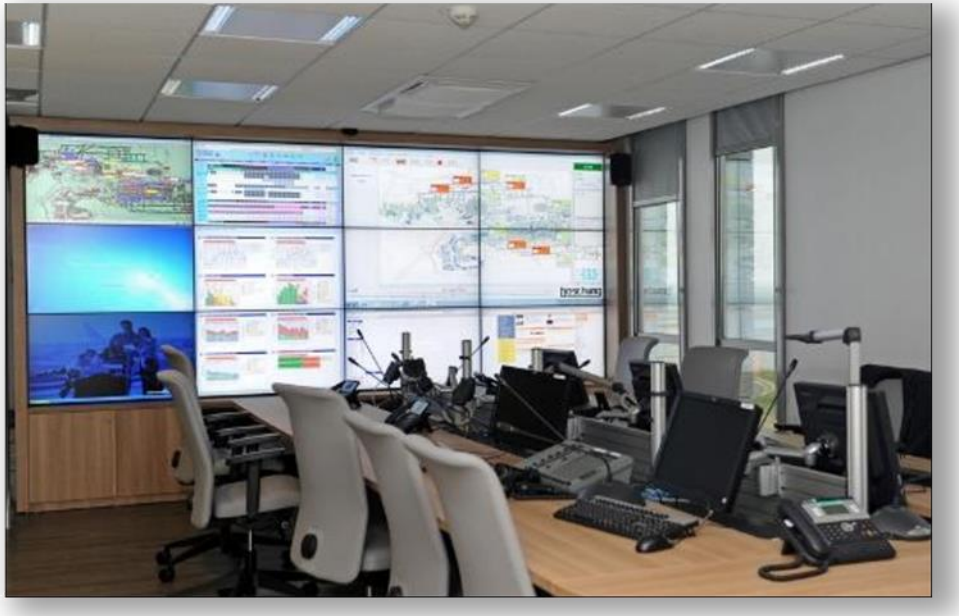
Groupe ADP
Airside Operations
Paris-CDG Airport

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

CDM Implementation

MET@CDM

Gains



Paris-CDG CDM Cell

CDG Airport

Airport Infrastructure Information

- Surface : 3,200 ha
- 2 pairs of runways – dedicated mode DEP/ARR (scheduled capacity: 120 mvts/h)
- 110 km Taxiways
- 8 ILS CAT.III
- 9 passenger terminals
- 2 cargo hubs

Statistics 2017

- 69.5 M passengers
- 475,000 movements
- 1,400 mvts per day
- RWY throughput: ARR 73 / DEP 76
- 146 Airlines

Weather environment

- Low Visibility Procedures (LVP)
- Snow

Winter 17/18 : 19 d – 30 cm
Winter 12/13 : 30 d – 59 cm
Winter 10/11 : 23 d – 30 cm

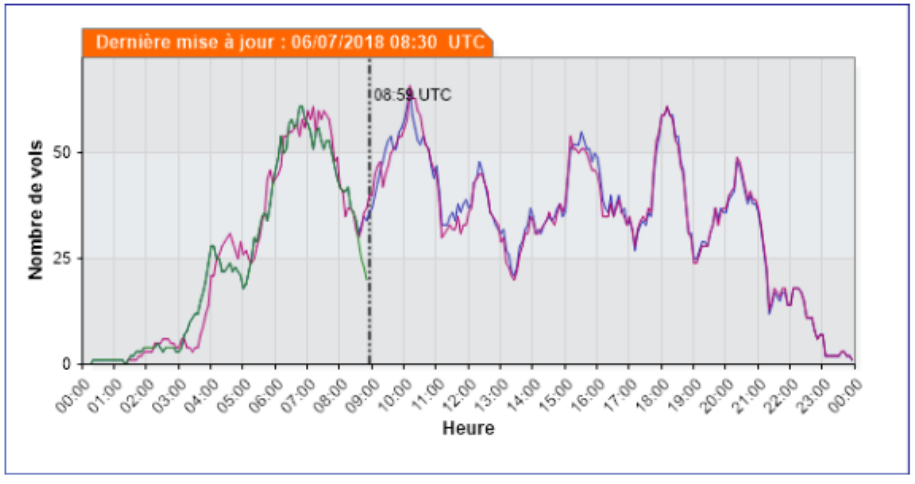
ATC Infrastructure

1 approach room, 3 control towers,

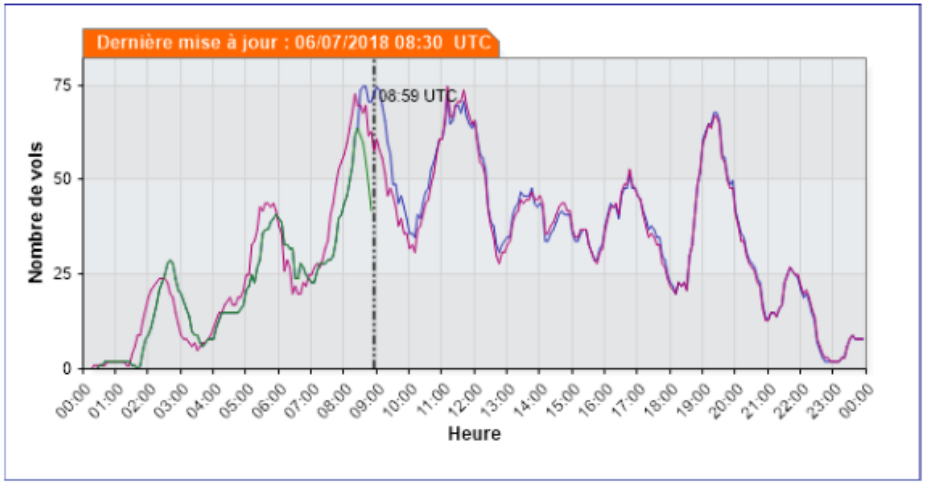
2 apron control centers

High peaks make the traffic structure decisive

Arrivals



Departures



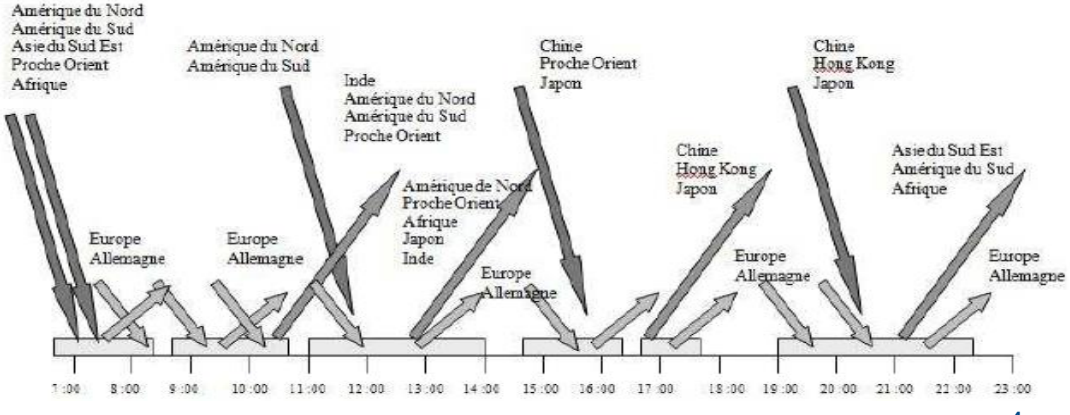
About 1,400 flights per day

2 aircrafts per min at peak hours

RWY throughput: 73 ARR/h – 76 DEP/h

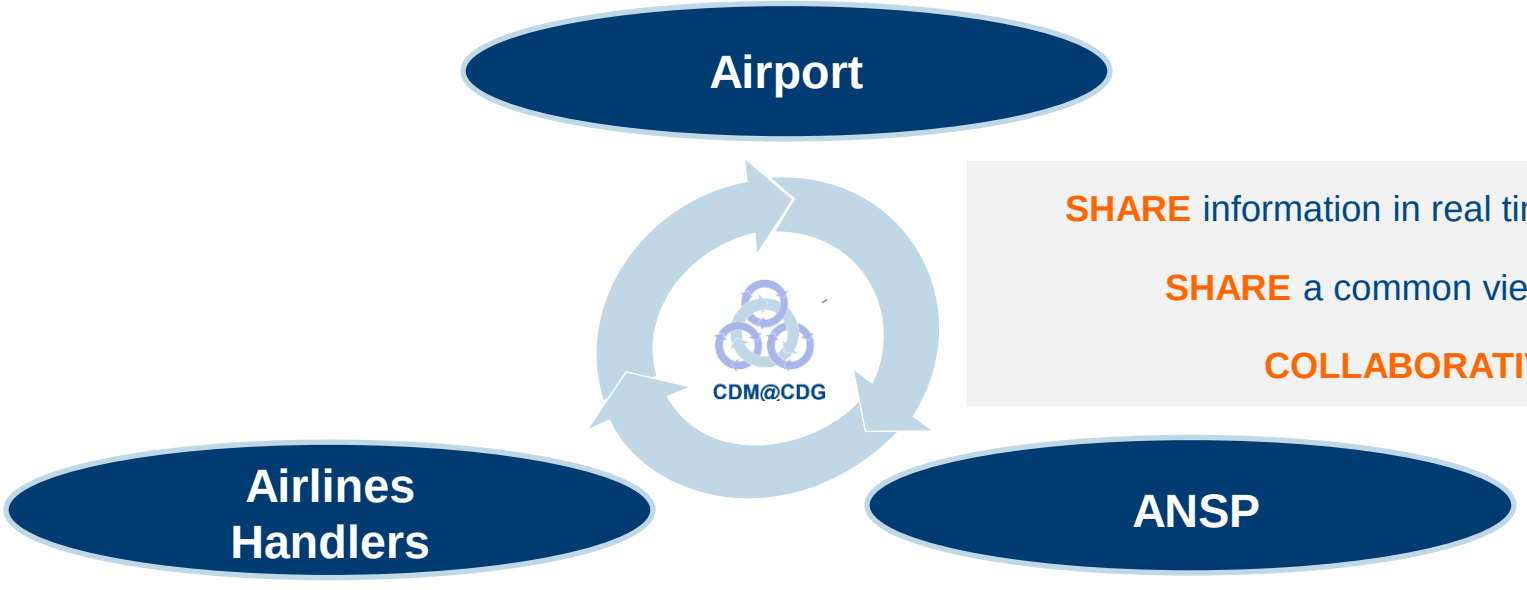
AIRFRANCE

Hub Structure for half of traffic



CDM concept

A concept aiming at improving <u>airside operations</u> (nominal and adverse conditions), between :



SHARE information in real time

SHARE a common view

COLLABORATIVE decision

This project is supported by Europe through Eurocontrol and SESAR project (Single European Sky ATM Research)

Commission européenne

EUROCONTROL

CDM@CDG concept

CDM origins

Since 2003, airports became bottlenecks

Congestion Point between airport & en-route delays

European traffic is due to triple by 2025

→ Triple the capacity

→ Reduce ATM costs by 50% per flight

→ Increase safety by a factor 10

→ Reduce the environmental impact per flight by 10%

CDM@CDG origins

2003 Snow Event with

- ✓ 2 days non-stop
- ✓ Cancellations : 25%
- ✓ Delays : +2h per flight
- ✓ Around 5,000 pax stucked inside terminals and 5,000 pax in the hotels

⟹ Every stakeholder used to work in silos, there was no coordination, no information sharing…

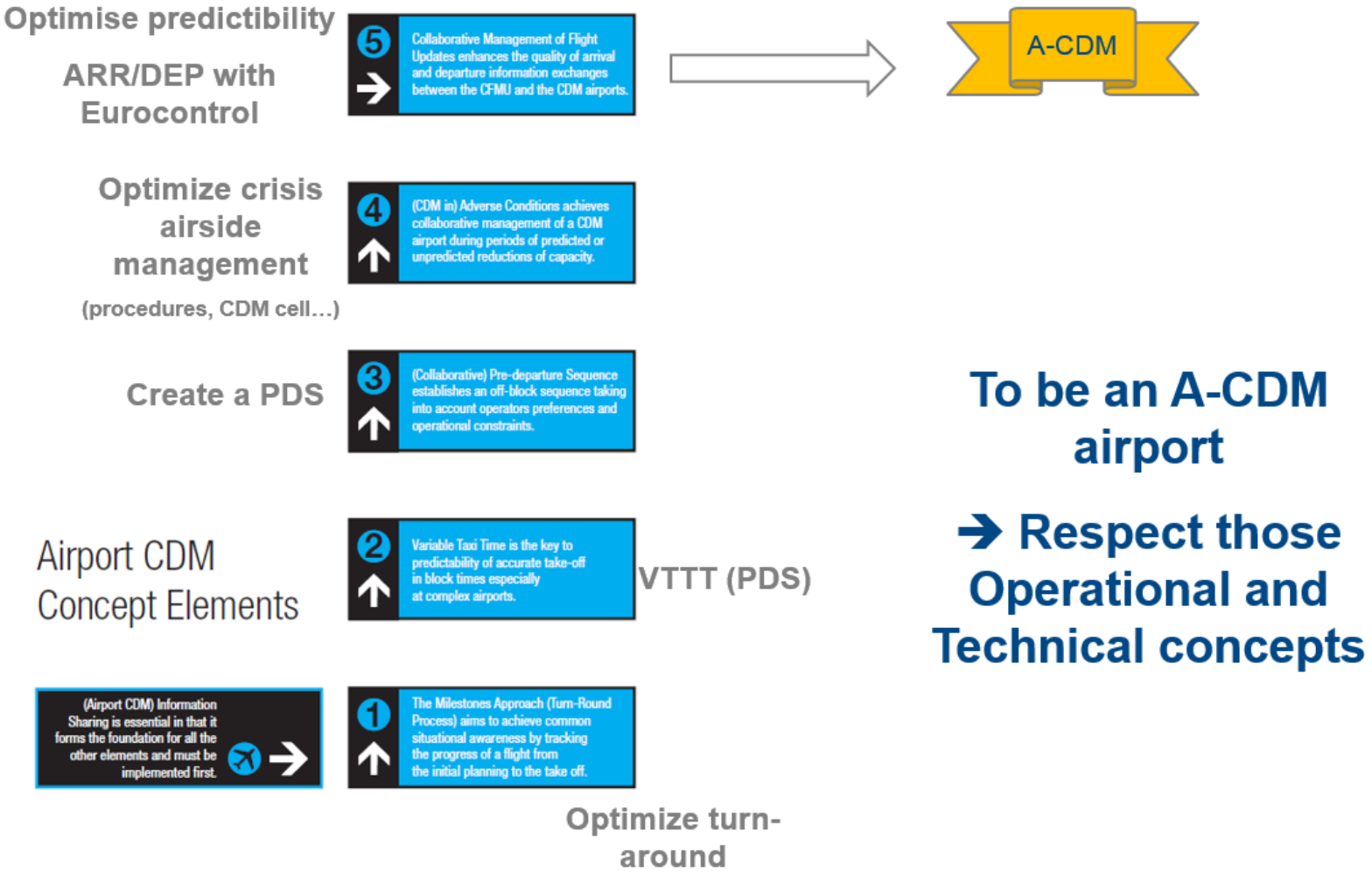
2004 DSNA, Aéroports De Paris and Air France launched CDM@CDG program in order to :

- ✓ deploy Airport Collaborative Decison Making (A-CDM) concept with Eurocontrol rules
- ✓ reduce delays, improve departures and arrivals prectibility
- ✓ reduce taxi-time, kerosene consumption and polluting emissions (CO_2, NO_X, HC …)
- ✓ optimize airport capacities and resources usage

A-CDM label given to CDG on Nov 16th, 2010


EUROCONTROL
DIRECTORATE OF NETWORK MANAGEMENT
Airport Collaborative Decision Making
In recognition of the effort of all
Paris Charles de Gaulle
Airport partners
in their successful implementation of the following Airport Collaborative Decision Making elements:
Information Sharing
Milestone Approach
Variable Taxi Times
Pre-Departure Sequence
Adverse Conditions
Management of Flight Updates with the ATFM network
In accordance with the principles described in the EUROCONTROL A-CDM Implementation Manual.

CDM@CDG origins

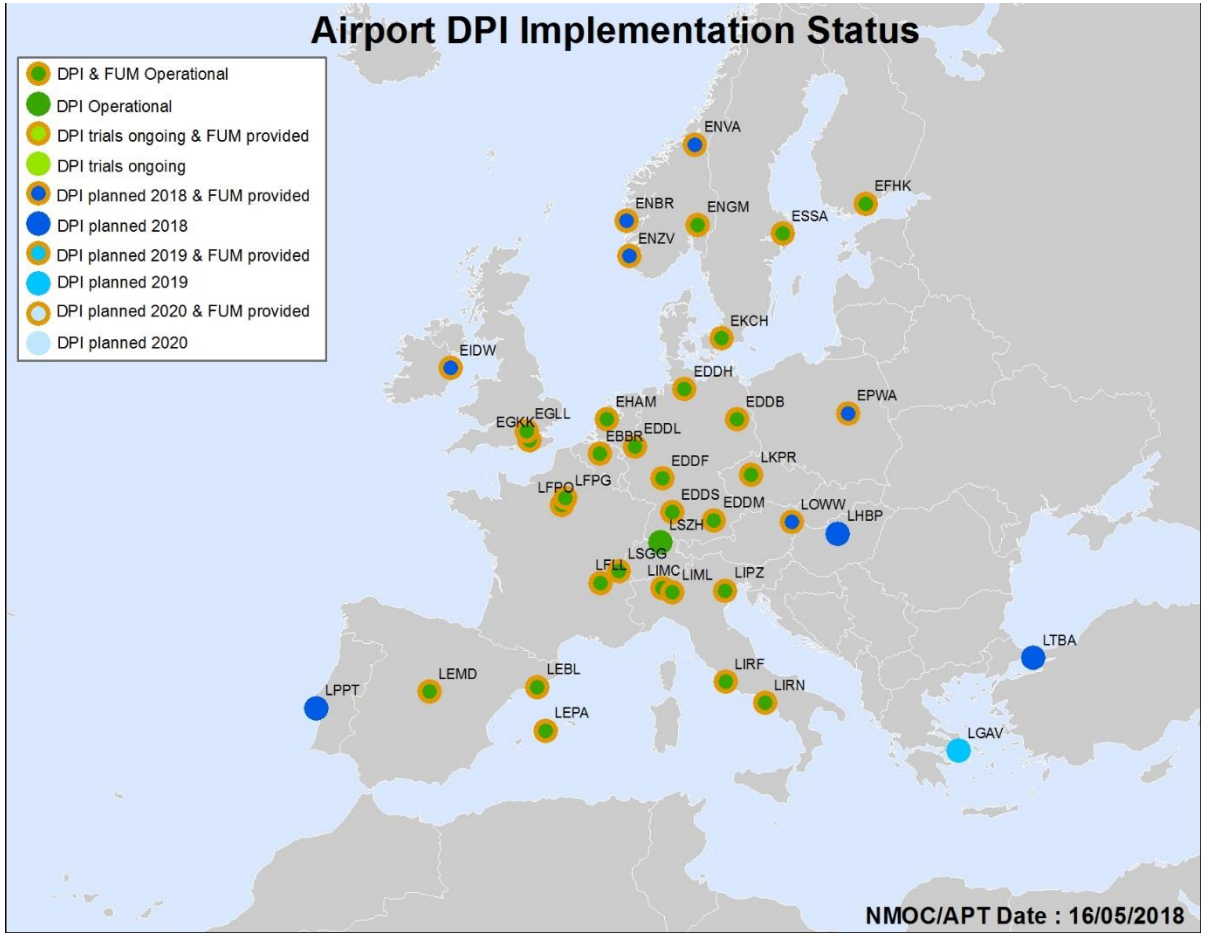


To be an A-CDM airport

➔ Respect those Operational and Technical concepts

A-CDM airports across Europe

A-CDM is fully implemented in 28 airports accross Europe



A-CDM outside Europe

- Dubai (DXB)
- Changi (SIN)
- HongKong (HKG)
- Mumbai (BOM)
- Australia (multi-a/p)
- New Zealand
- Russia
- Africa
- Americas (YYZ, GRU)
- Others…..

CDM@CDG structure

Operational Pillar

To optimise operational collaboration between stakholders

- → To reinforce sharing information: daily teleco and dedicated website
- → To create trust between stakeholders
- → To harmonize processes and improve collaboration decision process

Technical Pillar

To optimise departures flights sequencing

- → Industrialize the departure process
- → Optimize airport ressources: Boarding, Stands, Deicing pads, Runways
- → Reduce traffic congestions on taxiways and close to runways thresholds (increase safety)
- → Limit the environmental impact of airport operations (kerosene, gas emissions)
- → Enhance predictability to the Network Manager (prediction 3 hours before)
- → Optimise punctuality (a better Delay 0 KPI)

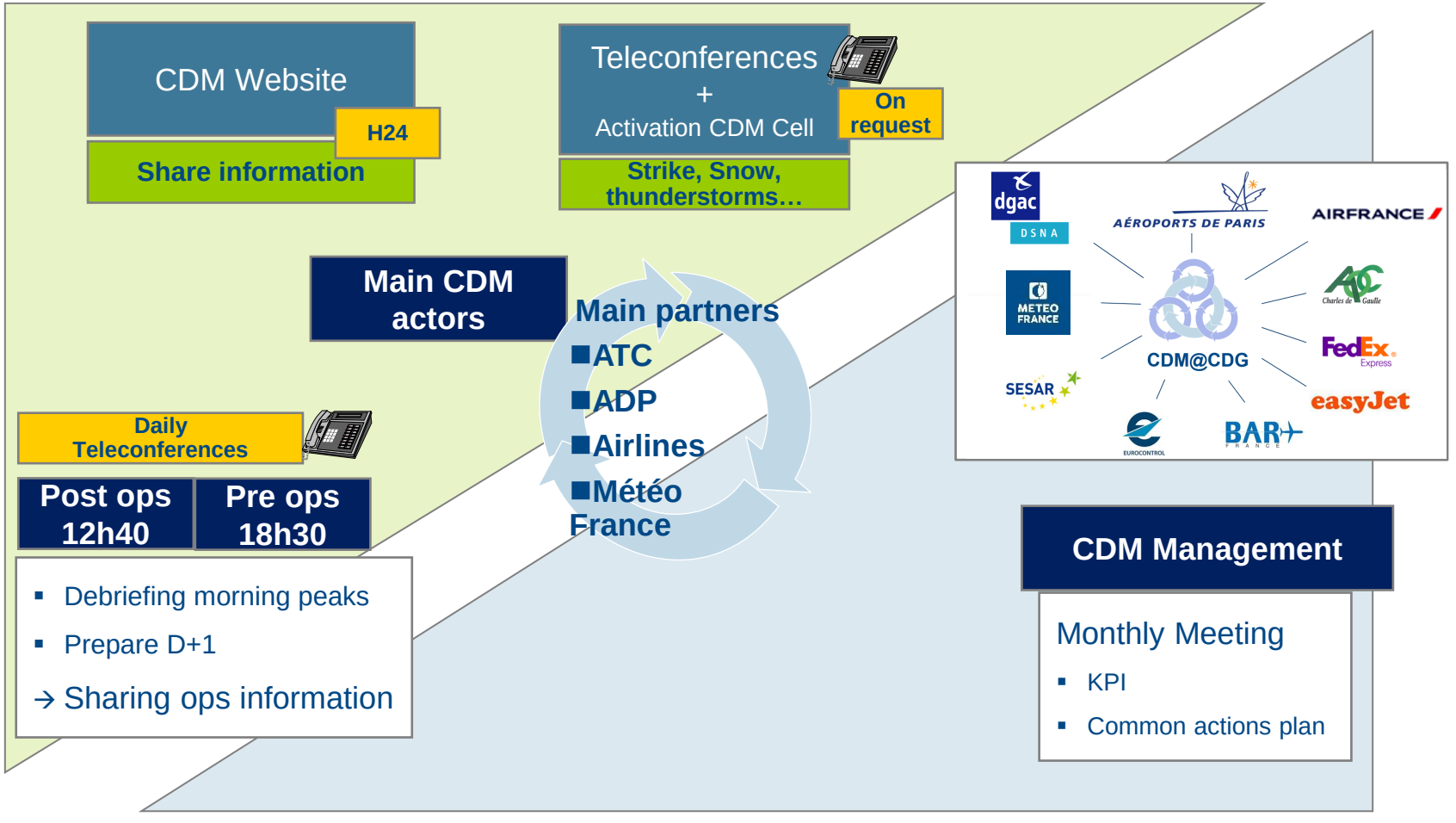
Benefits

Dep taxi-time : - 2.5 min/flight

Kerosene : - 4,000 t/yr (~4 M€/yr for airlines)

CO_2 : -12,000 t/yr

CDM@CDG structure



CDM cell

At Paris-CDG, operational collaboration is present in **normal** conditions and stepped up in **adverse** situations.

When there are adverse conditions, the operational stakeholders decide to meet up in a dedicated decision-making room : **the CDM Cell.**

→ Its main purpose is to improve communication between the stakeholders to facilitate joint analyses and decision-making.

CDM Cell in « veille opérationnelle » : LEVEL 1

- Nominal situation
- REP CDGR (Airside Ops duty manager) supervising airside operations
- Sharing information and collaborative decision between ops stakeholders

CDM Cell in « veille active » : LEVEL 2

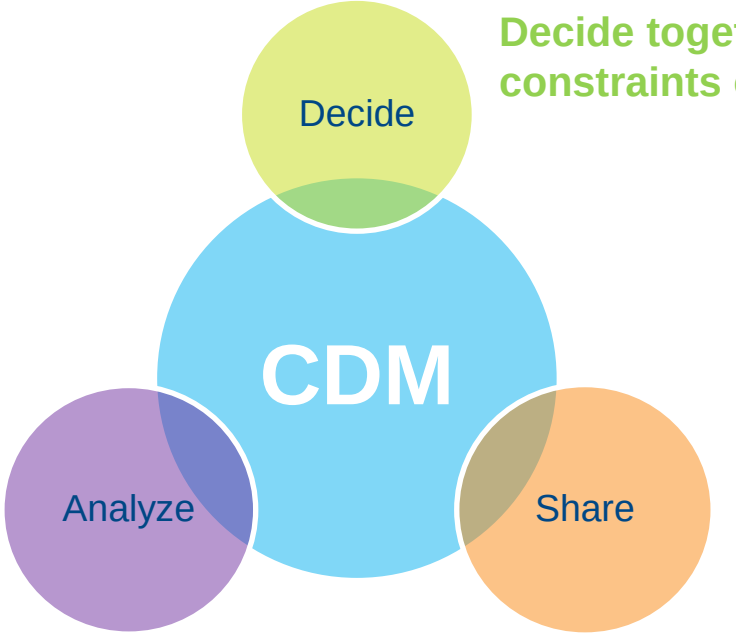
- Monitoring non nominal situation (e.g. starting a runway refurbishment)
- Anticipating delays

CDM Cell in « armé décisionnaire » : LEVEL 3

- Stakeholders present in the A-CDM cell define the strategy to optimise airside operations

CDM cell

In order to manage the airside operations during adverse conditions and make the tactical decisions, it is necessary to :

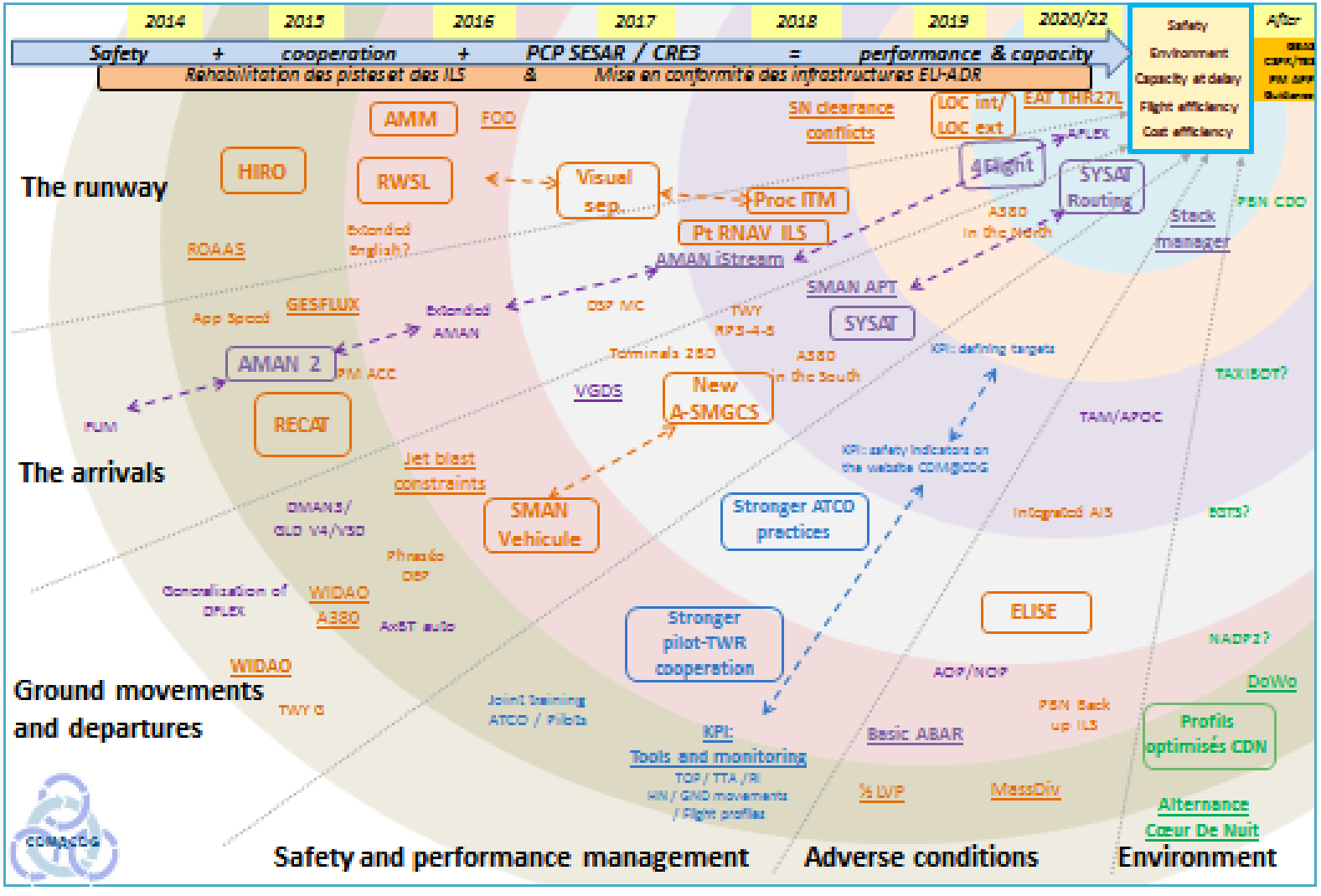


Decide together within the constraints of each stakeholder

Develop tactical solutions on resources utilization (runways, de-icing pads…) and impact on traffic

Share available information continuously to all participants

ROADMAP CDM@CDG 2020



CDM@CDG : for all parties' interest

- ✓ for Eurocontrol the European **Network Manager** : more up to date and accurate information leading to better network planning
- ✓ for the **airport operator** : improved use of stands/gates
- ✓ for the **ground handler** : more accurate arrival times and planning. Better use of resources
- ✓ for the **aircraft operator** : improved awareness about the status and location of the aircraft, more accurate fleet predictions. Significant decrease in fuel costs - for the environment: less noise and lower CO_2 and NO_x emissions
- ✓ for the **air traffic controllers** : reduced workload due to a greater predictability of traffic
- ✓ for the **passenger** : reduced delays and probability of missed connections, better reliability on flights meaning improved customer satisfaction

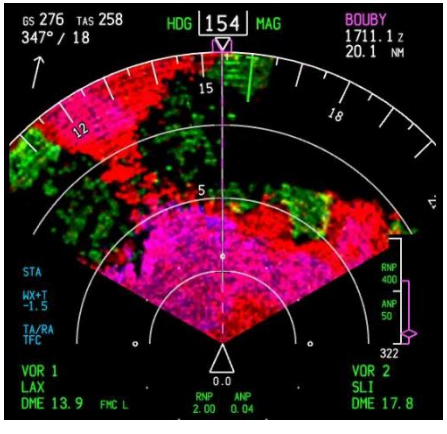
CDM@CDG

- ✓ Optimises the aircraft turnaround process and improves operational efficiency.
- ✓ Is based on information exchange between operational users and suppliers of services at airports.
- ✓ Improves accuracy and predictability of arrival and departure information.
- ✓ Improves punctuality as airport partners work together as an aircraft turnaround team.

CDM implementation

MET@CDM

Gains



Météo France: a key partner for CDM@CDG

Share information for pro activity

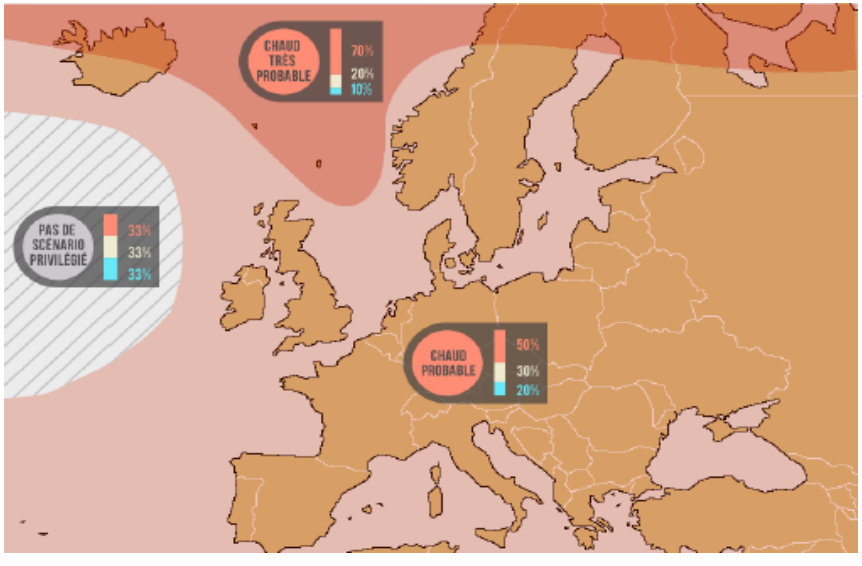
Update on regular basis

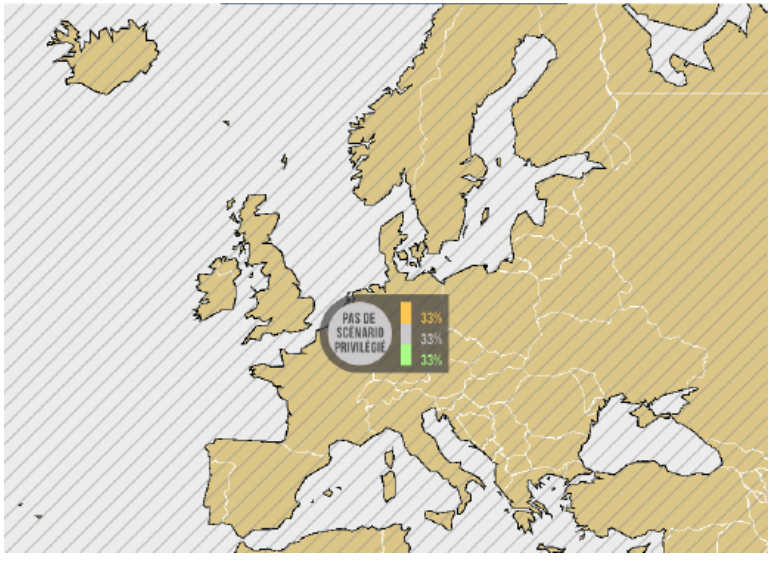
Communicate for better understanding

Back-up CDM community → manager on duty during winter period, physically participating to CDM cell

Develop tools to meet customers needs and expectations → dedicated WG

Long term forecast for coming winter (temperature & precipitations)





METEO FRANCE @CDG

Dedicated website providing observations & forecast

https://pro.meteofrance.com/page/index/affiche/id/170003 — Accueil Portail — Météo-France Pro

OBS 10:01Z | PREVI 09:20Z | MAA ..:..Z ../.. | LVP 09:00Z | CHAT --/-- --:--Z — Aéroports de Paris — Déconnexion

METEO FRANCE | CDG | ACCUEIL | AEROGRAMME | BULLETIN REGIONAL | OBSERVATIONS | AIDE DECISION | PREDEC+ | METAR & TAFs | APPROCHE | IMAGERIE | PASSE | CHAT | Contact | Vers ORY

Accueil / ACCUEIL

Bienvenue sur le site internet Météo-France de l'aéroport de Paris-CDG

INFORMATION

A compter du 2 mai 2018, les données mesurées de la page observation, de la page d'accueil et du voyant obs sont actualisées toutes les minutes.

Le diagramme des contaminants et températures de piste est désormais mis à jour au pas horaire. Il est accompagné d'une nouvelle légende. *Voir l'onglet AIDE DECISION / ETAT PISTES*

06/07/2018

10:01Z

1/8 CI 25000ft

>10km

24.6 °C

49 %

050° 3kt

MAX 5kt

1021hPa

Vue vers le NORD

Actualisation toutes les 10mn

Dernière image

Animation sur 1h30mn

Mentions Légales | Contact | Version mobile

METEO FRANCE @CDG

Real time observations

Paris-CDG (108m) - Observation du vendredi 06 juil. 2018 - 10:11Z (12:11 LT)

Temps présent	Nuages en formation ou en train de se développer
Etat du sol naturel	Sol sec

VISIBILITÉ et CIEL

Visibilité	Nébulosité	Couches Nuageuses
>10km	1/8	1/8 CI 25000ft

TEMPÉRATURE, HUMIDITÉ et PLUIE

T. sous abri	Td (Pt. rosée)	Humidité	T +10cm	T sol	T -10cm	Pluie 6'
24.8 °C	13.4 °C	49 %	33.9 °C	45.9 °C	21.6 °C	0 mm

VENT

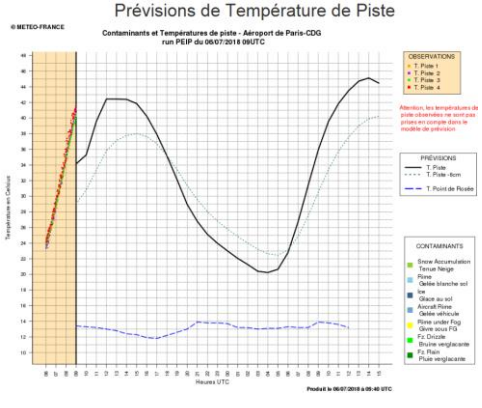
	Moyenne sur 10 minutes	Moyenne sur 2 minutes	Rafale maximale	
09	020°/3kt (5km/h)	280°/2kt (4km/h)	4kt (8km/h)	
	010°/4kt (8km/h)	020°/3kt (6km/h)	3kt (5km/h)	27
08	030°/5kt (9km/h)	040°/8kt (14km/h)	9kt (17km/h)	
	040°/4kt (7km/h)	010°/4kt (8km/h)	6kt (11km/h)	26

PRESSION

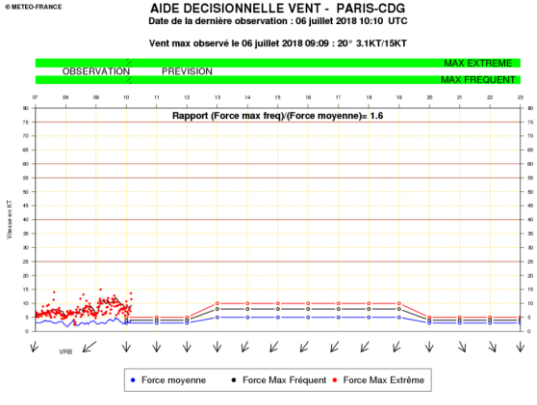
Pression niveau mer	1021.4 hPa	QNH	1021 hPa	POM	> 20000m

HBN		RVR						HBN	
09	> 26000ft	09L	> 2000m	MED	> 2000m	27R	> 2000m	27	> 26000ft
		09R	> 2000m	MED	> 2000m	27L	> 2000m		
08	> 26000ft	08L	> 2000m	MED	> 2000m	26R	> 2000m	26	> 26000ft
		08R	> 2000m	MED	> 2000m	26L	> 2000m		

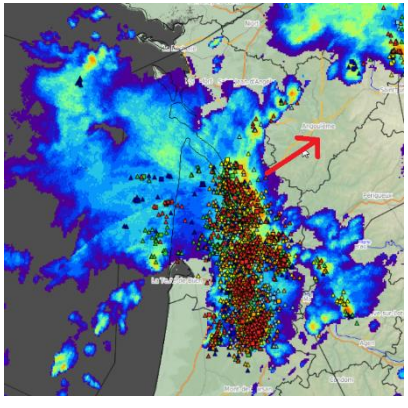
RWY temperature forecast



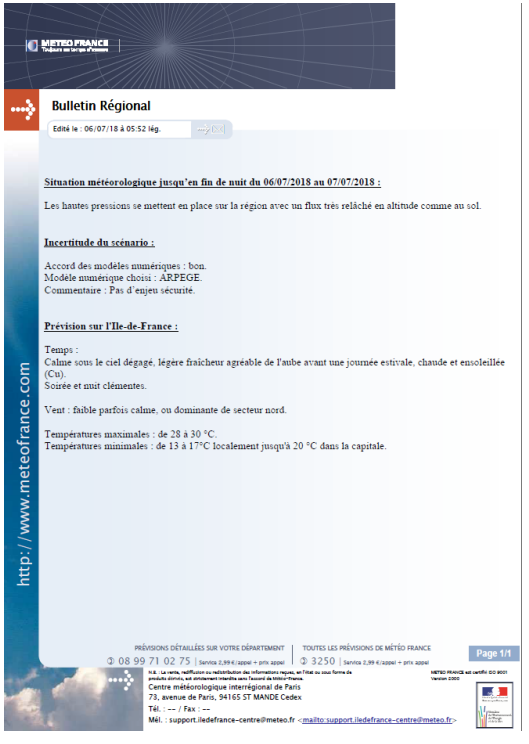
Wind speed



Radar imagery



Regional forecast



METEO FRANCE

Bulletin Régional

Edité le : 06/07/18 à 05:52 lég.

Situation météorologique jusqu'en fin de nuit du 06/07/2018 au 07/07/2018 :

Les hautes pressions se mettent en place sur la région avec un flux très relâché en altitude comme au sol.

Incertitude du scénario :

Accord des modèles numériques : bon.
Modèle numérique choisi : ARPEGE.
Commentaire : Pas d'enjeu sécurité.

Prévision sur l'Ile-de-France :

Temps :
Calme sous le ciel dégagé, légère fraîcheur agréable de l'aube avant une journée estivale, chaude et ensoleillée (Cu).
Soirée et nuit clémentes.

Vent : faible parfois calme, ou dominante de secteur nord.

Températures maximales : de 28 à 30 °C.
Températures minimales : de 13 à 17°C localement jusqu'à 20 °C dans la capitale.

http://www.meteofrance.com

PRÉVISIONS DÉTAILLÉES SUR VOTRE DÉPARTEMENT 08 99 71 02 75 | TOUTES LES PRÉVISIONS DE MÉTÉO FRANCE 3250

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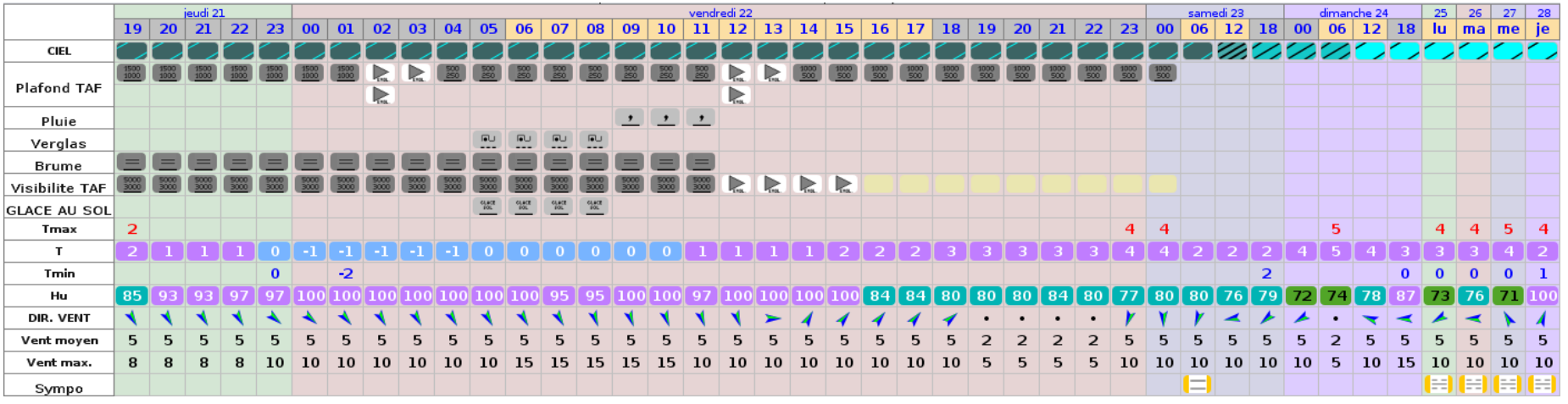
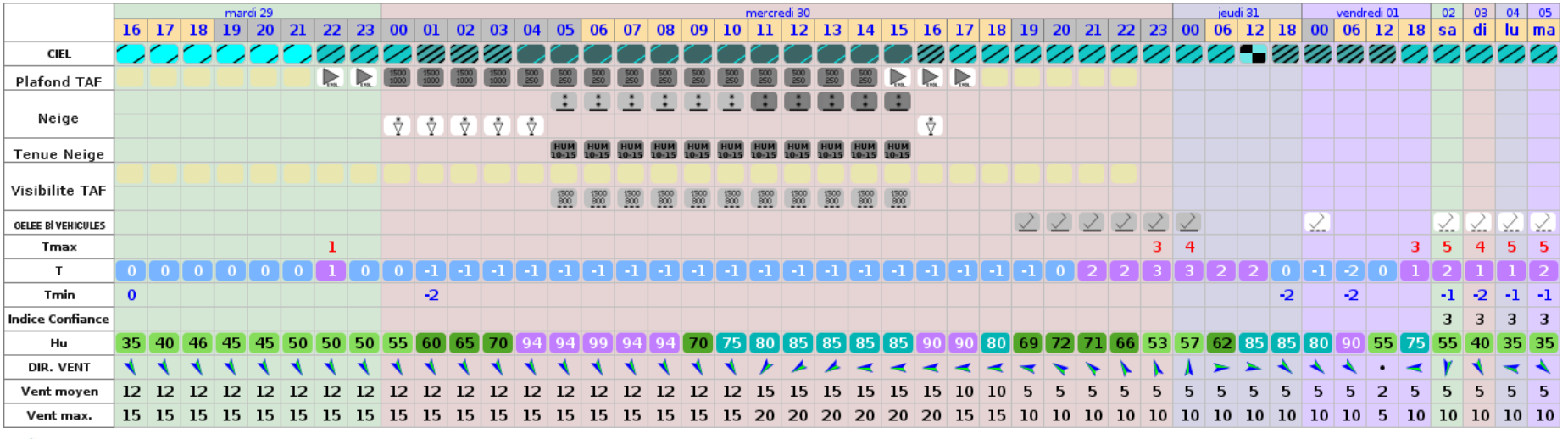
Tél. : -- / Fax : --
Mél. : support.iledefrance-centre@meteo.fr

The « Aerogramme » as a reference

Short term detailed forecast for coming hours & days

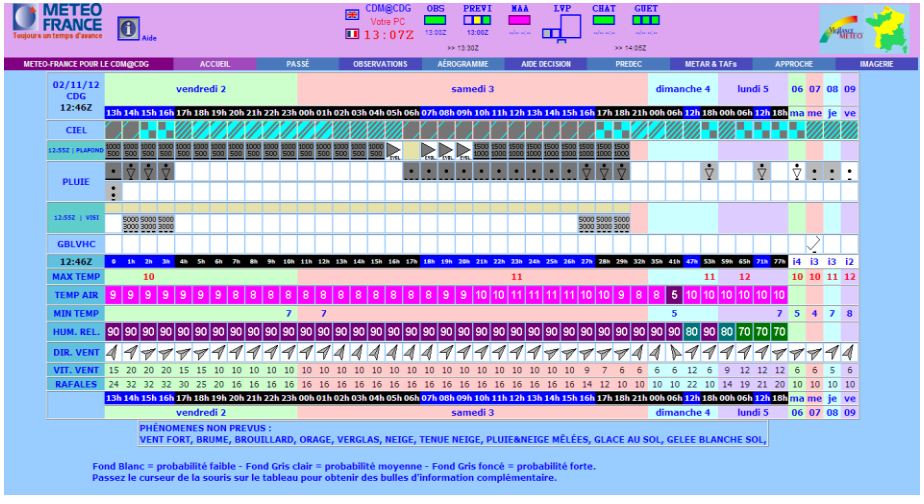




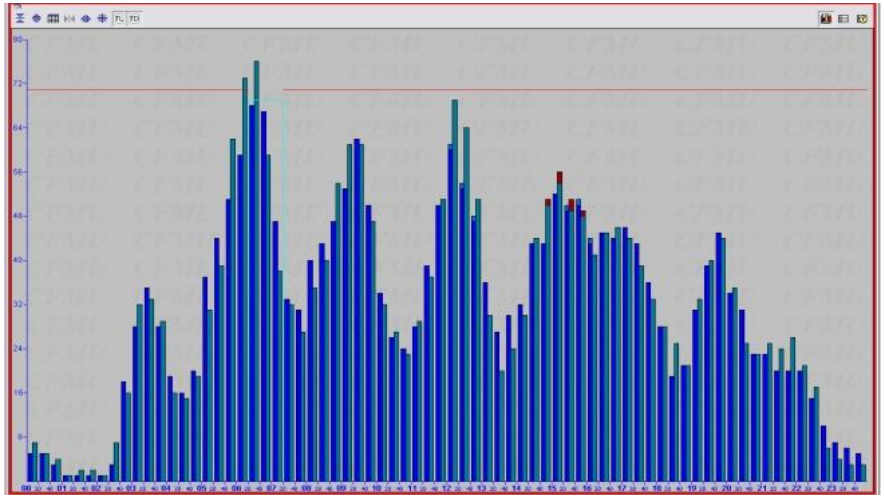
Pre-tactical work in winter conditions

Share and analyze

Weather forecast



Global traffic forecast



And other information or partners constraints that can impact traffic flow

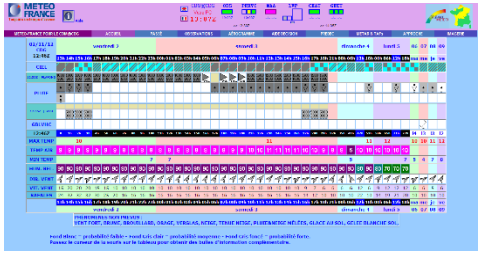
Decision

- Characterize the CDM Cell operational collaboration's level
- Adaptate de-icing & snow clearing means
- Suggest cancellations flights

Tactical work in winter conditions

Share and analyze

Meteorological forecast

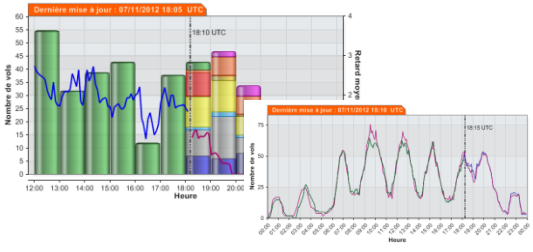


RWY Temp & freezing point

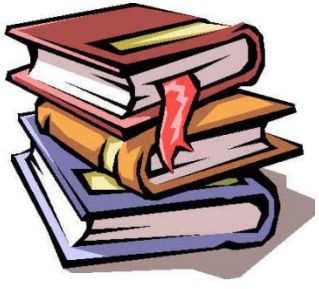
Ground movements

Local ATC data

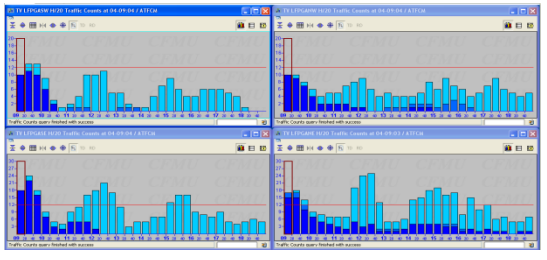
Real-time indicators : Traffic load, deicing throughput, etc.



Snow plan



Network data



And other information!

Decision

- **Decisions focused on infrastructure usage optimization**
- **Runways and Taxiways snow clearing strategy**

CDM implementation

MET@CDM

Gains

Gains

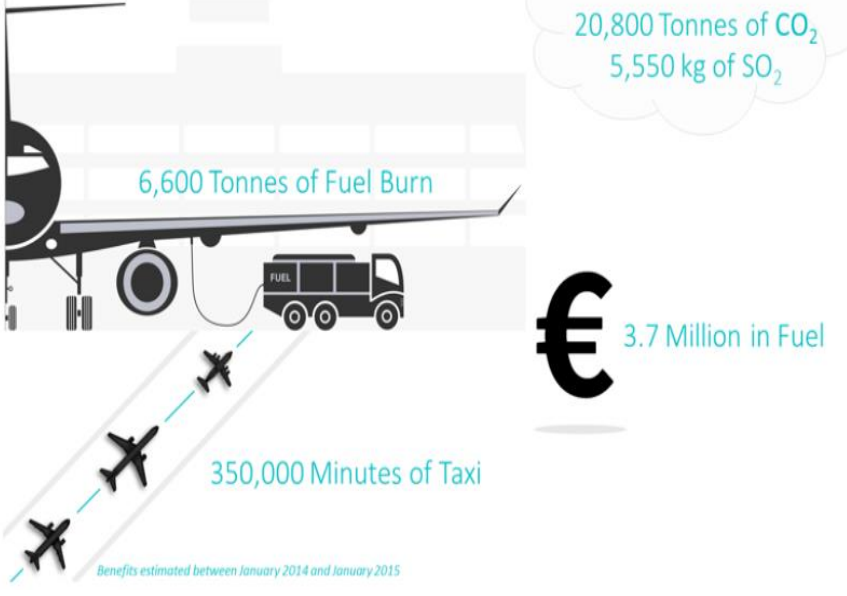
Improvements on :

- Safety
- Punctuality
- Forecasting
- Confidence
- Performance and capacity
- Quality standards
- Risk assessment
- Crisis management
- Taxi time
- Airport image

Figures

- Aircraft queueing (-40%)
- ATC delays
- Taxy time (up to 20%)

- Environmental impacts
  - Fuel consumption
  - CO_2 emissions



Thank you for your attention