



SESAR Showcase

A Conference & Exhibition of SESAR 1 Results

Amsterdam, 14-16 June 2016



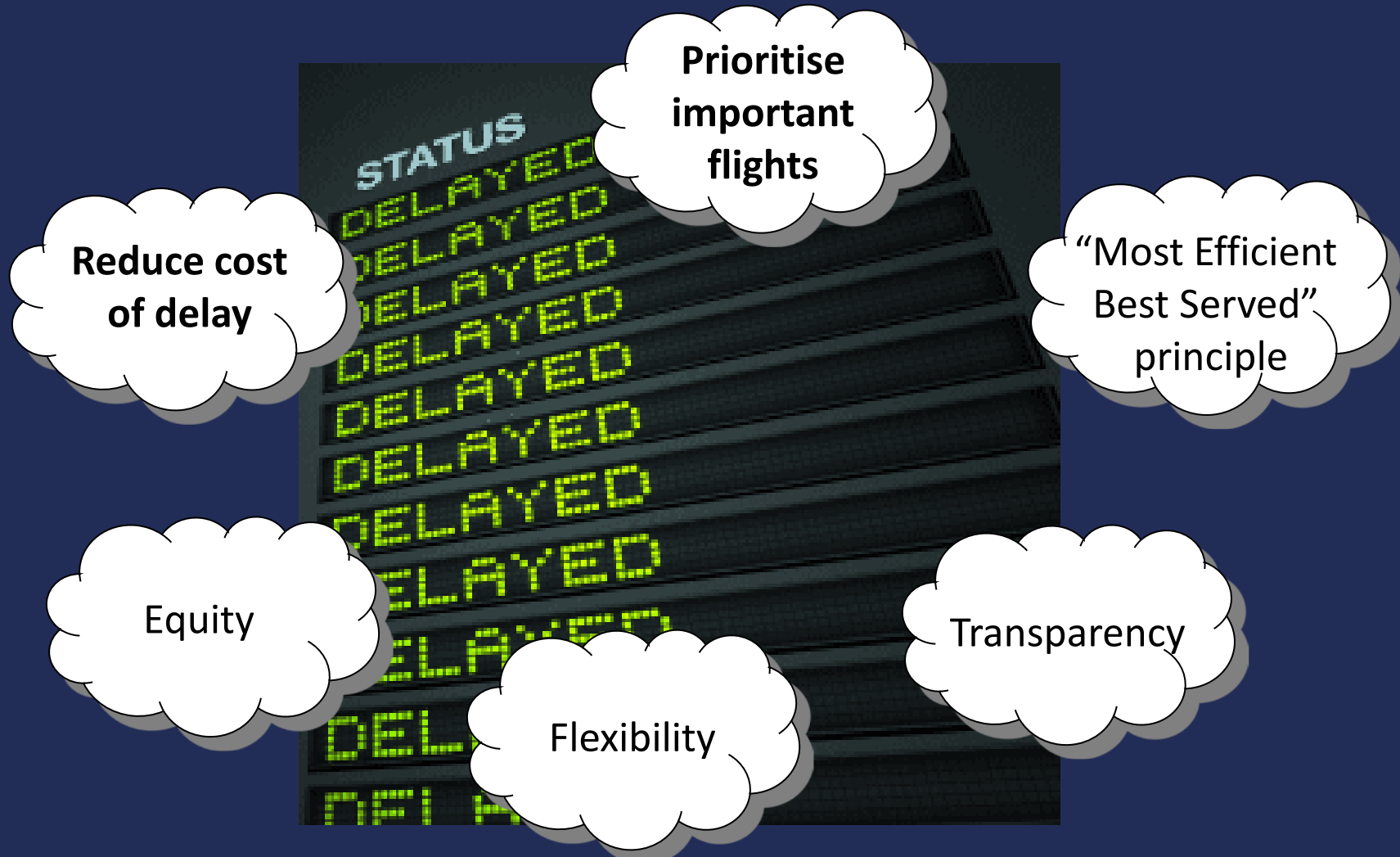


Airspace users reducing delay costs with the user-driven prioritisation process (UDPP)

Nadine PILON, EUROCONTROL

Olaf BELZER, SABRE

Needs of Airspace Users in case of delays



... to minimise the IMPACT or COST of delay on their operations !

User-driven prioritisation process (UDPP) in brief

UDPP provides AUs with the possibility to reduce their costs of delays by re-arranging their own flight sequences in case of delays through an AU-driven prioritisation process.

Two approaches have been validated in SESAR:



- Enhanced ATFM slot-swapping
- UDPP departure: AUs can change the priority order of flights in the pre-departure sequence : DFlex at Paris-Charles de Gaulle

New prioritisation approaches have been elaborated

Enhanced ATFM slot-swapping – problem statement

In order to maintain safety, the European Network ATFM aims to maintain traffic safety may impose delays before departure (ATFM slots) on certain flights

→ limitations on AUs operations

- For ATFM, all flights are equal
- For AUs, every flight is unique
- Reasons:
 - Passenger experience
 - Limitations: airport/crew/aircraft
 - Schedule Integrity

Principles of the UDPP concept

Respect all stakeholders' needs



Network /
Airports /
ATC
constraints



AU
needs

- Flexibility
- Equity
- High rate of acceptance of requests by ATM

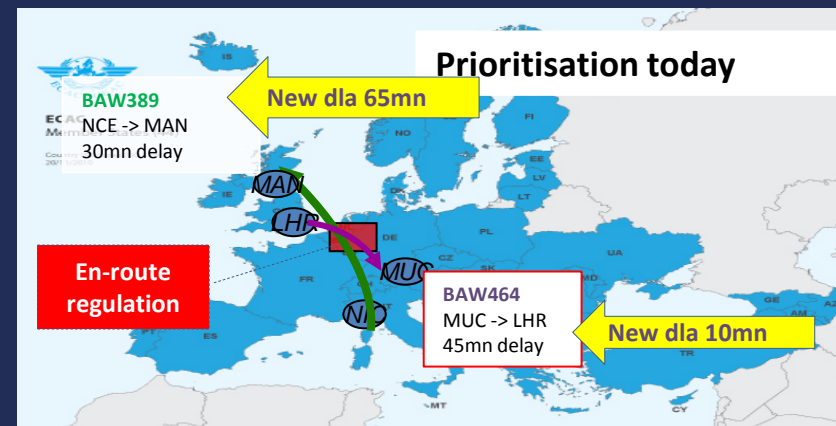
Prioritisation with ATFM slot swapping

Exists today!

- Requested by AUs to NM, under strict rules
- About 1500 swaps in 2013
- Figure significantly increasing

Enhanced to cope with:

- Opportunities limited to single swap
- Difficult to identify swaps that adhere to the rules
- Manual effort to request swaps
- Errors



SESAR Enhanced Slot Swapping

Multi-Swap

Substitution on Cancellation

Pre-Allocated Slot Swap

Automation Tool (eSS)



- Tool for airspace users
- Presents viable swap solutions quickly
- Highly configurable

- eSS Prototype developed at EUROCONTROL
- Used to refine known user requirements and identify new ones

Enhanced Slot Swapping Live Trial (2014/15)



13 AUs and the Network Manager:
most (90%) of swaps in Europe 'in
the trial'

Dec 2014 to Jan 2015, extended to
Mar 2015 at AUs' request

Aer Lingus

airberlin

AIRFRANCE

BRITISH AIRWAYS

easyJet

EUROCONTROL

FedEx

HOP!

KLM
Royal Dutch Airlines

Lufthansa

SAS

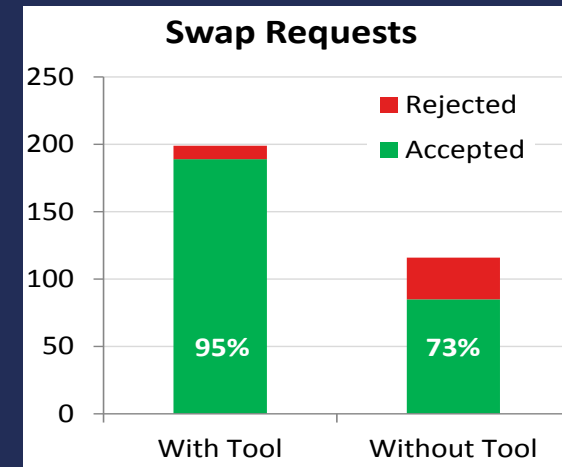
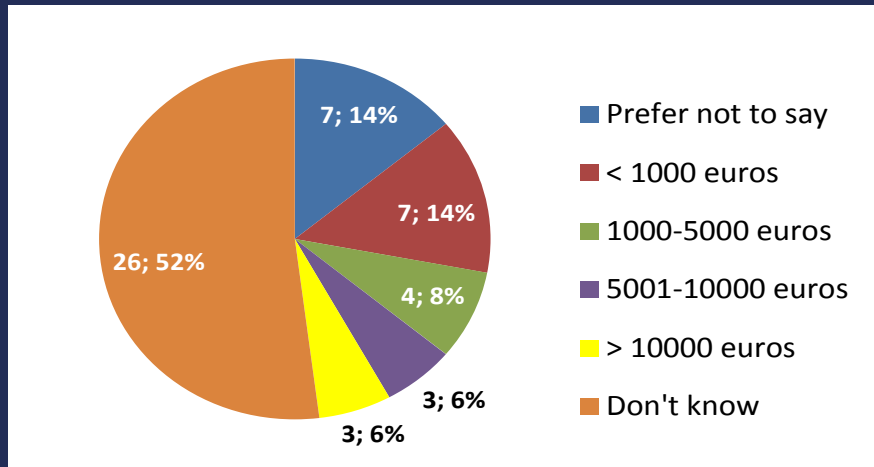
SWISS

Thomas Cook Group

TURKISH AIRLINES



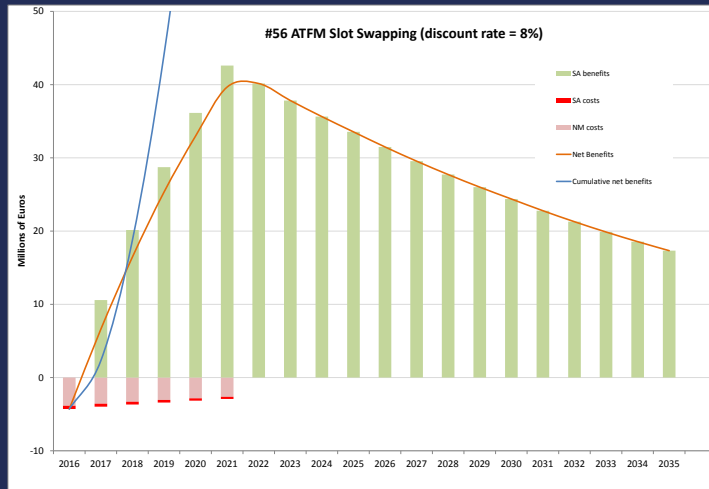
Enhanced Slot Swapping - benefits



- **EUR 4600** – the average cost saved per single ATFM slot swap
- **EUR 7-8 million** per year saving currently

Benefits	Airspace Users	Network Manager
More opportunities to swap	✓	
Reduced workload	✓	
Reduced cost of delay	✓	
Higher acceptance of swap requests	✓	✓

Enhanced Slot Swapping Ready for deployment



UDPP Business case (2035)

Net Present Value	Investment Cost	Benefits
Discounted at 8%		
503 M€	21 M€	524 M€

SESAR recommends to deploy:

- The eSS prototype is still in operation since the trial, deployed to interested airlines in the Network Manager Airline Operations Group (NM AOG)
- Deployment in EUROCONTROL NM-2017 release , to be available to all airspace users

Future: UDPP for full prioritisation

Support AUs to safeguard their operations during any Capacity Constrained Situations (Departure – En-route – Arrival):

- Pro – active repositioning for important flights
- Respecting Equity
- Sharing information: an AU input to Network collaborative decision making processes



Pro – active repositioning

How can AUs identify the “best” flights to be protected?

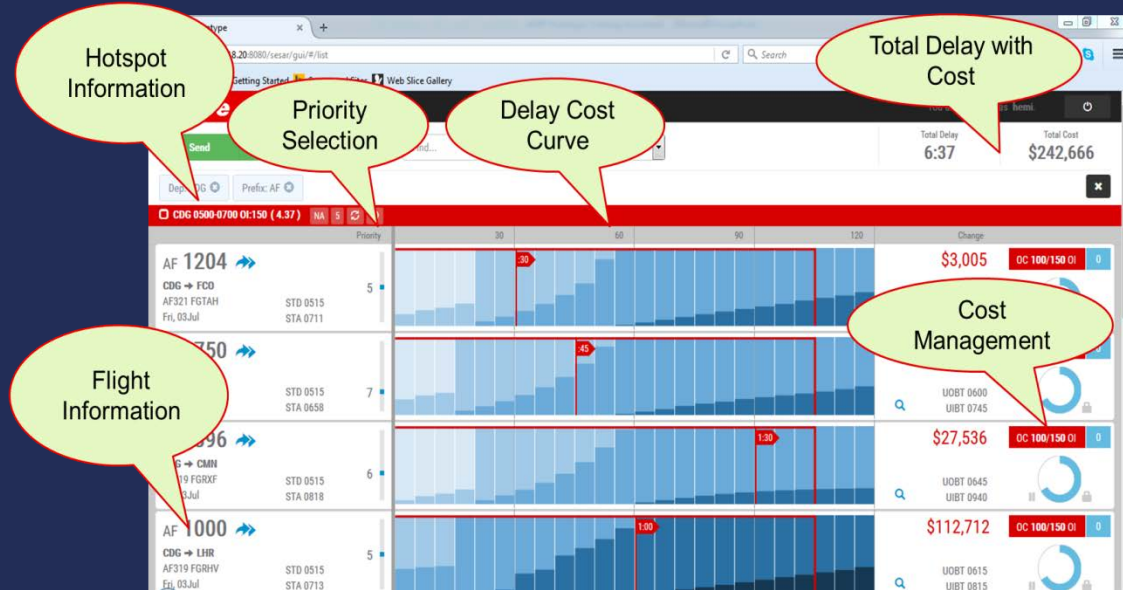


- Passenger experience
- Schedule integrity
- Airport/Crew/Aircraft limitations

Operational Cost Model developed by SABRE

- Visualising cost impact per flight
- Based on a delay cost curve
- Taking all factors into account

Operational Cost Model



Initial validation
10% - 15%
cost saving potential

Independent from

- Type of operations
- Fleet
- Scenario



Conclusion

UDPP brings AUs flexibility to reduce their cost of delay!

- Enhanced Slot Swapping: deployment for all AUs by EUROCONTROL in 2017
- More features in SESAR2020: Standardised procedures and standardised tools
- Significant achievements thanks to all stakeholders involved:



... and Frankfurt, Munich, Heathrow and Paris-CdGaulle Airports

Thank you for your attention



More information:

nadine.pilon@eurocontrol.int – +33 6 15 25 46 41

Olaf.belzer@sabre.com – +49 173 6014627

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Departure Flexibility at Paris Charles de Gaulle

SESAR Demonstration Project : DFlex

Mélanie Grandmaire
Kamal Amri

Air France
Groupe ADP

DFlex – A unique team

The DFlex consortium:

- CDM@CDG stakeholders : DSNA – ADP – Air France/HOP - Fedex
- Eurocontrol (UDPP team)
- American partners : Fedex – Delta – Airbus Prosky / Metron
to ensure interoperability with Next Gen program

AIRFRANCE  

HOP!

 DELTA 

FedEx[®]
Express


DSNA


EUROCONTROL


GROUPE ADP

 AIRBUS
AN EADS COMPANY
 METRON
AVIATION




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DFlex – “Raison d’être”

Airlines make passengers fly, not only planes !



 DEPARTS DEPARTURES			
HORAIRE TIME	DESTINATION DESTINATION		
12:00	AF342	YUL	delayed
12:30	AF1294	BUD	delayed
12:50	AF682	ATL	delayed

On a given day, AF682 should leave before AF1294 !

DFlex ➔ **Economic optimisation** of flight schedule



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DFlex – A step beyond the “Airport CDM”

Airport CDM:

- Information Sharing
- Improving efficiency
- Improving en-route sector planning



DFlex: a step beyond for the benefit of aircraft operators

- Flexibility in case of disruptions
- For all aircraft operators
- Significant value for key actors
- 1st airport implementation of UDPP concept



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DFlex – Flexibility means ...

Flexibility based on:

- 1st Scheduled / 1st Served principle
- Departure flight list (3 hours ahead)
 - time frame not limited to flight plan activation
 - based on airport system (flight schedule) & ATC system (DMAN)

3 functions developed to address Flexibility :

- Flight sequence reordering
- Flight ready to start
- Use priority order of a cancelled flight



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DFlex – Use Case 1

Flight sequence reordering

Initial priority order
(based on Schedule)

AF1214 / ZRH

AF7622 / BOD

Candidate for reordering

UX1034 / AGP

KL1230 / AMS

AF1888 / OTP

AF7652 / LYS

ME210 / BEY

EI521 / DUB

AF444 / GIG

AF12 / JFK

Flight to be prioritized

DL219 / MSP

AF342 / YUL

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DFlex – Use Case 2

Flight Ready to start

Initial priority order
(based on Schedule)

AF1214 / ZRH

AF7622 / BOD

UX1034 / AGP

KL1230 / AMS

AF1888 / OTP

AF7652 / LYS

ME210 / BEY

EI521 / DUB

AF444 / GIG

AF12 / JFK

Flight ready to start

DL219 / MSP

AF342 / YUL

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DFlex – Use Case 3

Use priority order of a cancelled flight

Initial priority order
(based on Schedule)

AF1214 / ZRH

AF7622 / BOD

Flight cancelled

UX1034 / AGP

KL1230 / AMS

AF1888 / OTP

AF7652 / LYS

ME210 / BEY

EI521 / DUB

AF444 / GIG

AF12 / JFK

Flight to be prioritized

DL219 / MSP

AF342 / YUL

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DFlex – From demonstration to deployment

A step-approach defined in order to mitigate the risk identified

Demonstration
Project

- REORDERING → March 2013
- Flight trials performed during 4 weeks in 2013
- Decision to continue the service
- PRIO. / CANCEL. functions → December 2013

- Officially in service since 2014
- Service opened to all → January 2016

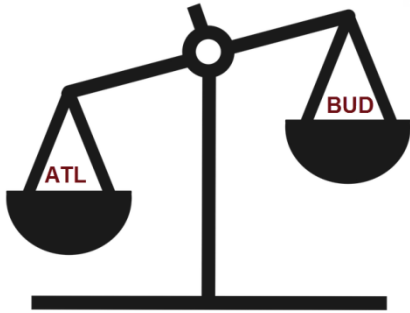
Deployment
Project



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DFlex – Airline results



20 ' saved on CDG-ATL vs 20 ' lost on CDG-BUD

➔ No minutes saved

But cost delay difference **up to 100 € /min**

- **DFlex Benefit = loss reduction**
- Mainly used during disruption day (when demand > capacity)
- **20 to 50** opportunities / disruption day
- **2000 €** of cost savings / prioritized flight
- Up to **10% of loss reduction** for a given disruption day



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DFlex – CDM@CDG compliant

- **Equity** → One of CDM@CDG pillar
- **Customer satisfaction** → Protection of sensitive flights
- **Transparency** → DFlex actions on CDM website
- **Fair-play** → Partnership between airlines



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DFlex – Smooth integration with ATC process

- No negative impact on safety & capacity

Use of flight trials

To fine-tune & smoothly integrate Departure Flexibility
Into the ATC Departure Management process (DMAN)

- Succeeded in addressing all stakeholders' needs

Flexibility possible until very last moment before departure
Without jeopardising the ATC departure optimisation



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DFlex - Conclusions

- A step beyond Airport CDM bringing flexibility
- 1st implementation of UDPP concept
- **Significant benefits** in disrupted situations
- Deployed right after the Demo project @CDG airport
- **Quick Return of Investment**

Next step : AFlex - Arrival Flexibility

→ On going Large Scale Demo : iStream Project



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**Thank you
for your attention**