Airport Collaborative Decision Making

A-CDM in Germany
Introduction

- Senior expert Airport CDM/Total Airport Management at DFS – German ANSP
- DFS Focal point A-CDM/TAM
- Chairman German A-CDM harmonisation group

In aviation since 1984:

- 1984 – 1990 German Airforce
- 1990 – 1996 DFS AIS/ARO Officer AIS Frankfurt
- 1997 – 2000 DFS Expert Office TWR/APP Frankfurt
- 2001 – today DFS Senior expert at DFS Headquarter

Licences:

- AIS/ARO – DFS
- FAA Aircraft dispatcher – Simuflite
- Flow Manager – Eurocontrol
- TWR/APP Frankfurt – DFS
Content

- Motivation for Airport CDM in Germany
- Implementation basics – Definition / Process essentials
- Status of Airport CDM in Germany
- Results
- International
Motivation for Airport CDM

Start and motivation of A-CDM in Germany

- It all started in the late 90’s, after a very extreme adverse situation experience at Munich Airport

- Joint evaluation meeting was held to investigate what went wrong
  - Airlines; ATC; Airport Operations; Ground handling....

- One of the most surprising findings/conclusion was:
Motivation for Airport CDM

Start and motivation of A-CDM in Germany

- Despite the same language and although we operate at the same airport
  ..........we do not understand each other........

- Abbreviations
- Definitions
- Partners needs
- Reactions
- Way of thinking
- Regulations and requirements
- Processes for problem solving

“If I had known this, I would have reacted differently…”
So the very first idea of Collaborative Decision Making was born at Munich airport, with the main focus on:

- Common Situational Awareness
- General process during all kind of operations (regular/irregular)
- Coordinated execution of operational processes and decisions
- No Blame Culture
- Focus on the overall system “Airport”
Motivation for Airport CDM

- The main challenges and questions in this period were:
  ➔ Convincing, convincing, convincing, ...........
  ➔ What is my benefit…
  ➔ What is with my data…
  ➔ What are the costs….
  ➔ We have never done this....... 
  ➔ Can´t we buy a tool....
Motivation for Airport CDM

- After a bumpy start of the first CDM attempt in the early 2000’s the decision was taken to start an official ACDM@MUC project in 2004

- Main project partners:
  - Munich Airport Company
  - DFS (ATC)

- Permanent participation of other local partners ensured Airlines, GH, De-Icing Company, etc.

- Close co-operation during the project implementation between ACDM@MUC and Eurocontrol
  - Proof of concept for European Airport operation programme
  - Support of European harmonisation and standardization issues
  - Joint development of ATFM network connection
• Airport CDM is an overall operational process supporting an optimized TurnRound at an airport for all stakeholder/partner
• Airport CDM is about people and processes, not just about tools
• Airport CDM partners are:
  - ATC Tower
  - Apron Control
  - Ground handling
  - Service providers
  - ATFM
  - Adjacent units
  - Airlines
  - Airport Traffic Ops Centre
  - Gate + Positioning
Implementation basics - Process - Essentials

- Let us build an A-CDM tower
- Important: Start with the foundation and build it up step by step
Implementation basics - Process - Essentials

Airport CDM Information Sharing

Common Situational awareness ➔ Baseline for all process parts
Implementation basics - Process - Essentials

- Transparency and Information Sharing is the most important basic step to ensure “Common Situational Awareness” for all partners.

“The right information, at the right time, to the right people”
Implementation basics - Process - Essentials

The Milestones Approach

Airport CDM Information Sharing

Key steps for the successfull A-CDM process

Common Situational awareness ➔ Baseline for all process parts
The original Airport CDM process has 16 defined process milestones.

**Inbound phase**
- Data consistency check
- ATC Flight Plan Activation (EOBT – 3 hrs)
- Take Off from Outstation
- Local Radar Update
- Final Approach
- Landing
- Taxi In (EXIT)
- ALDT
- EOBT – 2 hrs

**Outbound phase**
- Taxi Out (EXOT)
- Start Up Request
- Start Up Approved
- Take Off

**Turnaround phase**
- AIBT
- AGHT
- In-Block / Actual Ground Handling Starts
- TOBT Update Prior to TSAT
- TSAT Issue
- Aircraft Ready
- Boarding Starts
- ARDT
- ASRT
- AOBT
- Off-Block
- ATOT

*Source: Airport CDM implementation manual*
Implementation basics - Process - Essentials

Ensure the feasibility of flight turnaround by permanent matching and correlation of related In- and Outbound flight times and data.

- Inbound Flight
- Taxi In
- Turn-Round

ELDT + EXIT = EIBT + MTTT = Earliest Off Block Time

12:55 + 0005 = 13:00 + 0030 = 13:30

E/TOBT of Outbound flight

13:30 or later

E/TOBT of Outbound Flight earlier than 13:30

A-CDM Alerting

ELDT = Estimated Landing Time
EXIT = Estimated Taxi In Time
EIBT = Estimated In Block Time
MTTT = Minimum Turnaround Time
TOBT = Target Off Block Time

Quality driver number one for your TurnRound efficiency
Implementation basics - Process - Essentials

Variable Taxi Time Calculation

The Milestones Approach

Airport CDM Information Sharing

Better planning

Key steps for the successful A-CDM process

Common Situational awareness ➔ Baseline for all process parts
The use of Variable Taxi Times (VTT) replaces “NMOC Default Taxi Times” and ensures better prediction of Target Take of Times.

A-CDM variable taxi time considers:
- Parking Position / Day / Hours / Rwy in Use
- Optimized Pre Dep Sequencing (TSAT)
- High quality of Take Off predictability (TTOT)
- Realistic CTOT for regulated flights

Average or default taxi time 15 min
- lack of Take Off prediction quality (TTOT)
- Non realistic CTOT for regulated flights
Implementation basics - Process - Essentials

- Pre-departure Sequence
- Variable Taxi Time Calculation
- The Milestones Approach
- Airport CDM Information Sharing
- Leads from FCFS to BPBS
- Better planning
- Common Situational awareness ➔ Baseline for all process parts
The Target Off Block Time (TOBT), as the estimation of aircraft ready, is the Airline commitment to the A-CDM process

Impact:

- Fueling
- Dispatch
- Technical Problems
- Cockpit
- PAX / Gate / Terminal
- Ground handling
- Loading
Target Start Up Approval Time TSAT is the Airport CDM commitment to the process.

Introduction of TSAT based on TOBT, VTT, CTOT and real operational capacity as driver for the „Pre Departure Sequence“.

Impact:

- Weather situation
- Traffic Demand
- Infrastructural constraints

Implementation basics - Process - Essentials
Implementation basics - Process - Essentials

- In- & Outbound flight updates (ATFM/ATC)
- Pre-departure Sequence
- Variable Taxi Time Calculation
- The Milestones Approach
- Airport CDM Information Sharing
- Connection to the EnRoute phase, Efficient TurnRound planning
- Leads from FCFS to BPBS
- Better planning
- Key steps for the successful A-CDM process
- Common Situational awareness ➔ Baseline for all process parts
Implementation basics - Process - Essentials

- Linking the airport into the European ATFM network by exchanging reliable In – and Outbound estimates/target times through automated Data exchange with ATFM (NMOC)“

- For countries or regions without C-ATFM – Connect your adjacent ATC units

DPI = Departure Planning Information Message (Outbound)
FUM = Flight Update message (Inbound)
Implementation basics - Process - Essentials

- Adverse Conditions
- In- & Outbound flight updates (ATFM/ATC)
- Pre-departure Sequence
- Variable Taxi Time Calculation
- The Milestones Approach
- Airport CDM Information Sharing
- Completes A-CDM for all kind of ops
- Connection to the EnRoute phase, Efficient TurnRound planning
- Leads from FCFS to BPBS
- Better planning
- Key steps for the successfull A-CDM process
- Common Situational awareness ➔ Baseline for all process parts
Implementation basics - Process - Essentials

Airport CDM Information Exchange / Common Situational Awareness (e.g. CDM Data sets, Alerting, ELDT, EIBT, TOBT, TSAT, TTOT)

In-/Outbound connection / feasibility check

Estimated Landing time (ELDT)
Take off from outstation + update

Approach phase, e.g. ELDT-30

Take Off Outstation

ATC-FPL (EOBT-3h)

EOBT-2h (CTOT)

Early-DPI

Target-DPI target

Target-DPI sequenced

ATC-DPI

TSAT

AOBT

Aircraft ready

Ground handling

Start Up Given

”Take Off“ ATOT

Inblock

TOBT

Implementation basics - Process - Essentials

Results

- Airport CDM at Munich Airport including local issues was successfully implemented in 2007
  - Foundation of European and German harmonisation/standardization
- Airport CDM projects started in FRA; DUS; BER; STR; HAM
  - Based on European and German harmonisation/standardization
- A German A-CDM harmonisation initiative group was founded

Objectives:
- Exchange of information and best practices between the different German CDM airports
- Achieve a common understanding of A-CDM in Germany and represent this understanding to the European Airport CDM harmonization process

“One face to the customer”
## Results

<table>
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<th>Munich</th>
<th>Frankfurt</th>
<th>Berlin</th>
<th>Düsseldorf</th>
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<th>Hamburg</th>
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<tbody>
<tr>
<td><strong>DFS Project - Partner</strong></td>
<td>FMG - Airport Company</td>
<td>Fraport - Airport Company</td>
<td>FBB - Airport Company</td>
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<td>FSG - Airport Company</td>
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<td><strong>ATFM connection (NMOC)</strong></td>
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<td>Fully implemented</td>
<td>Fully implemented</td>
<td>Fully implemented</td>
<td>Project phase</td>
</tr>
</tbody>
</table>

Erik Sinz, DFS  
Components beneficial to Airport CDM

- There are two main components beneficial to a fully implemented A-CDM:
  - Local A-CDM process/implementation
  - ATM network (ATFM) connection

- Only a fully implemented A-CDM will lead to all following benefits
Results

Local results:

- Common Situational Awareness reached
- Very good involvement of all operational partners achieved
- Improved ground handling processes due to TOBT
- Reduction in controller workload
- No Blame culture due to a commonly shared A-CDM
- Improved programmability due to increased stability for all operational processes (Airlines, Airport; ATC) based on reliable target times (TOBT/TSAT/TTOT)
- Decrease in Taxi times
- Best use of available capacity
- A-CDM one of the key drivers for increasing the declared capacity
Results

Network ATFM results:

- Flight update message (ELDT) increases the quality of the estimated landing time ➔ enhanced airport operation planning
- Local Target take off times (TTOTs) needed for the potential CTOT adjustment and sector load planning
- Identification of Ghost Flight plan ➔ More CTOTs available
- Fewer “lost CTOTs” ➔ frees available CTOT for other flights
- Quality of Airport CDM TTOTs (DPI) lead to better prediction of network traffic which will increase capacity (enroute, etc.) ➔ 2-4% for the overall European ATM system
Results – Before / After Implementation

- Waiting time at the runway ➔ decrease of approximately 2 min
- ATFM CTOT adherence ➔ increase of approximately 20 %
- Airport Slot adherence ➔ almost no flight without airport slot
- Late position/gate changes ➔ reduced to a minimum (1%) due to better data and process quality
- Impact of arrival delay on departure flights ➔ 80 to 90 % of arrival delay could be reduced or absorbed during the turnaround process
- Taxi time ➔ decrease of taxi time 10%
- Punctuality ➔ 4,5% increase
- Less cancelled flights during adverse situations 5000 flights/y. ➔ 0,5% decrease = 250 flights
- A-CDM one of the key drivers for increasing the declared capacity (1 to 4 movements per hour in average)
Conclusion

- **Airport CDM:**
  - Ensures an overall process for all stakeholder
  - Is not an IT-Tool – it just needs some supporting tools
  - Considers stakeholder’s needs
  - Requires cooperation of all stakeholder
  - Improves the operational efficiency at airports
  - Is „No-Blame-Culture“
  - Connects the airport to the ATM network (ATFM or ATC)
  - It is not cost intensive
  - Is not „rocket science“
  - Allows to being pro-active instead of reactive
  - Benefits are measured and proven
  - Means: „Best planned – best served“
Erik Sinz
Senior Expert A-CDM / TAM / HUB / Capacity
DFS A-CDM national / international focal point
Chairman German A-CDM Harmonization Initiative

DFS Deutsche Flugsicherung GmbH
Am DFS Campus 10
63225 Langen

Telephone +49 (0) 6103 / 707 - 1573
Facsimile +49 (0) 6103 / 707 - 1580
Email erik.sinz@dfs.de

Moritz Manzel
Consultant
Aeronautical Solutions
Sales and Consulting

DFS Deutsche Flugsicherung GmbH
Am DFS Campus 10
63225 Langen

Telephone +49 (0) 6103 / 707 - 2065
Facsimile +49 (0) 6103 / 707 - 4995
Mobile +49 (0) 173 / 6509968
Email moritz.manzel@dfs.de