Implementation, goals and operational experiences of A-CDM system
A-CDM

Airport Collaborative Decision Making

Increasing airport effectiveness
Decreasing delays
Forecast of flight events
Optimization of resources

ACI Europe, Eurocontrol, IATA
Problem analysis

• Increasing volume of air traffic
• Limited capacity of airports:
  – Aircraft stands
  – Runway holding position
• Communication problems with other stakeholders
• Not efficient network management
• Not efficient slot management (CTOT -5/+10)
• „Traffic jams”
Solution

• Cooperation with stakeholders
• Common database
• Common „language”
• Early decision making (between EOBT-3 hours ans EOBT-40 minutes)

• CDM airports build a network, where the events are know for the members of the network
Solution

A-CDM database

- Airline
- Airport operator
- Air Traffic Control (TWR)
- Aircraft crew
- Network management centre
- Ground handling companies
Difficulties of implementation

Unfavourable conditions:
De-icing
• It is essential to determine the exact duration of de-icing and integrate it into turnaround time.
• De-icing time can affect other milestones
• De-icing places could be:
  – On aircraft stand
    • In this case, it is part of the turnaround time
    • TOBT contains expected de-icing time
  – Other stand
    • VTT OUT contains expected de-icing time
Advantages

Increasing airport effectiveness
- Better capacity utilization
- Less delay, more punctual flights
- Less fuel consumption
- More stable traffic flow
- Better forecast for on-block/off-block time
- Less taxi time, less holding time

Better environmental indicators
- Less pollution
- Noise reduction

Increasing network effectiveness
- Better slot management
- Less restriction
Advantages

Who benefits from the implementation of A-CDM?

- Airline
- Airport
- Ground handling companies
- ATC
- Passenger
Operational experiences

Forrás: EUROCONTROL
Operational experiences

Brussels
• Decrease of CO$_2$, NO$_x$ emission and fuel consumption
• Decrease of taxi time (average of 3 minutes)

Munich:
• Decrease of taxi time with 10%
• Fuel savings

Frankfurt:
• Better runway exploitage
• More punctual departures, more stable TOBT
Thank you for your attention!

eniko.nagy@mail.bme.hu
Information management system of A-CDM
Definitions

Main abbreviations

• TOBT – Target Off Block Time (by GH, updated in case of manual data entry, e.g. 5 minutes difference)
• TSAT – Target Start-Up Approval Time (calculated by information system e.g. shifting in case expected holding time)

Normally TOBT=TSAT
• TTOT – Target Take Off Time
• VTT – Variable Taxi Time (VTT IN, VTT OUT) depends on: runway usage, aircraft stand, aircraft category, LVP)
• AOBT – Actual Off Block Time
• AIBT – Actual In Block Time
• MTT – Minimum Turnaround Time (depends on airlines)
• DPI – Departure Planning Information (forwarded to network management centre automatically, connection between airport and management centre)
• FUM – Flight Update Message (coming from network management centre)
Definitions

**Target Off Block Time (TOBT)**
- Forecasted time by airport operator or ground handling company. When aircraft is ready for departure, doors are closed, jetties are removed, push-back tug is ready, aircraft is ready for push-back and engine start.

**Target Start-Up Approval Time (TSAT)**
- Expected clearance time of push-back/engine start. It takes into consideration TOBT, CTOT and actual traffic.
Definitions

Calculation of Variable Taxi Time
In order to change standard VTT time. It has 2 components: VTT IN and VTT OUT

VTT IN
• It takes into consideration the location of runway exit, taxiing route and aircraft stand position. EIBT is more punctual by using VTT IN.

VTT OUT
• Calculated by the determination of taxiing route between aircraft stand and the appropriate runway threshold. It is important while determining TTOT.

Target Take Off Time (TTOT):
TOBT + VTT OUT = TTOT
Definitions

DPI and FUM messages

- **Departure Planning Information (DPI)**: Network Management Centre is supported by DPI messages directly from airport CDM database. It ensures real-time flight information prior to departure.

- Parallel to this FUM (**Flight Update Messages**) messages are received from Network Management Centre that contain the expected arrival time of incoming aircrafts. It supports planning of departure aircraft handlings.
Operation of A-CDM

- European air traffic control (EUROCONTROL)
- System of ground handling companies
- Aeronautical fixed telecommunication network
- IT system of air traffic control
- Airport operational database (AODB)

- DPI, FUM, etc.
- STN, TOT, etc.
- TSAT, TOT, etc.
- TTOT, etc.
Operation of A-CDM, Milestones

A-CDM Milestones

**INBOUND**
- Data coherency check
- FIR Entry/Local Radar Data
- Final Approach
- Taxi In

**TURN ROUND**
- Minimum Turn Round Times will be in the CDM platform and can be updated by Aircraft Operator/Ground Handling
- Boarding

**OUTBOUND**
- Take Off from Outstation
- Actual In-Block Time
- Final update of Target Off-Block Time
- ACN issues a Target Start-Up Approval Time
- Actual Off-Block Time
- Actual Start-Up Approval Time
- Actual Start-Up Request Time
- Actual Ready Time
- Taxi Out

Source: [www.munich-airport.de](http://www.munich-airport.de)
Milestones

M1 – ATC Flight Plan activation (EOBT-3hrs)
M2 – update of FPL data(EOBT-2hrs)
M3 – TAKE-OFF (ATOT – FUM)
M4 – Local Radar Update (more punctual than FUM)
M5 – Final Approach
M6 – LANDING (ALDT, VTT IN)
M7 – In Block (AIBT)
M8 – Ground handling starts (MTT)
M9 – Update of TOBT before TSAT
M10 – TSAT issue (TSAT)
M11 – Boarding
M12 – Aircraft Ready
M13 – Start Up clearance request
M14 – Start Up approved (ATC gives the push back clearance)
M15 – Actual Off Block Time (VTT OUT)
M16 – Actual Take Off Time (ATOT)
Thank you for your attention!

eniko.nagy@mail.bme.hu