Airport Collaborative Decision Making – Enhancing Airport Efficiency

SWIFT Conference, Banff
18 September 2012
Airports are facing challenges

- Capacity constraints
- Congestion
- Aircraft delays
- Increased carbon emissions
- Managing Real-time airport operations
- Irregular operations

The situation is likely to get worse with projected traffic growth.

Collaborative Decision Making (CDM) is needed to overcome these challenges

http://youtube.googleapis.com/v/-yDiURylREk
CDM Evolution and Integration

Inter-Continental

Inflight CDM
ICAO - System Wide Information Management (SWIM)

Regional

Inflight CDM
Regionally integrated A-CDM

Airport

Stand-alone A-CDM
Airside

Landside / Airside integration

ICAO
Aviation System Block Upgrades

SESAR
(Europe)

NEXT GEN
(US)

ACI EUROPE EURO-CONTROL A-CDM Project
The Airport CDM Partners

- Ground Handlers
- Aircraft Operators
- ATC
- CFMU
- Airport Operator
The Challenges

- Improve common situational awareness between the airport partners
The Challenges

- Enhance predictability of airport operations
The Challenges

- Optimise the utilisation of airport resources
Limit the environmental impact of airport operations
The Challenges

- Better integrate the airports into the ATM Network
Culture change is the biggest challenge!

Tear down the walls between the airport partners
CDM In Adverse Conditions

- Improve the management of predicted and unpredicted disruptions
CDM In Adverse Conditions

- Anticipate capacity reductions
CDM In Adverse Conditions

- Facilitate recovery after disruptions
Integrate de-icing in the turn-round / departure process
A-CDM Objectives

- 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 ATFM slot wastage
- Flexible predeparture planning
- Reduce apron and taxiway congestion

Ref. Eurocontrol
A-CDM in Europe

- The EUROCONTROL Airport CDM project integrates processes and systems aiming at improving the overall efficiency of operations at European airports. Particularly focusing on the aircraft turn-round and pre-departure sequencing process. This in turn allows the ATM Network to run more fluently.

- A-CDM is about partners - airport operators, aircraft operators, ground handlers, air traffic control and the Network Manager - working together more efficiently and transparently in how they work and share data.

- The benefits are visible at a network level, with more accurate take-off information feeding into the air traffic flow and capacity management system run by EUROCONTROL's Network Management.
Also Underway
Kiev (KBP)
Nice (NCE)
Stuttgart (STR)
Hamburg (HAM)

EUROCONTROL/ACI EUROPE
joint targets for 2011
Reference Documents

European Airport CDM
Airport Collaborative Decision Making

Quick Links
- Home
- Airports
- Links
- News and Events
- Multimedia
- Acronyms and Definitions
- Forum (registered users)
- Forum (guest users)

Newsroom

Airport Collaborative Decision Making (CDM) Forum
- Registered users
- New user registration

Related Links and Media
- What is Airport CDM
- Airport CDM Implementation Manual

http://www.euro-cdm.org
1992, CDM begins as ‘FAA / Airlines Data Exchange’ (FADE)

1996, FADE becomes ‘Collaborative Decision Making’ (CDM) Initiative
- CDM Stakeholder Group (CSG) established; Provides guidance and tasking to subgroups
- Focus is on timely exchange of Air Traffic Flow Management (ATFM) data among NAS Stakeholders

2006, CSG formed the Surface CDM (S-CDM) WG
- Identify and document “surface management” solutions in operation at U.S. airports
- Identify the essential data elements that should be exchanged among NAS Stakeholders participating in a Surface CDM environment

2008, CSG formed the Surface CDM Team (SCT)
- Further refine the essential data elements that should be exchanged among NAS Stakeholders participating in a Surface CDM environment
- Develop the US Surface CDM Concept of Operations (ConOps) in the Near-Term
- Identify Policy issues associated with US Surface CDM

A-CDM in USA
- 2010, FAA Accepts US Surface CDM ConOps
- 2011, Commence Validation of US Surface CDM ConOps (S-CDM capabilities)
  - Improvement of individual and shared situational awareness regarding departure management via the sharing of real-time and forecast operational information which positions Stakeholders to understand the current status of the airport operation
  - Tactical management of airport surface movement and aircraft departure queues to avoid excessive taxi-out times and improve departure efficiency
  - Improvement of the management of arrival traffic flows to increase throughput and coordination of arrival and departure demand
  - Analysis, measurement and monitoring capabilities to position Stakeholders to objectively quantify airport operational performance, the impact of the specific airport operations on the NAS, and the performance of individual Stakeholder organizations
  - Global harmonization to ensure synergy with other countries and to adopt “best practices” from the respective models, which will facilitate future interoperability among the various international models
Collaborative Decision Making to Improve Efficiency and Minimise Delays

ACI Resolves to:

1. Support a joint project with CANSO to promote the worldwide introduction of A-CDM systems that can interact with in-flight CDM using standard interfaces, based on the existing model supported by EUROCONTROL;

2. Support work on a data interchange technical framework between airlines, ground handlers and airport operators;

3. Support further work with ICAO on the Future Aviation (air traffic management

4. Work with ACI regions to promote worldwide standards for Airport CDM.
Airlines Benefits

1. **Delay Cost Savings**
   Reduction of delay on ground has been identified as the main benefits for an airline in an airport with CDM applications implemented. (e.g. help to return to normal operations after disruption, more transparent view of GH operations)
   Airlines could also decide to reduce the buffer in their schedules
   Reduce Missed connections/ Reduction of turn-around time/ Reduce taxi fuel burn

2. **Additional movements**
   Benefits for additional movements in the airport (flight cancellation avoidance)

3. **Improved Customer Satisfaction**
   (qualitative benefit)

4. **Lower Ground Handling Prices**
   Increased productivity could enable ground handlers to lower their prices.
   Lower GH costs lower airlines costs in general (competitive environment)
   (qualitative benefit)
Airport Operator Benefits

1. Airport revenue
Net revenue realised through additional flights and passengers (additional movements).

2. Airport image
Passenger perception of smooth operations. The perception of the community of the airport in terms of what it does to reduce emissions, noise, etc.
(qualitative benefit)

3. Airport operational efficiency
The common situational awareness achieved by CDM will help achieve a better use of airport resources (e.g. manpower, stands, gates)

4. Airport punctuality
It collaborates to improve airport image which leads to revenue increases.
(qualitative benefit)
1. Improvement in Working Environment
Lower workload and reduce probability of **errors** which leads to an improvement in the working environment (e.g. traffic according to plan, reduced apron and taxiways congestion, improved operations during disruptions periods) *(qualitative benefit)*

2. Efficiency increase
Better use of resources that will possibly lead to cost avoidance

3. Higher Service Quality
Better predictability of take-off times and flexible pre-departure planning will lead to higher service quality (e.g. airport becomes more attractive to airlines) *(qualitative benefit)*

4. Network Effects
The ANSPs emphasised the benefits of the network effects if CDM is operational at many airports in Europe *(qualitative benefit)*
ATM Network Benefits

- Accurate departure estimates enable better demand calculation
- Better demand calculation results in better flow and capacity management
- Enhance ATFM slot compliance / reduce number of wasted slots
- More accurate information = 0.5% en-route capacity increase
- ANSP Net Present Value = 73.72 Million euro

More airports → Increased Network Benefits → Increased Local Benefits
Ground Handlers Benefits

1. Improve Efficiency
   Increased predictability enables better planning. Reduction in operating costs and avoidance of future operating costs (e.g. efficient use of existing manpower and equipment, reduced amount of activities performed “in a hurry”/less accidents)

2. Improve Customer Satisfaction
   Increase in the quality of the service they offer to their customers due to the possibility of exchanging information in real time. (qualitative benefit)

3. Lower Prices (also an Airline Benefit)
   Increased productivity could enable ground handlers to lower their prices. Lower GH costs may attract more customers (competitive environment) (qualitative benefit)
**Benefits for Passengers & Environment**

- Reduction of delays
- Increased passenger satisfaction as a result of improved punctuality
- Fewer missed connections
- Better information and services during periods of disruption
- Decreased emissions and noise of taxiing aircraft due to less waiting time on taxiways and at the holding point (inbound / outbound)
The next edition of the *Global Air Navigation Plan* (Doc 9750, GANP) will be presented to the ICAO Assembly in 2013, and establishes the “aviation system block upgrade” (ASBU) strategy.

The ASBU modules are flexible and scalable building blocks that can be implemented depending on the operational need.

Timescales in the ASBU framework (Block 0 = 2013, Block 1 = 2018, Block 2 = 2023, Block 3 = 2028) depict the readiness of components.

For airport operations, and airport capacity enhancement, the blocks cover:

- a) integration of arrival/departure/surface management;
- b) increasing use of GNSS-based instrument procedures;
- c) optimized management of wake turbulence separation;
- d) enhanced surface surveillance, and
- e) **airport collaborative decision-making**.
IMPROVED AIRPORT OPERATIONS THROUGH AIRPORT-CDM

Summary: implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and manoeuvring areas and enhance safety, efficiency and situational awareness.

In a section on Current use, it describes Eurocontrol’s A-CDM application.

under Planned or ongoing trials it describes FAA initiatives including the collaborative departure queue management (CDQM) concept.
Where are the gaps?

Reliable and real-time off-block information
Lack of worldwide standards
Changing cultures – trust among collaborators

Ref. Eurocontrol
Lack of worldwide standards
Changing cultures

Trust
Cooperation
Buy-in
Signed in June 2012

**Preamble**: aims to facilitate the global promotion and roll-out of CDM programs in an effort to improve air traffic management through increased information exchange and data sharing among all relevant aviation community stakeholders.

**Goal** (extract): Air Navigation Service Providers (ANSPs) and Airports share common goals by collaborating in a common environment of airspace and airport networks, to augment the efficiency and capacity of the ATM system, both in the air and on the ground, so that each flight meets its user’s desired profile in a predictable and efficient manner. This is aligned with ICAO’s Aviation System Block Upgrade (ASBU) initiative as contained in the revised Global Air Navigation Plan to be published in 2012.
assist selected Airports and their ANSP partners to implement CDM by means of pilot projects.

support Airports and ANSPs to attain successive stages of implementation and maturity.

facilitate Project Teams made up of subject matter experts from a pool of expertise from Airports, Ground Handlers, ANSPs, Regulators and industry associates to assist pilot project implementation of CDM.

develop a joint best practices guide to CDM implementation, taking into account existing documentation. The use of standard definitions, protocols and procedures is foreseen. This would be complementary to guidance material published by ICAO.

Pilots to be both local (airport) and network (en-route) CDM demonstrations.
Leading, representing and serving the global airport community

www.aci.aero