Total Airport Management Suite

Moving from concepts to reality

Thomas Günther (Barco Orthogon)
META-CDM Workshop, January 15th 2013
TAMS – Total Airport Management Suite

TAMS: A suite of integrated systems to enable the overall TAM concept, consisting of …

- Commercial-off-the-shelf (COTS) *products*,
- Innovative solutions and R&D *prototypes*

Barco Orthogon – Company Introduction

- Orthogon GmbH founded 1989 in Bremen, today ~ 75 employees
- since 2002 100% subsidiary of Barco N.V
- specialized in software for ATC, Airlines and Airports
- Queue Management Tools (Arrival, Departure and Flow Management) with worldwide references, including:
  - EUROCONTROL
  - Avinor (Oslo)
  - CAD (Hong Kong)
  - Skyguide (Zurich)
  - Qatar Airways
  - NATS (London)
  - Airways New Zealand
  - CAAS (Singapore)

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Airside Process Optimization

- Coupled Arrival & Departure Management (AMAN/DMAN)
- Runway capacity utilization improved and balanced in accordance with predicted demand:
  - Gaps in arrival sequence to handle departure peaks
  - Runway balancing for multiple runway systems
  - Pre-Departure Sequencing compliant to Airport CDM concept
  - “What-If” probing to judge different strategies
OSYRIS DMAN supporting A-CDM

- Turn-Round Process
- Start-Up
- Push-Back
- Taxiing
- RWY Queuing
- Line-Up
- Take-Off

- TOBT
  Target Off-Block Time

- Variable Taxi Time Calculation (VTTC)

- A-SMGCS or SMAN
- AMAN
- DMET
- Flow Management

- Runway Sequencing

- TSAT
  Target Start-Up Approval Time

- Variable Taxi Time Calculation (VTTC)
  TTOT
  Target Take-Off Time

- Start-Up Delay
- Start-Up
- Push-Back
- Taxiing
- Line-Up
- Take-Off

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Airside Tactical Working Position (ATWP)

- **Collaborative Decision Making** at airport operations center for airside processes
- **Demand Prediction** for runways as well as arrival & departure routes (SID/STAR)
- **Performance prediction based on standardized**\(^1\) ATM Airport **Key Performance Indicators** (KPI):
  - Capacity (runway throughput)
  - Arrival punctuality
  - Departure punctuality
  - ATC slot compliance
  - Additional time for ASMA\(^2\)
  - Additional time in the taxi-out phase

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\(^1\) Airport Key Performance Indicators according to:
- Performance Scheme for Air Navigation Services (EU Regulation No 691/2010, July 2010).

\(^2\) ASMA: Arrival Sequencing and Metering Area
TAMS Key Elements

- Airport Operations Center with stakeholder-specific positions
- Distributed decision support ("Joint What-If")
- Integration of landside processes
- Pro-active capacity balancing for day of operations
- Forecast based on airport KPIs and cost model for airlines
TAMS Airport Operations Center (APOC)

- The figure shows the overall concept of decision making on a pre-tactical level in an Airport Operations Center (APOC), regardless of whether it is realized in a distributed form or as a single control room.

- The diagram depicts how APOC decisions provide orientation for the existing tactical operation centers without infringing on their local decision making authority.
Why TAMS goes beyond Airport CDM

- First, by a balanced **consideration of both airside and landside processes and their dependencies**.

- Second, by extending the time horizon to a **pre-tactical range** of several hours.

- Finally, by introducing new concept elements like **Airport Operations Plan** and **Airport Operations Center**.
TAMS Benefits

- TAMS increases capacity.
  - TAMS reduces average departure delay.

- TAMS increases efficiency.
  - TAMS increases the number of punctual flights.
  - TAMS reduces mean engine running time.

- TAMS has a positive impact on the environment.
  - TAMS reduces emissions by reducing waiting time at runway.

- TAMS increases passenger comfort.
  - TAMS reduces the number of passengers left behind.
Compatibility with global target concepts

### Appendix A: Summary Table of Aviation System Block Upgrades Mapped to Performance Improvement Areas

<table>
<thead>
<tr>
<th>Block 0</th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
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<tbody>
<tr>
<td><strong>B0-80</strong> Improved Airport Operations through Airport-CDM</td>
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<td>Optimisation of approach procedures including vertical guidance</td>
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<tr>
<td><strong>B0-70</strong> Improved Runway Throughput through Wake Turbulence Separation</td>
<td><strong>B1-70</strong> Increased Runway Throughput through Dynamic Wake Turbulence Separation</td>
<td><strong>B2-70</strong> Advanced Wake Turbulence Separation (Time-based)</td>
<td><strong>B3-75</strong> Optimised Surface Routing and Safety Benefits (A-SMGCS Level 3-4, ATSA-SURF)</td>
</tr>
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<td>Improved throughput on departure and arrival runways through the revision of current ICAO wake vortex separation minima and procedures</td>
<td>Improved throughput on departure and arrival runways through the dynamic management of wake vortex separation minima based on the real-time identification of wake vortex hazards</td>
<td>Advanced Wake Turbulence Separation (Time-based)</td>
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</tr>
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<td><strong>B0-75</strong> Improved Runway Safety (A-SMGCS Level 1-2 and 3-4)</td>
<td><strong>B1-75</strong> Enhanced Safety and Efficiency of Surface Operations (ATSA-SURF)</td>
<td><strong>B2-75</strong> Optimised Surface Routing and Safety Benefits (A-SMGCS Level 3-4, ATSA-SURF)</td>
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### Source


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