Total Airport Management Suite

Moving from concepts to reality

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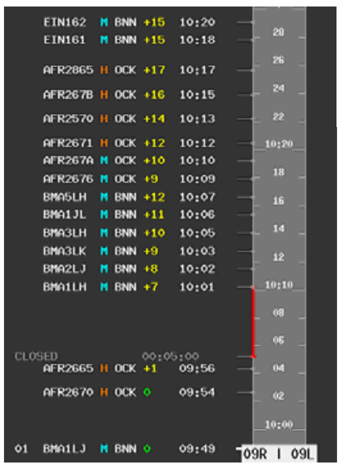
TAMS – Total Airport Management Suite

- 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*

Source: "TAMS Final Report", December 2012.

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:

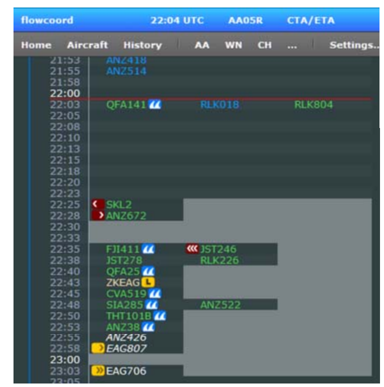


NATS (London)

EUROCONTROL

Avinor (Oslo)

CAD (Hong Kong)



Airways New Zealand

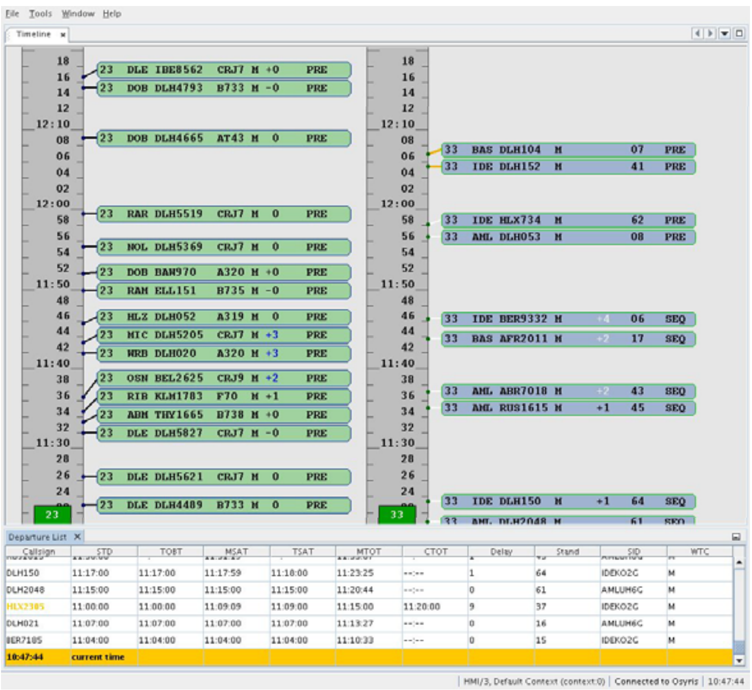
Skyguide (Zurich)

Qatar

CAAS (Singapore)

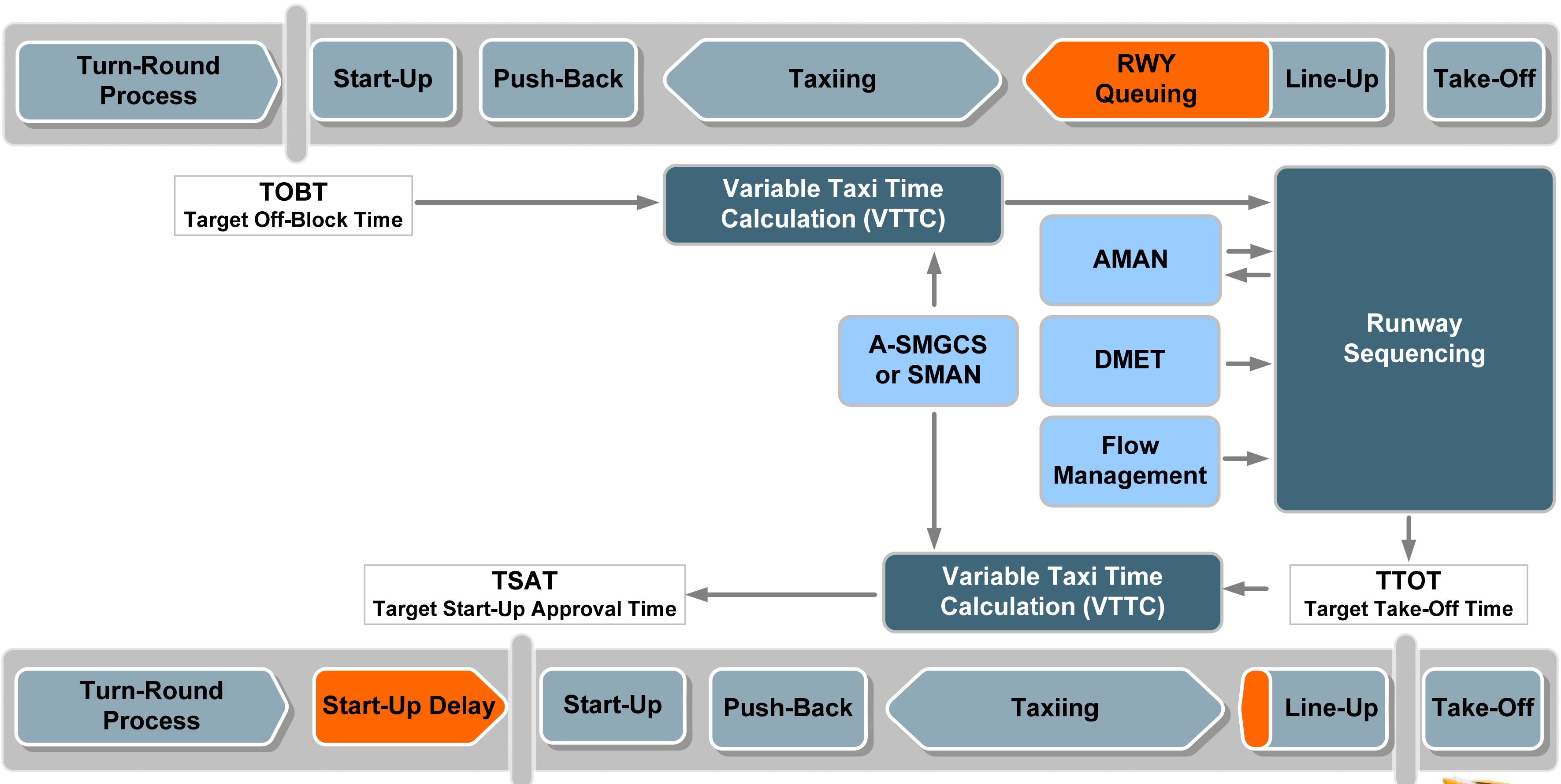
Airside Process Optimization

- Coupled Arrival & Departure Management (AMAN/DMAN)
- Runway capacity utilization improved and balanced in accordance with predicted demand:



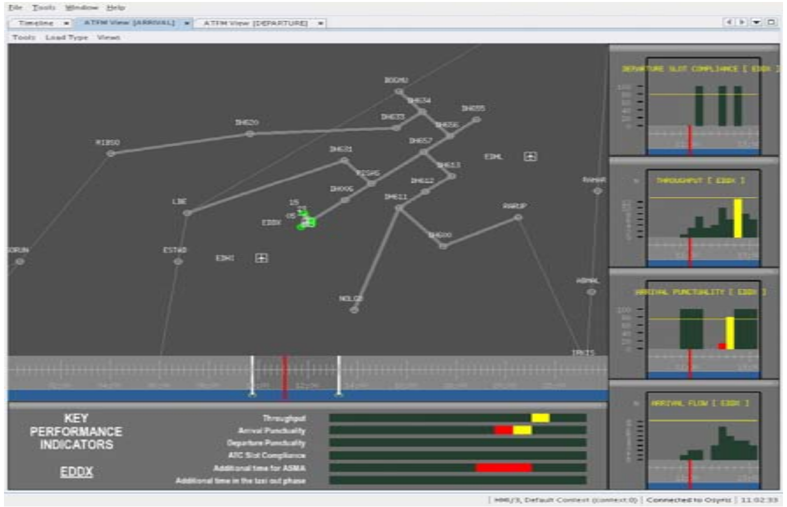
- Gaps in arrival sequence to handle departure peaks
- Runway balancing for multiple runway systems
- Pre-Departure Sequencing compliant to Airport CDM concept
- “What-If” probing to judge different strategies

OSYRIS DMAN supporting A-CDM



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

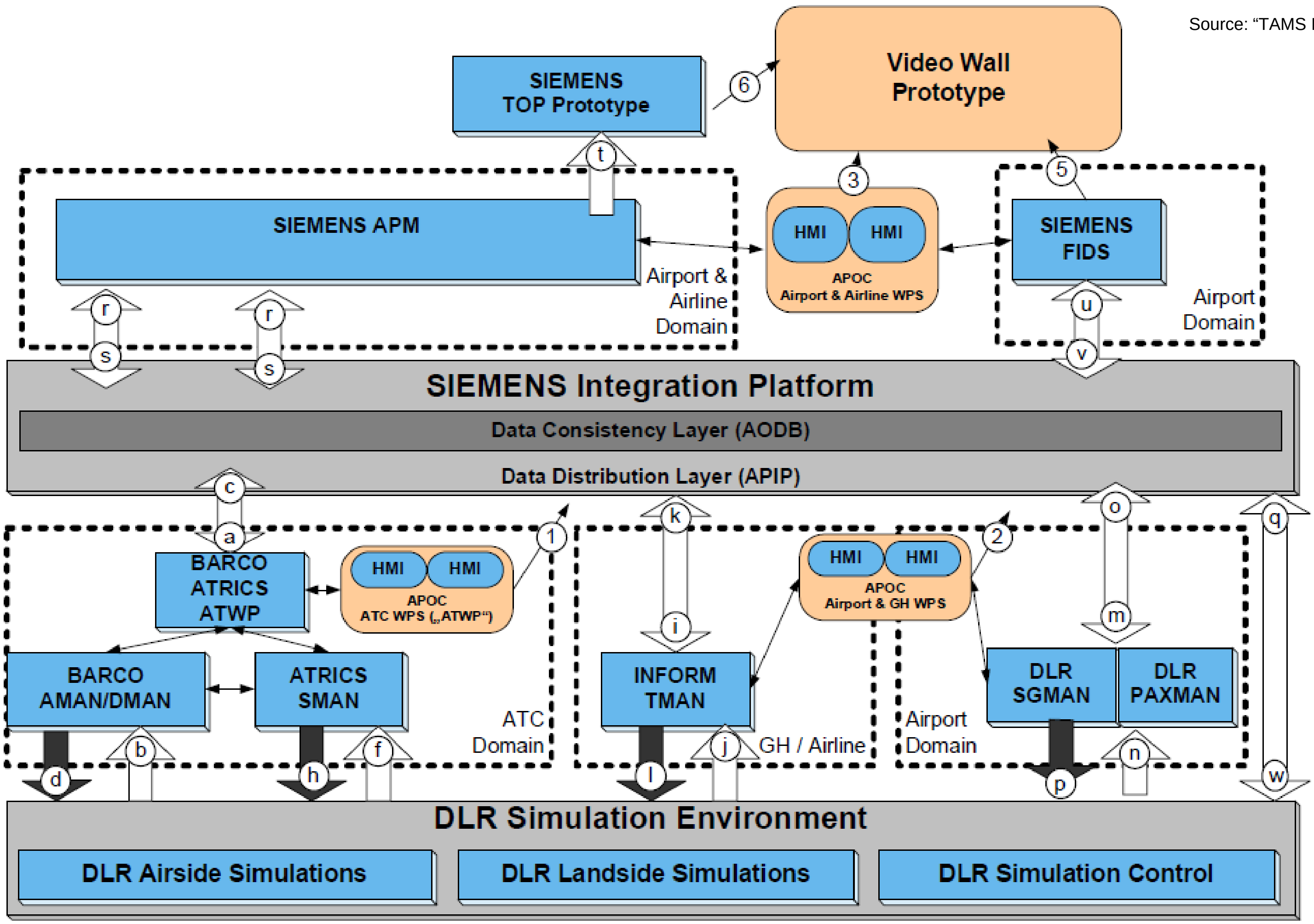


[1] Airport Key Performance Indicators according to:
- ATM Airport Performance (ATMAP) Framework (Eurocontrol, December 2009),
- Performance Scheme for Air Navigation Services (EU Regulation No 691/2010, July 2010).

[2] ASMA: Arrival Sequencing and Metering Area

TAMS Overall System Architecture

Source: "TAMS Final Report", December 2012.

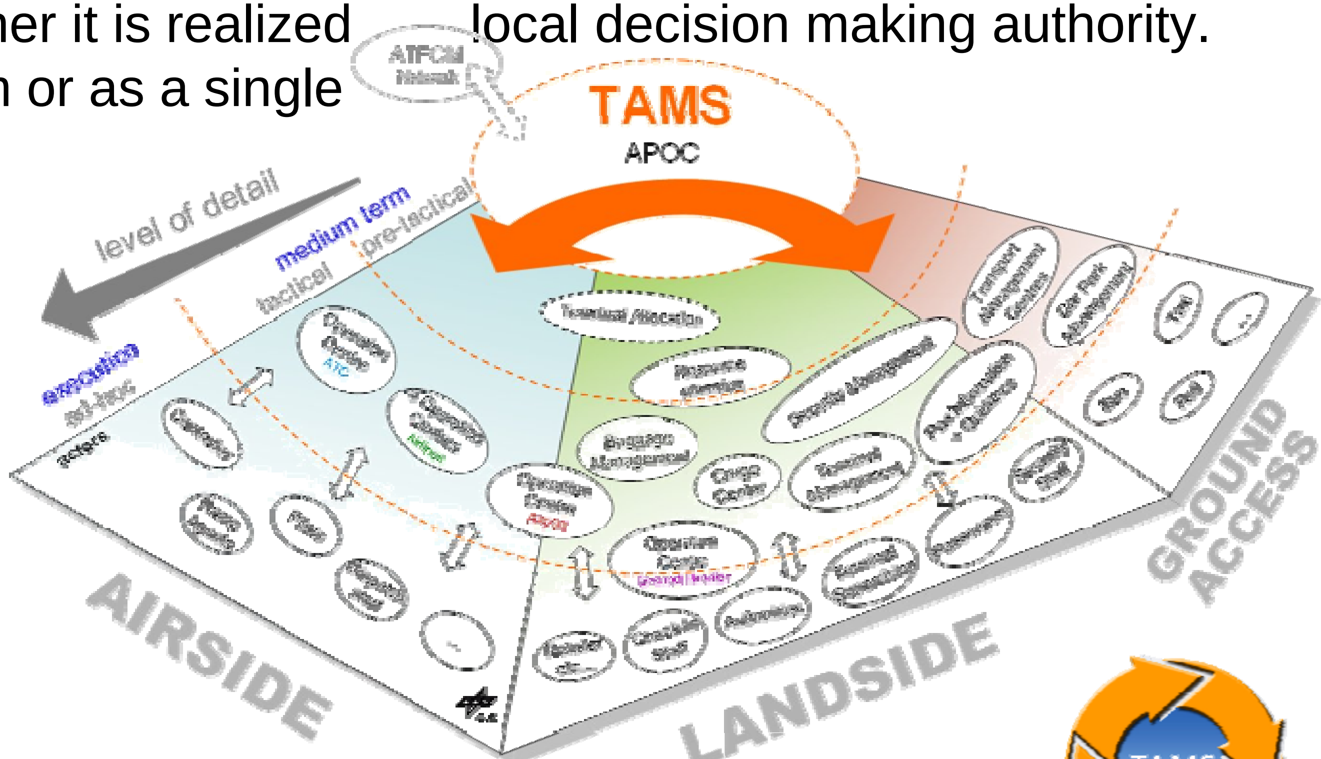


TAMS Key Elements

- 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 Appendix A

Performance Improvement Area 1: Greener Airports

Block 0	Block 1	Block 2	Block 3
B0-65 **Optimisation of approach procedures including vertical guidance** This is the first step toward universal implementation of GNSS-based approaches	B1-65 **Optimised Airport Accessibility** This is the next step in the universal implementation of GNSS-based approaches		
B0-70 **Increased Runway Throughput through Wake Tubulence Separation** Improved throughput on departure and arrival runways through the revision of current ICAO wake vortex separation minima and procedures .	B1-70 **Increased Runway Throughput through Dynamic Wake Turbulence Separation** 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	B2-70 (*) **Advanced Wake Turbulence Separation (Time-based)**	
B0-75 **Improved Runway Safety (A-SMGCS Level 1-2 and Cockpit Moving Map)** Airport sur	B1-75 **Enhanced Safety and Efficiency of Surface Operations (ATSA-SURF)**	B2-75 **Optimised Surface Routing and Safety Benefits (A-SMGCS Level 3-4, ATSA-SURF** olving to / cockpit ery of clearances ynthetic visualisation systems	
B0-80 **Improved Airport Operations through Airport-CDM** Airport operational improvements through the way operational partners at airports work together	B1-80 **Optimised Airport Operations through Airport-CDM Total Airport Management** Airport operational improvements through the way operational partners at airports work together		
	B1-81 **Remote Operated Aerodrome Control T**		
B0-15 **Improved RunwayTraffic Flow through Sequencing (AMAN/DMAN)** Time-based metering to sequence departing and arriving flights	B1-15 **Improved Airport operations through Departure, Surface and Arrival Management** Extended arrival metering, Integration of surface management with departure sequencing bring robustness to runways management and increase airport performances and flight efficiency	B2-15 **Linked AMAN/DMAN** Synchronised AMAN/DMAN will promote more agile and efficient en-route and terminal operations	B3-15 **Integrated AMAN/DMAN/SMAN** Fully synchronised network management between departure airport and arrival airports for all aircraft in the air traffic system at any given point in time

Airport-CDM → Total Airport Management

Arrival Management → Integrated Arrival / Departure / Surface Management

Source: "ICAO: Working Document for the Aviation System Block Upgrades", November 2011.

TAMS