Total Airport Management - Going Beyond Airport-CDM

GANIS-2: Capacity and Efficiency
Total Airport Management (System)

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German Aerospace Center (DLR) - Fields of Activity

- **Aeronautics**: (ca. 80% of activities, resources)
- **Space**: (ca. 20%)
- **Energy**
- **Transport**

**Security & Defense**
**Energy Storage & Efficiency**
**Digitalisation**

Cross-sectional tasks, inputs from all 4 programs

- **Research**: ~ 1.000 M€
- **National Space Admin.**: ~ 1.200 M€ (Nat. Progr. plus German ESA Share)
- **Project Management Agency**: ~1.100 M€ (State or Federal Funded Proj.)

Credit: DLR/ESA

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Motivation for Total Airport Management: The Airport - Capacity Bottleneck and Missing Link

- Air Transport will increase 3-4% per year*
- More efficient use of existing infrastructure needed
- Enhancing airport operation to stay competitive
- SESAR will implement Performance Based ATM
- SES Performance Scheme: Airport KPI Targets
- Airports becoming “Multimodal Hubs”

* vgl. Airbus Global Market Forecast 2012
Concept Development in Airport Operations

Airport Collaborative Decision Making (A-CDM)

Total Airport Management (TAM)

Performance Based Airport Management (PBAM)

Cooperative Landside and Airside Airport Management (pretactical = T₀+3h - T₀+24h)

Cooperative Airport Management based on KPIs (pretactical = T₀+3h - T₀+24h)

Information Exchange
Collaboration !?
(tactical = T₀ - T₀+3h)

* www.EURO-CDM.org
Airport Processes – Now and in the Future

PBAM by KPI

Challenge: many processes – even more provider
TAM / PBAM – Expanding the Scope of A-CDM
TAM / PBAM - Top-Level Operations Management

Level of Detail
- strategic
- medium term
- pre-tactical
- tactical
- execution ad-hoc

TAM Network
- APOC

Operation Centre Airport
- Operation Centre Airports
- Operation Allocation
- Terminal Allocation
- Resource Planning
- Baggage Management
- Cargo etc...
- Terminal Management
- Security Staff
- Check-in Staff
- Retailer
- Terminal Supervision

x Operation Centres
- Ground Hanagers

Transport Management Centers
- Car Park Management
- Security Management
- PAX Information & Guidance
- Passenger
- Authorities
- Rail
- Bus
- Taxi
- Parking

interaction across different layers

AIRSIDE
- A-CDM

LANDSIDE

www.DLR.de • Folie 7
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TAM / PBAM Concept Elements

- Airside and Landside Integration

- Airport Process Coordination
  i.e. check-in; security, turn around, de-icing,…

- Airport Operations Plan
  “AOP”

- Integration with the Network
  AOP <-> NOP (Network Operations Plan)

- Airport Operations Control Center
  APOC: centralized / de-centralized / virtual

  - Decision Support Tools
  - Cooperation Concept
TAM-Enabler (I)
Airport Operations Control Center (APOC) & Services

1. Performance monitoring
2. Performance steering
3. Performance management
4. Post-operations analysis

Pre-requisites
- Transparent und fair, following strict rules and regulations;
- Respecting sensitive data - business & privacy;
- Rules of interaction and engagement to be designed
- ensure order and clarity, and timely actions
TAM-System - Local Airport Complexity
SESAR2020

and

High Performance Airport Operations
SESAR 2020 – Content, Structure and Funding

585M€ of EU FUNDING

RUNNING COSTS: 29M€, STUDIES: 10M€, THIRD PARTIES: 10M€, SUPPORT: 20M€

81M€

335M€

63M€

37M€

EXPLORATORY RESEARCH

FIRST CALL ISSUED

Delivering best-in-class, globally interoperable and high-performing Air Transport for Airspace Users and Citizens

High Performing Airport Operations 24%

Optimised ATM Network Services 6%

Advanced Air Traffic Services 25%

Enabling the Aviation Infrastructure 32%

RPAS Integration 5%

LARGE SCALE DEMOs

PPP
Current projects within SESAR 2020 related to TAM
VLD - Integrated Airport Operations – IAO (PJ28)

Sesar Solutions to be demonstrated

- Manual and Automated Taxi Routing;
- Pre-Departure Sequencing;
- On-board Traffic Alerts and Airport Safety Nets.

Goals / Advantages

- Live traffic data instead of simulation scenarios;
- Shadow Mode Trials i.e. Hamburg Airport by DLR;
- Extensive dissemination activities;
- Supporting the deployment of Sesar Solutions.

Partners: DLR (Lead), Thales, Honeywell, DSNA, Airbus, Indra and consortia NATMIG and B4

Airport Demos: Hamburg, Budapest, Nice
IR - Total Airport Management - TAM (PJ.04)

1) Enhanced Collaborative Airport Performance Planning and Monitoring”
Solution 1 (ECTL Lead):
AOP, AOP-NOP Integration & A-CDM for Regional Airports

2) "Enhanced Collaborative Airport Performance Management”
Solution 2 (DLR Lead):
“What-If, UDPP, Environment, AI; Total Airport-DCB.

Partners: SEAC2020 (Lead); DLR, NLR, EUROCONTROL, Enaire, Indra, Thales, Leonardo, Frequentis, consortia: COOPANS, B4 and NA
Conclusion

Total Airport Management / Performance Based Management
- will be the successor of A-CDM, aiming for more efficiency
- supports holistic optimisation of airport ops
- enables the multimodal hub (airport) of the future
- will change stakeholders cultures…

Cooperate

Your cooperation is needed
- participate in the development
- position yourself and take advantage
- support implementation

Contact

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Concept Development, Prototyping & Validation through Simulation

(~ 150 FTEs)
PBAM-Enabler (II): Decision Support Tools

i.e. Total Operations Planner (TOP)

- Linking the flow and event level of the operations
- Interfaces with tactical systems
- Provides
  - KPI status and development
  - Forecasts
  - Recourse management
  - Airport Operations Plan (AOP)
- Client working positions supporting
  - Interacting with the AOP
  - Exchange tasks
  - What-if functionalities
PBAM-Enabler (III): AOP - NOP Coordination

- AOP includes a **performance level commitment** to the Network
- Early planning and **pro-active operations** increasing airport's predictability; **better resource utilisation**…
- NOP - receives early planning data for more **efficient and optimal sector capacity** and trajectory planning
- Airspace user's wishes submitted by **4D-business trajectories** potentially can be much more efficiently be incorporated
Single European Sky ATM Research (SESAR)

The SESAR Joint Undertaking is funded by public and private resources; European Union, Eurocontrol and industry partners, one third each.

- SESAR 1 Program (2008-2016): €2.1 billion
- SESAR 2020 Program (2016-2024): €1.6 billion
SESAR-1 Solutions