Modeling of Pre-Tactical Airline Decision Processes to enable Performance Based Airport Management

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Locations and employees

Approx. 8000 employees across 33 institutes and facilities at 16 sites.

Research Areas

- Aeronautics
- Space Research and Technology
- Transport
- Energy
- Defence and Security
- Space Administration
- Project Management Agency
DLR Aeronautics

- Optimisation the performance and environmental compatibility of the entire aircraft system
- Expanding the range of helicopters to all weather conditions
- Efficient and environmentally-friendly aircraft engines
- Safe, environmentally-friendly and efficient air traffic (flight control, flight operations)
What should be changed at airports?
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The Way to Performance Based Airport Management

Airport Collaborative Decision Making (A-CDM)

Total Airport Management (TAM)

Performance Based Airport Management (PBAM)

Information sharing and declaration of a TOBT (tactical = $T_0$ to $T_{0+3h}$)

Definition of a cooperative Airport Management (pre-tactical = $T_{0+3h}$ to $T_{0+24h}$)

Target value oriented cooperative Airport Management (pre-tactical = $T_{0+3h}$ to $T_{0+24h}$)
Targets of P-AIR-FORM

A) • demonstration of improved efficiency of airport operations by pre-tactical planning

B) • show changes in ways of working and cooperation of stakeholders at airports with PBAM

C) • verification of positive effects of improved weather forecasts during pre-tactical planning of airport operations
Stakeholders visited

Airline
Ground-Handler
Airport
ANSP

Involvement of all stakeholders directly participating in pre-tactical processes
Modeling Approach

- Evaluation of visits
  - surveys
  - job descriptions
  - process models

- Modeling of single stakeholders – actual state
  - organization
  - processes
  - IT systems

- Modeling of the stakeholders’ interactions for selected processes

- Modeling of processes – target state
Business Process Modeling (BPM) in ARIS

- Architecture of Integrated Information Systems – ARIS
- database with revision control
- parallel work at different company sites
- detailed modeling of selected processes

- conjunction of:
  - **Processes** (value-added chain, EPC)
  - **Organization** (organigram)
  - **Functions** (application systems)
  - Data
  - Services
Modeling of Organization 1/2

- target:
  - gain insight into the relationships within one stakeholder/ between stakeholders
  - identification of responsibilities
  - organigrams
  - modeling in different hierarchical levels (top-down)
Modeling of Organization 2/2
Example: Airline PAX Segment (Snippet)

- Passenger
  - Ops
    - Hub Control Center (HCC)
      - FOMOD
      - Passenger
      - Airport Operator
      - CONNEX
    - Customer Care
    - Operations Control Center (OCC)
      - Regional
      - Short Range
      - Long Range
Modeling of Resources

- application system type diagrams
- overview of interfaces between stakeholders
- input for process modeling
Process Modeling 1/3

- modeling in 4 hierarchical levels (top-down)
  - value-added chain diagrams in level 1 to 3
  - event-driven process chains in level 4
- focus on pre-tactical processes
Process Modeling 2/3
Example: Value-Added Chain Airline

Management Processes

Core Process: Conduct Flights

Supporting Processes
Process Modeling 3/3
Example: EPC CONNEX
Process Modeling 3/3
Example: EPC CONNEX
Airlines‘ Problems

- MRO Agent in HCC/ OCC missing
  - information from maintenance missing or too late
- ARR/DEP capacity from ANSP
  - missing or too late
- discrepancies between filed flightplans and EUROCONTROL data
  - ANSP agent desired
- missing interfaces of different stakeholders’ IT systems (e.g. airport)
- missing comprehension of other stakeholders processes, needs & constraints
- …
Airlines‘ Suggested Improvements

- better weather forecast/ nowcast
- better integration of systems
  - currently, data has to be inserted manually in up to 3 systems
  - error-prone
  - additional work & coordination (e.g. via phone)
- centralized Airport Operations Center (APOC) with all stakeholders
- ...

...
Recap of Airlines‘ Comments

⇒ just a snapshot of the airlines visited
⇒ most of the suggested improvements aim at:
  ⇒ better integration of systems with automated data sharing
  ⇒ avoid errors and save time
  ⇒ get the right information at the right time
  ⇒ improved stability & reliability of planning for all stakeholders

⇒ main aspects of PBAM

⇒ problems:
  ⇒ integration costs money
  ⇒ willingness to share own data to other stakeholders
Conclusion

- BPM illustrates interdependencies, responsibilities and promotes Business Intelligence
- stakeholders involved in pre-tactical processes ask for better integration of systems & earliest possible information sharing in order to save resources
Way forward

Modeling of target state of processes

Implementation costs & durations

Implementation of pre-tactical KPI
→ Evaluation of changes to the processes

Input into further concept development of PBAM
Thank you for your attention!

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