Observations from an Airport – Surface Routing and Guidance

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Overview

Frankfurt Airport today

Operational Changes and new Technologies

Investments & Benefits

Challenges & Outlook
Frankfurt Airport – some figures

Traffic statistics 2012 (in mio pax)

1. London Heathrow  70,0
2. Paris CDG          61,6
3. Frankfurt          57,5
4. Amsterdam         51,0
5. Madrid            45,2

A typical day in FRA:

- 1500 aircraft movements (max)
-  94 movements / h (max)
-  155,000 passengers
-  77,000 pieces of baggage
-  6,200 metric tons of cargo
-  397 trains serving the airport
Frankfurt Airport – Ground Traffic Control

Fraport Apron Control
Surface Management - a little Flashback

Situation in FRA 1998:
- 416,000 mvt. / a (1,200 / day + few tow mvt.)
- SMR and some cameras are the only sensors available for traffic surveillance
- flight data is available in a separate airport operational database (AODB)
- Controller must build his traffic-picture from Outside view, cameras, SMR and database

Situation today:
- 482,000 mvt. / a (1,500 / day + 150 tow mvt.)
- A-SMGCS integrates all relevant data from radars, multilateration detection system & airport database and A-DSB on one screen
- Controller has one comprehensive picture with position & ID of all aircraft and relevant vehicles
- All communication still by voice and switching of lighting and stop-bars manual (separate HMI)
Current and future Operating Environment

Current operating environment in FRA:

- Opening of 2 new Apron Control Towers
- Increased traffic complexity in FRA (opening of new runway and new terminal pier)
- Strong focus on punctuality and predictability (introduction of A-CDM, night curfew, …)
- Outsourcing of Apron Control units as a consequence of strike action in 2012

The SESAR Concept of Operations:

- Airports will be integrated into the network operating with an Airport Operations Plan (AOP) and Network operations Plan (NOP)
- This will involve a transition from time-based to performance-based operations
- One continuous aircraft trajectory including the “ground sector” of the flight as Airport Transit View

Growing need for planning support in surface management!
Surface Management – the concept

Ground Trajectory Management:

- Based on position data and aircraft ID from the surveillance system the Surface Management Tool (SMAN) proposes a surface route for every inbound and outbound-flight, the **Airport Transit View**
- By linking the ATV to the trajectory of the inbound and outbound flight a continuous trajectory for each airframe is established
- In the final stage of implementation the surface route is transmitted to the pilot by datalink and / or selective switching of airfield lighting and stop-bars (“Follow the Green”)
Surface Management – operational changes

Controller:

– Reduced voice communication & switching of R/T channels (⇒ less communication errors)
– Usage of only one HMI for all tasks (⇒ increased situational awareness)
– Shared visibility of routes and intentions (⇒ seamless coordination between controllers)
– Role of the controller changes from controlling to managing the flight (⇒ Change Management !)

Pilot:

– Increased situational awareness (⇒ less communication errors, route deviations and incursions)
# Surface Management – technology investments

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**Investments and expected benefits**

**Investments:**
- Technology investments incl. tuning, maintenance, etc. (⇒ *May be high for new airfield lighting*)
- Change management and staff training (⇒ *Long and complicated change process*)
- Standardisation and certification (⇒ *May take long depending on parties involved*)

**Benefits:**
- Increased situational awareness for pilots, controllers, management units (⇒ *Safety*)
- Reduction of controller workload (⇒ *Efficiency*)
- Increased predictability / better adherence to planning (⇒ *Predictability*)
- Reduced emissions & in some cases reduced taxi times (⇒ *Environment*)
- Reduced operating costs with usage of LED-lighting (⇒ *Cost*)
Conclusions & Outlook

Surface Management is an important building block to improve operational efficiency at complex airports.

Main difficulties are:
- Substantial investments (adaptation of airfield lighting)
- Difficult Change Management Process
- Potentially long duration of standardisation & certification activities

Main benefits for airports are:
- Increased situational awareness
- Reduction of controller workload
- Increased predictability

In the coming 5-10 years more big airports will be equipped.
Any Questions ?!?