Disruptive Technologies in Air Traffic Management (ATM)
- Example: flight centric operations (sectorless ATM)

Ralf Bertsch
Director Planning and Innovation
DFS Deutsche Flugsicherung GmbH
Disruptive Technologies in ATM
Flight centric operations (sectorless operations)

What is sectorless ATM?

- En-route control has certain similarities with the division of work on a production line
- More demand – more sectors (division of sectors, complicated shapes and contours, balconies, windows …) – complicated ATCO training
- 700 sectors in Europe
- A flight from Toulouse to Hamburg involves 42 frequency changes

“Sectorless ATM“ is a departure from spatial ATCO responsibility towards aircraft-centred responsibility
- One controller is in charge of 5 to 6 aircraft over distances of several hundred kilometres
- Priorities & avoidance procedures must be clearly defined
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- ATCO focus is on tactical control
- The system provides planning and actual information (also conflict detection and resolution in some modern systems)
- Situational awareness about 5-10 minutes into the future

Interesting: The four-eyes principle is maintained
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Current situation …

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... a lateral airspace 15 times as big as today

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- .. one air traffic controller is continuously responsible for a flight within the whole sectorless airspace
- .. one air traffic controller controls several flights at a time
- ... other controllers are responsible for other flights in the same airspace
- .. separation of other aircrafts by simple rules (e.g. right before left -> reduced coordination)
Results of DFS validation activities (1):

- Continious flight guidance leads to
  - Improved 4D-trajectory support (stability, predictability, continuinity of flow)
  - Improved use of MTCD\(^1\) (horizon >10 min.)
  - Improved support of TTA/TTO\(^2\) concepts (AMAN, E-AMAN\(^3\))
  - Datalink as main means of communication (time enough to solve conflicts some minutes ahead)
  - Less Voice Com interactions (A/G and G/G)

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1 Medium Term Conflict Detection
2 Target Time of Arrival / Target Time Over
3 Arrival Manager, Extended Arrival Manager
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Results of DFS validation activities (2):

Example:
- Real traffic scenario from 10th October 2014 in simulated sectorless operations
- Productivity = 5.1 flight hour per controller (31 flight hours controlled by 6 controller) (max. 36 aircraft simultaneously)

Distribution of traffic to all available controllers ("call center principle")
- Indicates potentially high productivity increase and increase of cost efficiency
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Results of DFS validation activities (3):

Disruptive changes:

- Controller role (less tactical much more planing oriented)
- Controller training (methods, qualification, certification)
- Controller skills („less challenging“?)
- Technology
  - Communication (e.g. voice radio coverage for very large areas )
  - ATS (MTCD/RA¹ Tools; Contingency and Backup Systems)
  - COM/ATS-integration
- Regulation
  - Controller licence

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Ralf Bertsch, DFS Deutsche Flugsicherung GmbH

¹ Resolution Advisory
Thank you for your attention!
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... possible new designs for controller working positions

DFS validation activities 2016

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