

8th Florence Air Forum
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Disruptive Technologies in Air Traffic Management (ATM)

- Example: flight centric operations (sectorless ATM)

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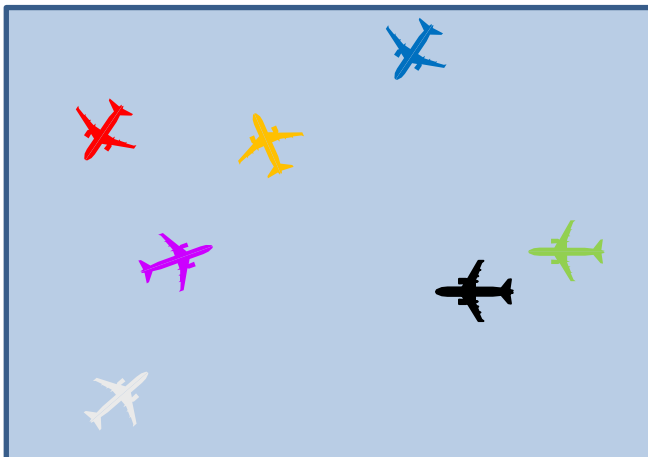
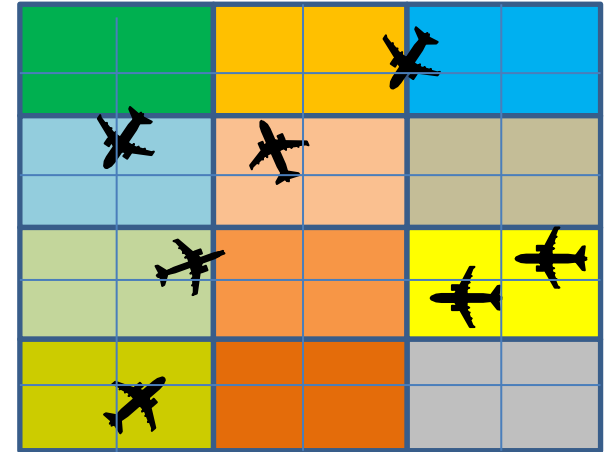
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Disruptive Technologies in ATM

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

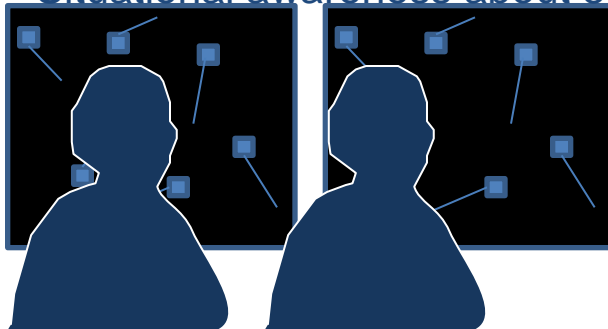


- „Sectorless ATM“ is a departure from spatial ATCO responsibility towards aircraft-centred responsibility
- One controller is in charge of 5 to 6 aircraft over distances of several hundred kilometres
- Priorities & avoidance procedures must be clearly defined

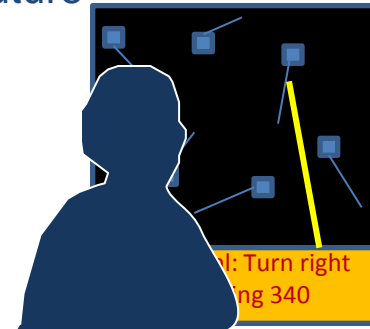
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Flight centric operations (sectorless operations)

- 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

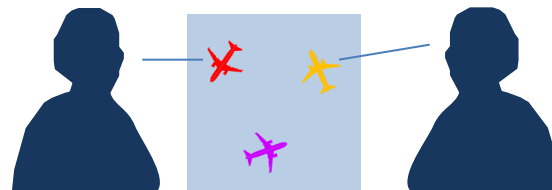


Executive + planner



ATCO + improved conflict detection and resolution system

Interesting: The four-eyes principle is maintained



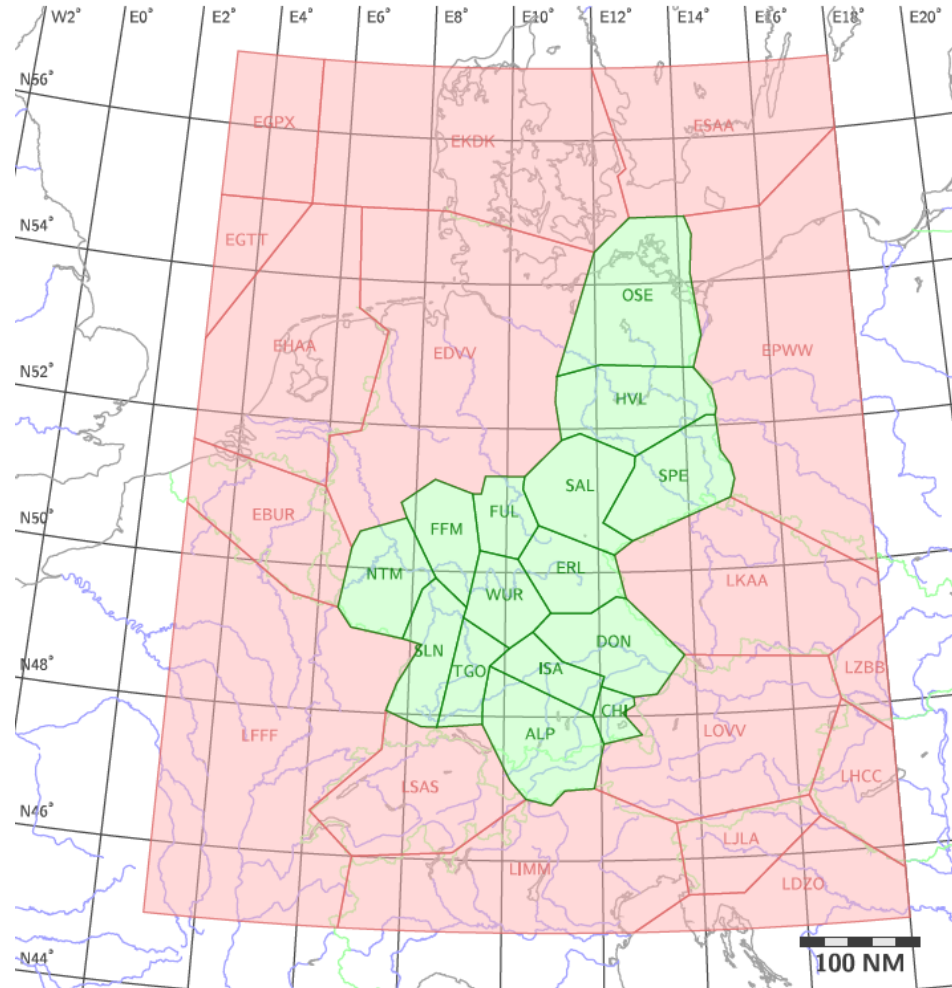
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Flight centric operations (sectorless operations)

Current situation

...

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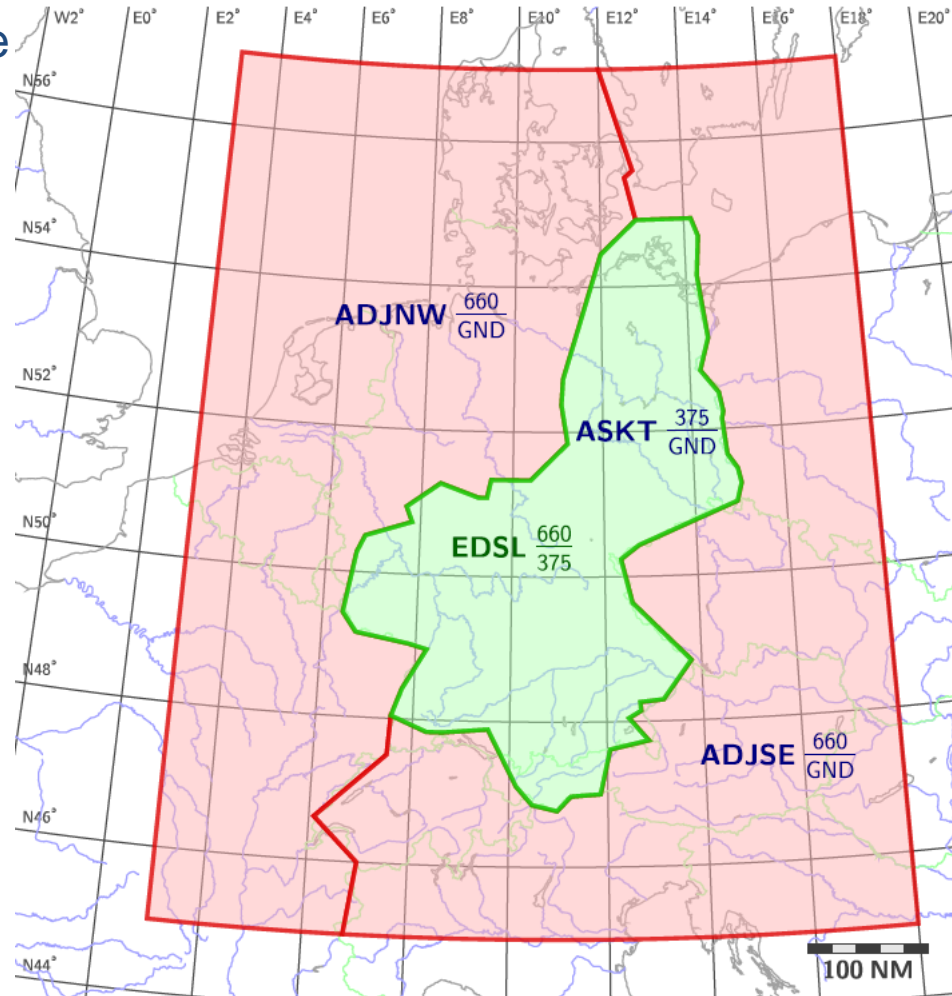


Disruptive Technologies in ATM

Flight centric operations (sectorless operations)

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

(Rhein UAC - Germany)



- .. 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)

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Flight centric operations (sectorless operations)

Results of DFS validation activities (1):

- Continuous flight guidance leads to
 - Improved 4D-trajectory support (stability, predictability, continuity of flow)
 - Improved use of MTCD¹ (horizon >10 min.)
 - Improved support of TTA/TTO² concepts (AMAN, E-AMAN³)
 - Datalink as main means of communication (time enough to solve conflicts some minutes ahead)
 - Less Voice Com interactions (A/G and G/G)



- 1 Medium Term Conflict Detection
- 2 Target Time of Arrival / Target Time Over
- 3 Arrival Manager, Extended Arrival Manager

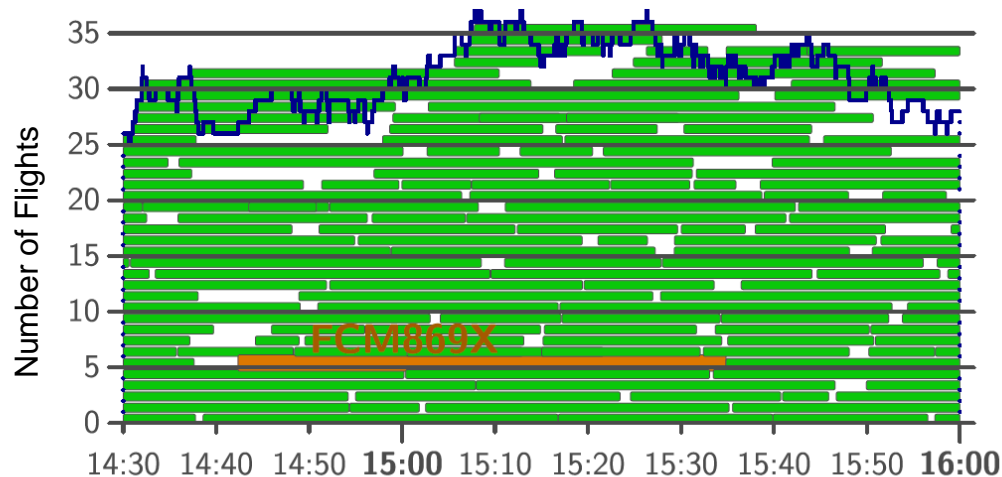
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Flight centric operations (sectorless operations)

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

Disruptive Technologies in ATM

Flight centric operations (sectorless operations)

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



Thank you for your attention !



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Disruptive Technologies in ATM

Flight centric operations (sectorless operations)

... possible
new designs
for controller
working
positions

DFS validation
activities
2016

(Rhein UAC
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