DFS World Webinars Vol. 2
01 June 2021

Multiple Remote Tower Operations

Challenges for Research and Implementation

Holger van de Sand

DFS

DFS Aviation Services   DFS Deutsche Flugsicherung   DRONIQ

Agenda

① **History**

② **DFS Situation**

③ **SESAR Research**

④ **Outlook**

History

Remote Tower Center Leipzig
(Germany)

2018
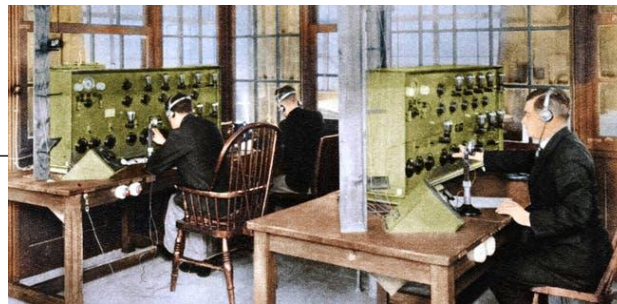
Leipzig/Halle Airport (Germany)   **2010**
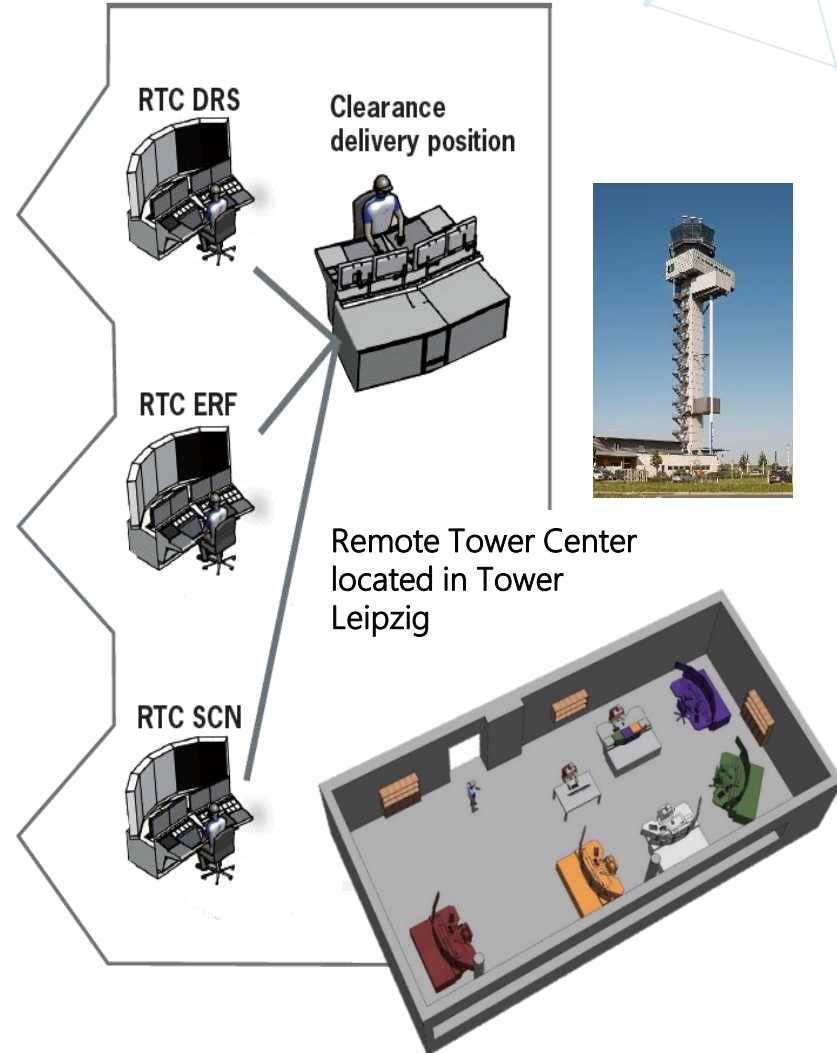
1960   Nairobi Airport (Kenia)

1920

Croyden Airport
(London, UK)

DFS Situation (SCN in operation, ERF, DRS planned)

- Location-independent provision of aerodrome control services with a camera surveillance and control system (out-of-the-window view, OTW).

- 3+ air traffic controllers (AIR+GND combined) will provide aerodrome control to 3 RTC airports (Single mode)

- All controllers will be cross-trained to provide control services for every RTC airport.

- Future integration of 1 Clearance Delivery position for all airports is planned (Multi mode)

Dresden (DRS)

Erfurt (ERF)

Saarbrücken (SCN)

RTC DRS

RTC ERF

RTC SCN

Clearance delivery position

Remote Tower Center located in Tower Leipzig

DFS Situation (SCN in operation, ERF, DRS planned)

Since 12/2018 providing remote tower services SCN@LEJ without any impact on airspace users!

Camera-Tower in SCN
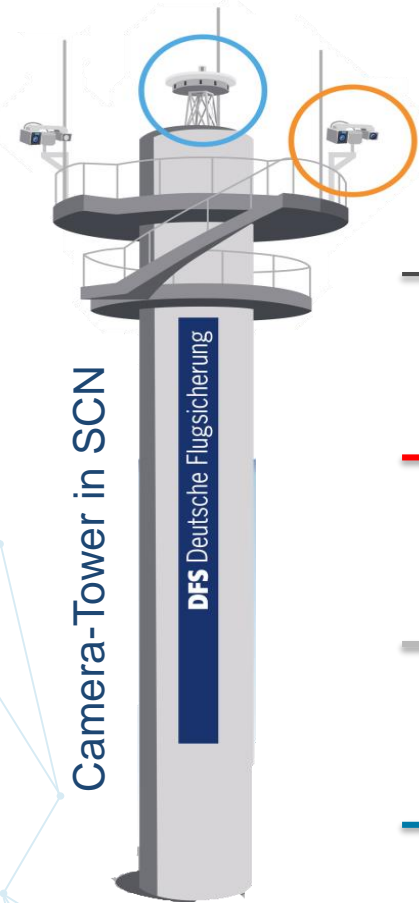
Distance: 450 km;
135 Mbit/s (redundant) connection

More than 1.000.000 gigabyte of data were transferred without interruption

More than 22.000 controlled flights (IFR/VFR)

More than 450.000 passengers transported by airlines

Controller-Working-Position in LEJ

SESAR Research (DFS MRTC project activities)
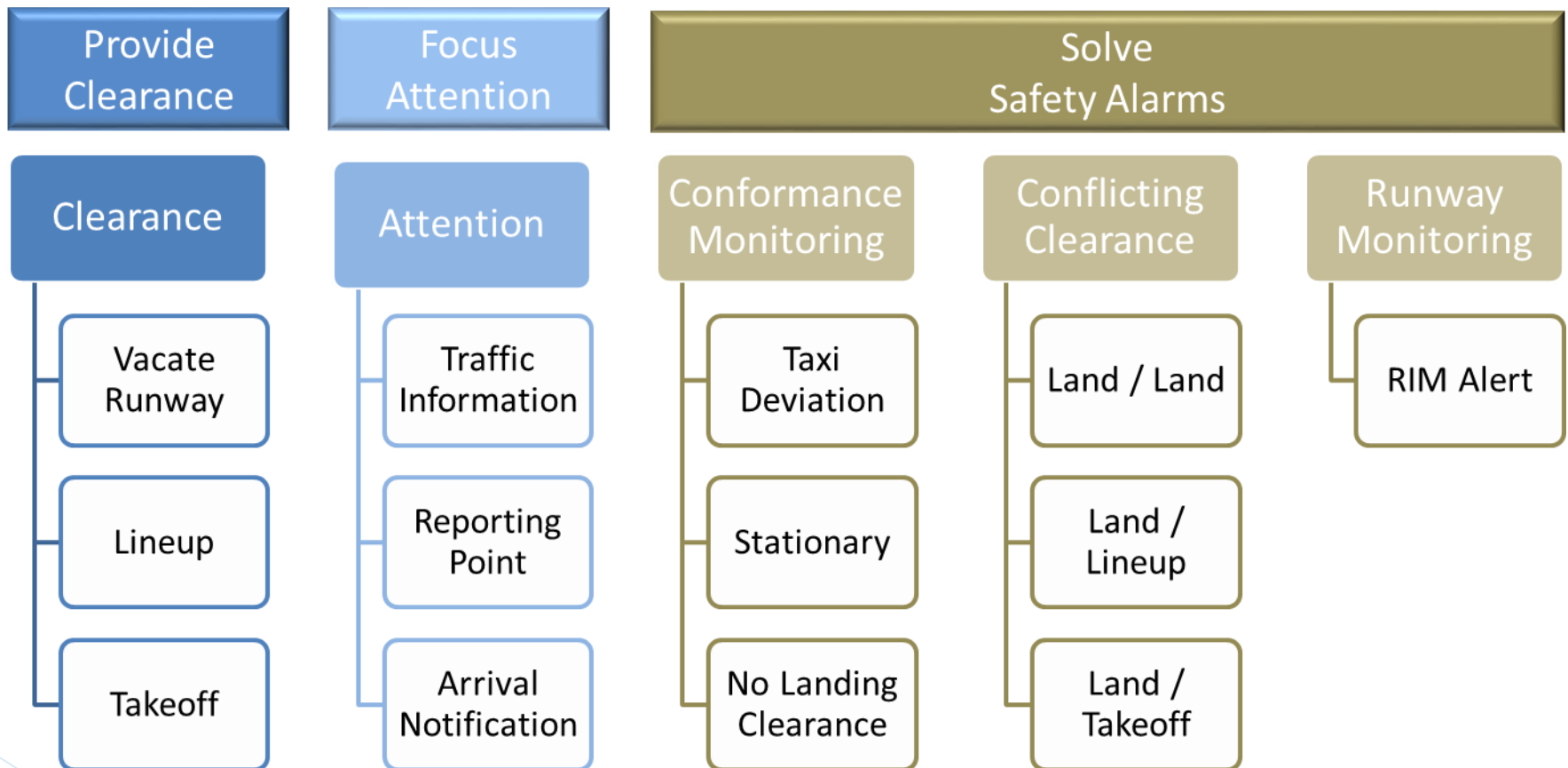
- DFS Design Considerations
  - Airports
    - Scalability for „n" airports
    - Provision of ATS with high traffic numbers
  - Human Machine Interface
    - Reduction of displayed information to „need to know"
    - Information is preprocessed according to specific situation
  - Information processing
    - Focussing attention via „Events"
    - High degree of automation

SESAR Research (DFS MRTC project activities)

- DFS principles

  - ➢ Airports are equipped with
    - Electronic Flightstrip System
    - Visual Representation
    - Surveillance (air and ground) – ground optional

  - ➢ Automation Level
    - Supportsystem -> ATCO remains responsible
      - Automation support based on events
        for Standard Procedures using conservative separations

    - ATCO works manually – i.e. independently of Events
      - Increase capacity (i.e. avoid delay)
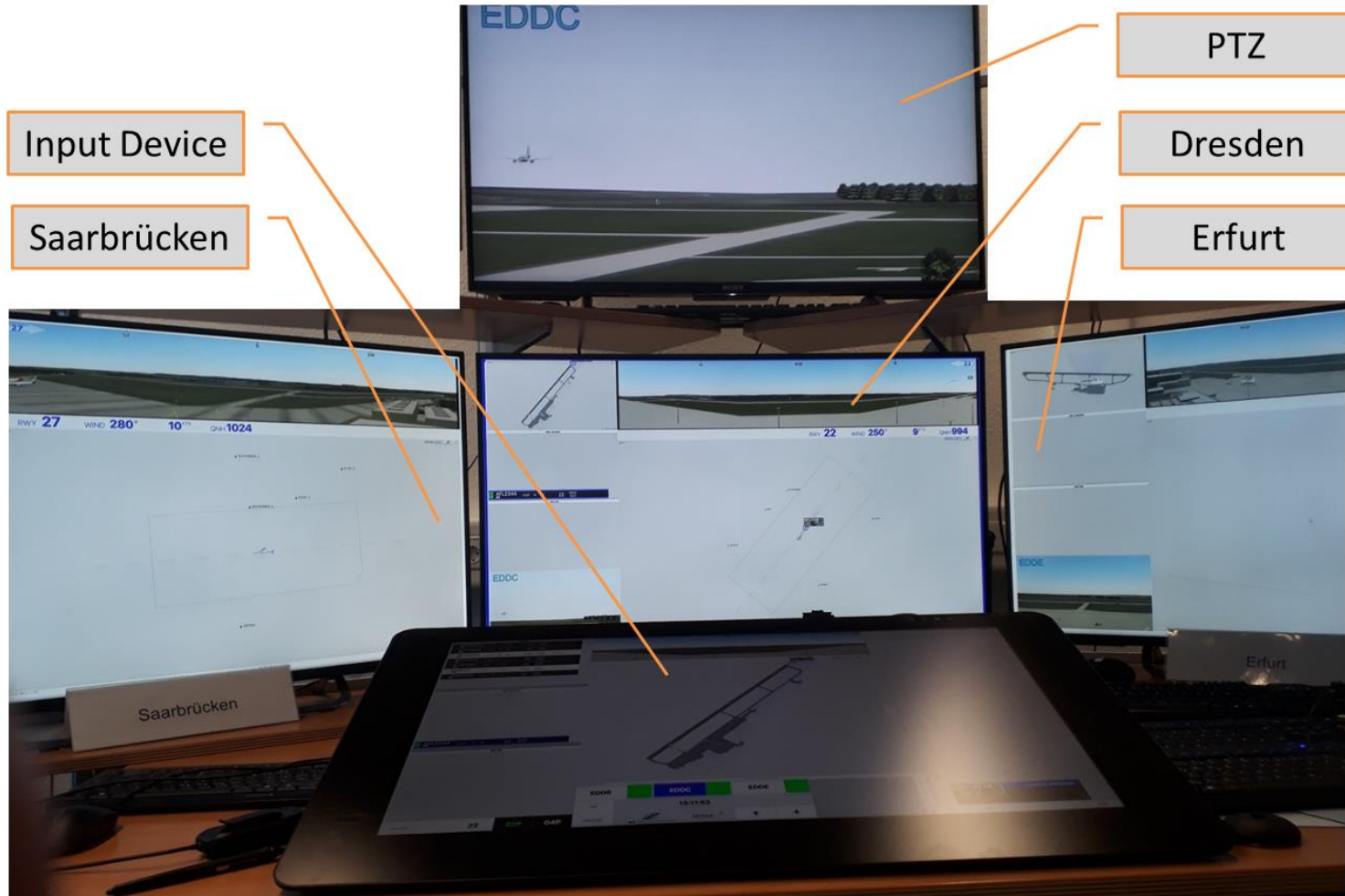   - Provide non-standard procedures

SESAR Research (DFS MRTC project activities)

Events indicate the ATCO that an action is required

Provide Clearance	Focus Attention	Solve Safety Alarms		
Clearance	Attention	Conformance Monitoring	Conflicting Clearance	Runway Monitoring
Vacate Runway	Traffic Information	Taxi Deviation	Land / Land	RIM Alert
Lineup	Reporting Point	Stationary	Land / Lineup	
Takeoff	Arrival Notification	No Landing Clearance	Land / Takeoff	

SESAR Research (DFS MRTC project activities)

DFS Prototype at HQ Langen

SESAR Research (DFS MRTC project activities)

DFS Prototype Input Device

Panorama

Flight Strips

Surveillance

Controls

Events

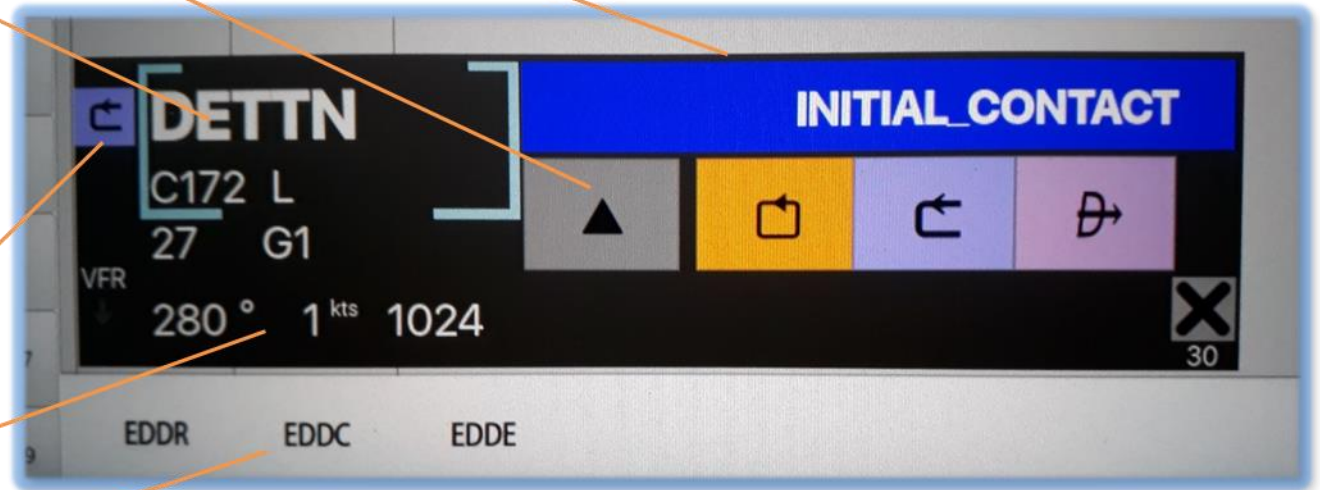# SESAR Research (DFS MRTC project activities)

DFS Prototype Event

SESAR Research (DFS MRTC project activities)

DFS Prototype Safety Event

Priority

SESAR Research (DFS MRTC project activities)

DFS Prototype – Results of first simulation 2019

- ATCO
  - 3 ATCOs   Core Team
  - 4 ATCOs   Unfamiliar with RTC
- Duration
  - 2 Weeks
  - Each ATCO 2 Days
- Scenarios
  - 24 Movements per hour for all airports
  - Up to 6 simultaneous movements
- Results
  - Huge Learning Curve
  - Events could be followed
  - Voice Recognition did not work

Outlook (DFS MRTC project activities)

Further simulations in 2021

Outlook (DFS MRTC project activities)

Actions 2021/2022

- Sampling information from simulations and development
- Continuing on the Safety Assessment (which implements the HF Assessment)
- Creating reports within the SESAR wave 2 framework
- Decision making for participation SESAR wave 3 (Start 2023)

Special challenges

- Further software development to improve automation
- Implementation of MLAT sensors in PTZ function – validation of low cost MLAT performance / validation in shadow modes using real data
- Improvement of the prototype
- Build up ATCO's trust in procedures and systems
- Proof the sufficient level of safety

Further questions?
More information please?

Let us #stayconnected!

Holger van de Sand
Head of Regulatory Affairs Remote/Virtual Tower Operations
DFS GmbH
holger.van.de.sand@dfs.de

www.dfs.de