Remote Tower Center Leipzig

Operational Overview

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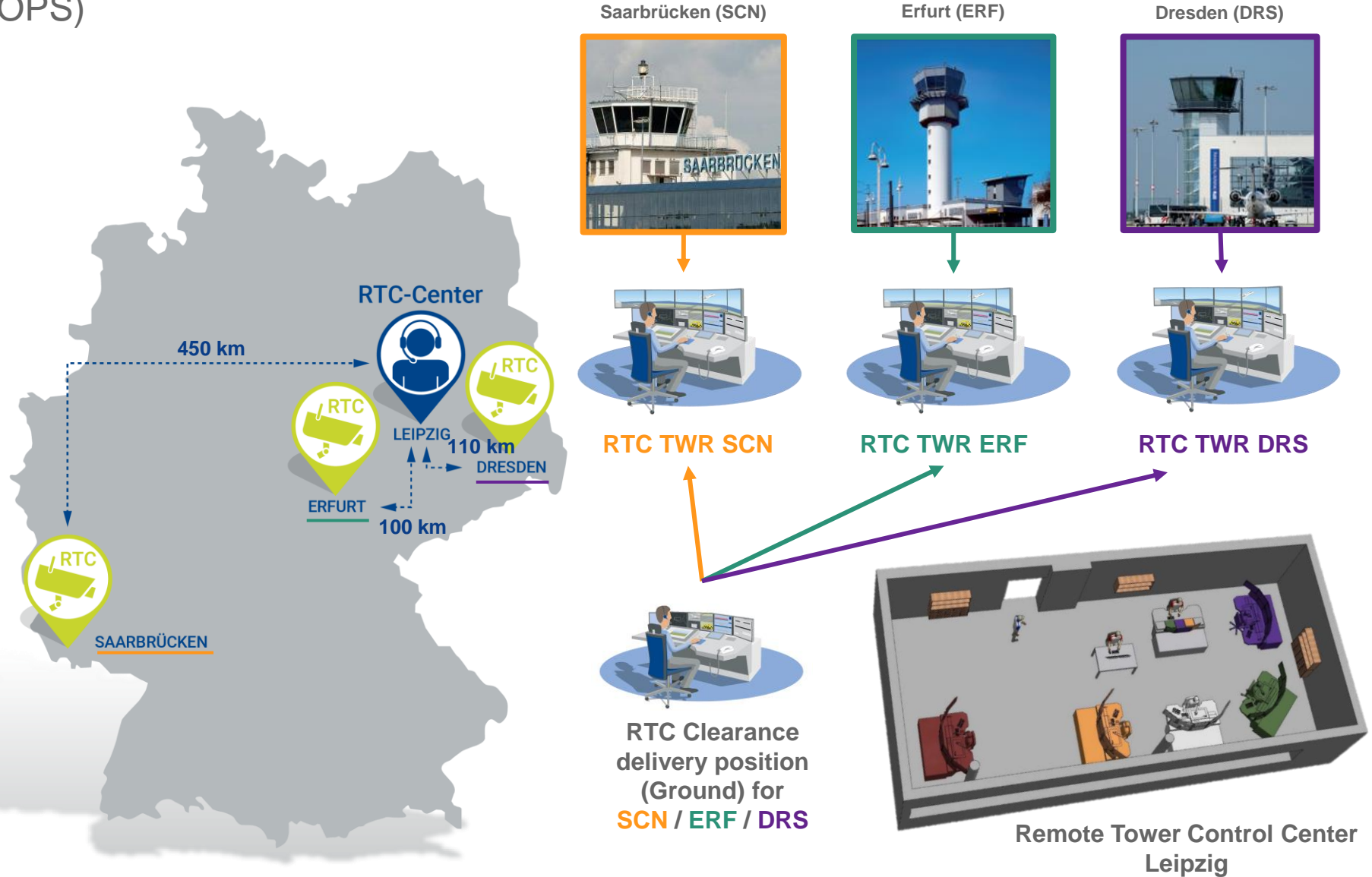
Agenda

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DFS-Project Remote Tower Control (RTC)

Overview (Use Case & CONOPS)

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

- **No changes for airspace users!**

- **Human factor study to confirm CONOPS:**

  - All ATCOs to be cross-trained

  - Create one dedicated "remote tower" licence group for the three RTC airports.

  - Integration of the Clearance-Delivery-Function (Ground) at one working position for all three airports.

RTC-Center

450 km

RTC LEIPZIG

RTC 110 km DRESDEN

RTC ERFURT 100 km

SAARBRÜCKEN

Saarbrücken (SCN)

Erfurt (ERF)

Dresden (DRS)

RTC TWR SCN

RTC TWR ERF

RTC TWR DRS

RTC Clearance delivery position (Ground) for SCN / ERF / DRS

Remote Tower Control Center Leipzig

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DFS-Project Remote Tower Control (RTC)

Motivation

Human resources:

- Using human resources more efficiently
- Pooling operational and technical functions

Technology:

- Harmonising the ATM technology
- Reducing operations and maintenance costs

Future / Strategy:

- Development from single to multiple remote operations
- Using the new technology for increasing capacity/safety

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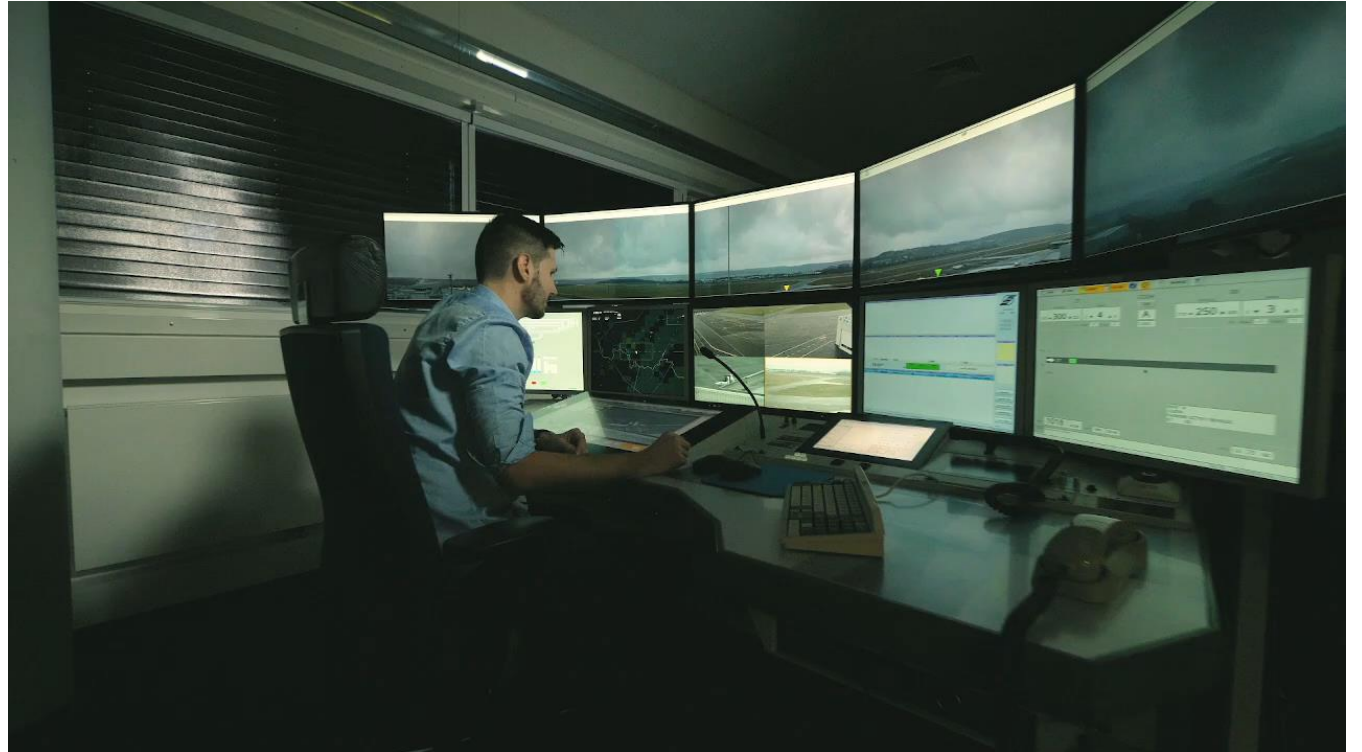**DFS** Deutsche Flugsicherung

Start of operations

SCN@LEJ on December 4, 2018; ERF@LEJ on April, 28, 2022

- On December 4, 2018, a Luxair regional airliner from Saarbrucken (SCN) was the first aircraft controlled remotely from the DFS Remote Tower Control Center.

- The second RTC site Erfurt (ERF) became operational on April 28, 2022.

"Our remote tower control system exemplifies innovation, efficiency and our unchanged high safety standards"

said Arndt Schoenemann, CEO of DFS.

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Infographic
Saarbrücken - Leipzig

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

Distance: 450 km; 155 Mbit/s (redundant) connection

More than 6.400.000 Gigabyte of data were transferred

More than 38.000 controlled flights (IFR/VFR)

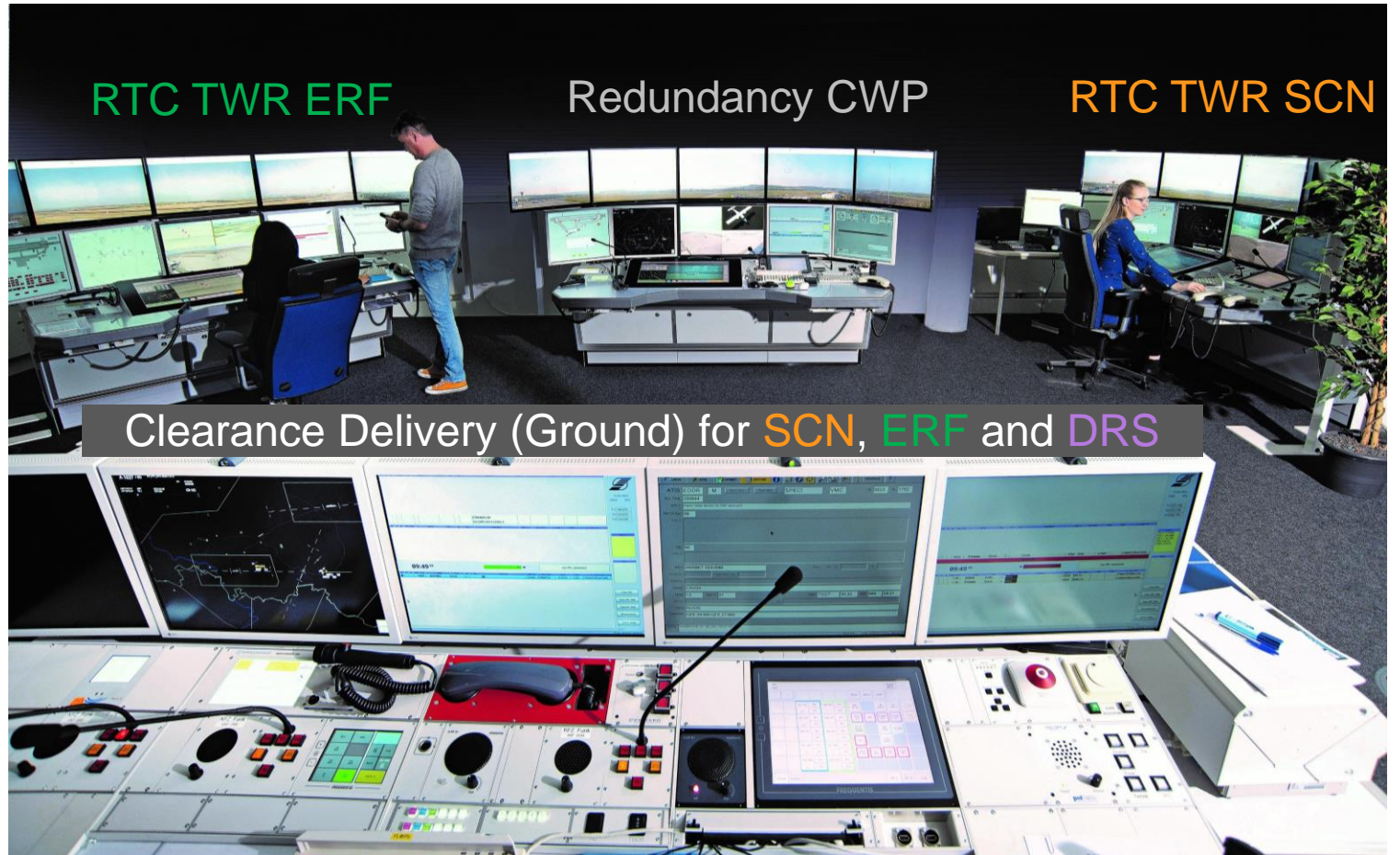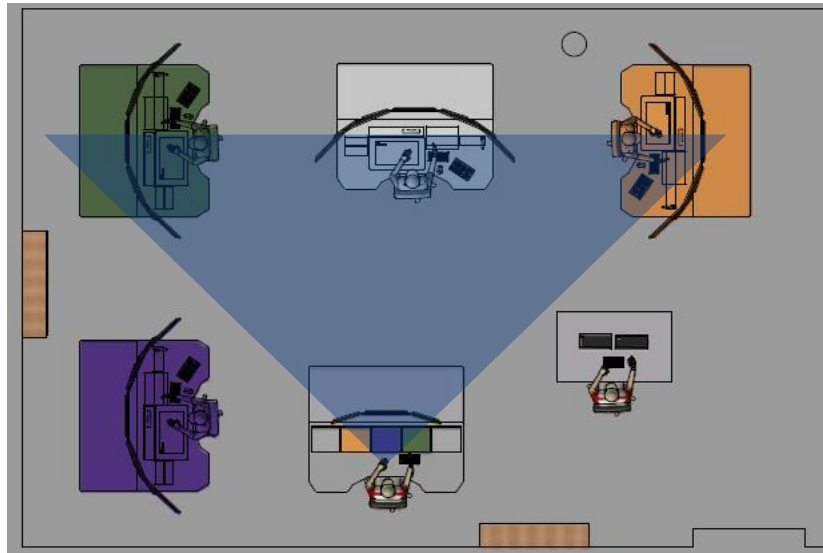**More than 750.000 passengers transported by airlines**

SAARBRÜCKEN

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Controller Working Position SCN

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Remote Tower Control (RTC)

OPS Room – DFS Remote Tower Control Center (Leipzig)

The design and layout of the controller working position (CWP) was developed together with the air traffic controllers:


RTC TWR ERF   Redundancy CWP   RTC TWR SCN

Clearance Delivery (Ground) for SCN, ERF and DRS

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Operational implementation is key (finding the right layout & HMI)

Validation phase with ATCOs from the three TWRs

Validation phase over 14 month using an agile approach

Agile approach to the development of the system

- Validation 1 – n
- Iterative validations
- Controller Input
- Valid. system
- Measures for next validation
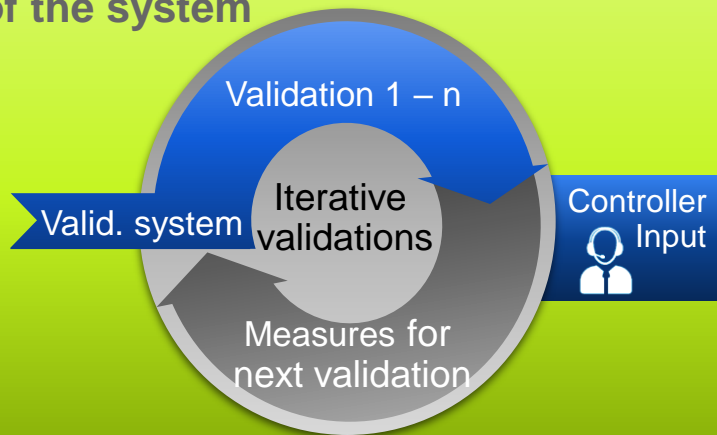
Accepted workplace based on:

- Scalable and scrollable 360° panorama
- **Switch visual / infrared view**
- Multi-touch concept
- Optimized interaction
- Integration of radar data (PTZ Map)
- Different PTZ-tracking functions

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Operational implementation is key (finding the right layout & HMI)

Highlights

360° panorama:
- Visual view
- Infrared view

2 Pan-Tilt-Zoom (PTZ)-cameras:
- Visual tracking
- Infrared tracking

Augmented reality (overlay information)

Further Highlights

Tracking based on picture recognition or surveillance data

Mini ATM HMI to control the PTZ (PTZ-MAP)

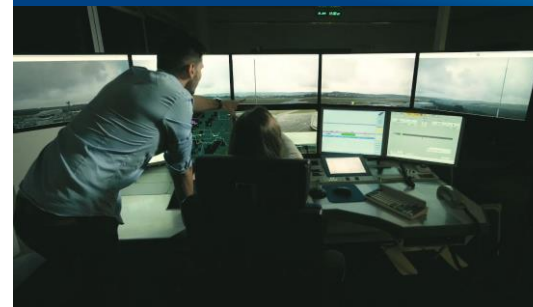Multi layer redundancy concept

Remote Light Gun

PTZ tracking (Infrared)

Object detection (Bounding)

Flexible CWP design

Video (Full-HD) and Infrared - synchronized

Stitched and harmonised, high dynamic range

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Remote Tower Control (RTC)

Some features of CONOPS (concept of operations)

- Choose panorama alignment and display section 180-360°
- PTZ „binoculars" follow objects automatically
- Switch visual / infrared view

- Automatic object detection
- Add helpful overlay information
- Only one keyboard/mouse instead of three

all information direct in front → minimize headdown and ATCO turnaround times

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Key Success Factors & Lessons Learned

RTC: More than just a project and much more than ATC with cameras

Involvement of ATCO and ATSEP from the early beginning through all phases of the project

Change management should not be underestimated even in the phase after the new system has been put into operation

The safety concept developed with ATCO and ATSEP works and has proven itself

The project is constantly developing the system further with ATCO and ATSEP in order to steadily improve the situational awareness

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Change mangement

- Change management played a special role in this project.

- The implementation of RTC represents a paradigm shift in the provision of aerodrome control services for DFS.

- Since the beginning of the project, several measures have been implemented to support the change management process.

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Change mangement

Measures

- Introduction of a "remote tower working group" with one controller from each of the affected sites.

- Active involvement of controllers in the tender process for the selection of the new remote tower system.

- Regular meetings and workshops (e.g. safety assessments) with the remote tower working group.

- Regular information events for employees/ airports/airlines.

- Publications in technical journals and other media.

- ...

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ATCO training

- Operational (ATCO) Training is based on the following assumptions:
  - Training for RTC is not a question of intense training for new procedures, extensive new knowledge or different airport environments
  - Instead, it is a question of continouse training of new working methods and working steps to achive routine in the handling of the new information source
- Thus, the following training set-up is being preferred (sim, shadow, sim with Checkout)
  - Simulation sessions as initial introduction and concluding windup
  - Continuous shadow mode training over a longer period is an efficient means of training to experience the day-to-day business while getting used to the new working steps
- Duration:
  - Brief and condensed simulation sessions in the beginning and the end
  - Shadow mode training over a period of 4-8 months

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Approval process (notification of change)

- Following the routine process of notification and implementation of a change

- Process not different to implementing any other new technology within ANS

- DFS successfully used local safety assessment guidelines for the demonstrations and commissioning of Saarbrucken

- DFS classifies "out-of-the-window-view" system as SUR (video sensor) and ATS systems (HMI)

- necessary EC declarations of verification of systems were delivered for approval as for any other CNS and/or ATS-system

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Next steps into a digital future

Starting with cross-training for SCN and ERF in 2022

– More efficient staff planning of ATCO will be possible thanks to created synergies after cross-training

Validation of a new sensor-concept in DRS

– Three instead of two pan-tilt-zoom-cameras should be used

– New infrared-panorama (higher framerate and resolution)

– New hot-spot-camera-concept for the coverage of apron-area

Software and Hardware-Upgrades

– Example: Introduction of a multi-button mouse with advanced functions → The goal is to minimize the head down times of ATCOs

– Mid-Life-Upgrade of existing sensors and hardware in SCN

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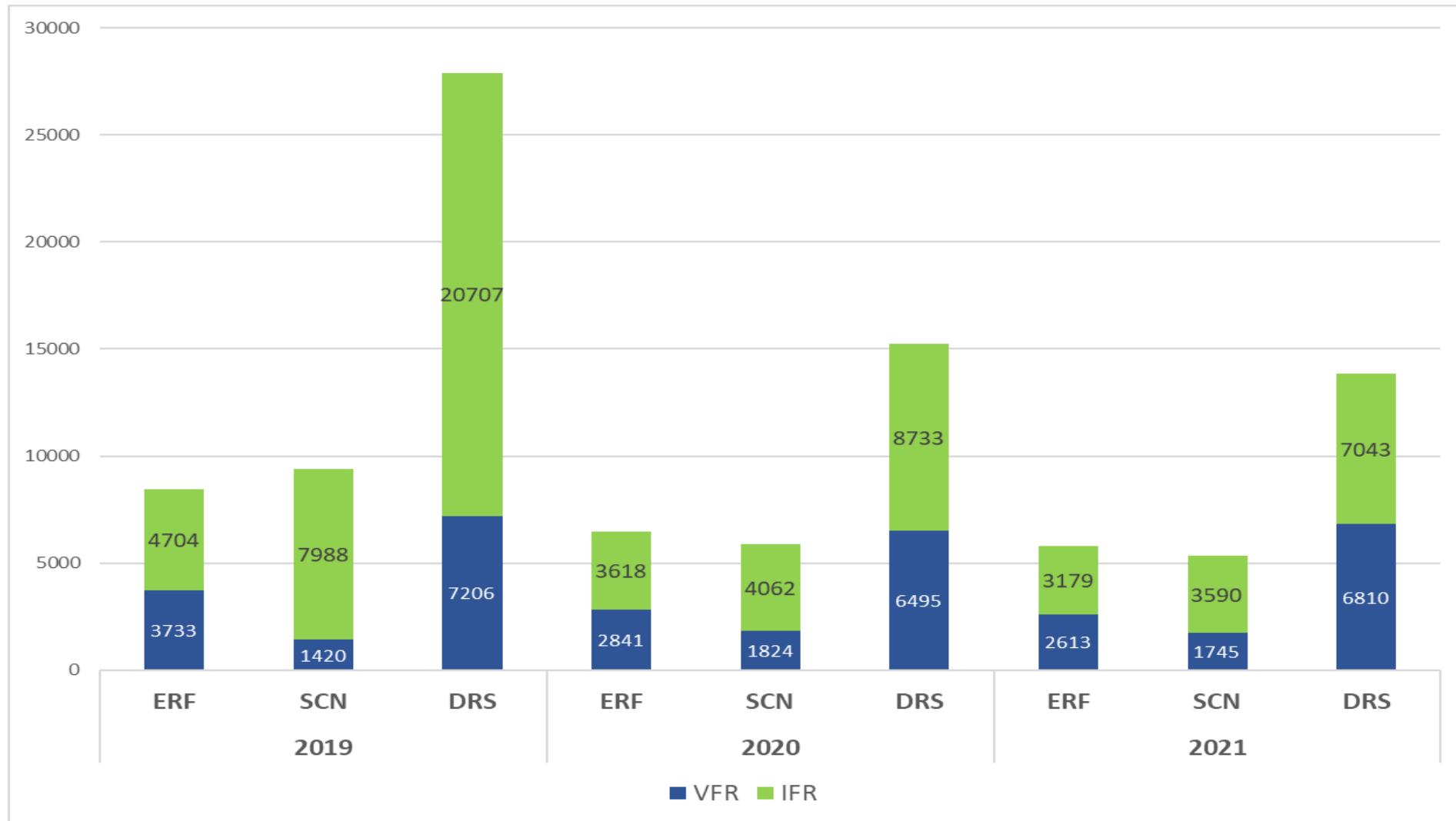# Remote Tower Control (RTC)
Current status Dresden (DRS)

– Activities planned for Dresden also had to be postponed several times due to corona.

– The implementation of the new system has been almost completed.

– The first validation with the new system is still ongoing.

– For the time being collection of results and creating requirements are the main tasks. Next validations are planned in 2024.

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Thank you for your attention!

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Traffic Figures
Aircraft Movement 2019 - 2021

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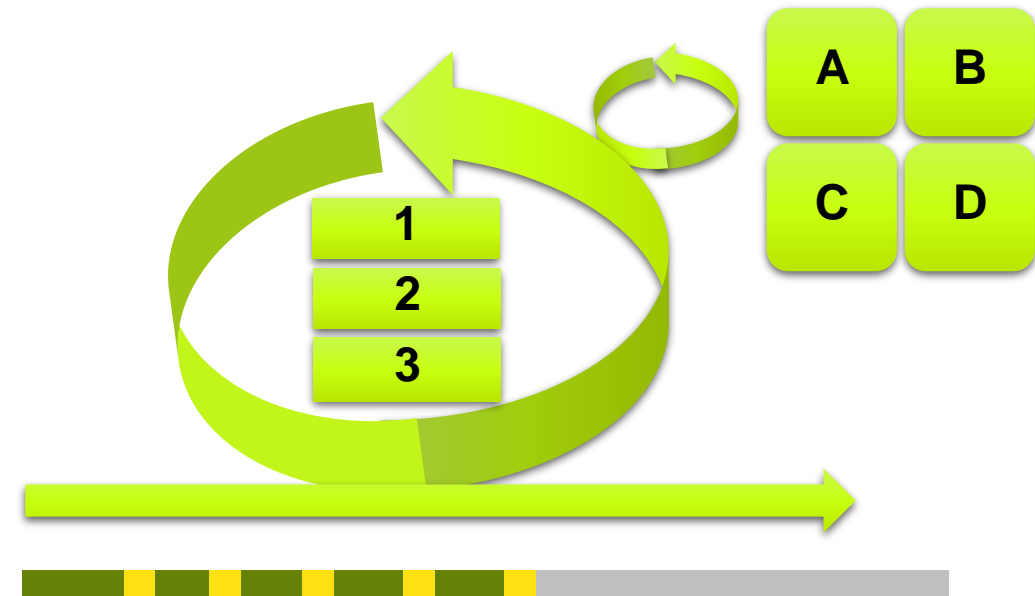
Hybrid project management
Waterfall model and agile PM

Classic project management (control of the project)

Product
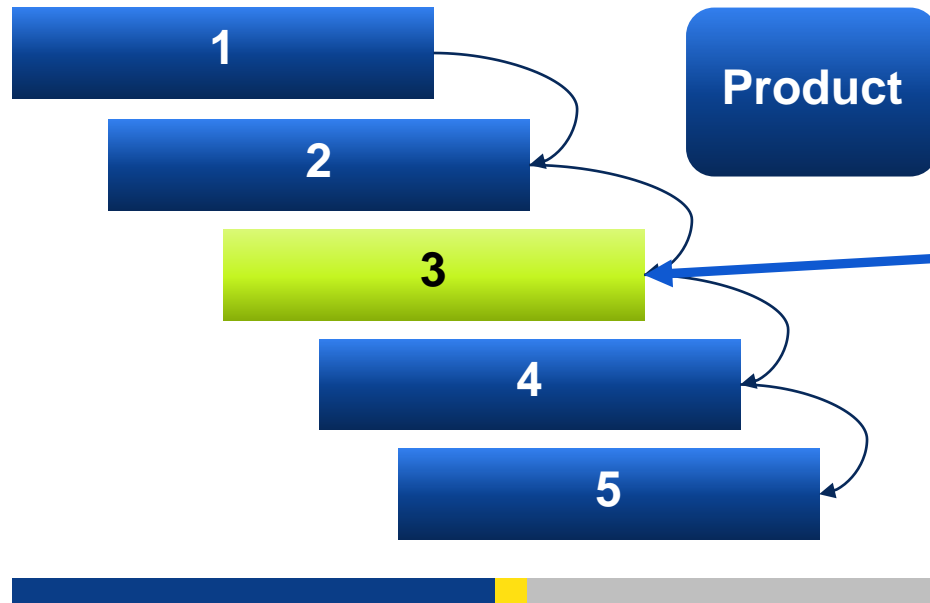
Linear approach, sequence of project phases separated by milestones. Tight definition of results, costs, deadlines and resources. Changes should be avoided.

Agile project management (development of the new system)

Based on an iterative incremental approach. In each iteration, a potentially deliverable product increment is completed. Teamwork with more ownership, short feedback loops, high responsiveness and CIP lead to success.

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DFS-solution

Further development of the system during the validation phase