HungaroControl
Hungarian Air Navigation Services

MORE THAN AN ANSP

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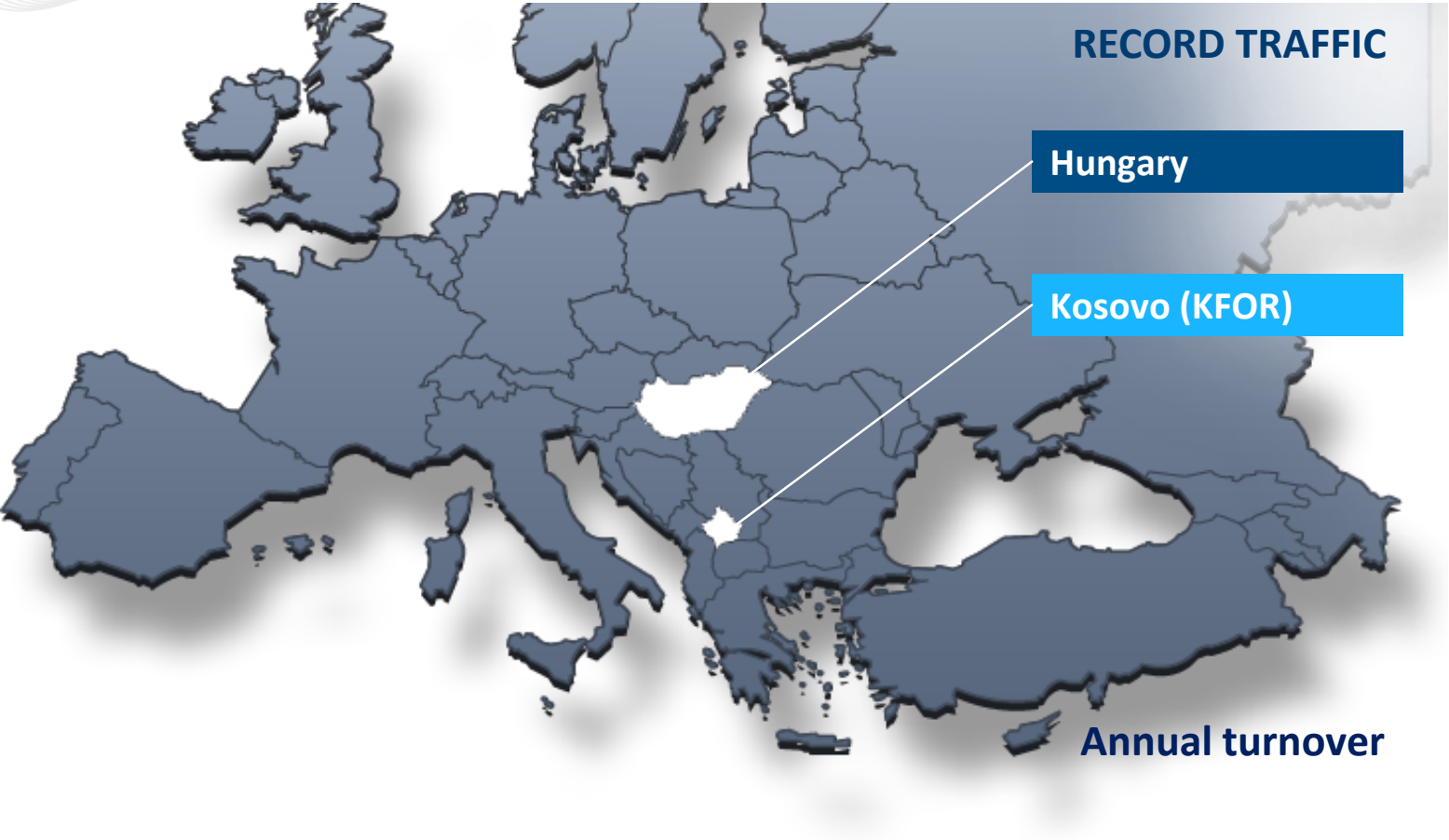
OVER THE PAST YEARS EUROPEAN TRAFFIC HAS BEEN SIGNIFICANTLY REARRANGED



906 147 movements in 2017

810 243 All movements in Hungary's airspace

KFOR sector **95 904**

708 112 En-route services in Hungarian Airspace

102 131 Arrival / departure of Budapest Liszt Ferenc International Airport

126 From Air Navigation Services (EUR m)

743 211 Air Traffic Controllers, 257 operational and technical supporters

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REMOTE TOWER

SPECIAL FEATURES OF HC AND BUDAPEST LISZT FERENC INTERNATIONAL AIRPORT

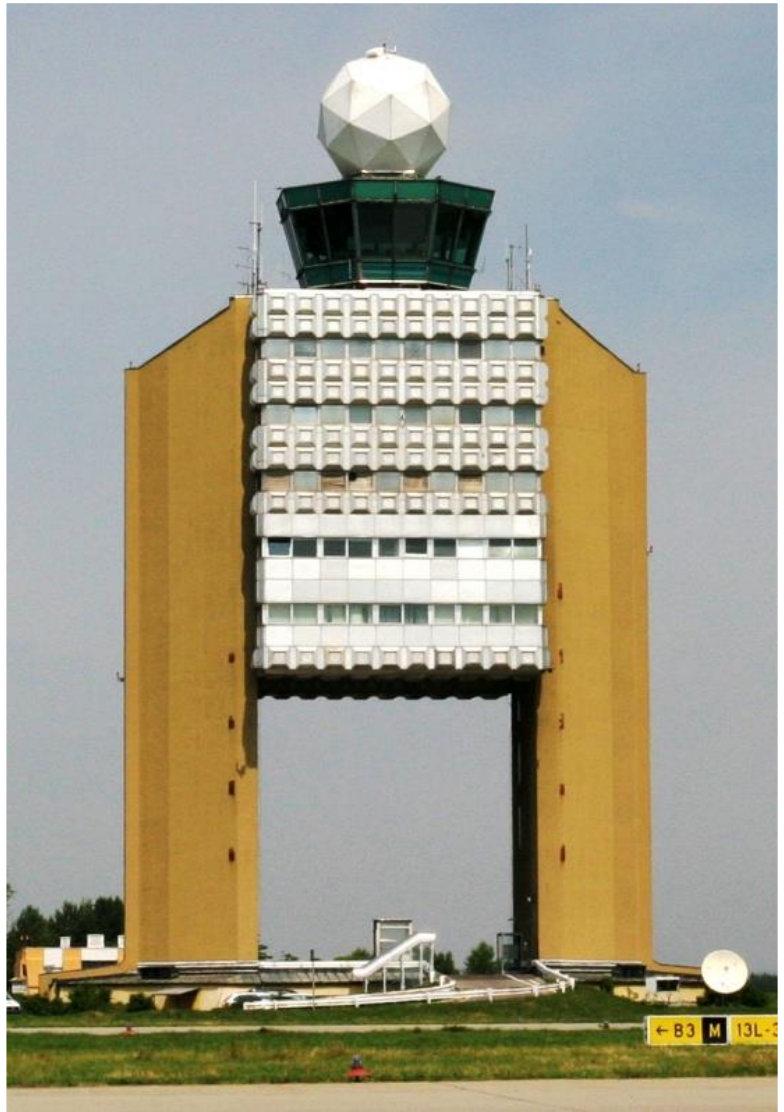
Two parallel runways, and two aprons with more than 6 km between the farthest thresholds

A-SMGCS – ability to control traffic without any visual information, based only on radar information

More control positions, specialized duties (Tower, Ground, Delivery, Coordinator, Supervisor)

Stripless operation; main ATM system's tower capability, automated ILS and AGL control

BUDAPEST TOWER



More than 30 years old concrete tower building, facing enormous maintenance costs

The tower building belongs to the airport, rented by HungaroControl with common responsibilities

Airport closings due to irregularities of the infrastructure in 2012 and 2015

Separated staff, inconvenient SRA entry

Refurbishment is forecasted to last for 6-8 months

Complete reconstruction of the tower building is not expected in the close future

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MAIN-STANDBY ALTERNATIVES

Considered alternatives to provide business continuity (main-backup)

- Building new tower and then refurbish TWR – cost & location problems – no way
- Refurbish actual TWR during operation – safety problems – no way
- Creating rTWR + keeping actual TWR – possible & feasible, reduced safety & financial risk
- Main-standby opeartion by remote tower – increased service level, long term best solution

Business need must be fullfilled by application of remote technologies

REMOTE TOWER PARADIGM

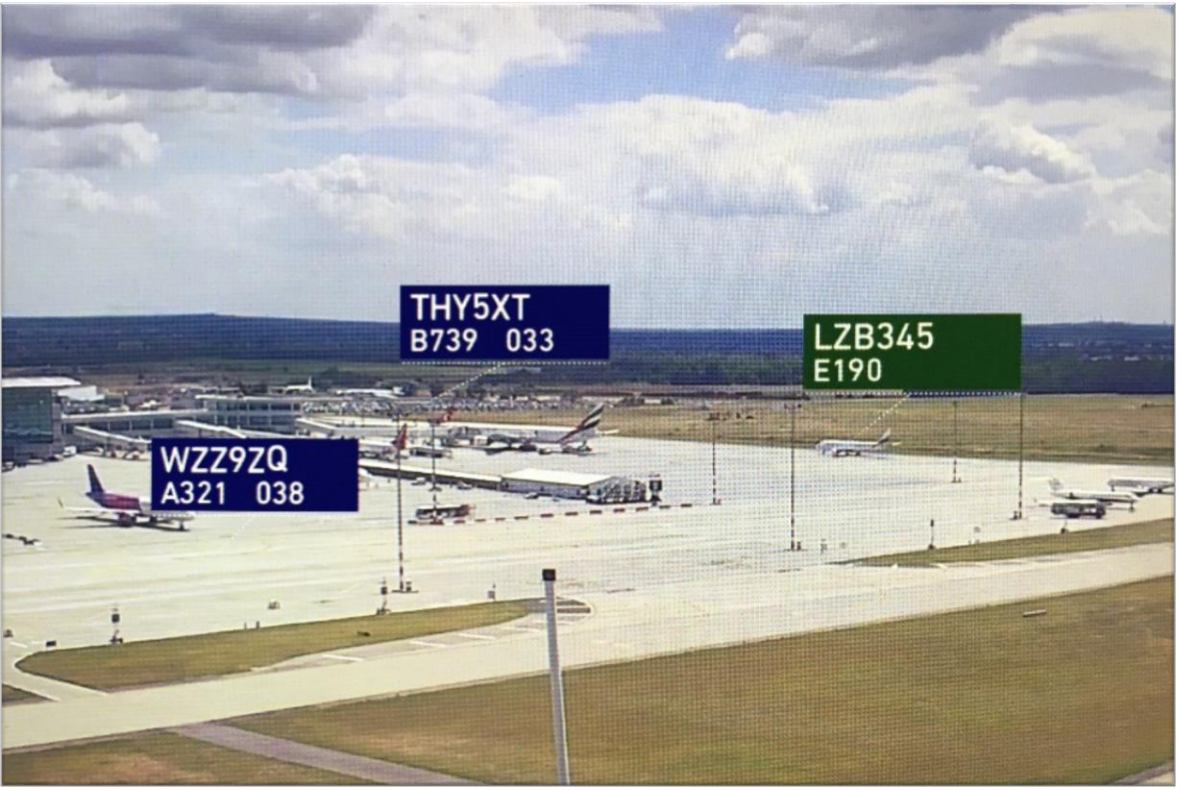
What does RTWR really mean?

- Remote tower would mean controlling air traffic by cameras? No!
- Generally controlling aerodrome traffic is building a mental model of the future of traffic based on different sensors including visual one and repeatedly checking the actual traffic against this mental model correcting if needed
- **RTWR is an enhanced visual surveillance technique providing visual information for aerodrome control**
- Out-of-the-window (OTW) view is a tool not a goal
- Provide the best visual information for ATCOs (don’t replicate or duplicate the actual view)

Remote tower means providing the same aerodrome services from an airport-independent place/way -
Each and every airport has to develop its unique solution

REMOTE TOWER FOR MEDIUM AIRPORT

Implementing rTWR at LHBP

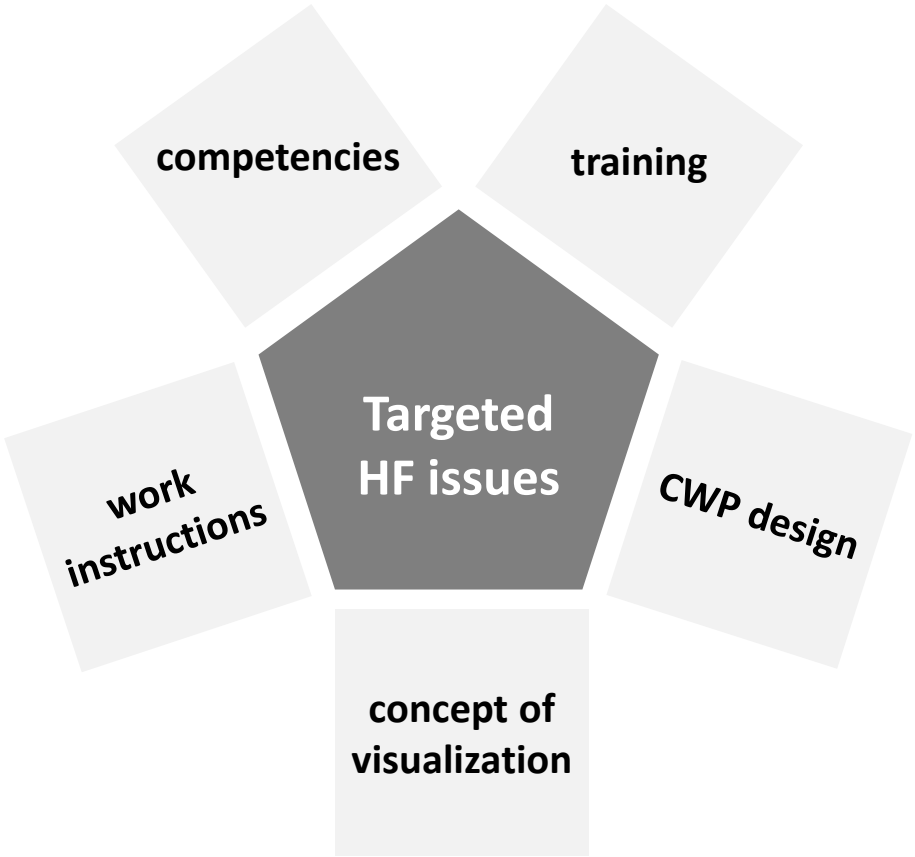


- Actual ATM-systems duplicated
- Distributed camera system
- Matrix videowall, no OTW-view
- Integrated A-SMGCS and cameras
- PTZ and fix cameras
- 4 ATCO + 1 SV
- ATCO paradigm shifting
- Human aspects awareness

Minimal change and maximum availability with enhanced visualization means safe and continuous operation at a reasonable price

BACKBONE OF THE IMPLEMENTATION FROM HF POINT OF VIEW

SAFETY ASSESSMENT



Available guidance (at the time):

- EASA ED decision 2015/014/R implementation 2015/015/R rTWR ATCO licensing
- SESAR solution package:
  Human performance assessment
  Safety assessment
  (focus on visualization)
- ECTL: Human factor case

HUMAN FACTOR CASE FINDINGS

Videowall - new common visual reference

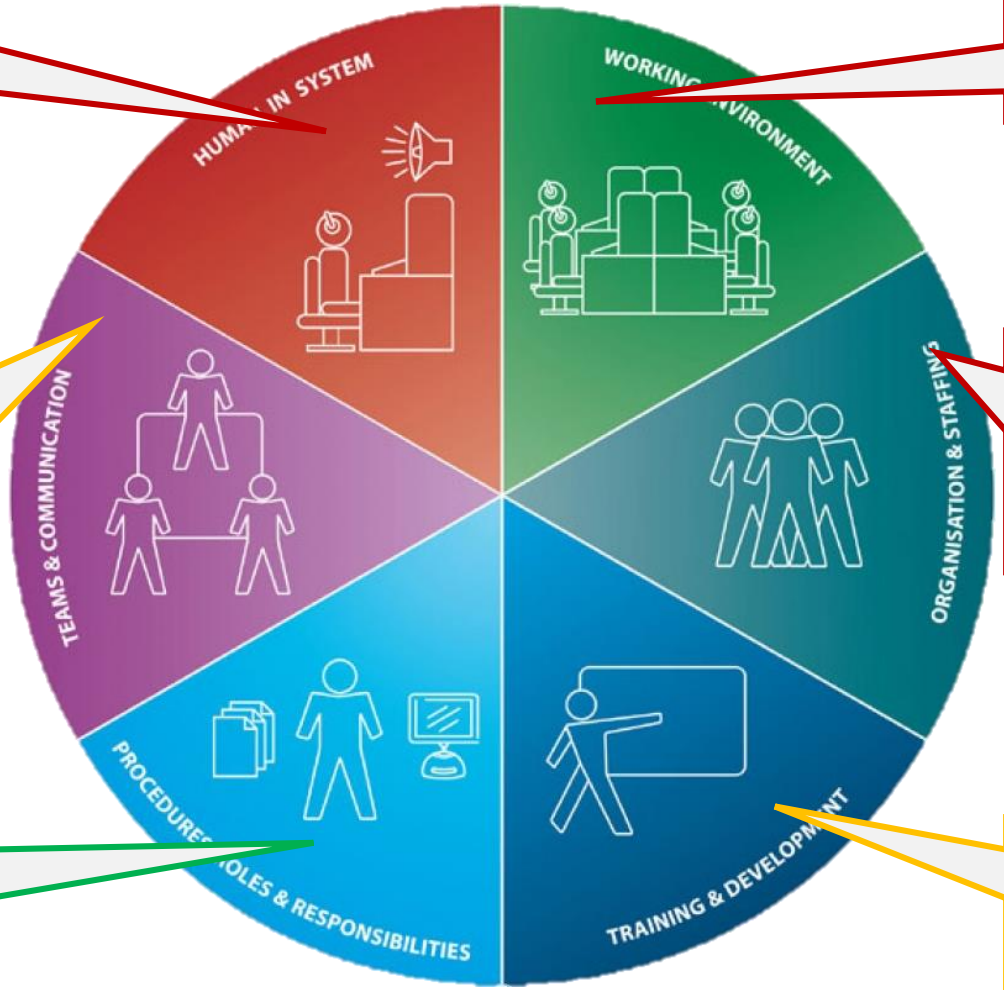
Physiology – more screen time

Change in team dynamics

Psychosocial issues – losing contact with airport environment

Recorded image – change in accountability?

Adequate time and training for new equipment



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STRATEGIC PROGRAM RESULTS SO FAR

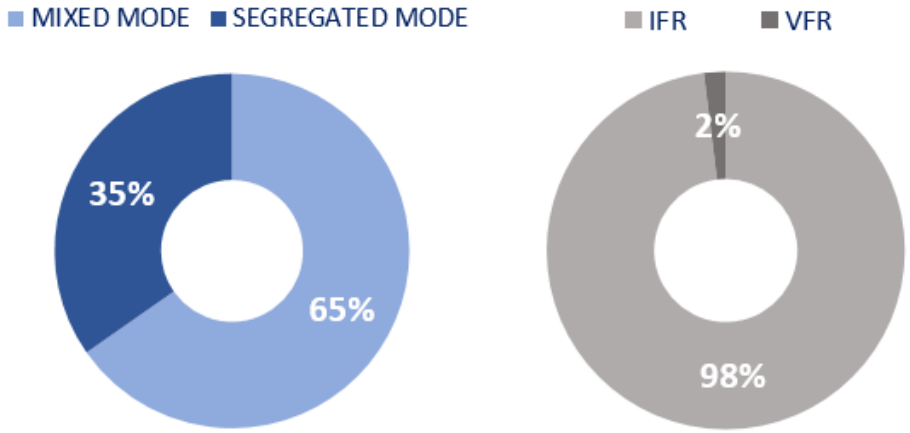
REMOTE TOWER STATISTICS 08.06.2018

OPERATIONAL HOURS

329 h

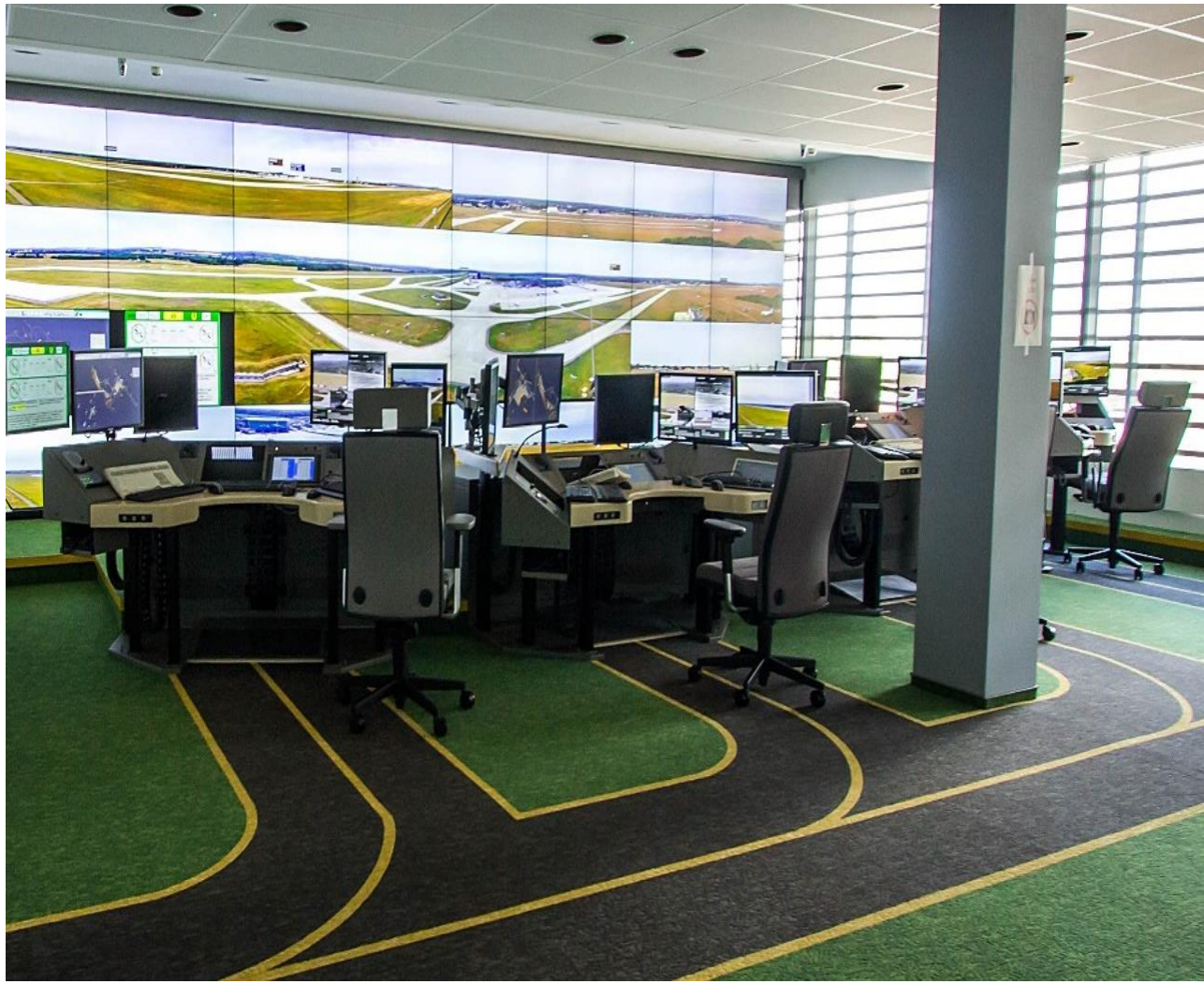
CONTROLLED MOVEMENTS

5 997



VISIBILITY

VMC	IMC	LVP2
315 h	13 h	1 h



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FINAL REPORT - CONCLUSIONS

Demonstration of SESAR LSD resulted in the following conclusions

Conclusion 1

- Remote tower solution **has been successfully demonstrated** at a medium size airport environment, presenting the capabilities of the technology

Conclusion 2

- Next to relevant technological aspects (like visualization functionalities), **human factor related changes are equally important elements** to a successful implementation of the solution.

Conclusion 3

- Complexity of a **medium size airport requires more customization from the technology side and more adaptation side from the human actors** than in a small, single runway environment.

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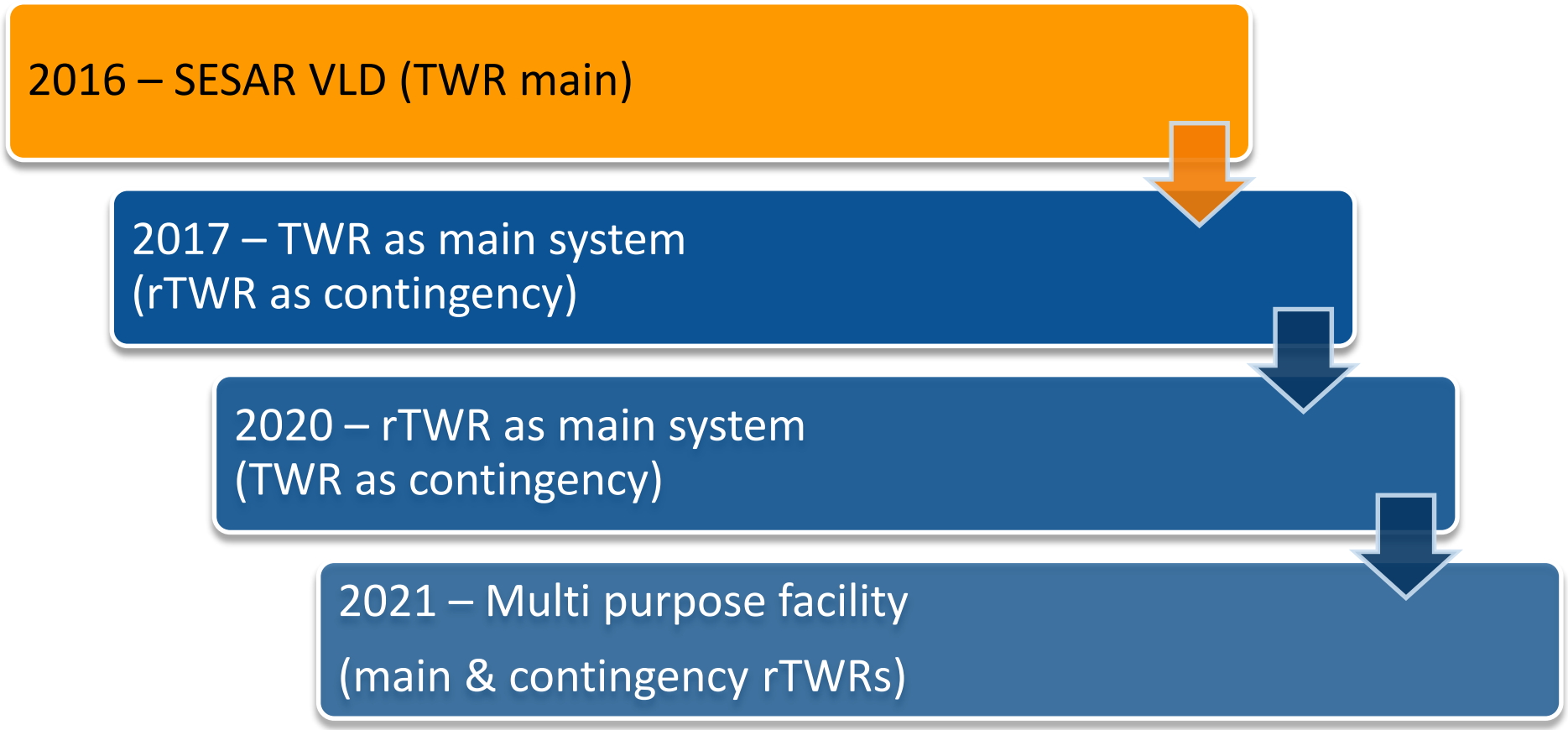
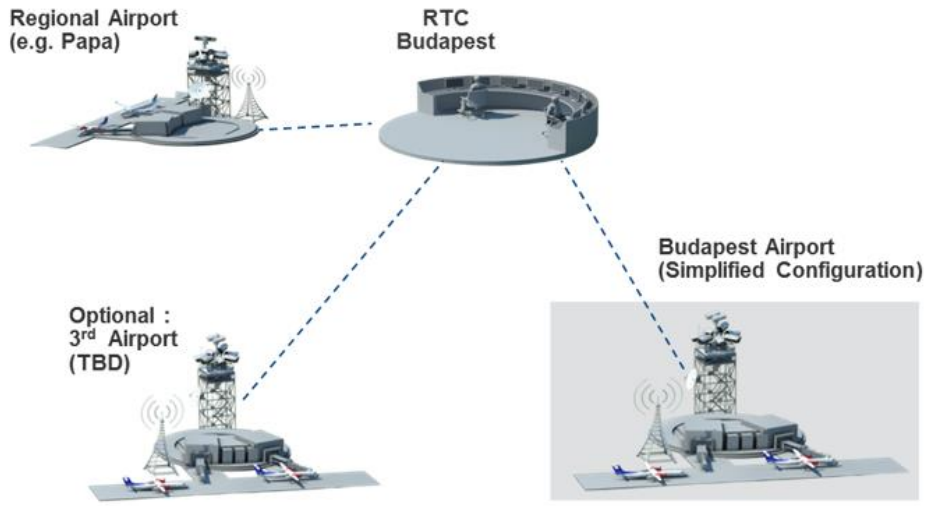
STEPWISE DEVELOPMENT

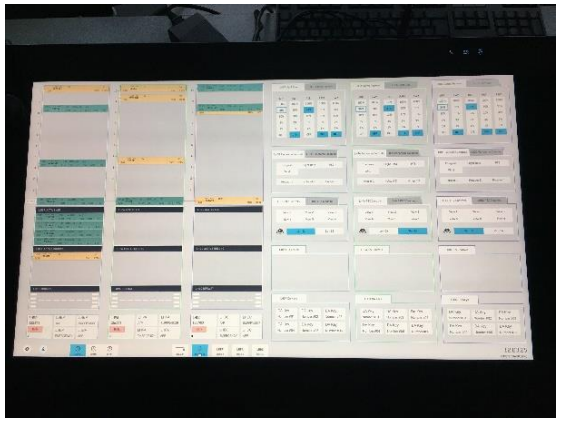
rTWR implementation phases



MULTI REMOTE TOWER

The concept of multiple remote towers can further maximize the cost savings realized through the implementation of Remote Tower services. The basic notion of the concept is for a single Air Traffic Control Officer (ATCO) to deliver control services to multiple airports simultaneously from a single working position.





THANK YOU FOR YOUR ATTENTION