

UNPACKING SESAR SOLUTIONS REMOTE TOWER SERVICES

12-13 JUNE 2014, DUBLIN AIRPORT



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Hosted by:



- 09:00 **Welcome**
Florian Guillermet, SESAR Joint Undertaking
- 09:15 **Remote Tower Services: The business perspective (I)**
 - **Manufacturing Industry**
Per Ahl, SAAB
Michael Ellinger, Frequentis
 - **Airports**
Andreas Eichinger, ACI Europe
 - **ANSPs**
Cristiano Baldoni, ENAV/A6
- 10:25 **Coffee**
- 10:55 **Remote Tower Services: The business perspective (II)**
 - **State and municipal**
Eamonn Brennan, Irish Aviation Authority (IAA)
Ingrid Cherfils, Swedish Transport Agency
 - **Dialogue towards approval**
Anders Erzell, Swedish Transport Agency
 - **Staff Associations**
Willem Zuidveld, International Federation of Air Traffic Controllers' Associations (IFATCA)
 - **Implementing stakeholders**
Niclas Gustavsson, LfV
Hans Hedde, DFS
- 12:45 **The need for guidelines**
Paul Adamson, Eurocontrol
- 13:05 **Question and Answers**
Michael Standar, SESAR Joint Undertaking
- 13:25 **Eurocontrol strategic approach**
Frank Brenner, Eurocontrol
- 13:50 **Wrap up**
Florian Guillermet, SESAR Joint Undertaking
- 14:00 **End of meeting (Light lunch)**

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Remote Tower Services: The Business Perspective

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Florian Guillermet SESAR JU

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Remote Tower Services: The business perspective

Manufacturing Industry

Per Ahl

SAAB Group

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#SESAR



Remotely Operated Tower

- *Saab Experiences and Challenges* -



Per Ahl

Vice President

Head of Commercial Aerostructure, Civil Security, and Traffic Management

Market Area Europe and Greater Middle East

TIME FOR A NEW BUSINESS MODEL ???



REMOTELY OPERATED TOWER

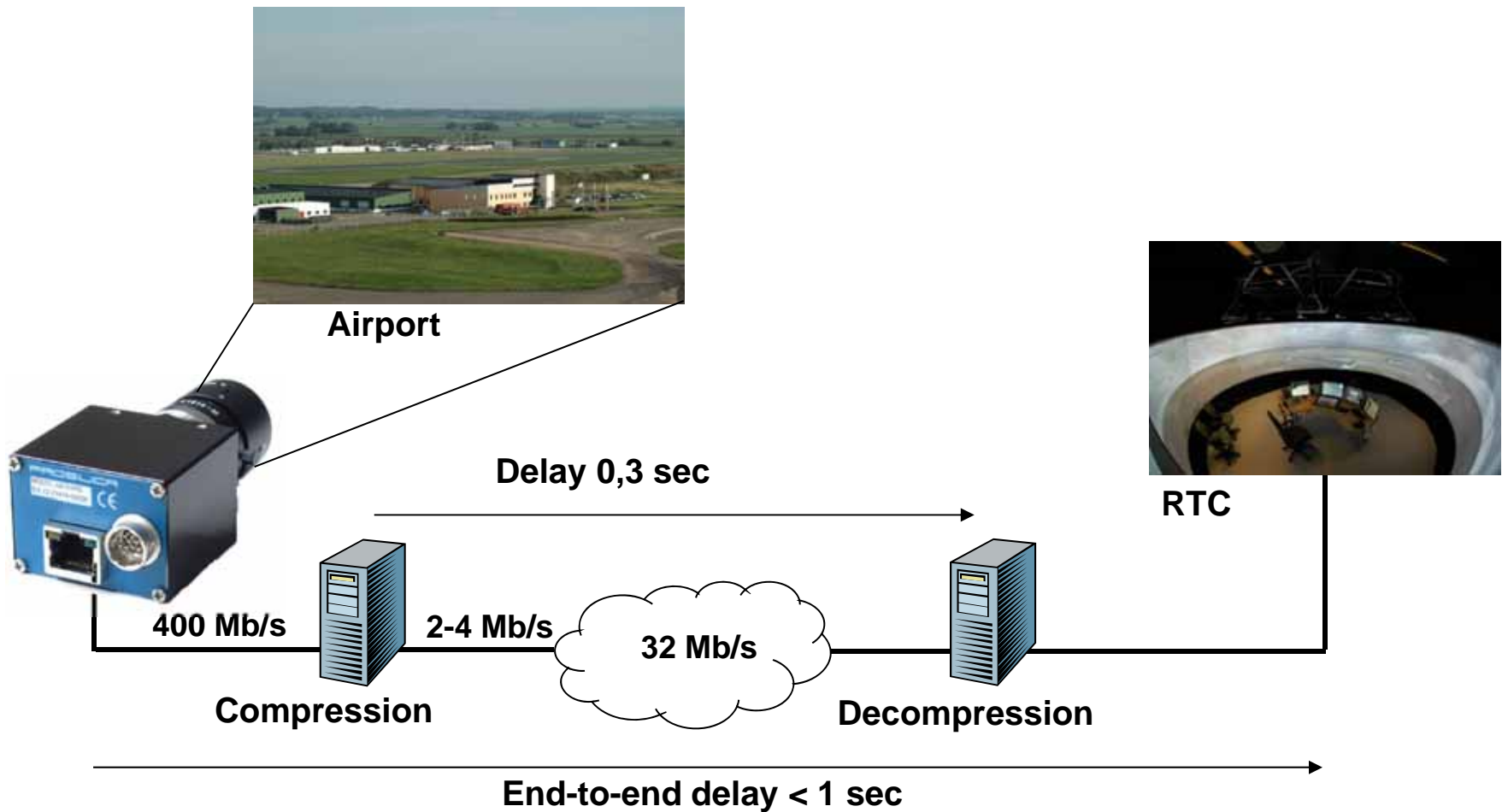
Test system in Sweden since 2008

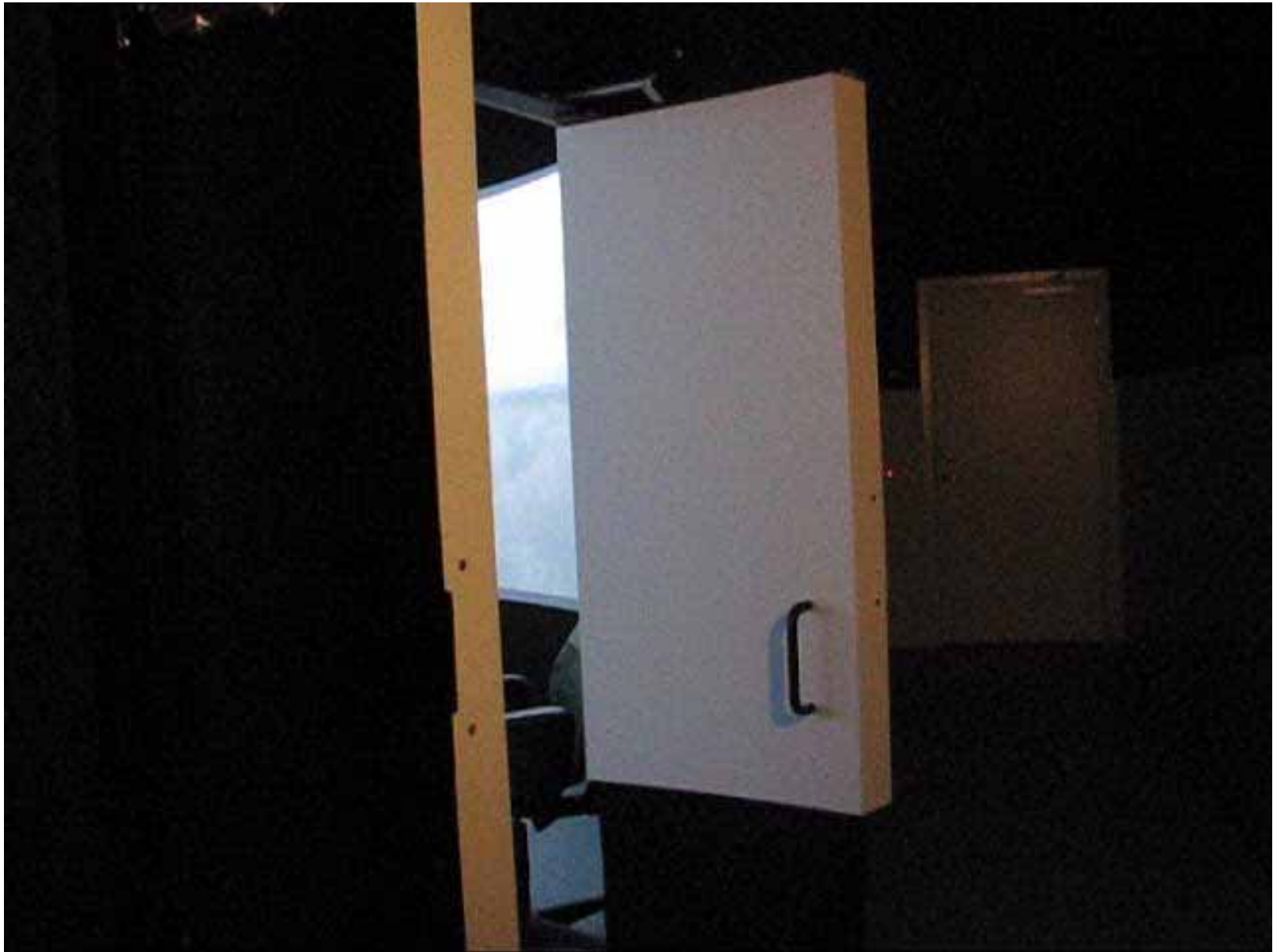
Controlling
Ängelholm Airport
from Malmö-Sturup
Airport, distance
100km



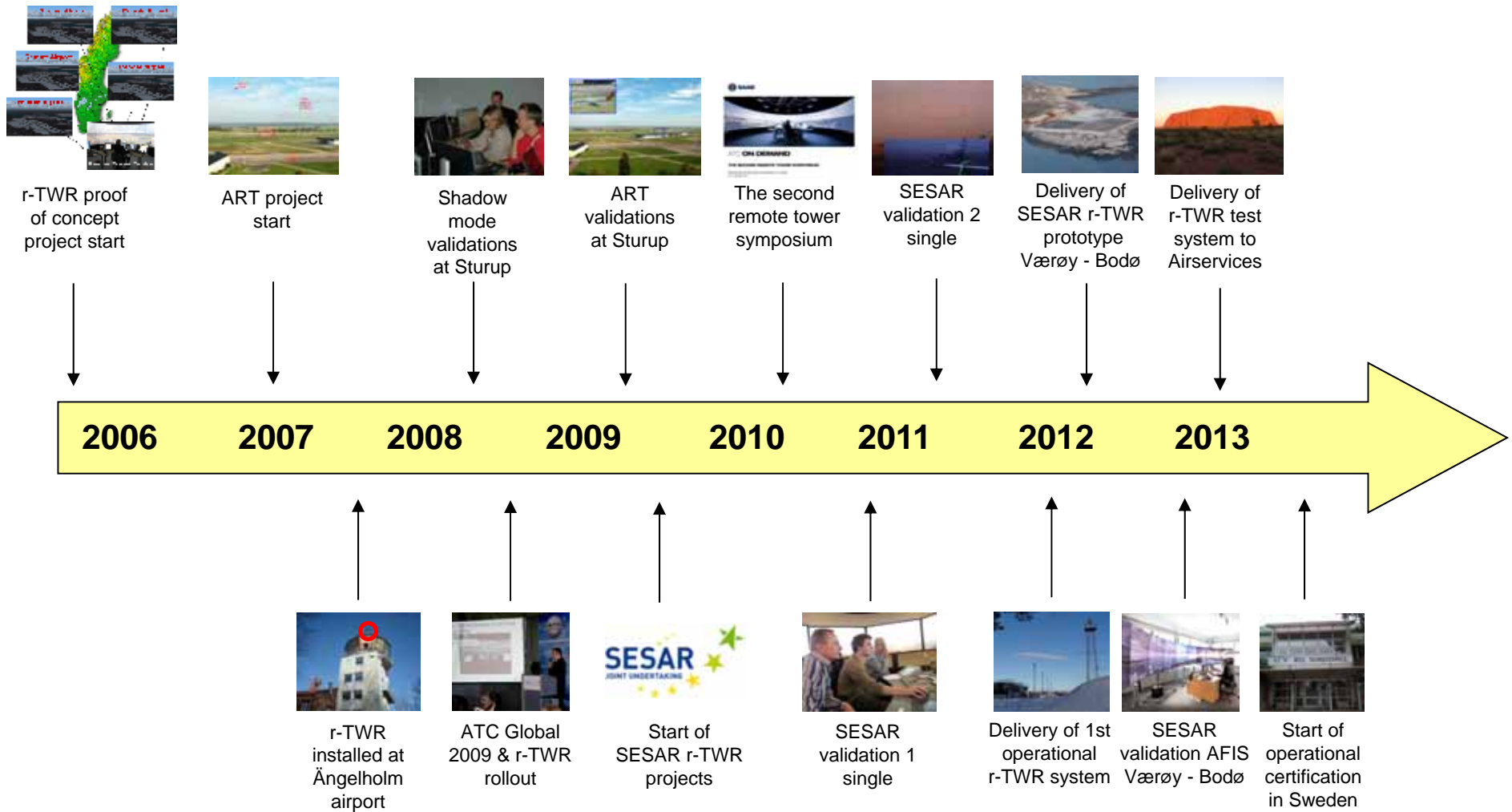
REMOTELY OPERATED TOWER

The technical challenge





Saab ATM - long time r-TWR experience



Environmentally-Protected Remote Sensor Housing

- ▶ 14 high-definition cameras
- ▶ Pan/tilt/zoom (PTZ) cameras... optical and infrared (IR)
- ▶ Signal light gun
- ▶ Acoustic sensor



Remote Tower – CWP

- The Out The (Tower) Window (OTW) view is presented for the ATCO in the Controller Working Position (CWP)



Overlay of weather information



Wind rose



RVR-values

Sun light prevention with filters

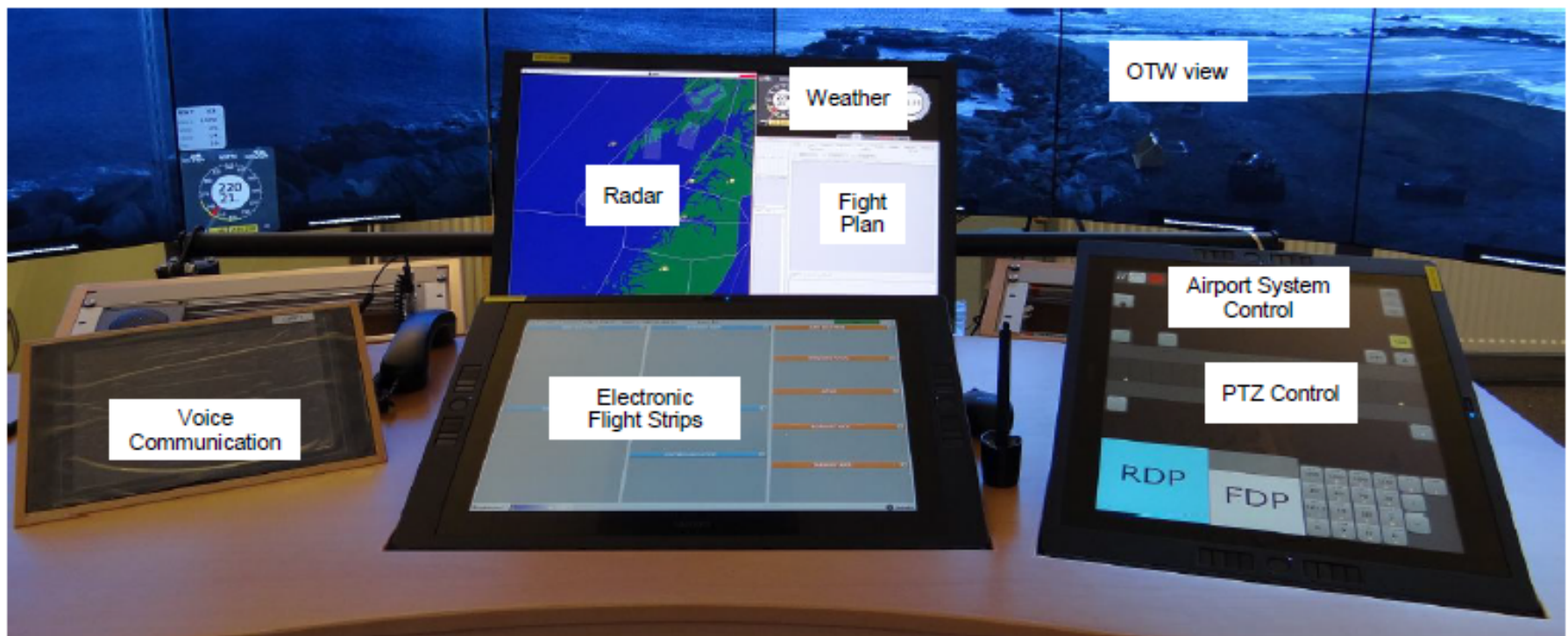


With Filter

Without Filter

Remote Tower – CWP

➤ CWP Systems





Norrlandsbild
Trädgårdsgatan 19
851 06 SUNDSVALL
Tel. 060-15 05 05

R-TWR Pilot Implementation Project Sweden

- Contract awarded in January 2011
- Two airports Sundsvall and Örnsköldsvik
- The RTC will be located in Sundsvall
- Delivered December 2013
- Operational validation 2013
- Final Validation report February, 2014
- Approval for Operational use in Q2 2014



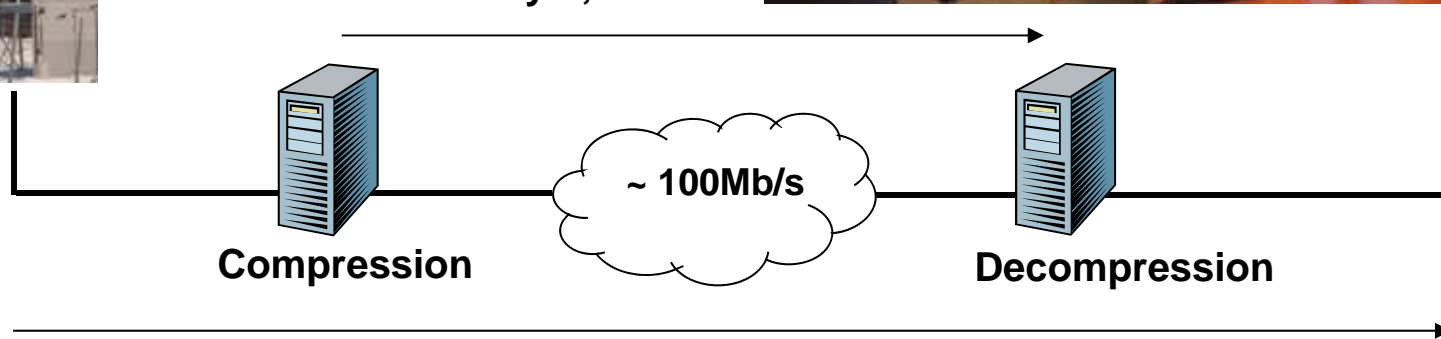
REMOTELY OPERATED TOWER

Airport

Remote Tower Center



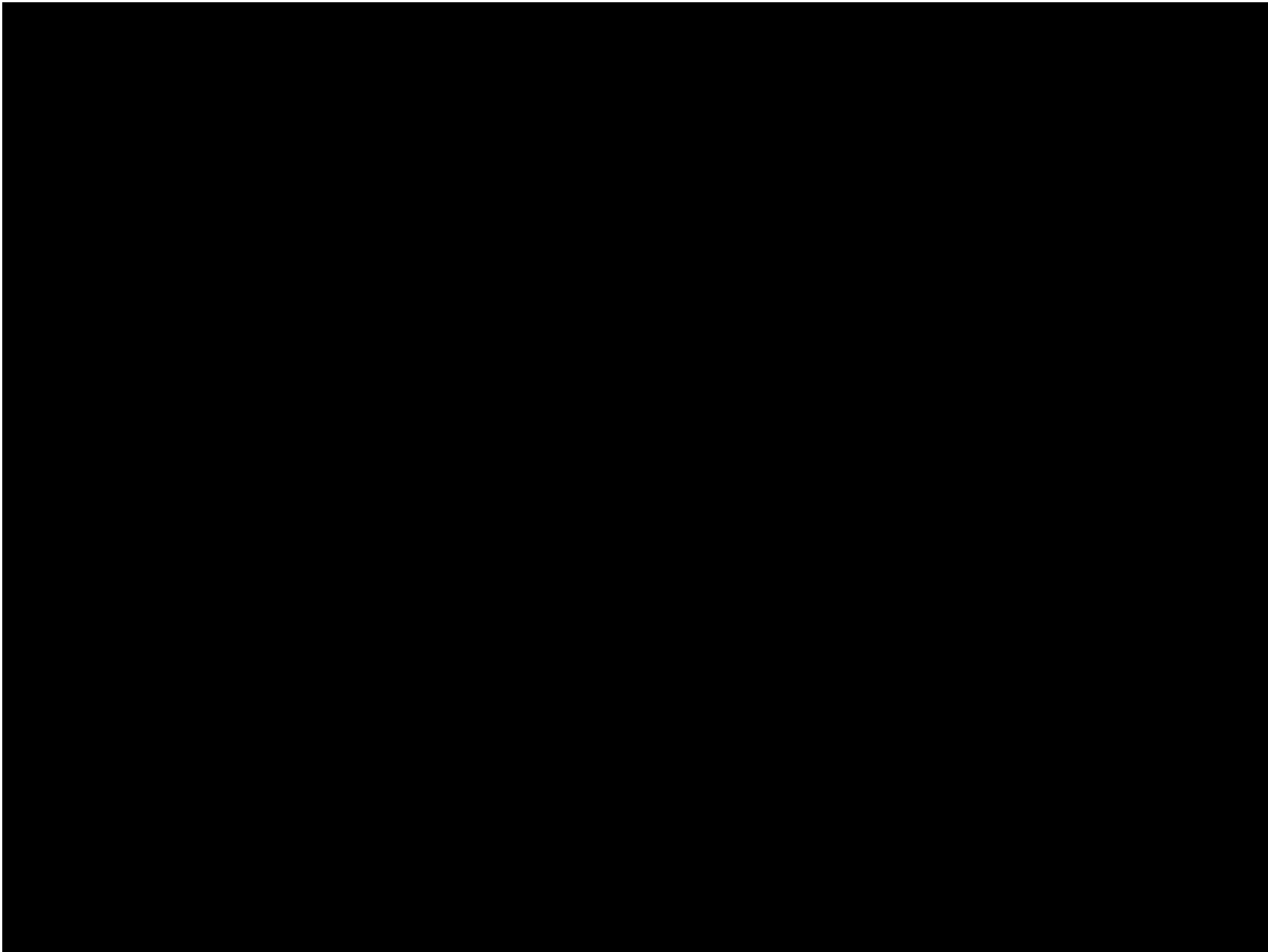
Delay 0,3 sec



End-to-end delay < 1 sec

The OTW view in RTC in Sundsvall





R-TWR test site to Airservices Australia

- Contract was signed on the 1st of June 2011
- Remotely control Alice Springs airport from Adelaide (1500 km)
- Site survey performed in Alice Springs 5-7 of June 2011
- Based on the Swedish implementation + visual tracking
- Delivery in Q4 2013
- FAT December 2013
- SAT February 2014
- Validation start Q3, 2014



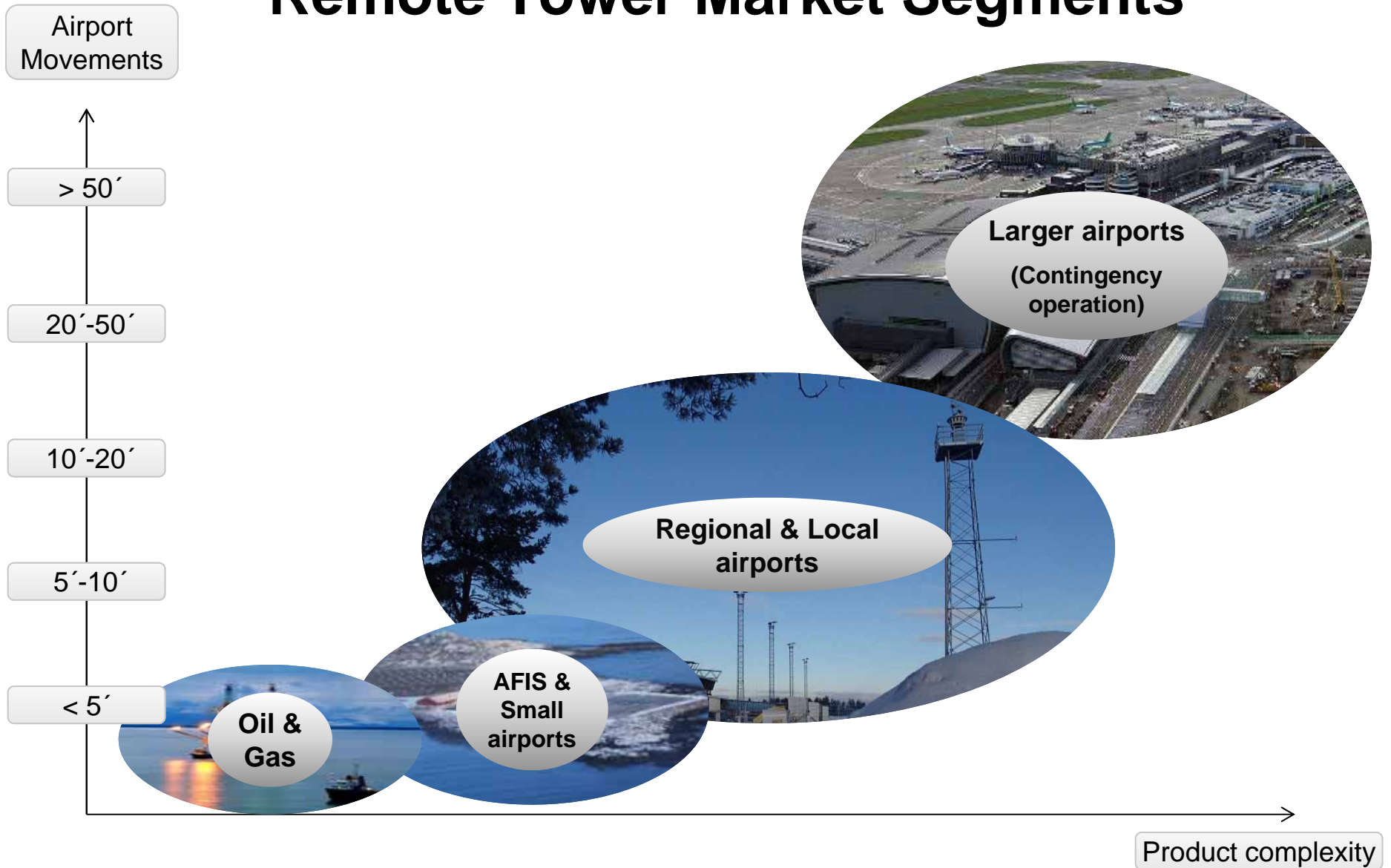
Remote Tower - Norway



- ▶ Værøy heliport, RTC in Bodø
- ▶ SESAR Trials in Dec 2012
- ▶ Röst installed December 2013



Remote Tower Market Segments



r-TWR Training & Simulation

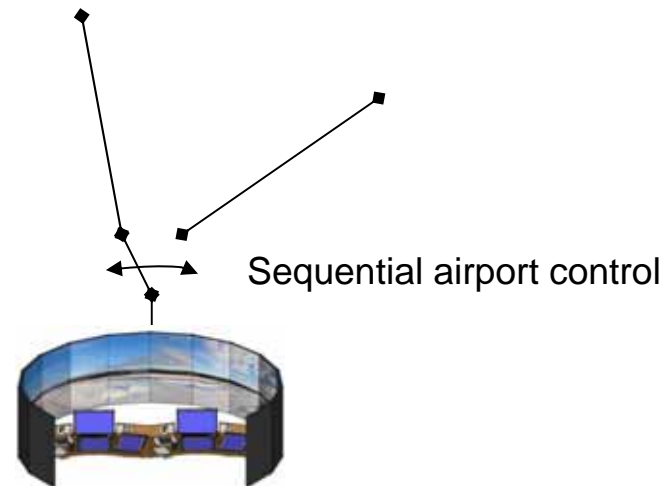
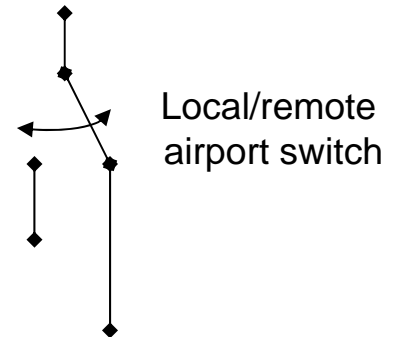
- ▶ A module that feeds ordinary r-TWR CWP position(s) with all necessary data for 1-N airports
- ▶ 1-M pilot positions



NEXT STEPS

r-TWR Switching

- ▶ Allows one CWP to be switched between different r-TWR airports. The One-To-One CWP is statically connected to a specific airport
- ▶ Cost reductions for an ANSP, the RTC is equipped with a less number of CWPs
- ▶ A disconnected airport is closed
- ▶ Well fitted for locations with very low traffic density, such as military maintenance bases, oil rigs and heliports

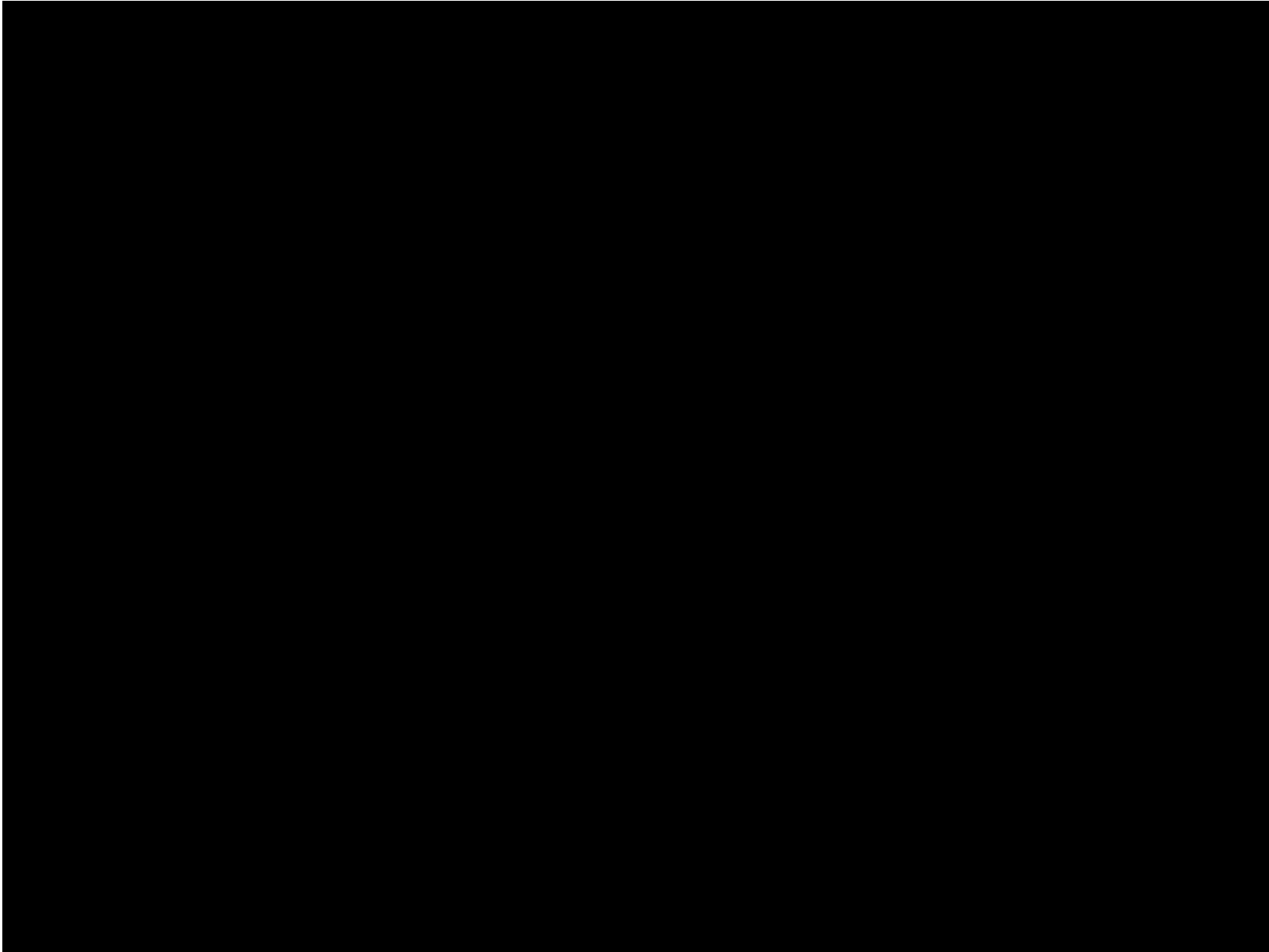


Multiple Airports in one CWP

3 examples of OTW (Out of The Window view) konfig. Side by side presentation







SUMMARY:

Driving forces for Remote TWR

- **Survival opportunity for smaller airports with low traffic density**
- **More efficient and cost effective TWR service**
 - Difficult to recruit to distant airports
 - Ability to sequenced control of small airports
 - Multi airport control
 - Possible shared use of the APP-resources
- **Increase ATC operation by utilizing the staff in a more cost effective way**
 - Lack of educated or trained people when expanding the operation
 - Multi airport control – one controller will be able to control up to 3 airports
- **The ability to have 7/24 SAR operation**
 - Flexibility to open up airfields
- **Alternatives to new construction or refurbishment of the tower**
- **> 30 customers in queue.....**

TIME FOR A NEW BUSINESS MODEL ???

- ATC ON DEMAND -



Experiences – Change Management

How does pixels affect operations?

- ▶ What is comparable to real life? 1080 p i.e. HD?
- ▶ Digital windows
- ▶ Video tracker accuracy
- ▶ Work environmental considerations



How does frame rate affect operations?

- ▶ Smoothness in picture – What is comparable to real life?
- ▶ Rapid moving targets requires high update rate i.e. frames per second [fps = Hz].
- ▶ Number of images photographed per second
- ▶ All in all, situation awareness
- ▶ Work environmental considerations



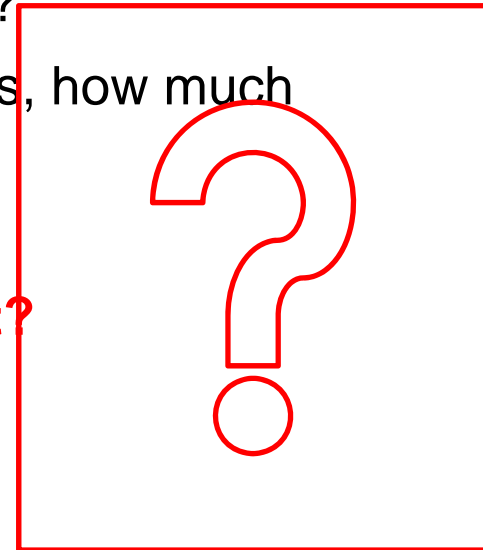
Considerations for visual & safety enhancement tools

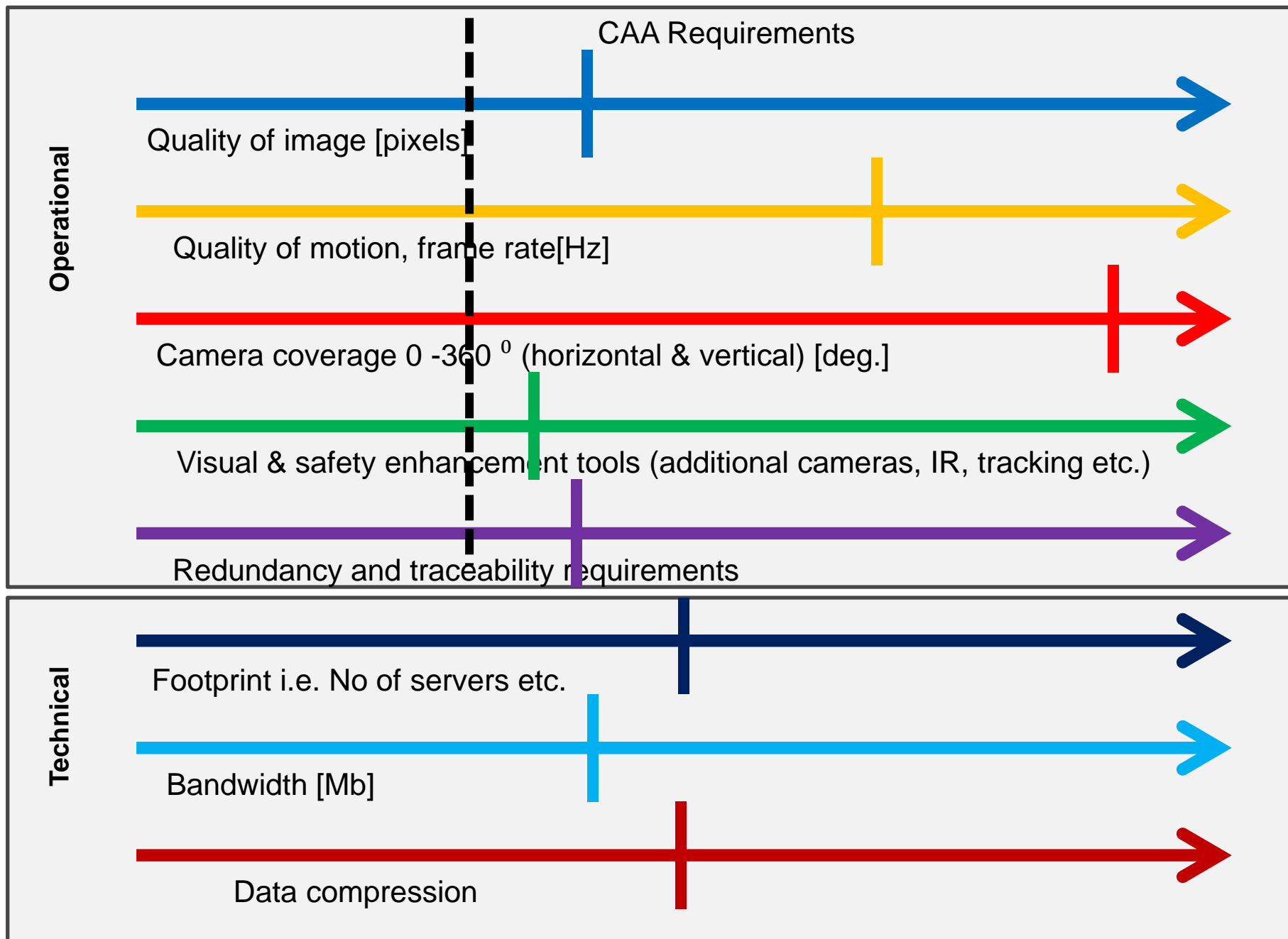
- ▶ IR
- ▶ Trackers
- ▶ Additional cameras
- ▶ Overlay (met info, labels, etc.)
- ▶ Anomaly detection
- ▶ Technically possible vs “Legally” achievable...?



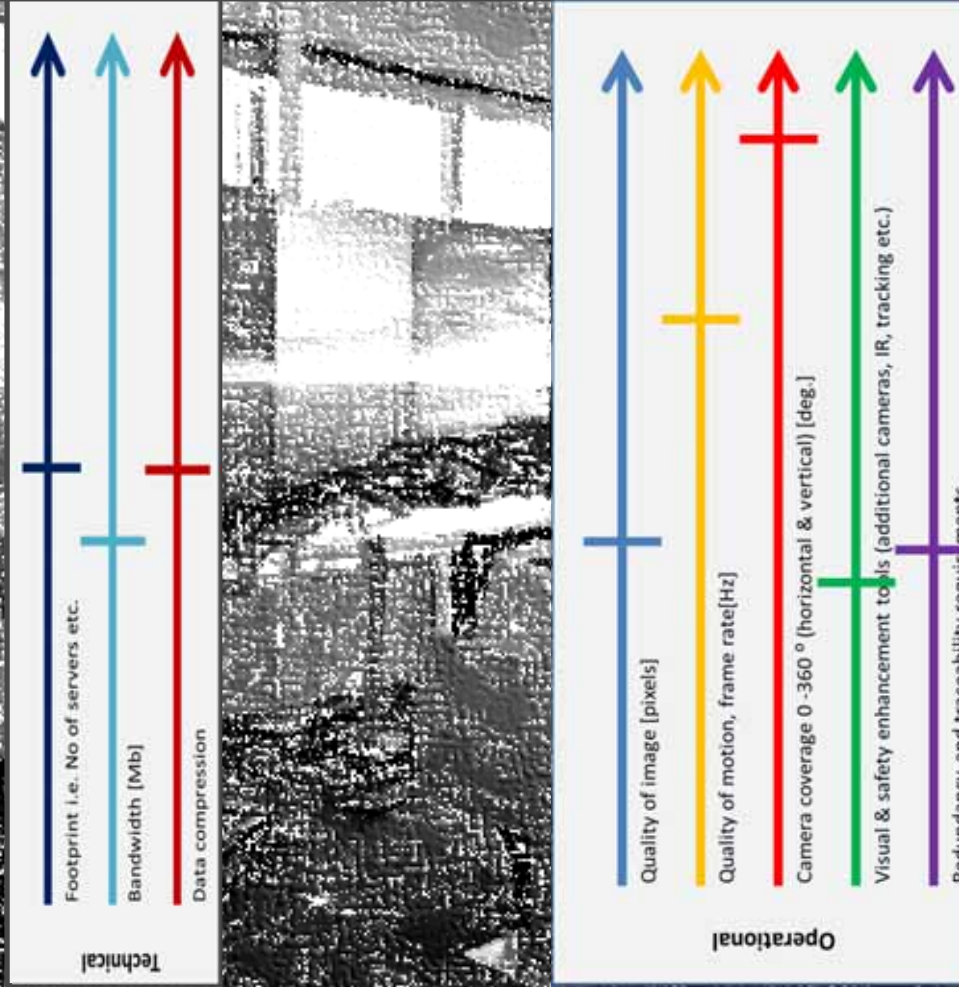
Issues to consider...

- ▶ How much do we need to see? Do we need to see at all?
Requirements i.e. what level of quality?
- ▶ Does our operation require 360° view?
- ▶ What vertical coverage do we need?
- ▶ Do we need to replace the binoculars? PTZ?
- ▶ In poor metrological conditions and darkness, how much do we need to see?
- ▶ **Level of redundancy & traceability?**
- ▶ **What rules & regulation to certify against?**
- ▶ Evolution rather than revolution
- ▶ KIS





Business Case \$\$\$



Experiences – Change Management

- It's not a Revolution – It's an Evolution
 - Applying today's Rules & Regulation on new infrastructure
 - Building the new basic platform to expand into the future
- It's not about Technology – It's Change Management
 - **Technology is not an issue – leave it to the vendors**
- Home work
 - How many airports - How to implement
 - **Operational context**
 - Build a Team
 - **COST BENEFIT ANALYSE !!!**
- Invite your stakeholders
 - Regulators, Controllers, Unions, Technical staff
- Start with a test system
 - Build trust
 - Adopt operational procedures
 - Experiences, knowledge
 - Look at an implementation plan
- **It takes time – BUT YOU CAN START NOW**



SAAB

SAABGROUP.COM

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Remote Tower Services: The business perspective

Manufacturing Industry

Michael Ellinger

Frequentis

Hosted by:





smart**VISION**

DESIGNED BY FREQUENTIS

New Approach for Remote Virtual Tower Solutions

→ More than 65 years of innovation & expertise in mission critical applications

We develop and market high reliable communication and information systems for mission critical applications in the fields of Air Traffic Management and Public Safety & Transport.



Worldwide Control Centres develop towards the same standards.

→ Frequentis and SESAR

Frequentis is one of the main contributors in SESAR RTO projects :

- Evaluation of new enabling technologies (Cameras, Video Tracking, Network, Compression...)
- Strong focus on working position design & human factors
- Involvement in Remote TWR Validation in Norway
- Planned Multi Remote TWR Validation with DFS

SESAR provides us a very good platform for cooperation with ANSPs & industry partners

SESAR enabled us to drive the remote tower technology to the next level !

→ Remote TWR - Market View & Challenges

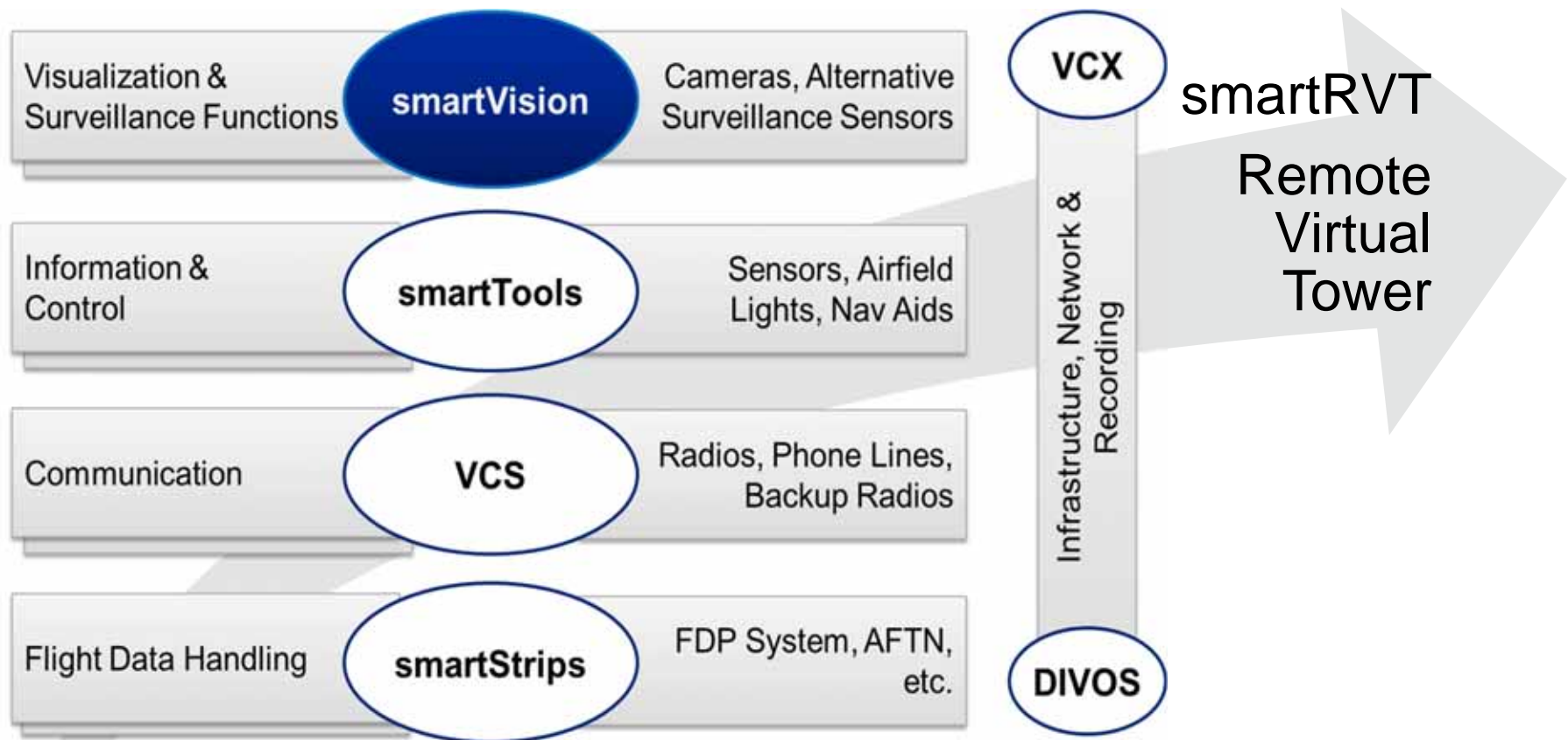
- A lot of interest from ANSPs & Airports in Remote Tower and similar usage scenarios
- Main Motivation & Goals:
 - Increase Efficiency
 - Cost Savings

Questions from customers :

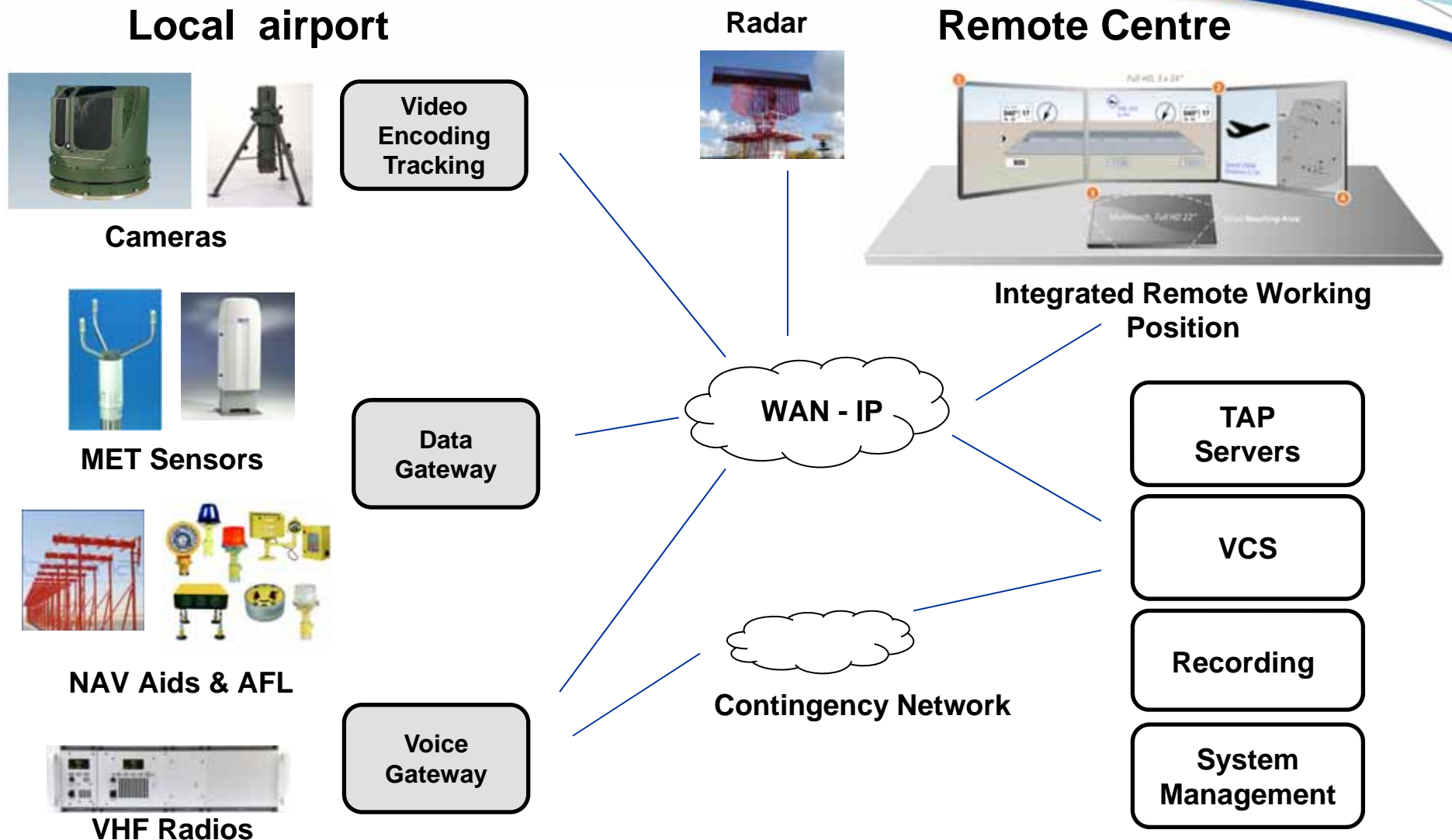
- **What is required to implement a remote TWR solution?**
- **How to get acceptance from ATCOs / regulator ?**
- **How to increase efficiency?**

→ What is required for RTO implementation ?

Remote TWR is more than Visualisation !



→ Centralization of ATC Systems



→ Network Infrastructure as key element

→ Highly reliable / Security

- Redundant links / separated routes / secure channels

→ Contingency Concept (degraded modes)

→ Transferring Voice, Data, Video via same network

- Bridging legacy protocols

→ Address high bandwidth demand for video

- optimize compression
- reduce data by selecting other camera technology

**Provide high level of safety
but keep your infrastructure costs low !**

→ How to get acceptance from the ATCOs and approval by regulator ?

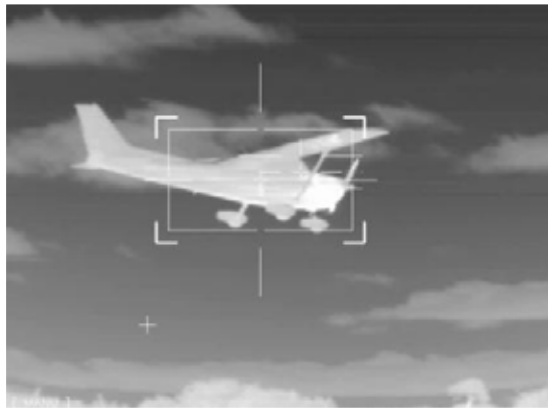
Do not only a replacement the tower view – enhance it !



→ Benefits of Thermal Infrared Cameras

- Better Ground / Sky Contrast allows detection of object even with lower resolution
- Enhanced Visibility in Heavy Rain, Snow/Sandstorm, Fog etc
- No sunlight reflection / Equivalent Day and Night Visibility

IR allows a significant reduction of bandwidth



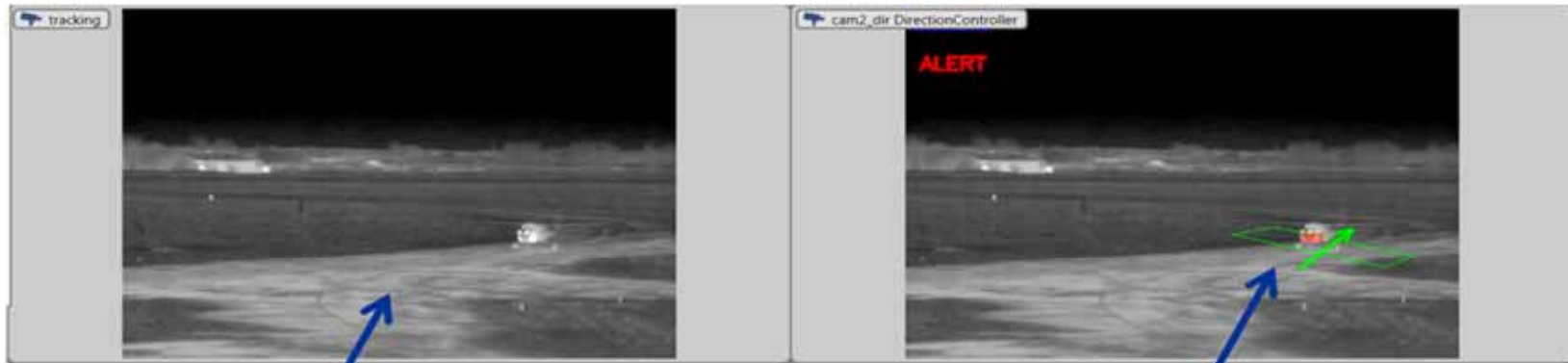
→ Increase Situation Awareness Object Detection & Information Augmentation

Wind / RVR
Overlay



Multiple objects are marked and tracked

→ Increase Safety: Video based Safety Net



original stream

overlay of detection area

→ Enhanced binocular with automatic tracking



**Select object in panorama view
get a close up in the binocular view**

- verify landing gear up / down
- detect engine fire
- monitoring final approach
- monitor aircraft in control zone



Distance Measurement of Objects → to compensate missing 3D view



report **distance**, **speed** and **altitude** of tracked object in real time

→ Provide an full integrated working position



→ How to increase efficiency ?

Multi airport handling is a key enabler!

- Apply a new working methode
- Support controller with additional support tools
- Increase Automation
- Close integration of all systems
- Introduce new planning tools for balancing workload

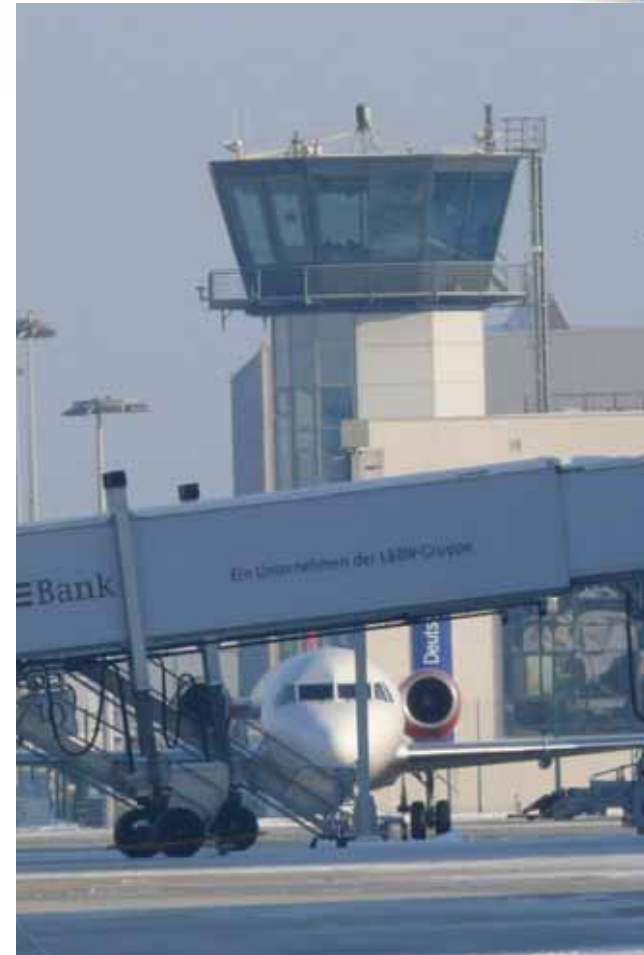


COMMUNICATION AND
INFORMATION SOLUTIONS
FOR A SAFER WORLD



Further Questions ?

→ Civil Validation - Dresden (DFS)



→ Military Validation - Airpower Zeltweg (ÖBH)



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Remote Tower Services: The business perspective

Airports

Andreas Eichinger

ACI Europe

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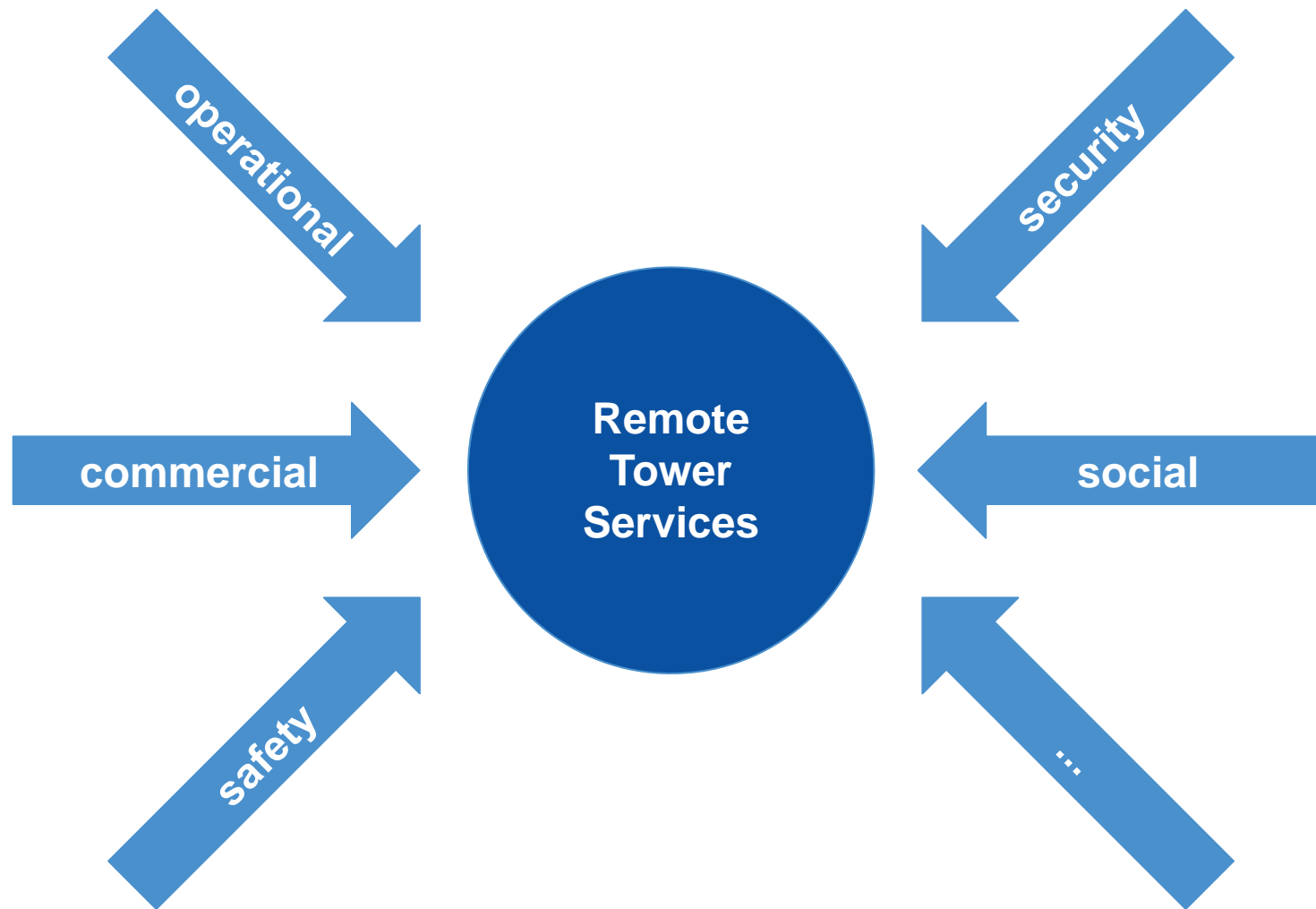
Remote Tower Services – The Airport Perspective

Andreas Eichinger

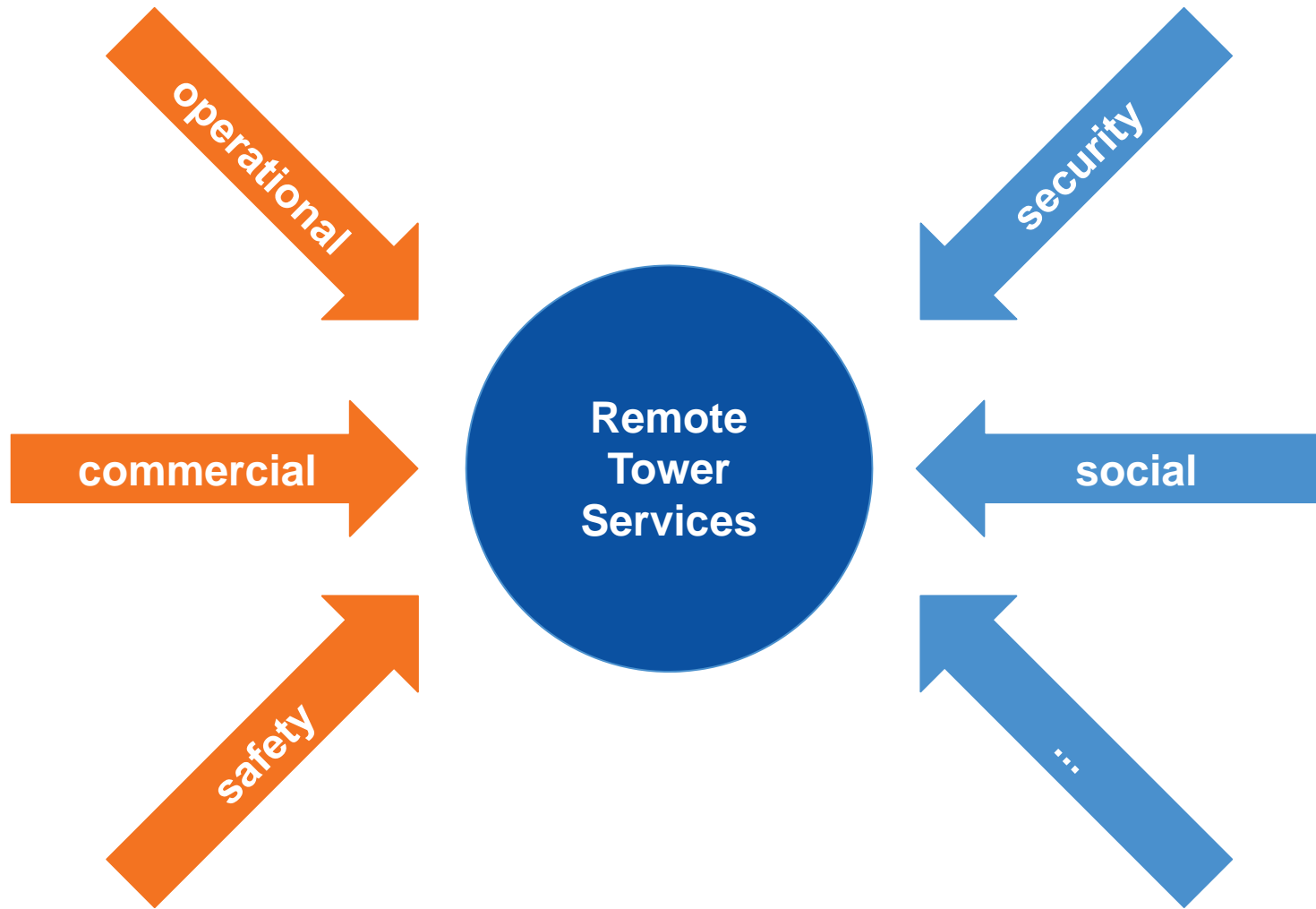
13 June 2014, Dublin



→ Perspectives on Remote Tower Services



→ Perspectives on Remote Tower Services



Operational Aspects

- Flexible opening hours to meet the requirements of the airport (or its customers respectively)
 - Flexible provision of ATC services during the operating hours of the airport
 - 24/7 emergency operations feasible even outside normal opening hours
 - Trials proved operational reliability
 - Further improvements might and trials will be required for multiple airport scenarios
- Improvements in service levels are possible



Commercial Aspects

- High percentage of an airport's costs are fixed
 - Not just capital costs for infrastructure but also operating costs, a significant proportion of which are driven either by regulatory requirements (safety and security), or by existing infrastructural requirements rather than traffic volumes
 - Nowadays, the cost of providing ATC services at an airport is fairly inelastic
 - Considering visiting costs at an airport the cost share of ATC is significant
 - Shared investment and operating costs should lead to reduced investments and reduced and more elastic operating costs
- ➔ Remote towers allow significant cost savings and lower visiting costs

Safety Aspects

- Timely implementation may be questioned by regulatory approval
 - > Danger: Regulations and resulting concept of operation not harmonised and not consolidated across EU Member States
 - > EASA Rulemaking Task 'Technical Requirements for Remote Tower Operations' (RMT.0624)
 - > Eurocae working group WG-100 'Remote and Virtual Towers'
 - > Requirements of the resulting regulation need to be proportionate and cost-efficient

 - Solutions need to be found for some tasks that are currently carried out by ATCOs or AFISOs
 - > Meteorological observation
 - > Runway inspections

 - Stored video and audio data may help accident and incident investigation
- ➔ Chance to modernise ATC facilities with state-of-the-art technology

Conclusions

Remote tower services allow...

- Improvements in service levels
- Significant cost savings and lower visiting costs at airports and are a
- Chance to modernise air traffic control facilities with state-of-the-art technology

Shifting focus

- Initial focus was on low to medium density airports
- Focus now also on contingency towers at medium to high density airports
- Application of the technology for remote apron control?

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Remote Tower Services: The business perspective **ANSPs**

Cristiano Baldoni

ENAV/A6

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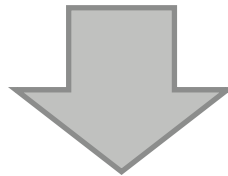


Agenda

- 1. Why to remote**
- 2. Remote TWR as the solution**
- 3. Same concept, several features**
- 4. Expected benefits**
- 5. Conclusions**

Why to remote...

- ! Need to comply with the enforced performance targets on cost-efficiency as per EC Regulation 691/2010 on Performance Scheme
- ! Significant and fairly inelastic costs of ATC services provision in small/medium airports, including costs for installing or maintaining manned TWR → several European regional airports have little chance of being commercially viable
- ! In certain EU regions, overcapacity of airport infrastructure relative to passenger current demand and airline needs



**Need to reconsider the traditional way to provide
ATS/ATC services!!!**

... Remote Tower as the Solution!

The SESAR Concept of Remote Tower for Single Aerodrome (SDM-0201) and its successor RT for Multiple Aerodromes (SDM-0205) represent an extremely modular and flexible solution for sharing ATS services across clusters of airports



Same concept, several features



A single Remote Tower Centre (RTC) serving several remote airports through a set of Remote Tower Modules (RTMs)



The RTC could be located at any location that has a very high level of integrity that meets all the service continuity requirements of the cluster of airports that are under its control



Remote Tower Concept does not require any special training, neither new methods, nor procedures, nor airspace redesign → seamless solution to the users



Flexibility and adaptability of the solutions to several European operational scenarios



The Remote Tower concept is also suitable to provide service continuity at a major airport in a contingency situation (e.g. temporary unavailability of the local tower for refurbishing)

Expected Benefits



Cost Efficiency

Staff optimisation
Reduced costs of maintenance for local tower building
More efficient/centralised training, based on available RTMs

Access and Equity

Possibility to maintain ATS services for airports otherwise economically unsustainable.

Directly & Indirectly

ANSP

Airspace
Users

Airport
Operators

Regional
Governments

ATCOs

Military

Citizens

Conclusions

- To foster the large scale deployment of the Remote Tower concept:
 - Further investigations and demonstrations activities are required to prove the maturity and the feasibility of the concept
 - Standardization and regulatory (i.e. licensing and service certifications) issues still need to be addressed, developed and then harmonized at European and at global level

But ...

Remote Tower concept is among the most promising SESAR solutions, well responding to the business needs of several stakeholders, which can effectively contribute to the sustainable development of the transport system in Europe!!!



Thank you!

Cristiano Baldoni
International Strategies
Head of SESAR Unit



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