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# DIGITAL TOWER SOLUTIONS FOR ANS

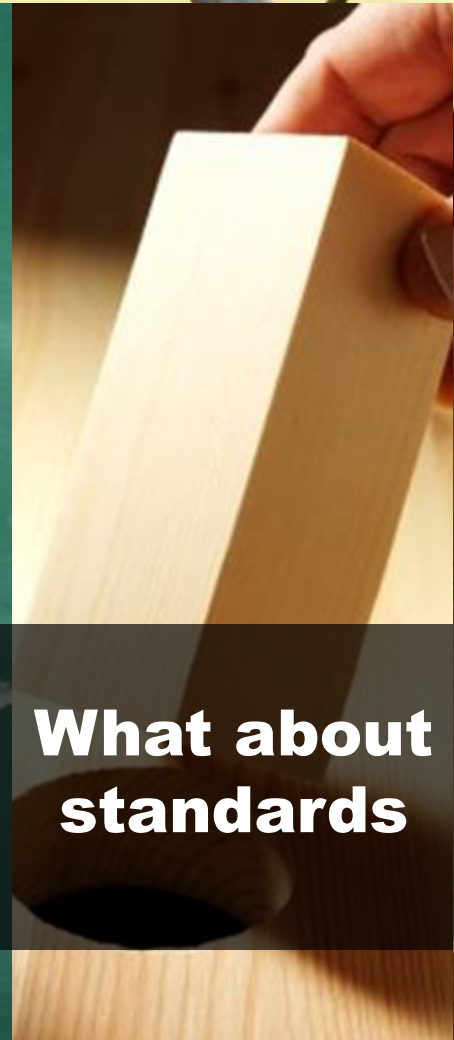
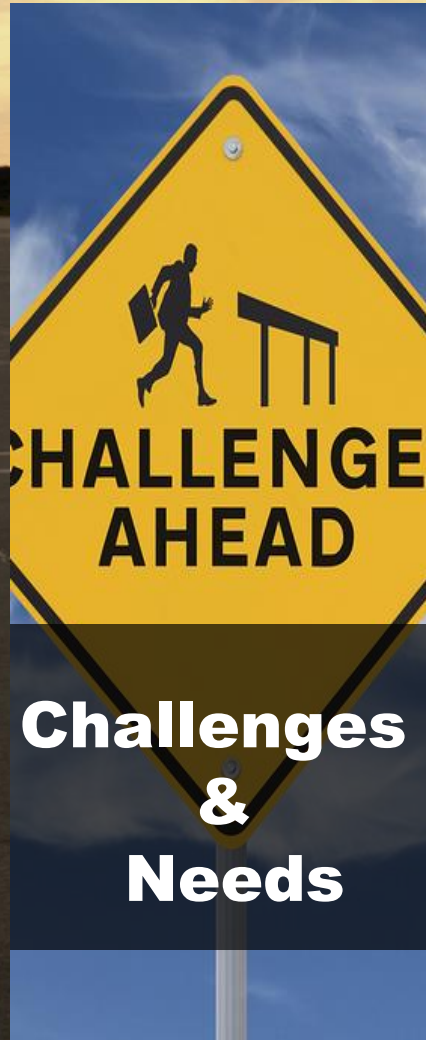
*- Technology is only half of the delivery*

Dick Langejan  
Dick.Langejan@saabgroup.com



# **DIGITAL TOWER SOLUTIONS FOR ANS**

***- TECHNOLOGY IS ONLY HALF OF THE DELIVERY***



# AIR TRAFFIC CONTROL CHALLENGES...

- ✓ ATC costs are increasing
- ✓ Aviation is vital for rural regions/ towns
- ✓ Need to be more flexible – new airports/ needs
- ✓ Each and one tower differently equipped
- ✓ Long opening hours, low utilization of staff ATC personal
- ✓ **Limited flexibility** (vacations, sick leave, overtime)
- ✓ Digitalization as such...
- ✓ Drones!
- ✓ Limited view to runways, holding points
- ✓ **Blind Spots**
- ✓ **Low Visibility / Night View / Sunlight**
- ✓ Birds / Wildlife Detection
- ✓ **Runway / Airport Extension**



# ..AND BUSINESS DEMANDS

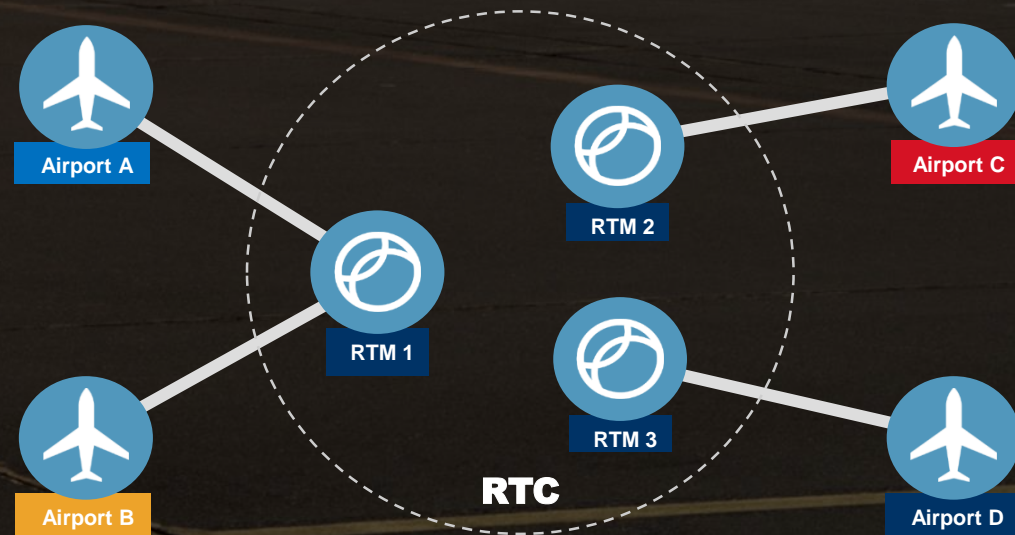


100% contingency solutions for larger airports are in demand  
– ***we cannot afford to stay closed***

# OPTIMIZATION TODAY

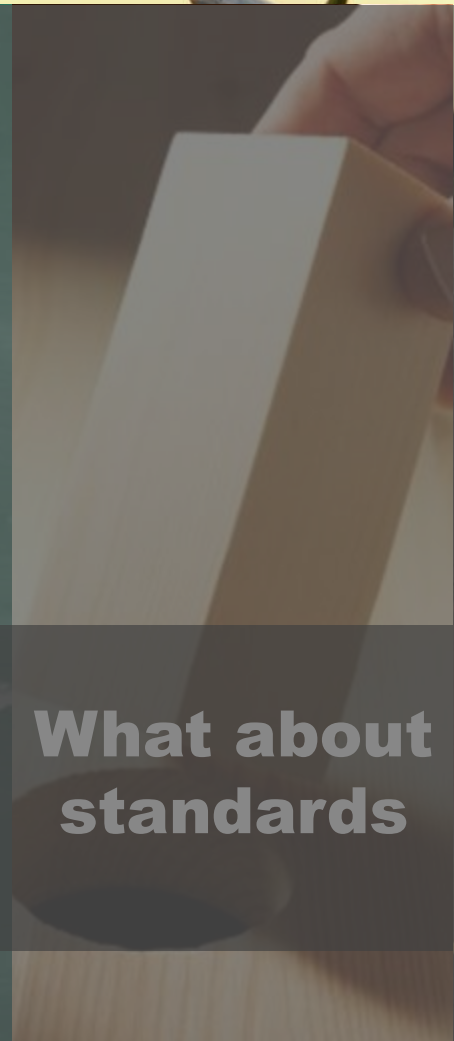
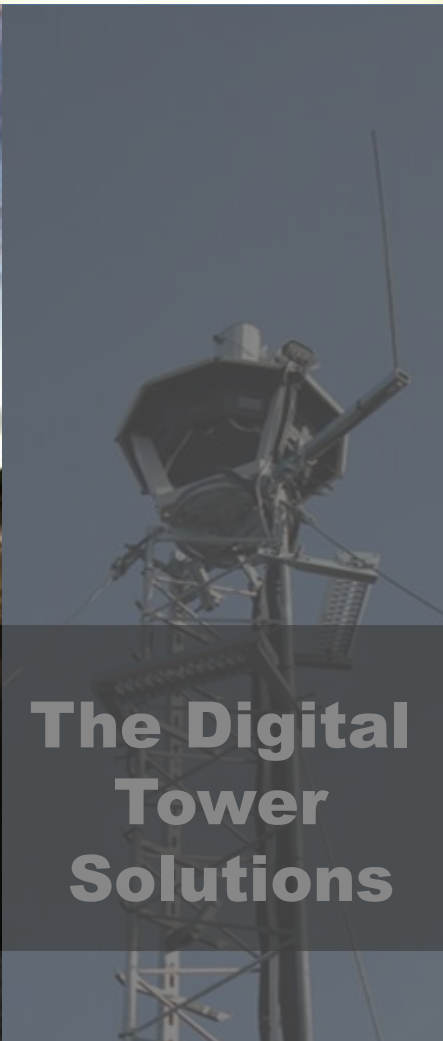
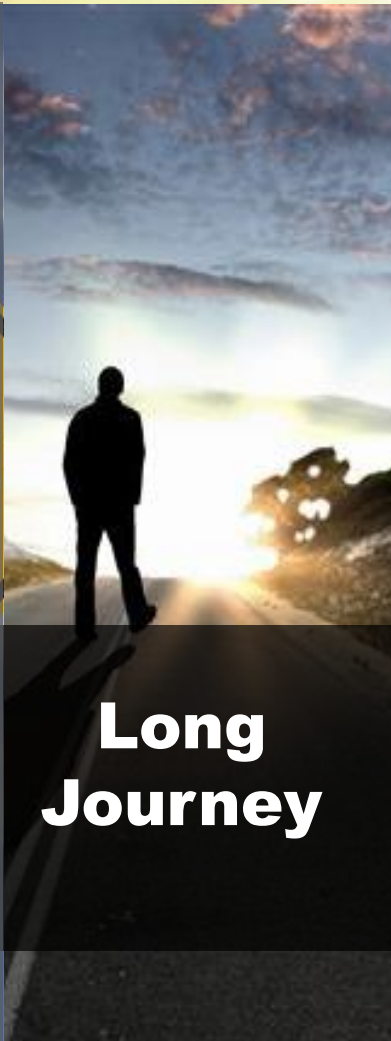


# FUTURE OPTIMIZATION

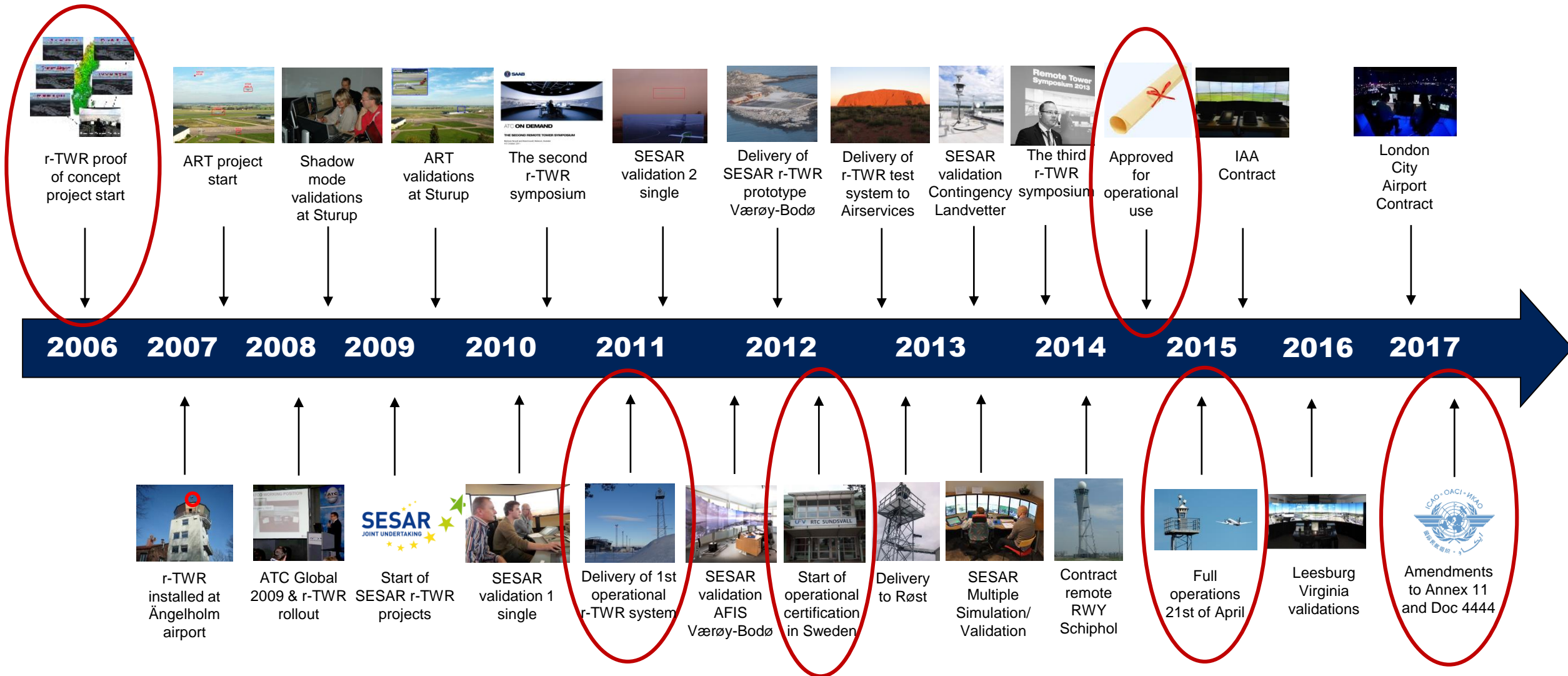


# **DIGITAL TOWER SOLUTIONS FOR ANS**

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# LONG JOURNEY & EXPERIENCE



# LONG JOURNEY & EXPERIENCE

## Saab's Digital Tower Sites

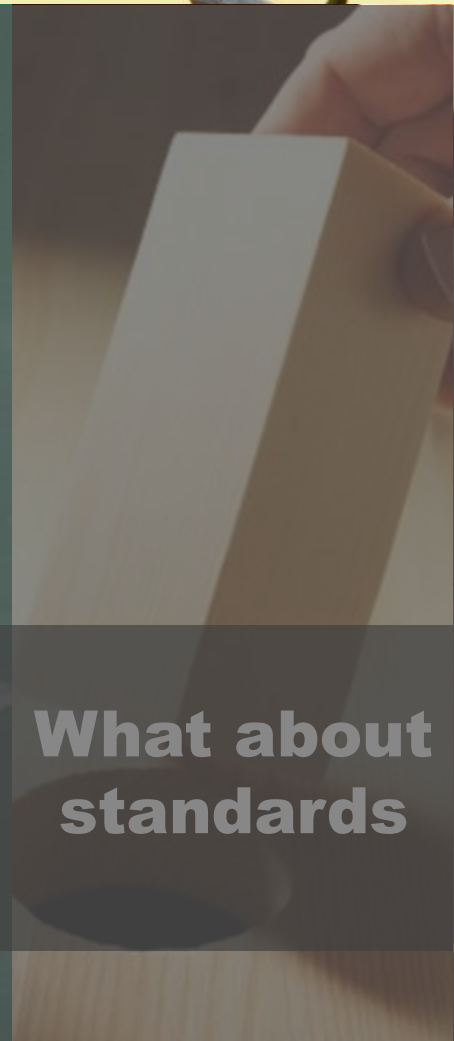
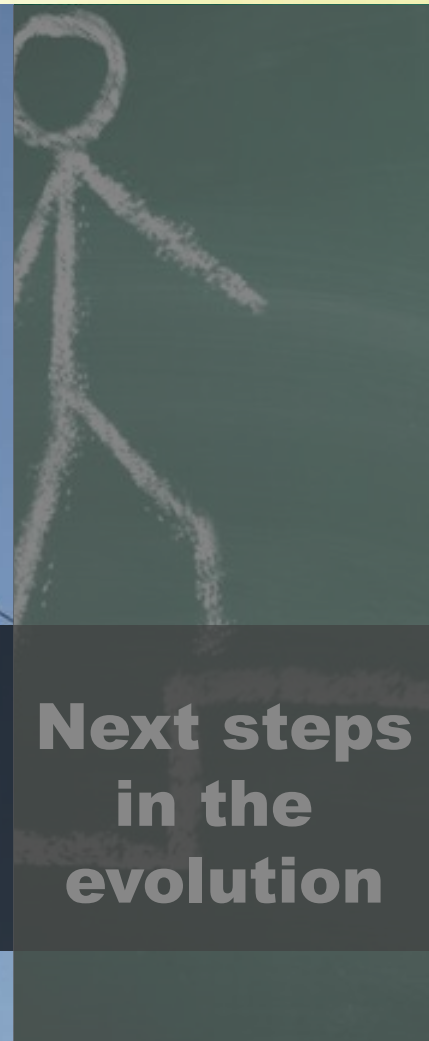
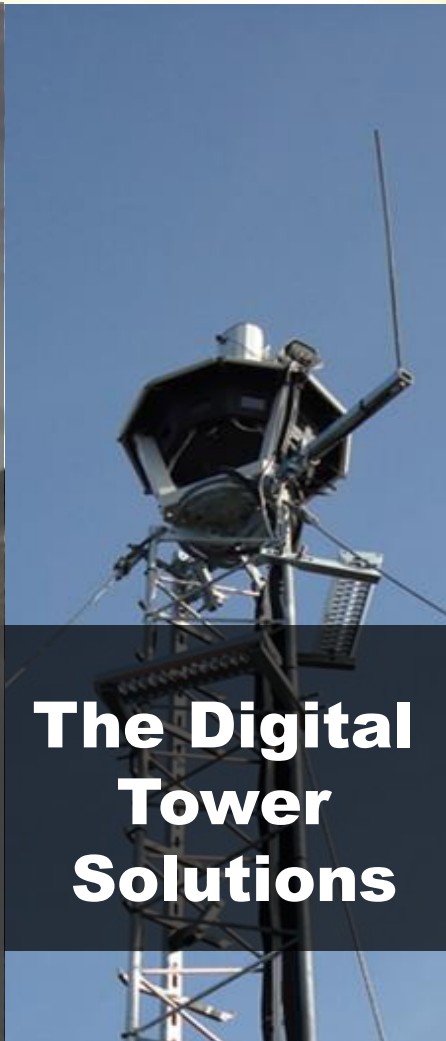
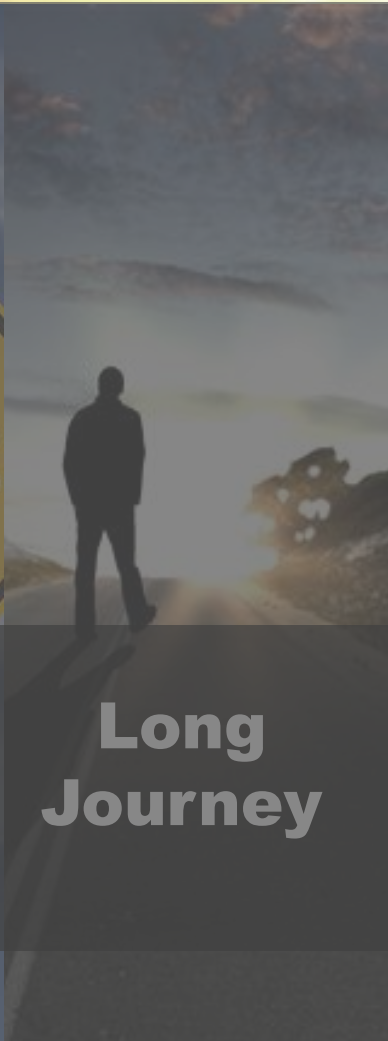
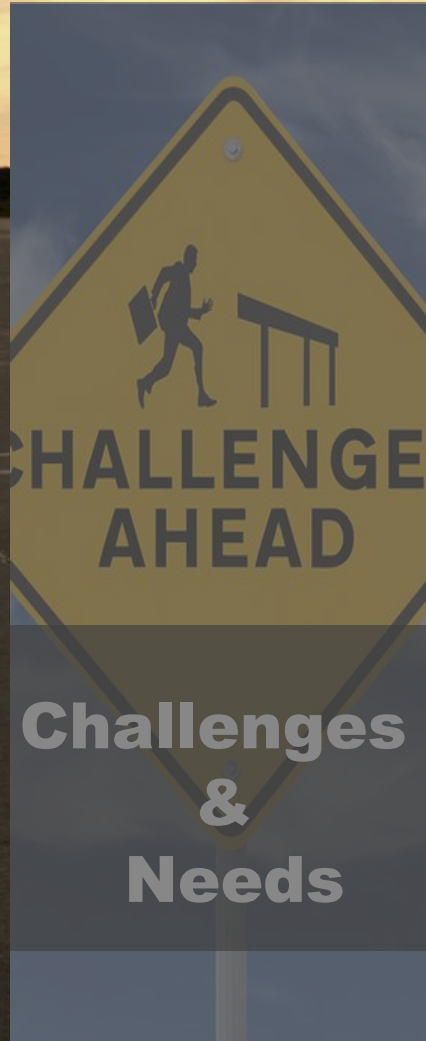
- ✓ **Örnsköldsvik** 365/24/7 - over 18000 hours in operation
- ✓ **Sundsvall** 365/24/7 - over 10000 hours in operation
- ✓ Linköping Airport
- ✓ London City Airport
- ✓ Schiphol
- ✓ Cranfield Airport
- ✓ Sälen Airport (green field)
- ✓ Ireland (Shannon, Cork & Dublin)
- ✓ Leesburg, Virginia (validation)
- ✓ Australia (validation)
- ✓ Norway (validation)
- ✓ ...more to come!!





# **DIGITAL TOWER SOLUTIONS FOR ANS**

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# THE DIGITAL TOWER SOLUTIONS



## COMPLEX AIRPORTS

- Contingency operation solution
- Remote or hidden runways
- Ramp towers
- Multi camera housing solution
- Multi sensor fusion
- Interoperable with legacy systems



## SINGLE RUNWAY AIRPORTS

- Air Traffic Services On demand
- Capable of managing several airports from a single Remote Tower Centre
- One controller is able to control multiple airports simultaneously
- Centralized approach for multiple TMA operation



## DEFENCE & MOBILE APPLICATIONS

- Contingency operation solution
- Emergency solutions
- Secure operator environment
- Fast deployable

# THE DIGITAL TOWER SOLUTIONS

- **Sälen Airport**

- Airport being built – green field
- Ski-resort in the Swedish "alps"
- Tourists during the winter season from Dec-April

- **No "traditional" TWR will be built**

- Going direct for Digital TWR
- Controlled from LFV's Remote TWR Center in Sundsvall, 380 km away
- Service by 2020

- **Digital TWR allowing for **ATS ON-DEMAND** when **ATS** is needed**

- Saving costs for airport and ANSP
- Improving service



# THE COMBINATION CREATES THE SOLUTION



**INFRASTRUCTURE & TECHNOLOGY...**

**...OUT THE WINDOW VIEW**

# TECHNOLOGY - REMOTE CAMERA

- **Up to 14 Ultra HD cameras**
  - 360 degree coverage horizontal
  - +/- 23 degrees vertical view as in the ordinary tower
  - 30 fps., 100 Mbps, H.264, max end-to-end delay < 1 sec
- **Integrated weather protected camera housing**
- **PAN/TILT/ZOOM CAMERA(S)**
  - 1-2 HD cameras
  - 1-2 IR cameras
- **Gap Filler Cameras**
  - Hot spot areas
  - Blind spots, covered by a building
  - Far away observations
- **Redundant network and power supply to ensure uninterrupted service**



# THE COMBINATION CREATES THE SOLUTION



**INFRASTRUCTURE & TECHNOLOGY...**

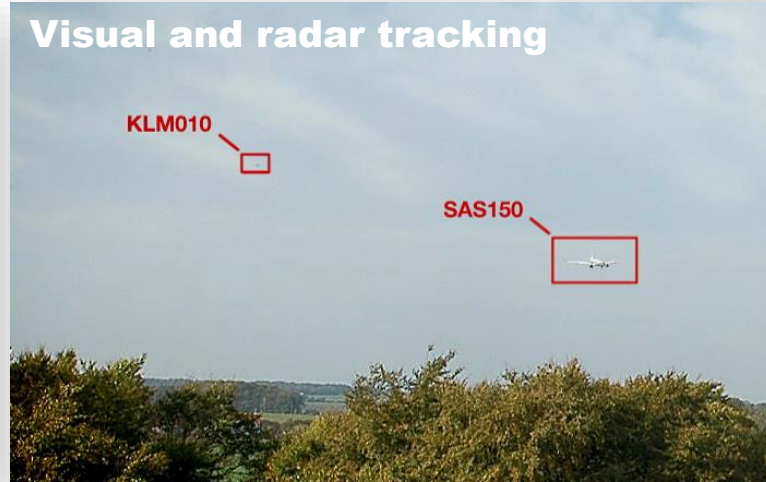
**...OUT THE WINDOW VIEW**

# OUT THE WINDOW VIEW – DIGITAL POSSIBILITIES

Local weather



Visual and radar tracking



Outline runway, taxiway etc.



Enhance visibility in adverse conditions



IR cameras




Tracking birds, drones etc.

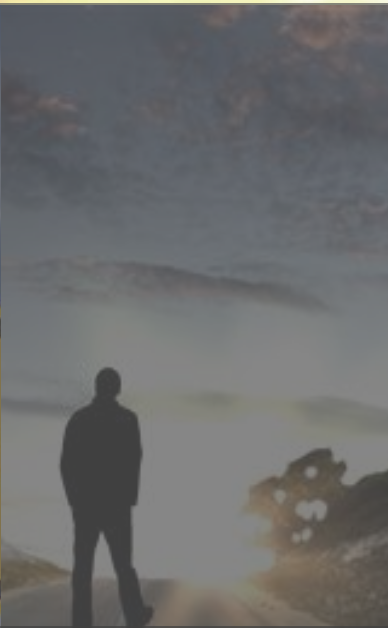


# **DIGITAL TOWER SOLUTIONS FOR ANS**

***- TECHNOLOGY IS ONLY HALF OF THE DELIVERY***



**Challenges  
&  
Needs**



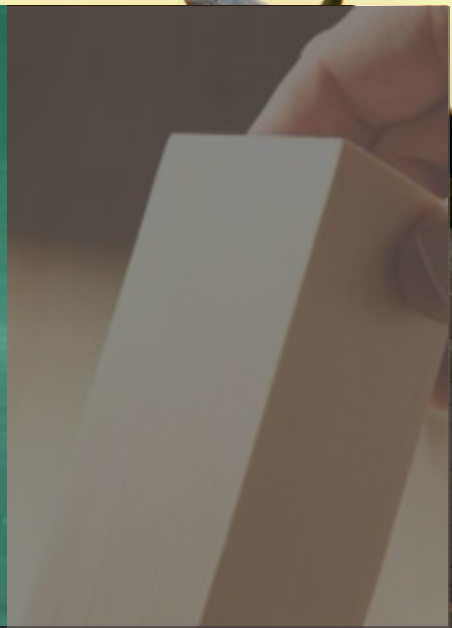
**Long  
Journey**



**The Digital  
Tower  
Solutions**



**Next steps  
in the  
evolution**

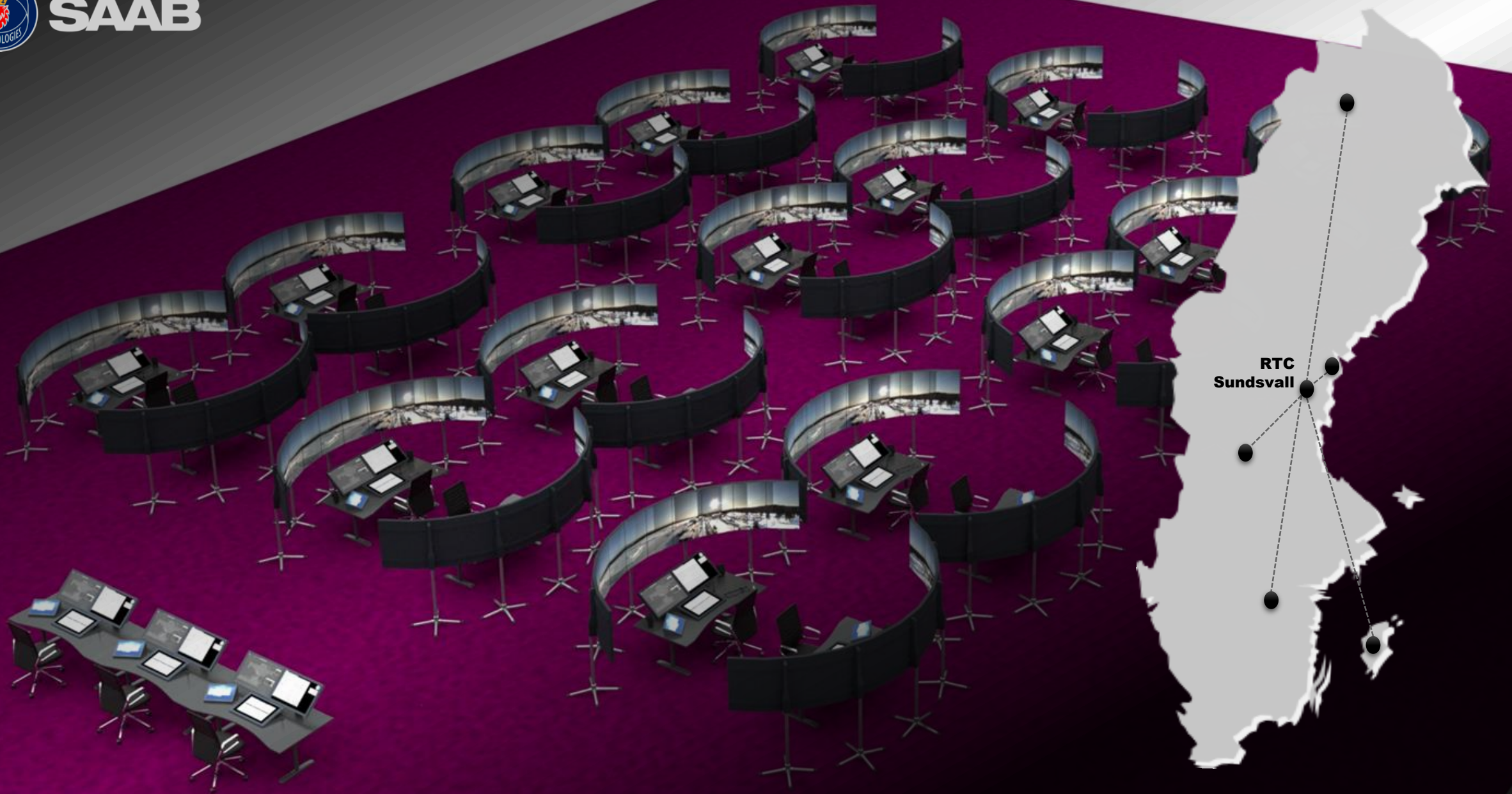


**What about  
standards**





**SAAB**





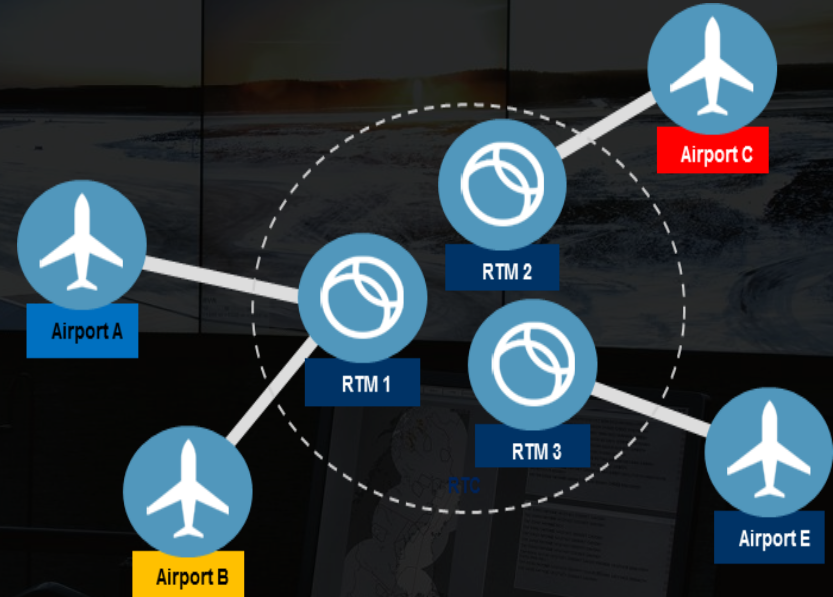
SAAB

# NEXT STEP: MULTIPLE OPERATIONS

Handling two airports is like handling two runways

New functions are developed for working with multiple operations

Simulation and validation starts this autumn.  
Operational in 2018




# **DIGITAL TOWER SOLUTIONS FOR ANS**

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**Challenges  
&  
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**What about  
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# ONGOING WORK ON STANDARDISATION

## • ICAO

- ASBU B1-81 covers Remotely Operated Aerodrome Control
- PANS-ATM (Doc 4444) Amendment 8 November 2018 / Procedures on remotely operated ATS

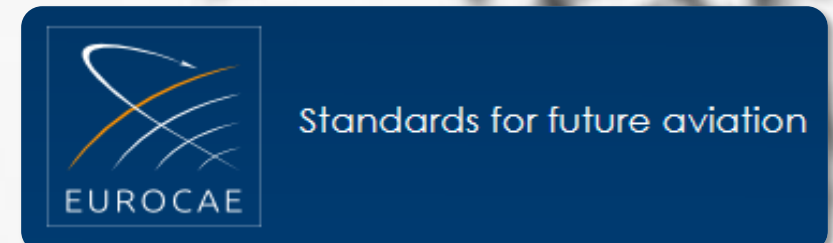
***When approved by and subject to conditions prescribed by the appropriate ATS authority, visual surveillance systems may be used in the provision of aerodrome control service to perform the functions listed in 7.1.***

## • EASA

- Guidance Material on the implementation of the remote tower concept for single mode of operation


## • EUROCAE

- WG-100 MASPS ED-240 "Minimum Aviation System Performance Specification for Remote Tower Optical Systems" was approved in Sept-2016
- Update of ED-240 to include remote tower target tracking technologies, including assessment of the applicability of MASPS already produced for A-SMGCS.




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**Long  
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**The Digital  
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**THANK YOU  
FOR LISTENING!**

