



AIR NAVIGATION SERVICES
OF SWEDEN

REMOTE OPERATIONS

- CHALLENGES
- EXPERIENCE GAINED
- EXPECTED CHALLENGES AND MITIGATIONS

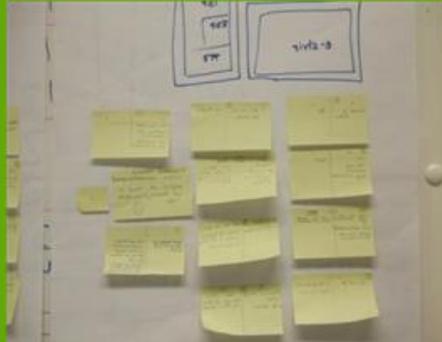
Mikael Henriksson RTC Specialist

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Agenda

- ✓ Introduction
- ✓ Short history and experience challenges
How was it 2009-2014 and perspective, where were you 2009?
- ✓ Lessons learned from that period
- ✓ Future- Remote TWR is the new “normal”

JANUARY 2011





REMOTE TOWER SERVICES (RTS)

In operation since April 21, 2015!



Co-funded by the
European Union



- ✓ Significant hesitance from organizations like ANSP, unions and lobby groups
- ✓ No guidelines except initial SESAR activities and participation
- ✓ Early design decision to make it operational driven. Technical system shall support present way of working
- ✓ Limited research was available and we needed to find some scientific evidence, DLR was contacted- reactive behaviour
- ✓ Regulator had limited experience and we needed to produce a lot of documentation



2009 - Challenges at that time

Early lessons learned

- ✓ Transparent communication-involving operational staff and open facility
“To see is to believe” - thousand of visitors
- ✓ Pushed for guidelines and the result is EUROCAE WG 100, EASA GM and amendments in ICAO ongoing work
- ✓ Be proactive and use research and university
- ✓ Give research organisations tasks and subjects that might be needed for the development of the functional system
- ✓ Have an open mind for changes but always validate the need to have constructive and always with the human in the loop.

FUTURE 2021

– Is remote tower the “new normal”?

Expected challenges

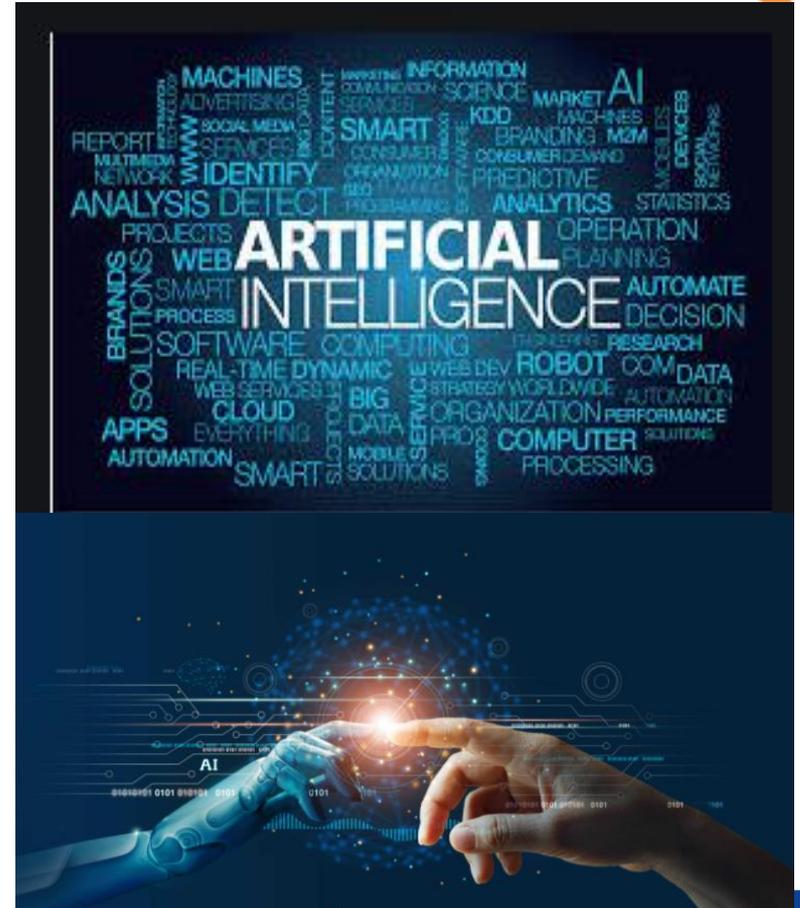
- ✓ Possible similar challenges as mentioned before
- ✓ EASA and other organizations need to be constantly involved and informed
- ✓ Driver is the industry that see business opportunities and creative engineers have ideas
- ✓ Still the fact; Nice to have is not necessarily need to have in relations to humans and regulations
- ✓ We still have a lot of rules and regulations to follow, and the amount is NOT shrinking

Applications are growing worldwide

- Bigger airports
- Multiple operations
- Military airports
 - Deployable system
- Different service level-AFIS; Advisory
- Apron/Ramp service
- Heliports

BUZZ Word; AI!

- ✓ Artificial intelligence-reflections
 - What kind of decision and do we need ATCO in the loop
 - Legal conflicts-who made the decision and based on what information
 - “Who” will learn the AI?
 - Does everyone(ATCO/Pilot/ Driver) follow regulations-wrong learning
 - Do we need to define AI in an ATM context
 - AI cloud-cyber threat



BUZZ Word; UAV/UAS/UTM

- Security surveillance-fence inspection
- Runway inspection
- Emergency response including SAR-Skeldar
- Sensor platform of communications and cameras
- Small package and bulk cargo transport
- Monitoring of linear network infrastructure such as railway tracks, power lines and pipelines
- Photography and cartographic survey
- Agricultural fertilizer and chemical application
- Aircraft external maintenance inspection



POSSIBLE MITIGATIONS AND THE USE OF INDUSTRY, SCIENCE AND OPERATIONAL STAFF IN A PROACTIVE WAY

- Early functional hazards analyze around subjects to find directions to go
- Use scientific research platforms like visualization, machine learning based on modelling, fast time generated data etc. for conceptional simulations of suggested technical support tool
- Results used by industry for product development
- Operational validations in simulators and operational environment since there are recording capability and operational feedback is crucial for implementation process
- Early information and dialogue with regulatory bodies
- Cooperation between industry and ANSP as far as it can regarding commercial secrets, like SESAR. Used for proactive research tasks
- Open mind for changes but validate nice to have and need to have from a regulatory and customers requirement-always keep HUMAN in the loop

THE BIGGEST EXPERIENCE IS NOT ABOUT
TECHNOLOGY

**IT'S ABOUT CHANGE
MANAGEMENT**

A large field of black umbrellas is shown from a low angle, creating a sense of depth and repetition. In the foreground, slightly to the right of the center, one umbrella is a vibrant orange color, standing out from the rest. A light orange speech bubble with a tail pointing towards the orange umbrella is positioned to its left. The background is dark, making the umbrellas stand out.

Thank you!