Remote Operations

Remote Towers in operation

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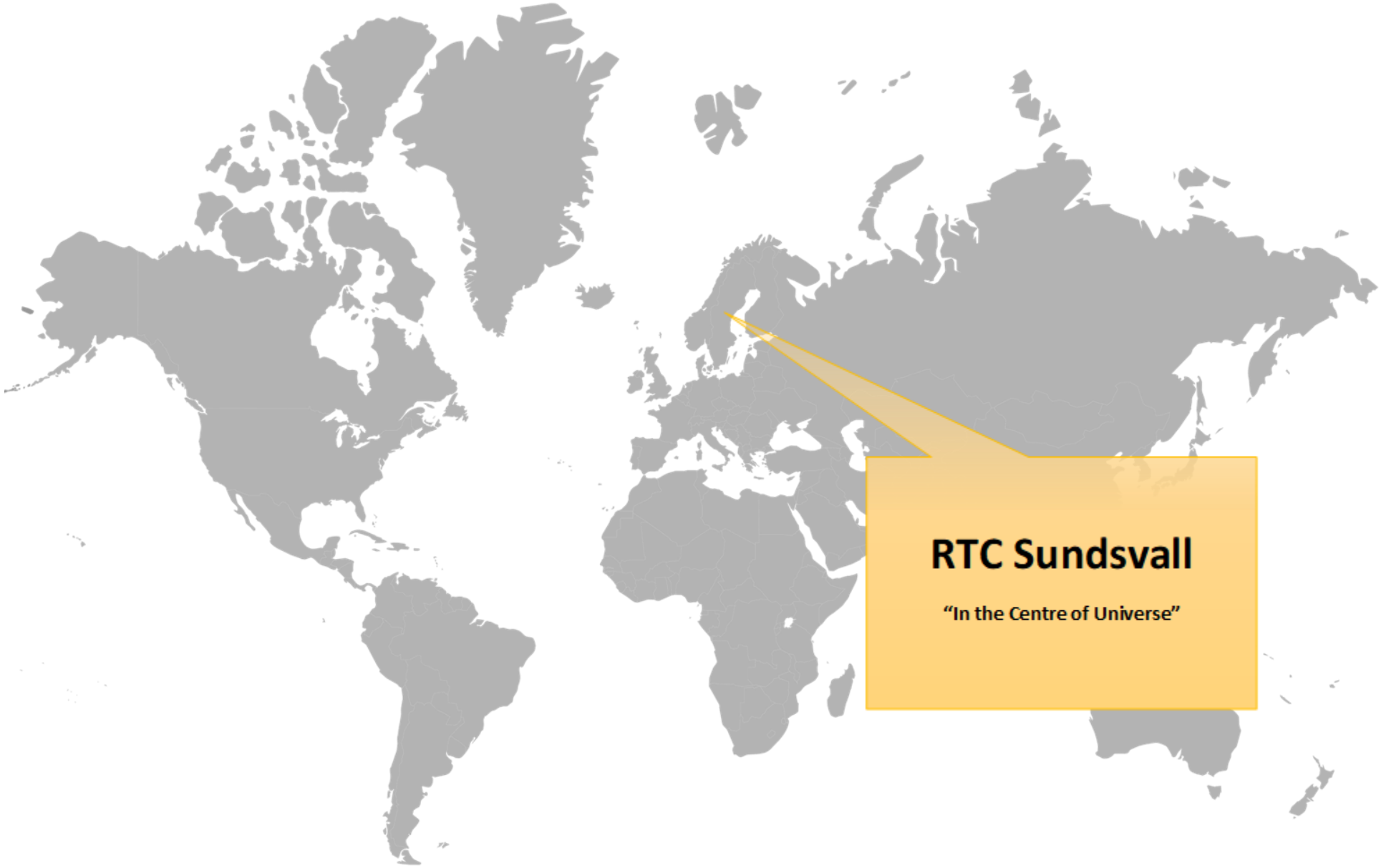
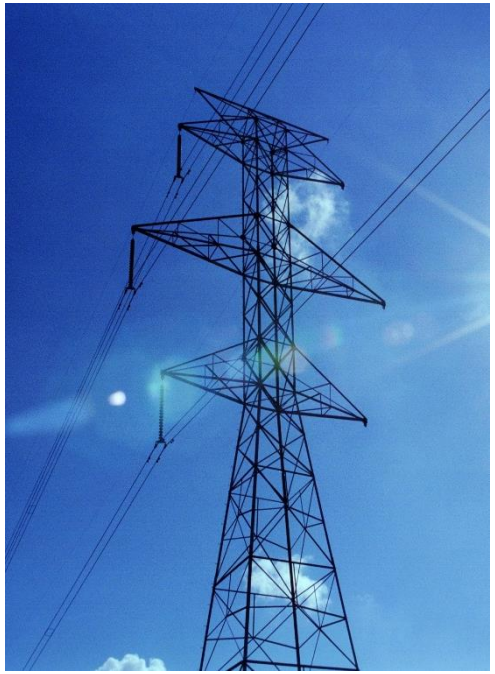
This is me



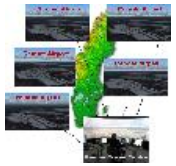
Remote tower instead of conventional TWR

- Replaces the conventional Air Traffic Tower
- Integrated ATC automation system
- …or using the customer's existing ATC system
- Providing the visual view by means of cameras and displays
- Improved safety by use of digital tools

System components



Long Journey



r-TWR proof of concept project start

ART project start

Shadow mode validations at Sturup

ART validations at Sturup

The second r-TWR symposium

SESAR validation 2 single

Delivery of SESAR r-TWR prototype Værøy-Bodø

Delivery of r-TWR test system to Airservices

SESAR validation Contingency Landvetter

The third r-TWR symposium

Approved for operational use

IAA Contract

2nd airport in operation in Sweden

London City Airport Contract

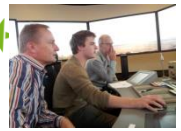
Cranfield (UK) Contract

2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

r-TWR installed at Ängelholm airport

ATC Global 2009 & r-TWR rollout

Start of SESAR r-TWR projects



SESAR validation 1 single

Delivery of 1st operational r-TWR system

SESAR validation AFIS Værøy-Bodø

Start of operational certification in Sweden

Delivery to Røst

SESAR Multiple Simulation/ Validation

Contract remote RWY Schiphol

Full operations 21st of April

Leesburg Virginia validations

Amendments to Annex 11 and Doc 4444

A **LONG** JOURNEY AND LOTS OF **EXPERIENCE**

Saab's Digital Tower Sites

- ✓ **Örnsköldsvik** — Almost 4 years
- ✓ **Sundsvall** — Over a year
- ✓ Cranfield Airport — Since december 2018
- ✓ Linköping city airport
- ✓ Scandinavian Mountain Airport

FUTURE – to young to see

- Will the RTC change how ATS is provided?
- What happens with the ATCO if the environment is to technical?

HISTORY

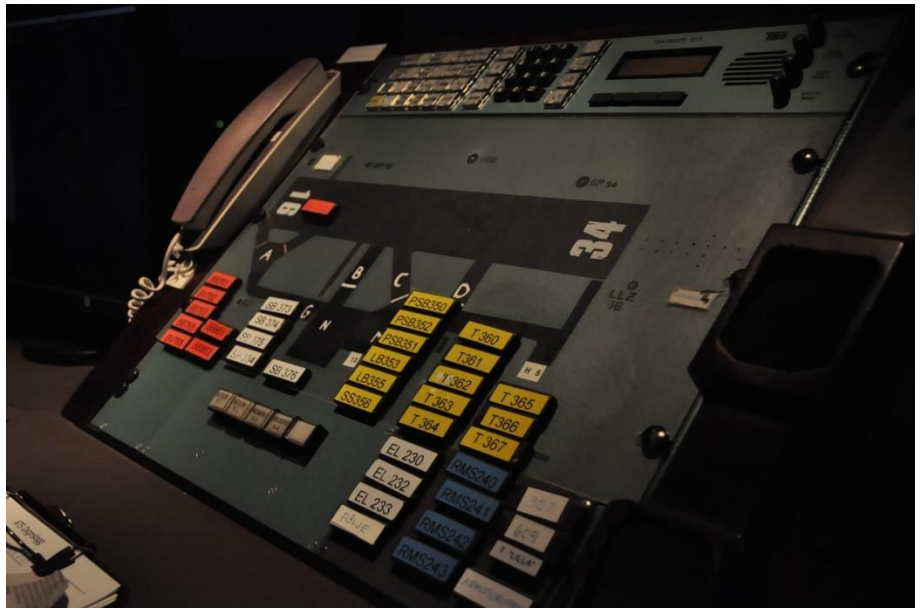
- In 1920, Croydon Airport, London was the first airport in the world to introduce air traffic control.
- In 1929, the first U.S. air traffic controller – **Archie W. League**
- First new build control tower at Clevland build 1929 and in operation 1930
- Tower at Sundsvall/Timrå Airport 1940-1960
- Interesting history is that Villa Tybo, at Sundsvall/Timrå, was located 500 m from runway with alot of trees covering runway. **Remote operations in 1940?!?**

Workload in a TWR

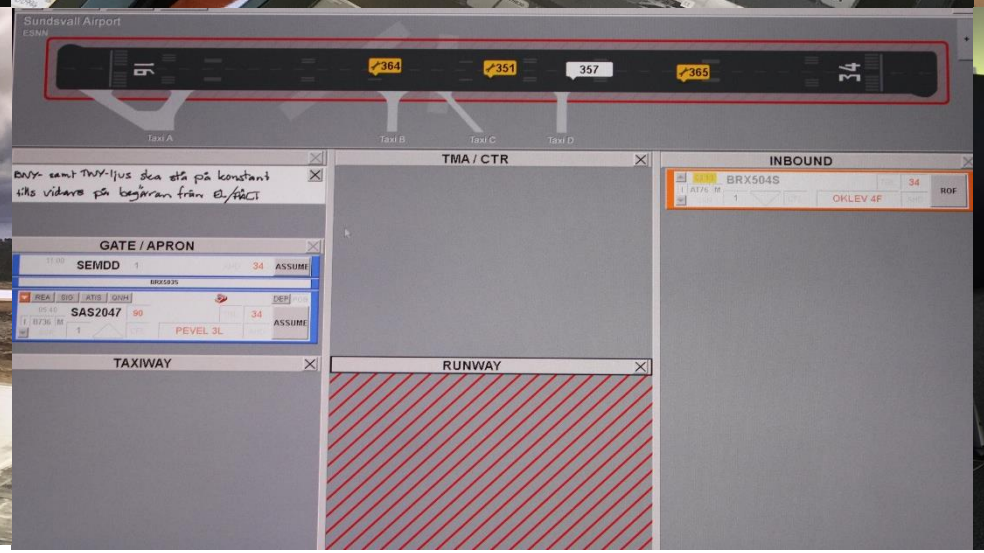
- Small tower and big tower
- Single ATCO operations – is the working position optimised?
- Old equipment works, why replace it?
- Small tower – availability?
- Big tower – capacity?
- Organisation fit for purpose.
- Optimization – one or many suppliers of systems good or bad?

Old fashion in old towers – but i works

- Paper and pen
- No support, no safety nets, no help?
- Memory!



RTC – FOCUS ON ATCO HMI



Workload in a RTC

- Crowded – never alone good or bad?
- To keep one systeminterface is important
- How much training do you need and should you always have training?
- ATCO need to keep them ”updated” on manuals and methods
- Organisation grows – more interfaces
- When do you set a ”system freeze”? And for how long?

Challenges today

Integrating new units and cultures in a RTC

Meeting different demands from people

Rostering and multi endorsements for good efficiency….it takes time

Using operational experience to push the technology forward

Implementing more Remote Tower Modules during live operations

Convince pilots, airports, ATCO and more

Challenges tomorrow

- Can AI support ATCO in decision
- Loss of ”basic” knowledge, (procedual)
- Technology demands new supporting functions in an organisation
- What happens with the airports?
- Drones?

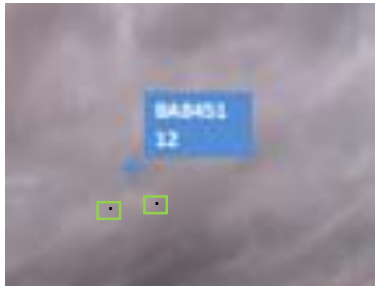
Who and why? – example of ”risks”

- Example on the upcoming fusion in the Eurocae WG-100
- Are we setting new risks
- Different aspects for objects on the ground vs objects in the air?
- System vs operator initiated fusions?

Too far away – don’t fuse

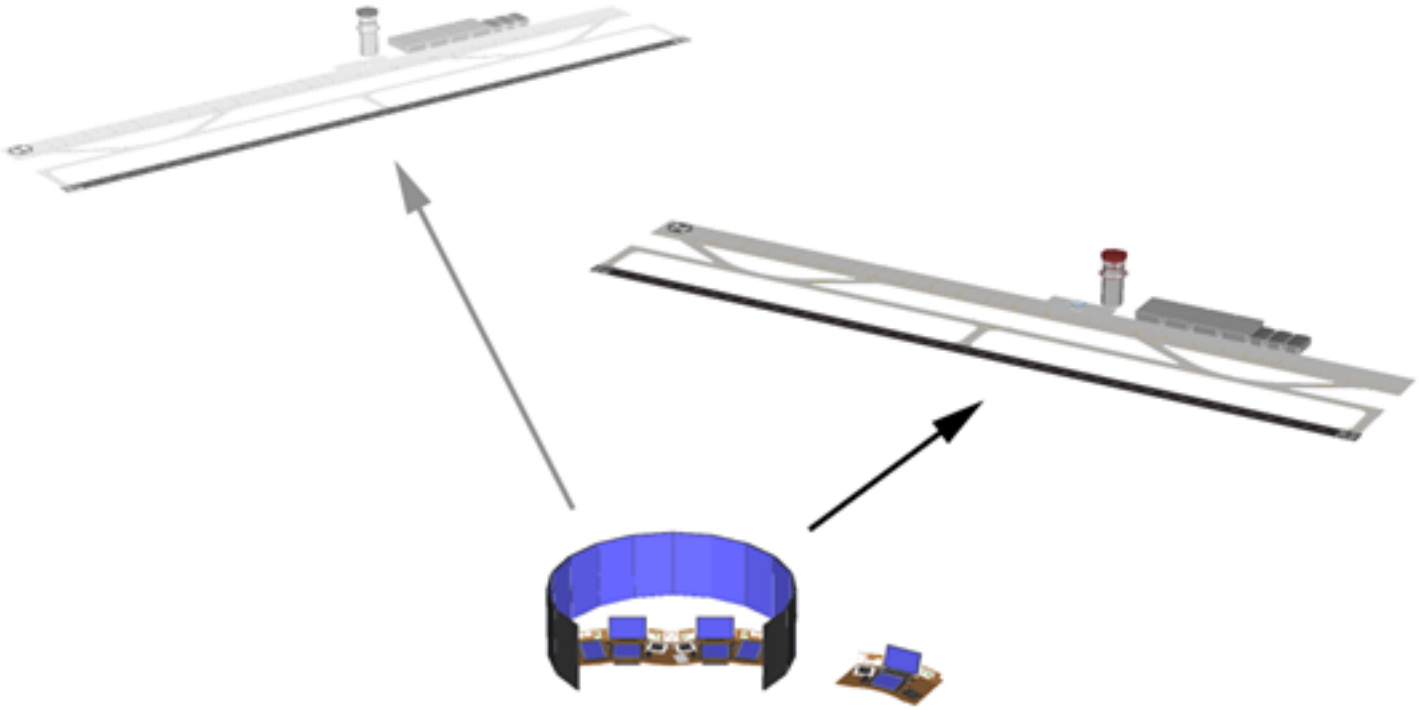
Close enough - fuse

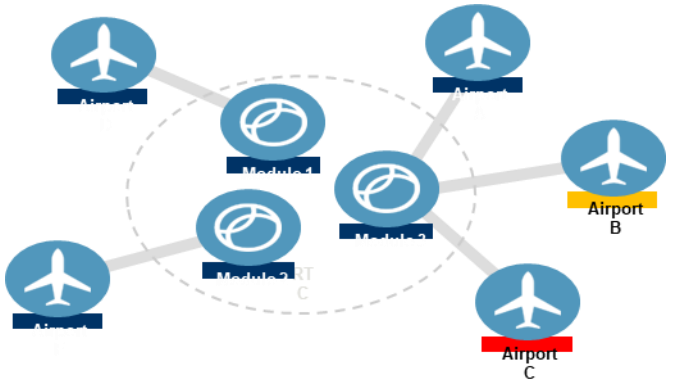
Oops, another one!



Remove fusion symbol

MULTIPLE AIRPORT CONTROL





MULTIPLE AIRPORT CONTROL

TRIPPLE AIRPORT CONTROL

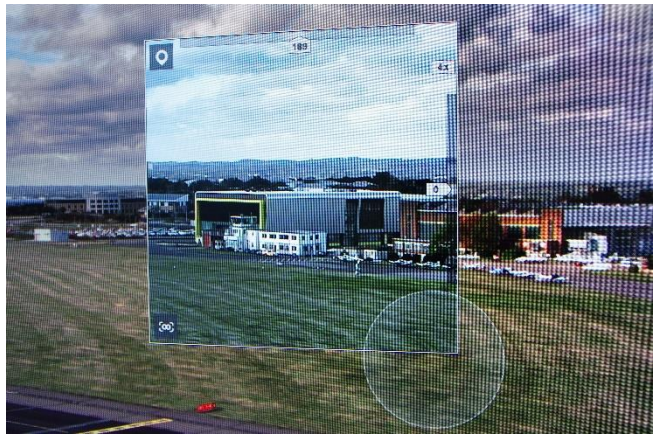
FOCUS ON OPERATOR

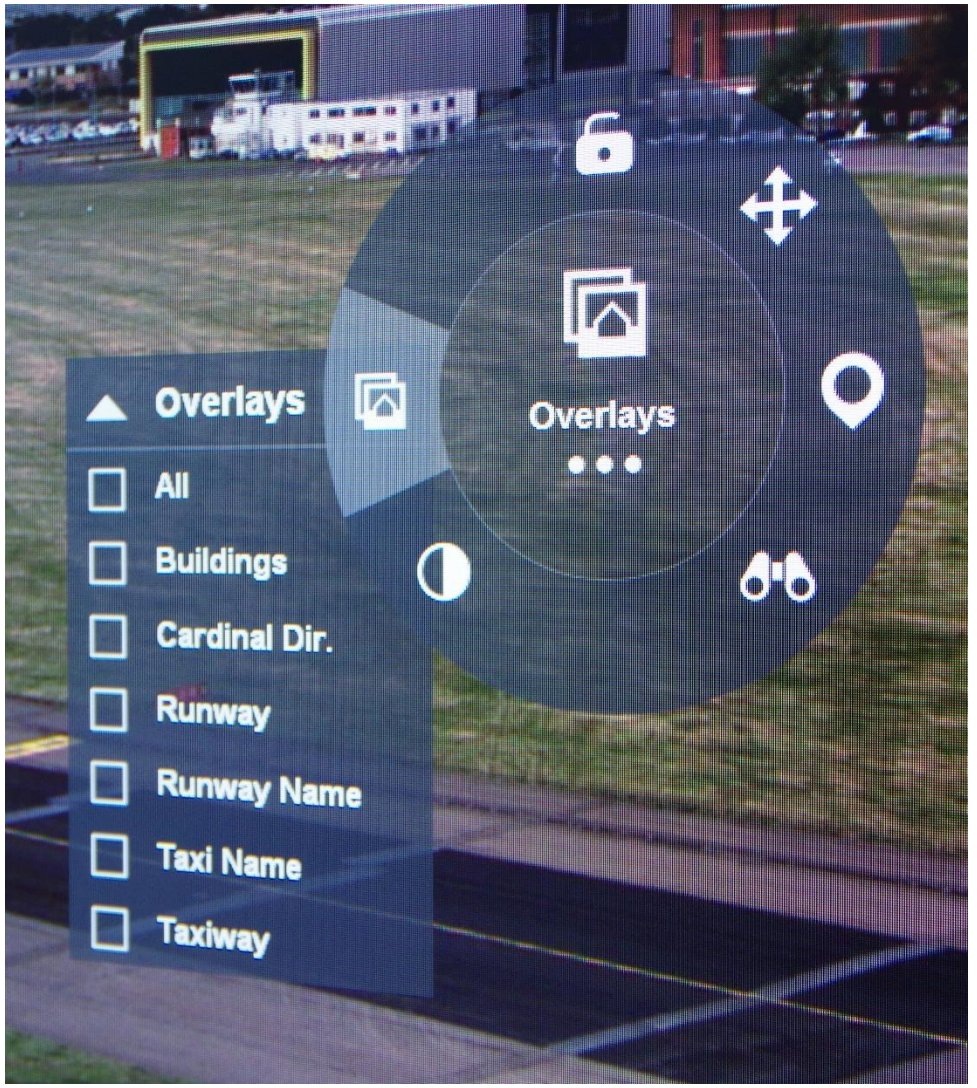
Move your eye from ”look down” to ”look up”

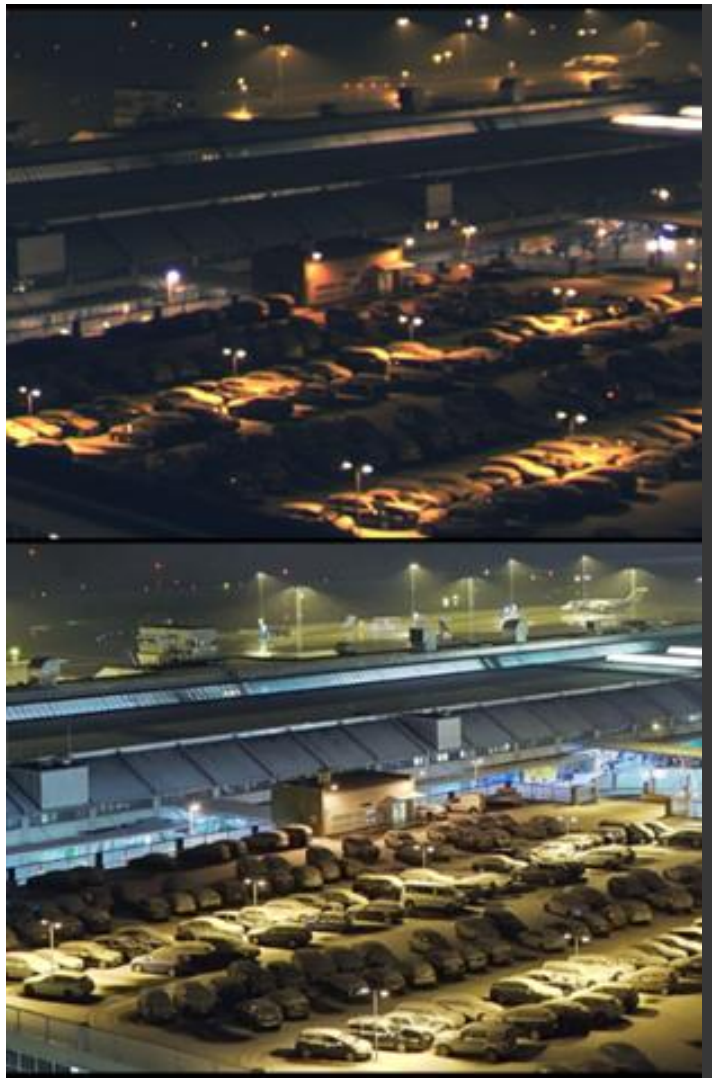
Increase situational awarness

Usage of ”The donut” designed by ATCO

Bring in things needed and step by step

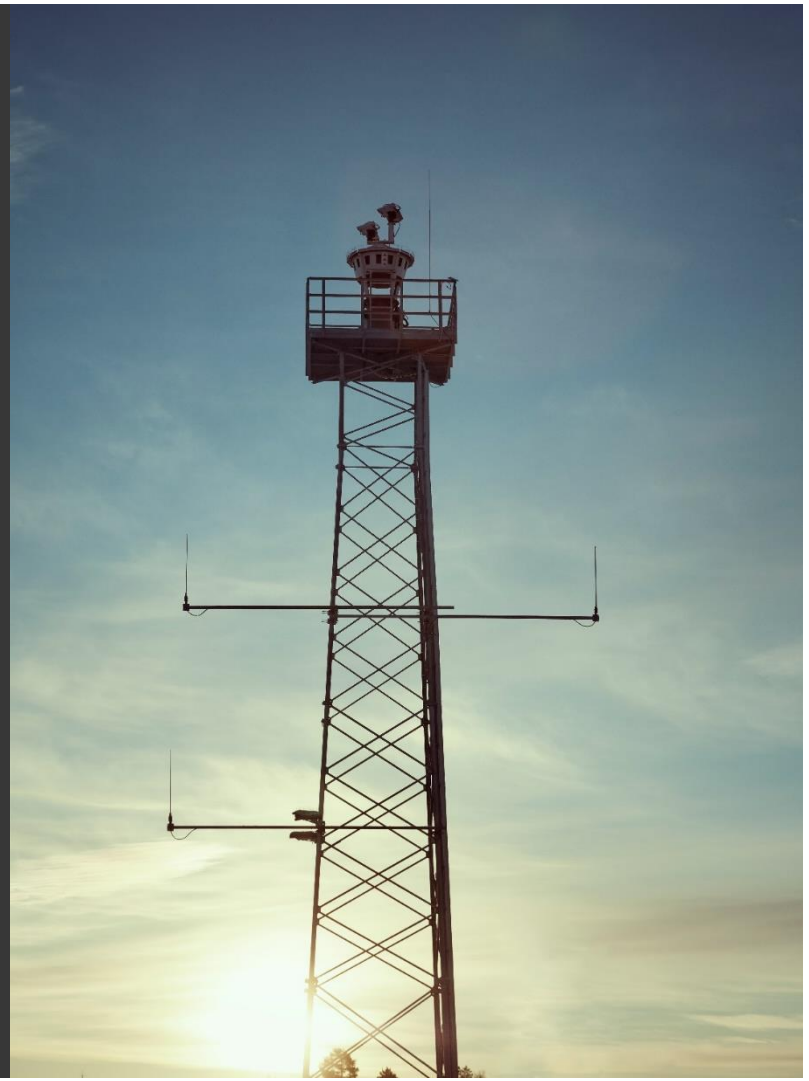






Focus on Camera Performance

- *The figure to the left is in heavy snow.*
  - *The top image accurately represents how the naked human eye views the scene.*
- *The bottom image shows how the camera views the same scene at full speed (30FPS).*
  - *sharp and vibrant*
  - *more details are visible in the darker parts of the image*



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