

# Transition To Remote Tower Operations And The Human Element

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# History

- 4 first AFIS aerodromes opened summer 1968: Namsos, Sandnessjøen



# History

## Mo i Rana and Brønnøysund



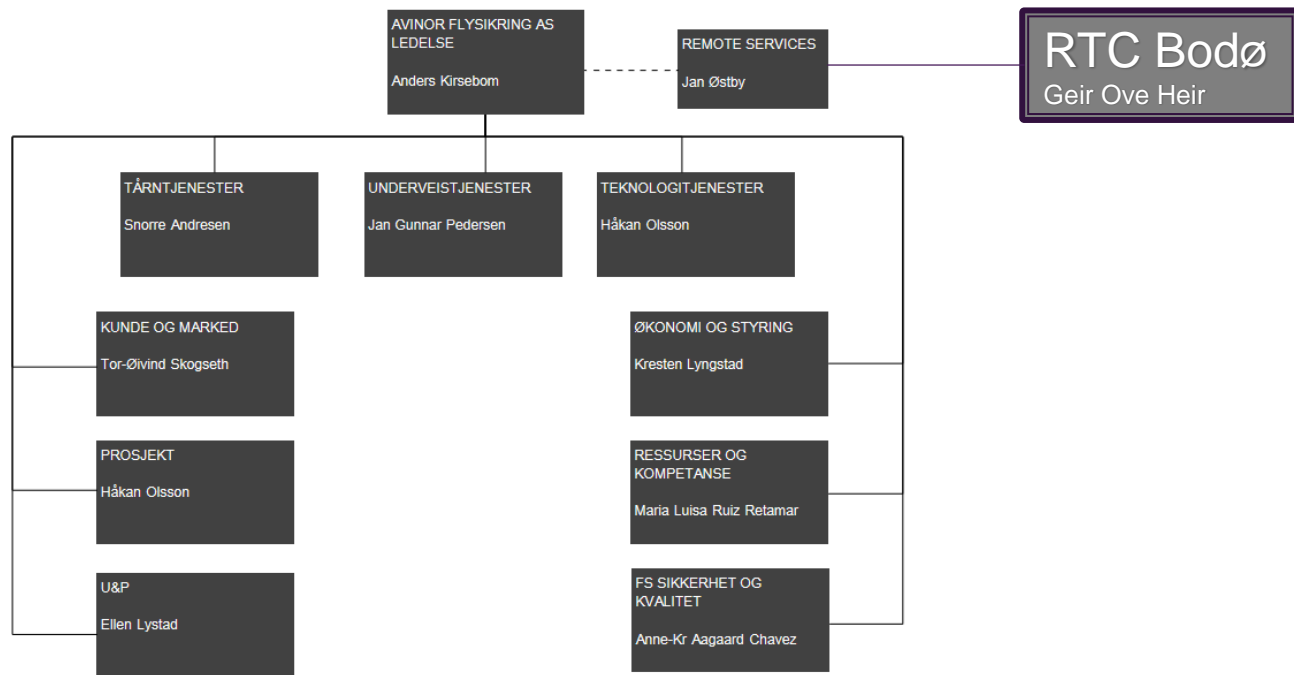


# AFIS - tower



- Infrastructure
- Surroundings
- 800 m RWY
- MET sensors
- COM
- VDF Direction Finder
- NAV Aids
- RWY lights
- Low density aerodromes, aprx 1200-15000 movements per year

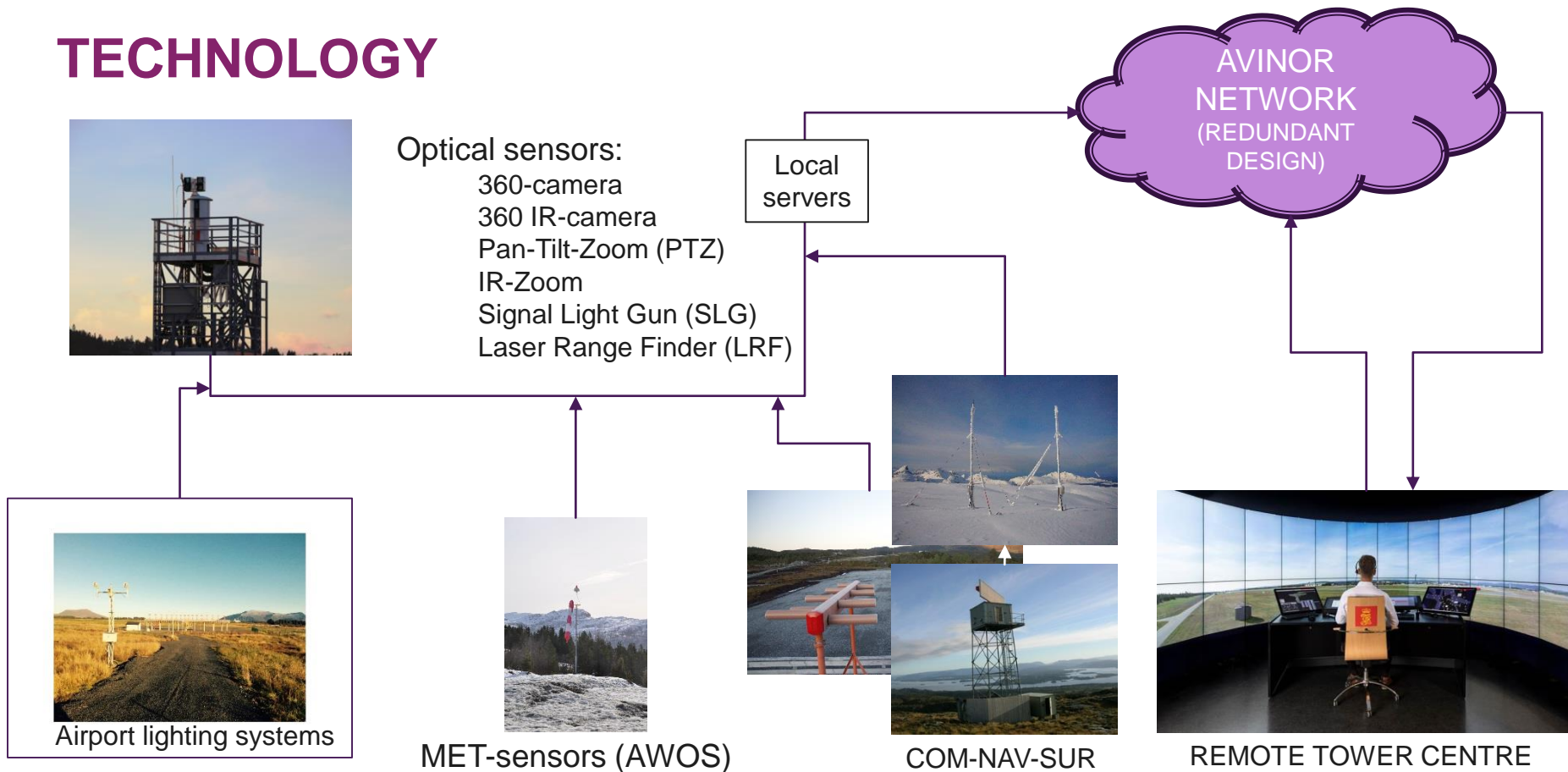
# Avinor Flysikring AS



# PROGRAMME OVERVIEW

- Strategic decision in the Avinor Group to implement Remote Tower at 15 airports. Varying in size from Røst to Bodø.
- Roll out and implementation step by step starting operations at AP-1 in Q3-2019 – ending with AP-15 at the end of 2021/2022.
- Initial operation in a Contingency RTC with 5 workstations and a supervisor WP.
- Commencing construction of a Main RTC 2018/19 with 16 workstations – planned completion in 2019/2020
- Overall Programme Cost: 130 million EUR
- Technology: 60 million EUR
- In-house deliverables: 70 million EUR

# TECHNOLOGY



# HIGH LEVEL SYSTEM REQUIREMENTS

- Visual detection capability (20/20 vision or visual acuity 1.0)
- Equal or better situational awareness compared to a regular TWR (PTZ, 360-IR og IR-Zoom, LRF, Information on Heads-Up-Display)
- Equal or improved level of safety
- Requirements derive from:
  - SES and SESAR
  - ICAO Doc 4444 – Procedures for Air Navigation Services Air Traffic Management
  - ICAO Doc 8964 (FAA ATCS MED) – Manual of Civil Aviation Medicine

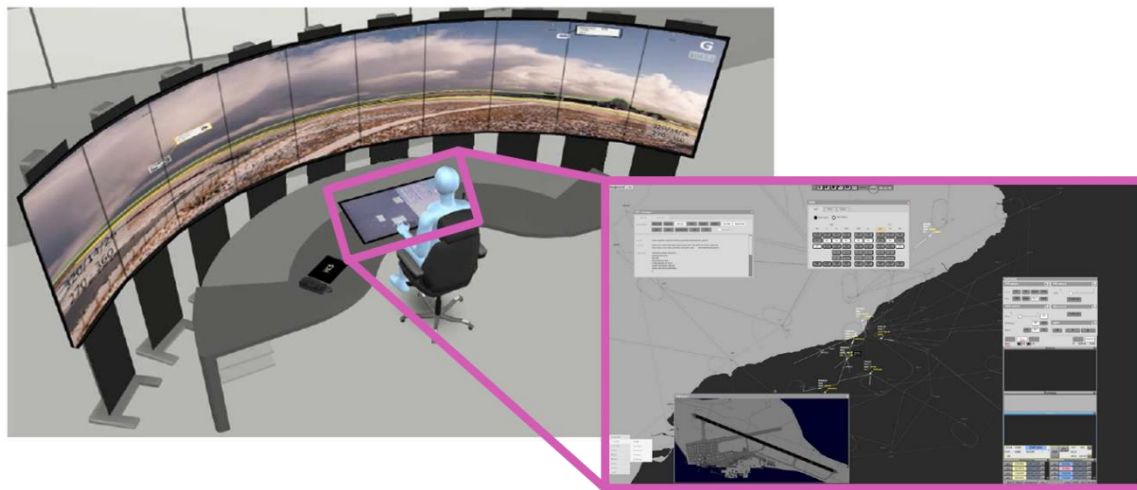




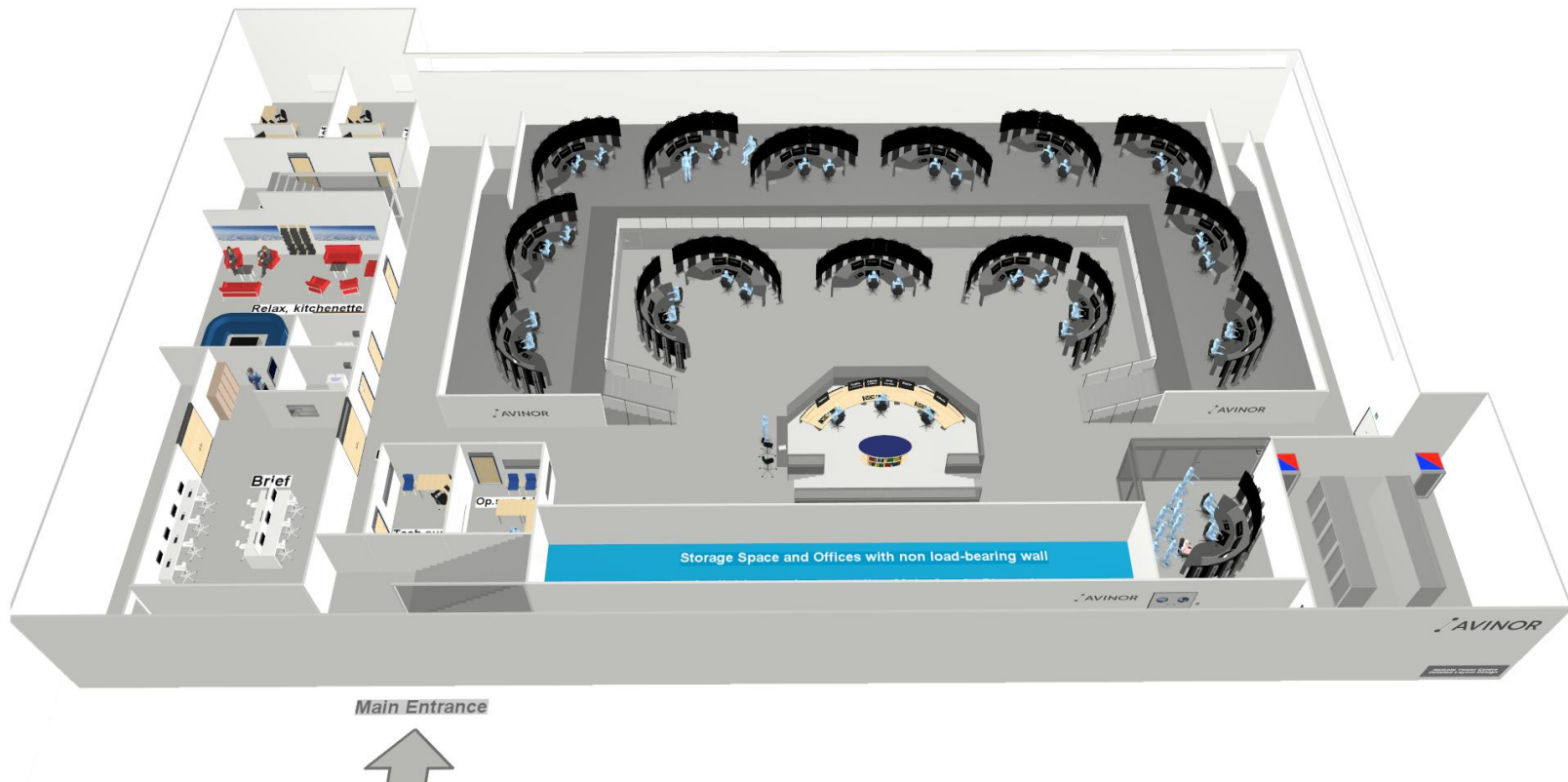
# Where are we coming from?



# Remote Tower Module



# Remote Tower Center



## Modes of Operation – one AFISO/ATCO

- Single                      One RTM serves one airport
- Sequential                One RTM serve more than one airport in sequence i.e. a defined period between airports being served
- Multiple/multi            One RTM serves more than one aerodrome simultaneously

# Conceptual layout multi





# Understanding the Change to RTS



## AVINOR FLYSIKRING



DH8A M N0260 <b>WIF741</b> ENNM1540 ENVA1558 4506	120 F100 F100	RNAV-PRE 118.6 0697 140	R25 WAR Q1024
RVSM-UNK		NANOX TRM DCT OKELO	NPL 21/5

# DP

- TRAC App



- All operators a personal iPad
- Log hours of work (multi)
- Rules, regulations
- Procedures
- Checklists EME
- Read and sign
- AIP
- Reporting/OJTI forms...
- Weather radar
- Briefing
- Other Avinor APPs

# BUILDING THE SAFETY CASE

- Operational Concept for Single RT operations developed
- Concept was base for a functional hazard identification work shop. Goal:
  - ✓ Identify and assess hazards;
  - ✓ Establish safety objectives for the RT concept
- The Functional Hazard Assessment (FHA) was brought further to a Preliminary System Safety Assessment (PSSA). Goal:
  - ✓ Establish initial safety requirements to the system as a whole (technology, procedures, people);
  - ✓ Safety requirements formed part of tender documents
- A similar process to assess human factors:
  - ✓ Work shops to establish main drivers and requirements to the system – particularly for the development of technology
  - ✓ HP Requirements formed part of tender documents

# MAIN AREAS OF THE HUMAN PERFORMANCE CASE

1. Roles and responsibilities
  - a) Operational methods
  - b) Tasks
2. Human and systems
  - a) Task distribution (human/system)
  - b) System performance
  - c) Human Machine Interface
3. Team and team communication
  - a) Team
  - b) Task distribution between teammembers
  - c) Team communication
4. Working environment
  - a) Design of controller working position
  - b) Physical working environment
5. Organisation and staffing
  - a) Accept and job satisfaction
  - b) Competency requirements
6. Training
  - a) Training plans



# TRANSITION INTO OPERATION

- **Acceptance:**

*The proposed solution is acceptable to affected human actors*

- ✓ *Changes in roles and responsibilities*
- ✓ *Impact of changes on job-satisfaction*

- **Competency**

*Changes in competence requirements are analysed*

- ✓ *Knowledge, skills and experience requirements*
- ✓ *Impact on operator licensing*
- ✓ *Possible interference between existing and new knowledge and skills*

- **Staff:**

*Changes in staffing requirements and staffing levels are identified*

- ✓ *Impact on staff levels*
- ✓ *Impact on shift organization*
- ✓ *Impact on workforce location*

- **Recruitment and Selection:**

*The impact on recruitment and selection processes has been considered*

- ✓ *Changes in operator's profiles*
- ✓ *Changes in selection criteria*

- **Training:**

*Training needs are identified for the affected human actors*

- ✓ *The content of training for each actor group*
- ✓ *The duration of training for each actor group*
- ✓ *The required types of training (classroom, simulator, OJT)*

## To Conclude

- Remote Towers is more than an equipment change
- Technology is important but not the only enabler to make operations a success
- The consideration of the human is key to make this a success for safety and business expectations

# Photos:

- *Brønnøysund Avis*
- *Norsk Luftfartsmuseum*
- *Norsk Luftfartsmuseum/Richard Stålbrand*