Remote TWR – Change Management (from a CAA perspective)

Cologne, 24 October 2023

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CAA Norway

Agenda

- Background
- CAA involvement
- How we approached the change
- Approval process
- Lesson learnt and experiences

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Background

- Norwegian ANSP has implemented Remote Towers (RT) solution together with the technology providers:
    - Kongsberg Defence & Aerospace
    - Indra
    - Collectively called NINOX

- Current operational concept focuses on single mode operations

- 1 AFISO per ATS-unit using 1 Remote Tower Module (RTM)

- RTC provides ATS to 11 AFIS units

- Total of 15 airports planned in phase I

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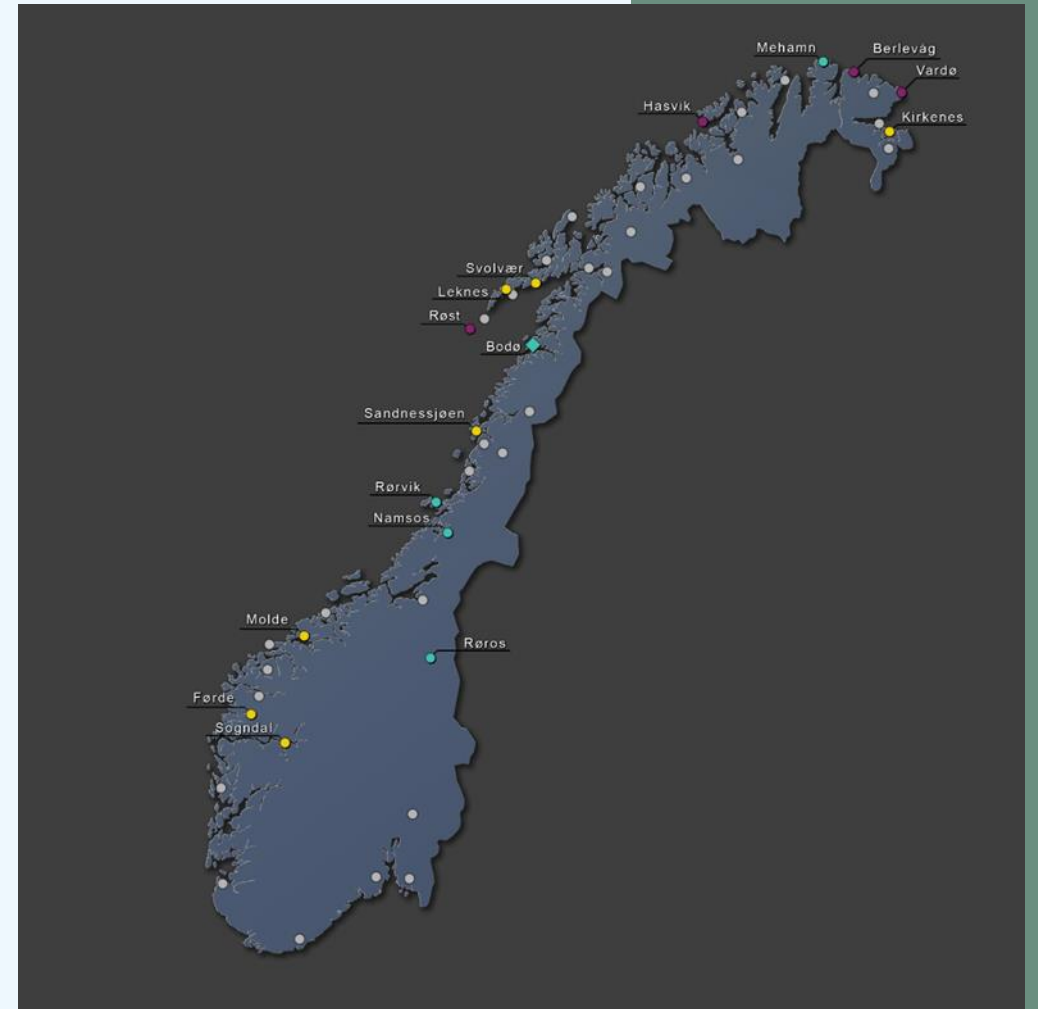
CAA descision/focus areas

- Remote TWR provide ATS under the same regulations as conventional towers
- No need for specific RT regulation
- Management of change – evidence/verification
- Local knowledge/safety culture
- Human factors
- Cyber security

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Safety Review Group (SRG)

- Change management/Safety Assessments
- ATS, AFIS Training, Human factor
- ATS/MET- obs.
- Cyber-security, Network, CNS/ATSEP
- Change management, IOP, Cyber-security, CNS/ATSEP
- Aerodrome inspector

Foto: Leonardo Yip, unsplash.com

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CAA NO approval process (1)

Focused on:

- Project Management
- Safety Risk Assessments
- ATM-/Cyber-Security Risk Assessments
- Human Factors Assessment
- AFIS Training, service provision, national regulations
- Met. Obs. service provision
- ATSEP Training, technical capability/resources

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CAA NO approval process (2)

Focus cont:

- ATSEP Training, technical capability/resources
- Interoperability & Conformity Assessment of systems/constituents
- Software Assurance
- FAT/SAT testing
- Contingency/rollback procedures & LoA
- Transition plan

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Breakdown of the Approvals – Notifications of Changes (NoC) (1)

ATS/CNS service providers:

- NoC - Establishment of a Remote Tower Center (Main/Con.)
- NoC - Technical system and first SW version
- NoC - ATS moving from the local unit into the RTC (1 NoC per unit)
- Emphasis on Passive Shadow Modes (PSM) and Advanced Shadow Mode (ASM) testing and its conclusion/evidence
- Focus on transition plans – rolls/responsibilities
- NoC - Weather Observations from the RTC

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Breakdown of the Approvals (2)

- All future SW versions require prior approval

- Approval for operation in 2 phases:
    - Approval to start Active Shadow Mode (ASM) after Passive Shadow Mode (PSM) concluded and report submitted to CAA-NO
    - Final operational approval after ASM concluded and report submitted to CAA-NO

Aerodromes

- NoC - Changing of ATS services from local to RTC (1 NoC per airport)

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Main focus areas (1)

- Meetings SRG and ANSP project team

- Dedicated meetings regarding Safety, Human Factors and Cyber-Security

- Conducted 4 audits (interviews with AFISOs, ATSEPs, project management)
  - RT1 – Project management, contract, conformity assessment
  - RT2 – Establishing the CRTC/technical system (following FAT/SAT)
  - RT3 – Verification of ASM report and transition plan
  - RT4 – Follow up after Røst operational

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Main focus areas (2)

- Findings/conclusions laid foundation for approval decisions/conditions along with:

  - Documentation (ex: safety assessments and procedures)
  - Stability data
  - Occurrence reports
  - FAT/SAT testing
  - PSM/ASM testing

- New SW release – conducted a follow-up visit on-site

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Cyber security

- ANSP conducted a cyber-security risk assessment (network & RT-system)
- External penetration testing performed
- No high-risk findings/vulnerabilities were detected
- Several recommendations to ANSP
- Penetration testing is quite a risk for an ANSP to take, however it provides a higher level of confidence in the system
    - Improved resilient
    - Improved cyber-security risk assessment

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Picture: Avinor Flysikring AS

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Questions?

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Remote TWR – Lessons learnt and challenges (from a CAA perspective)

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Experiences – RT project

- Early involvement from CAA
- Mature ANSP with robust (and approved) MoC processes
- Open and honest dialog throughout the approval process (progress meetings/informal meetings with management/document lists)
- Good understanding of the evidence required to show compliance with regulatory requirements

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Experiences – Management of change (MoC)

- Mature and well-functioning MS/SMS CA processes, including project management
- Given the CAA positive experiences on how to handle new technology/consept

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Initial challenges

- AFIS operation

- ANSP vs sub-contractors

- Technology suppliers, Cyber Security focus but were not as experienced in ANS MoC-process and provision of relevant documentation (Interoperability documentation)

- Supplier not familiar with Conformity Assessment process, documentation required to satisfy interoperability requirements

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Approval challenges

- Supplier and ANSP FAT/SAT test procedures not aligned
- ANSP used time and resources to attain an adequate level of documentation for Declarations for the suitability for Use/Declarations of Conformity
- SAT failures – affect regulatory compliance or only "nice to have features"?
- Camera/MTBF issues
- ANSP ATSEP capacity to handle technical failures
- Met. obs. challenging to assess

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What would we do different?

- Use more time assessing/approving documentation, sets precedence for approvals

- Ensure PSM and ASM test plans are coordinated and agreed upon by both parties – (duration, transition, pass/fail criteria - What is acceptable?)

- SW Test plan - define test criteria, how many fails are too many and to what degree?

- Sum of less critical fails - How does this affect the AFISO? ATSEP?

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What would we do different?

- SW freeze
  - What is a SW freeze?
  - Can you implement bug fixes during SW freeze?
  - What about in PSM/ASM?
  - After?

- Spend more time in the ops. room to familiarize ourselves with the system beforehand

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Future (1)

Increase number of ADR into RTC

- AFIS and ATC
- Mixed operational concept, require attention
- Similar approval processes
- Selected focus areas

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Future (2)

Sequential Mode – in progress

- SW upgrade
- Each pair of units will require separate approval
- Assessment of this change is in progress now
- Approval for concept testing granted and testing is under way now

Focus areas:

- AFIS service - 1 AFISO and 2 units sequentially
- AFIS/Aerodrome coordination - 1 AFISO and 2 units sequentially
- Human Factors
- AFISO Training

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Future (3)

Multiple Mode – Planned for future implementation

- SW upgrade, horizontal split on screens

- AFIS service - 1 AFISO and 2 units simultaneously

- Each pair of unites will require separate approval

Focus areas:

- AFIS/Aerodrome coordination - 1 AFISO and 2 units sequentially
- Safety assessment
- Human Factors
- AFISO Training

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Questions?

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