SnT 2025
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE
8 SEPTEMBER ONLINE DAY
9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE

P4.2-655

NORSAR AS72/SPITS Power system upgrade and plans for Antarctic off-grid station

Jon Magnus Christensen, Morten Hervik, Ravn Rydtun, Sindre Stokkan

NORSAR

INTRODUCTION AND MAIN RESULTS

This presentation will give an overview of the first years of operating the new power system at SPITS, with lessons learned, changes and expansions. Transition from project to daily operation and scheduled maintenance. The lessons learned from the AS72 power system upgrade will be leveraged in a research project at the Norwegian Antarctic station Troll where NORSAR is planning to establish a seismoacoustic 9-element off-grid array station. This presentation will outline the initial planning of the project and design choices.

SnT 2025 8 SEPTEMBER ONLINE DAY 9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

NORSAR AS72/SPITS Power system upgrade and plans for Antarctic off-grid station

Jon Magnus Christensen, Morten Hervik, Ravn Rydtun, Sindre Stokkan

P4.2-655

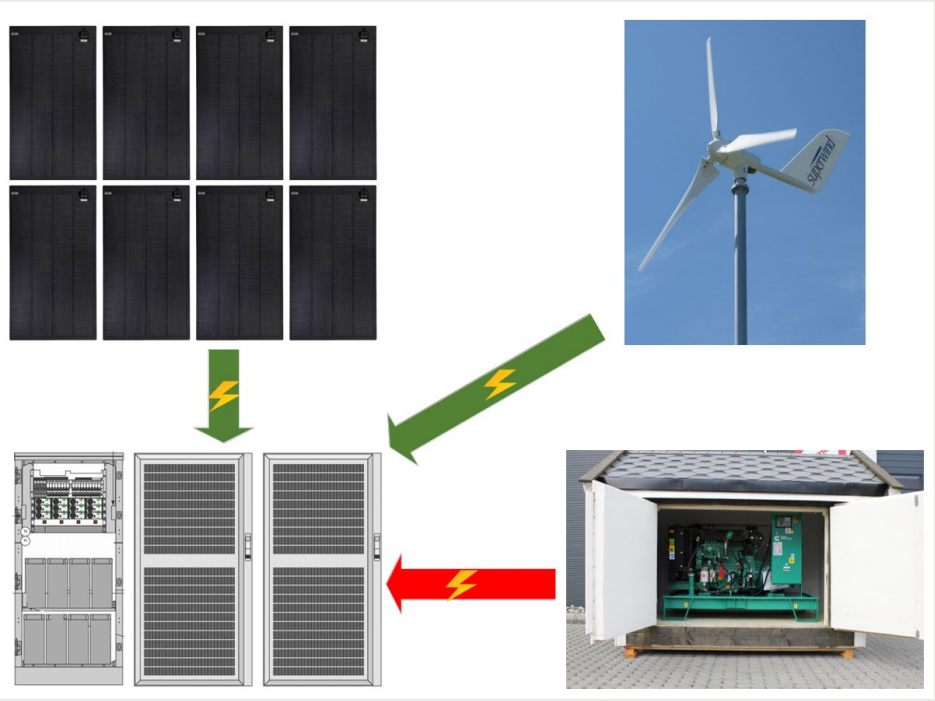
Off-grid power system at AS72 Spits

Main elements of the upgrade:

- Wind generator @ 1250 W
- 8 Solar panels @ 3200 Wp
- Cummins Diesel generator 17 KVA
- Delta UPS
  - Li-ion @ 1600 Ah
  - AGM @ 920 Ah
  - ~10 days backup
- Communication
  - TCP/IP to each digitizer
- Power control and monitoring capabilities with PLC
- Technical room ventilation

Experience after 3.5 years of operation:

- Station is running almost exclusively on solar and wind, even through polar winter
- No downtime due to power system failure
- Very little maintenance needed – usually once a year
- Slightly higher energy expenditure due to heating of Li-ion batteries than expected
- Not straight forward to implement wind turbines for Li-ion battery banks



NORSAR AS72/SPITS Power system upgrade and plans for Antarctic off-grid station

Jon Magnus Christensen, Morten Hervik, Ravn Rydtun, Sindre Stokkan

P4.2-655

Plans for off-grid seismoacoustic array in Antarctica

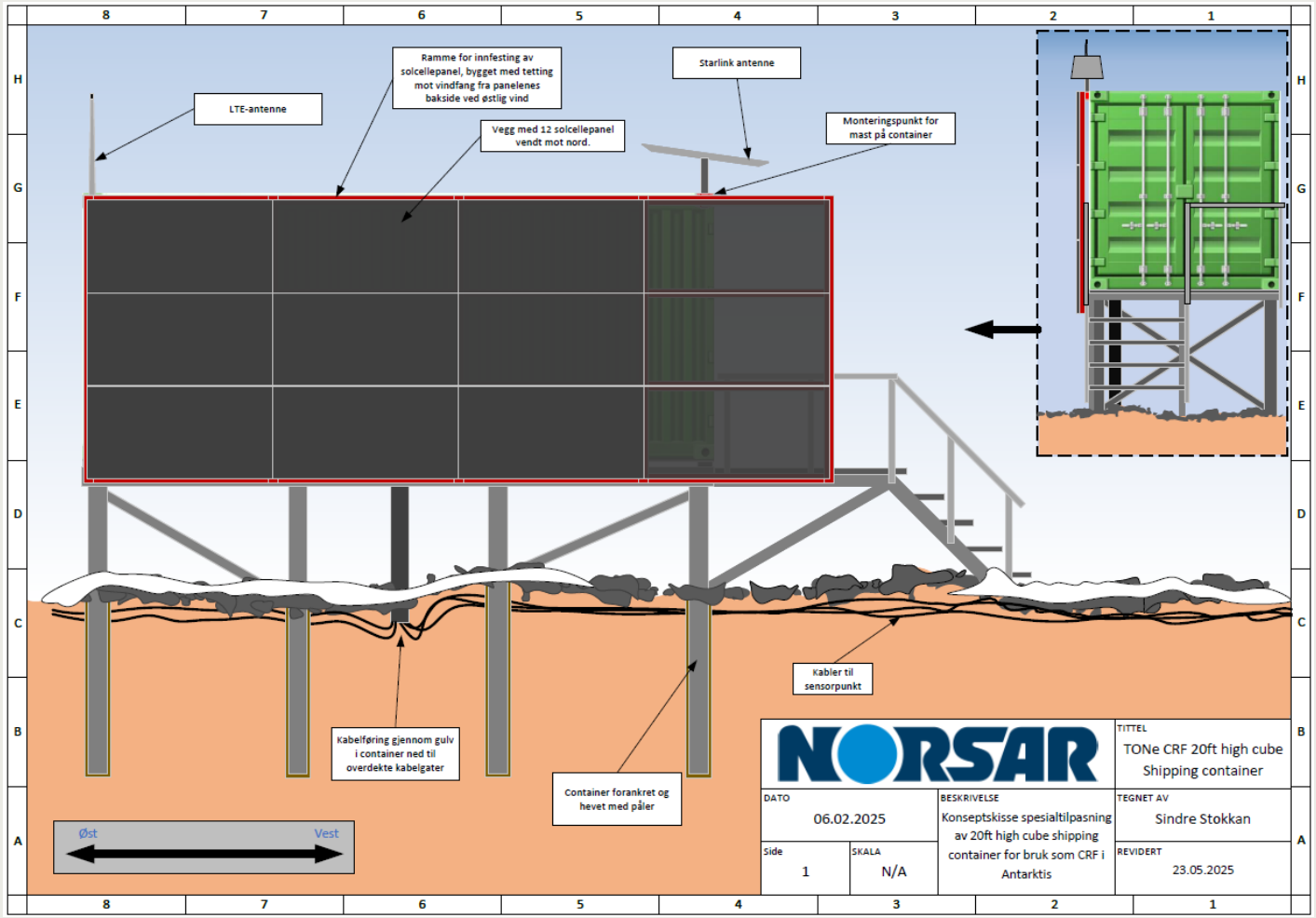
Leverage lessons learned from AS72

Main considerations

- Much higher winds expected – increase robustness of wind turbine needed. Additional turbines for redundancy in case of failure (APRS world WT10)
- Additional solar panel strings for redundancy
- Delta UPS system with increased battery capacity ~30 day back up power
- Reinforced 20 ft high cube container solution with additional insulated technical room

9-element array:
Kinemetrics STS 5A seismometers, Q330HRs digitizer, Hyperion IFSN-5402,
Nanometric T360 seismometer

Installation to be done in Q1 2026 at the Norwegian Research station TROLL.



SnT 2025
8 SEPTEMBER ONLINE DAY
9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

NORSAR AS72/SPITS Power system upgrade and plans for Antarctic off-grid station

Jon Magnus Christensen, Morten Hervik, Ravn Rydtun, Sindre Stokkan

P4.2-655

Part of larger Troll Observing Network (TONe) project managed by the Norwegian Polar Institute