

WXRCALMON 2023-11-08--10

# **CHALLENGES OF THE SWEDISH WEATHER RADAR NETWORK**

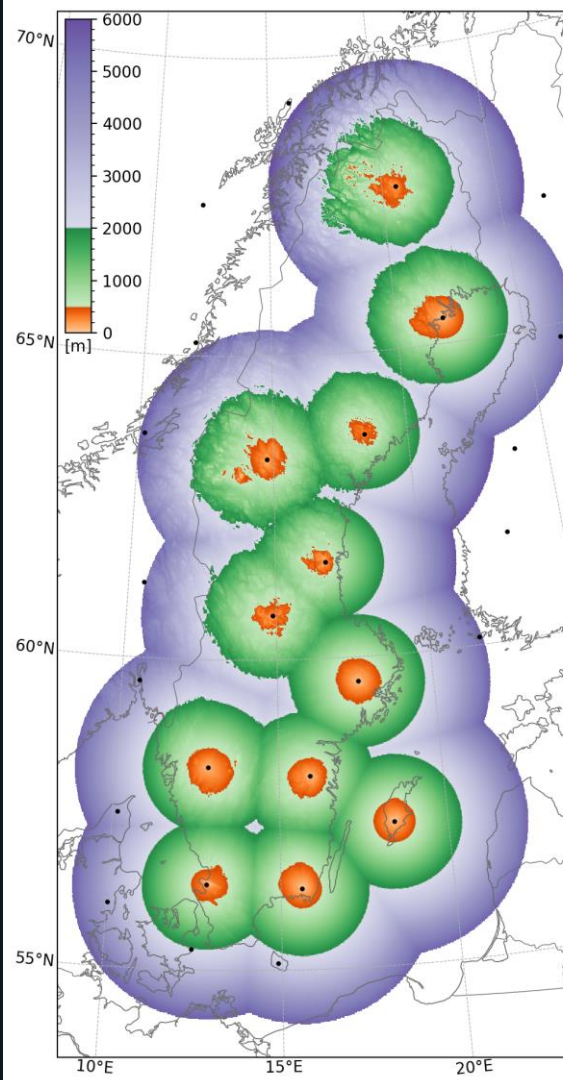
## Outline

- The Swedish Weather Radar Network
- Transmitter issue
- Pulsating intensity; gear box replacement



# The Swedish weather radar network

- 12 C band dual pol. Doppler EEC DWSR-2501C-SDP
- Modernised from Ericsson systems 2014-2021
- SMHI and Swedish Armed Forces jointly manage the radar network
- Maintenance is provided by Combitech AB (formerly part of Saab AB)



# Transmitter issue



C band magnetron VMC-1694

The magnetrons failed prematurely shortly after system modernisation.

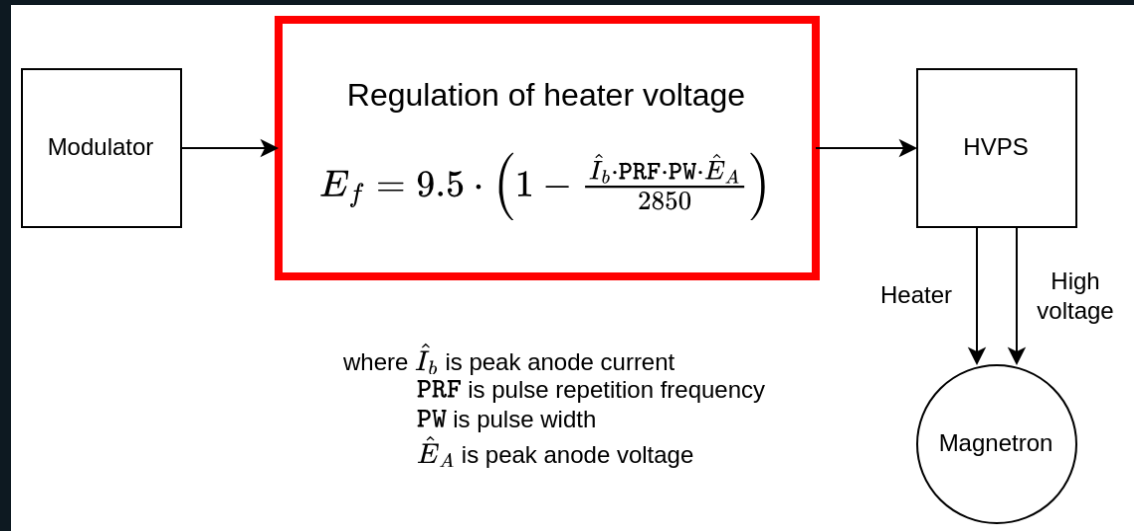
Root cause was running the magnetrons out of specification.

Excessive heating during operation often leads to instabilities like arcing, especially during long pulses or high duty cycle.

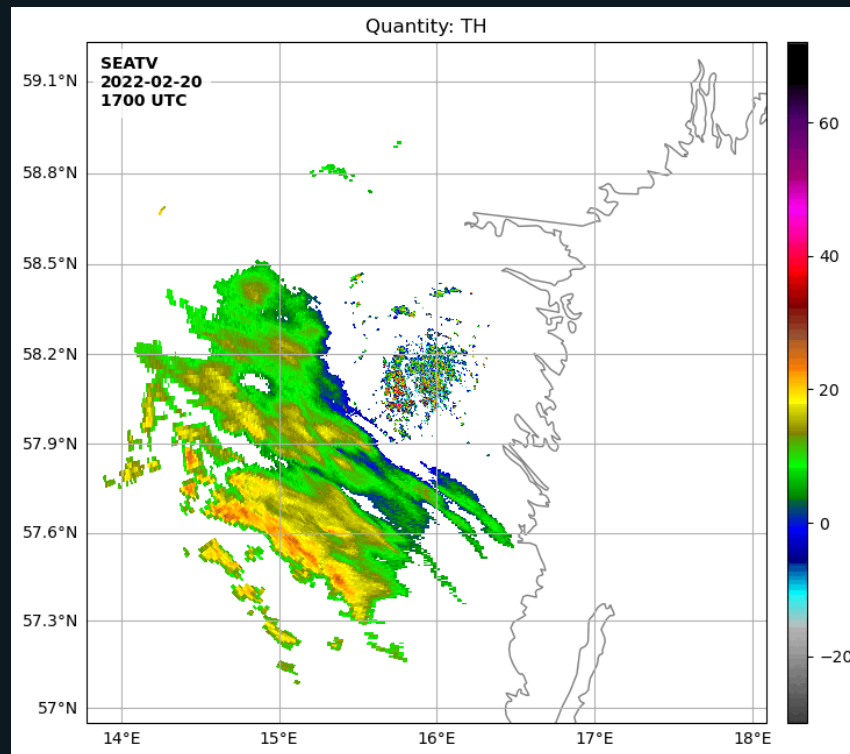
Since June 2023 all radars are running in H-mode only and low duty cycle.

# Transmitter issue - proposed solution

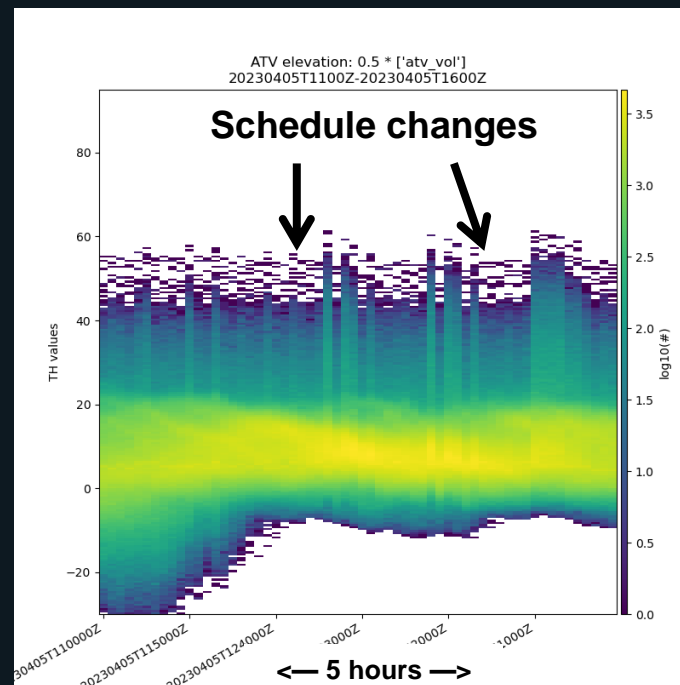
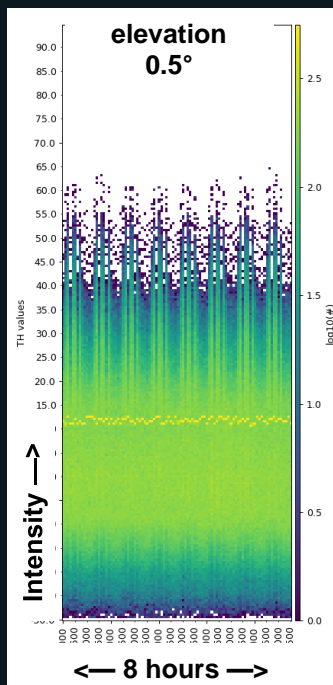
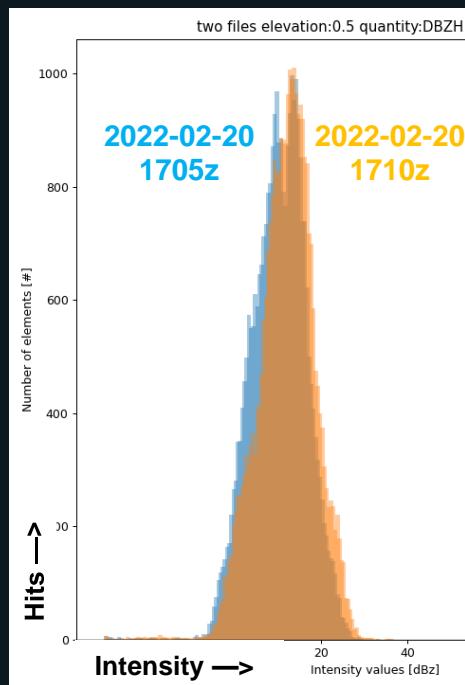
Modify modulator and high-voltage power supply to automatically regulate the heater temperature with respect to operating condition



# Pulsating intensity at radar ATV



# Pulsating intensity - changing schedule

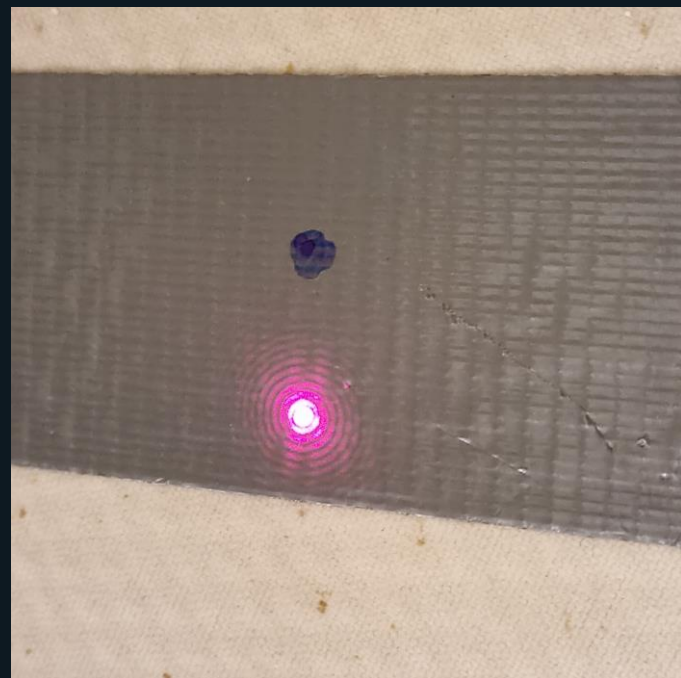
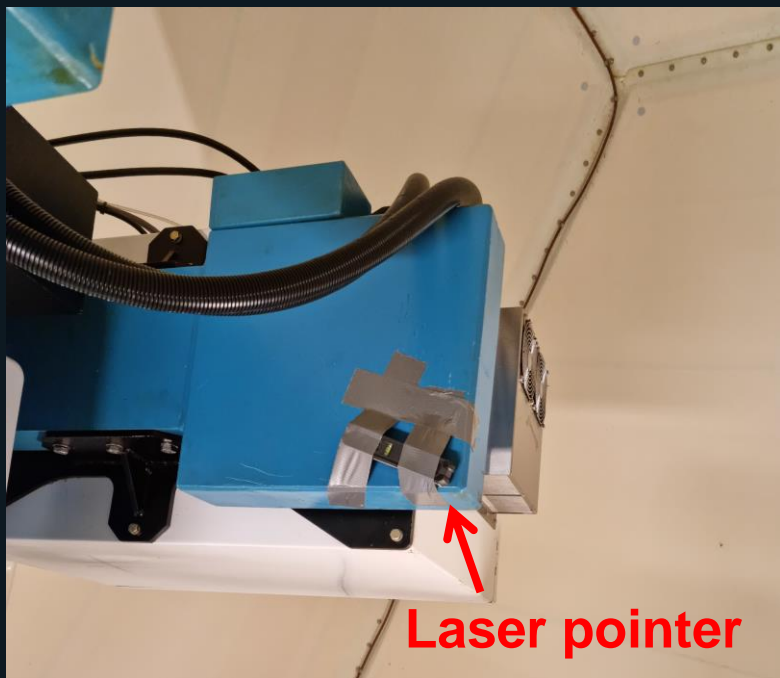


## Pulsating intensity - timeline

2019	Radar modernised in February Pulsating intensity first observed in August
2021	Replaced all components in cabinet except transmitter Schedule manipulated to provoke pulsating magnitude Replaced all bolts in the truss tower
2022	Receiver checked during operational use
2023	Replaced transmitter and magnetron Error cause found: Play in elevation gearbox Gearbox replaced. Problem fixed!



# Pulsating intensity - keeping it simple



# Pulsating intensity - elevation gearbox

Radial/tangential movement

Gearbox was replaced May 2023



Photos courtesy of Combitech AB

## Contacts

Daniel Johnson  
daniel.johnson [at] smhi.se

Lars Forsling  
lars.forsling [at] smhi.se

Günther Haase  
gunther.haase [at] smhi.se

Ulf Nordh  
ulf.nordh [at] smhi.se

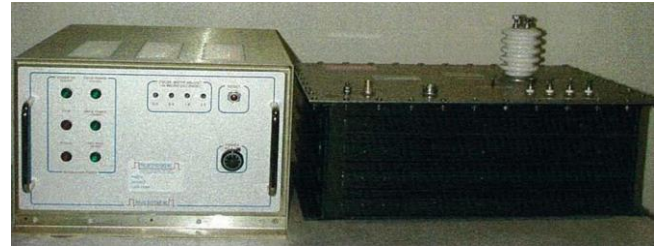
Ove Sundell  
ove.sundell [at] smhi.se



# WANT TO BUY

High-voltage power supply  
Pulse systems PS-1954

Modulator  
Pulse systems MG-1390 or MG-1429 rev A





**SMHI**

**Thank you!**