Safe and secure remote control for the twin radio telescope Wettzell

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NEXPReS

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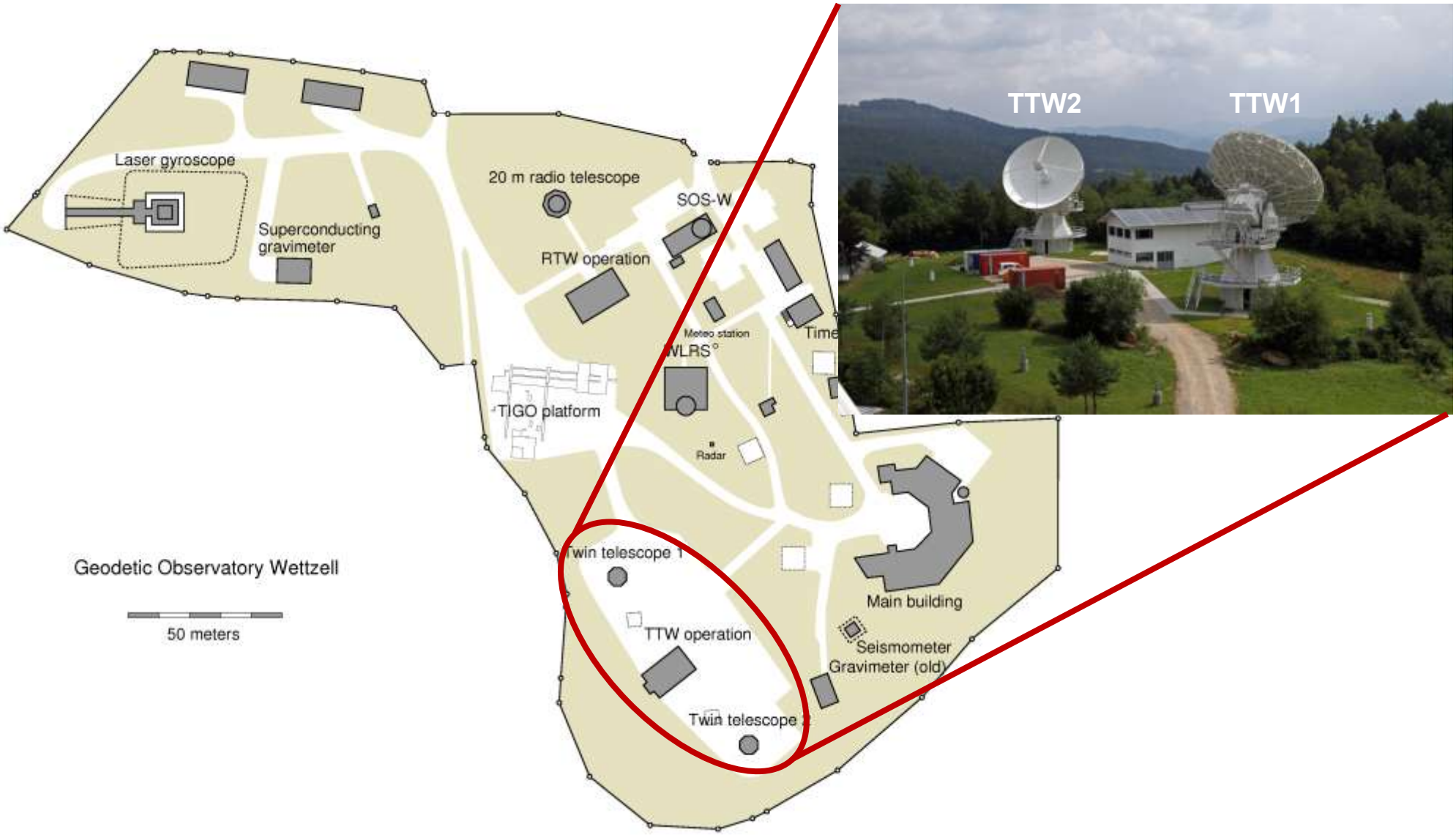
The Twin Radio Telescope Wettzell (TTW)

The Twin Radio Telescope Wettzell (TTW)



The Twin Radio Telescope Wettzell (TTW)

Technical details:

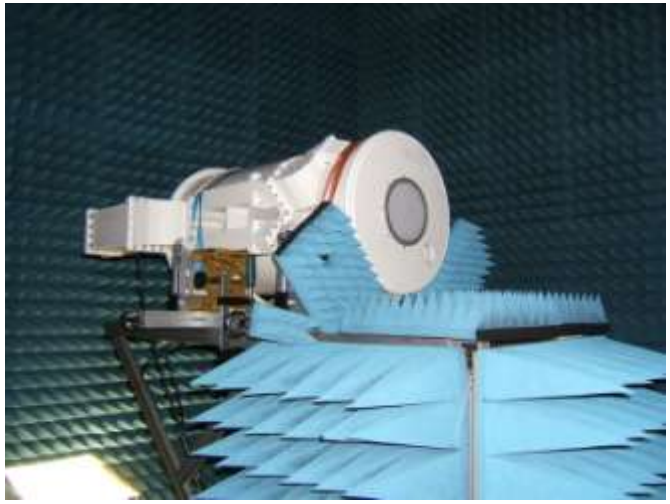
- Main reflector: 13.2m
- Ring focal design
- f/D = 0.29
- Path Length Error <0.3mm
- ALMA Mounting with drive velocities of 12°/s in Azimuth and 6°/s in Elevation
- Balanced antenna design
- 27Bit Encoder : 0.0003° resolution
- Adjustable sub-reflector using a Hexapod
- Lifetime min. 20 years

IVS WG 3 – VLBI2010: Current and future requirements for geodetic VLBI Systems

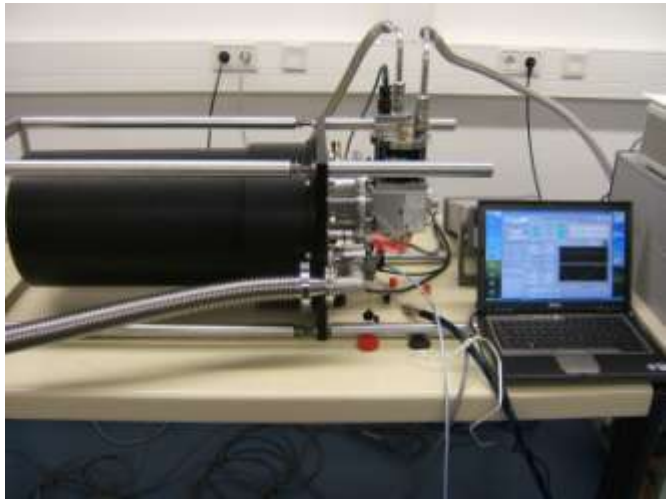
The Twin Radio Telescope Wettzell (TTW1)

The triband feed

Test in anechoic chamber



Test of the triband-dewar



Performance: feed

Frequency bands:
S-band: 2.2 – 2.7 GHz
X-Band: 7.0 – 9.5 GHz
Ka-band: 28 – 33 GHz

Insertion Loss:
S-band : < 0.12 dB
X-Band; < 0.08 dB
Ka-Band: < 0.5 dB

Return Loss:
S-band : > 25 dB
X-Band; > 20 dB
Ka-Band: > 35dB

Performance: dewar

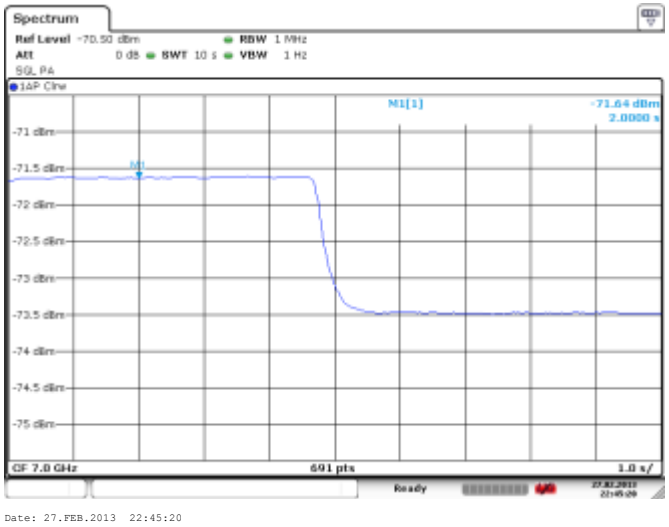
Cold head: T1 = 9 K
T2 = 25 K

LNA Noise Temperature:
S-band : < 20 K
X-Band; < 12 K
Ka-Band: < 35 K

LNA-Gain:
S-band : > 40 dB
X-Band; > 30 dB
Ka-Band: > 25dB

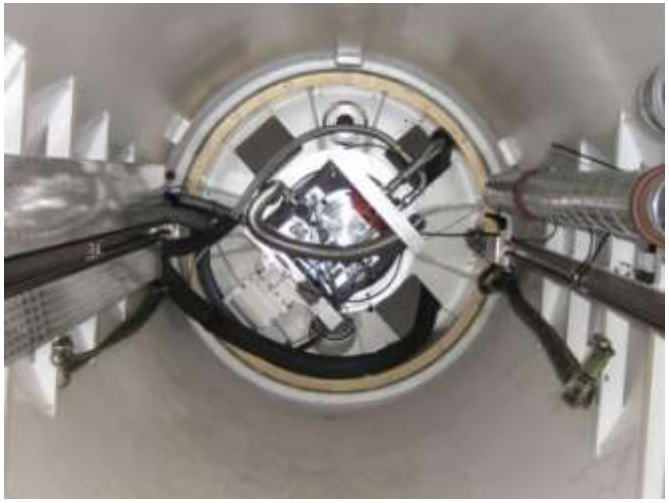
The Twin Radio Telescope Wettzell (TTW)

First Light of TTW1: Cassiopeia A at X-Band

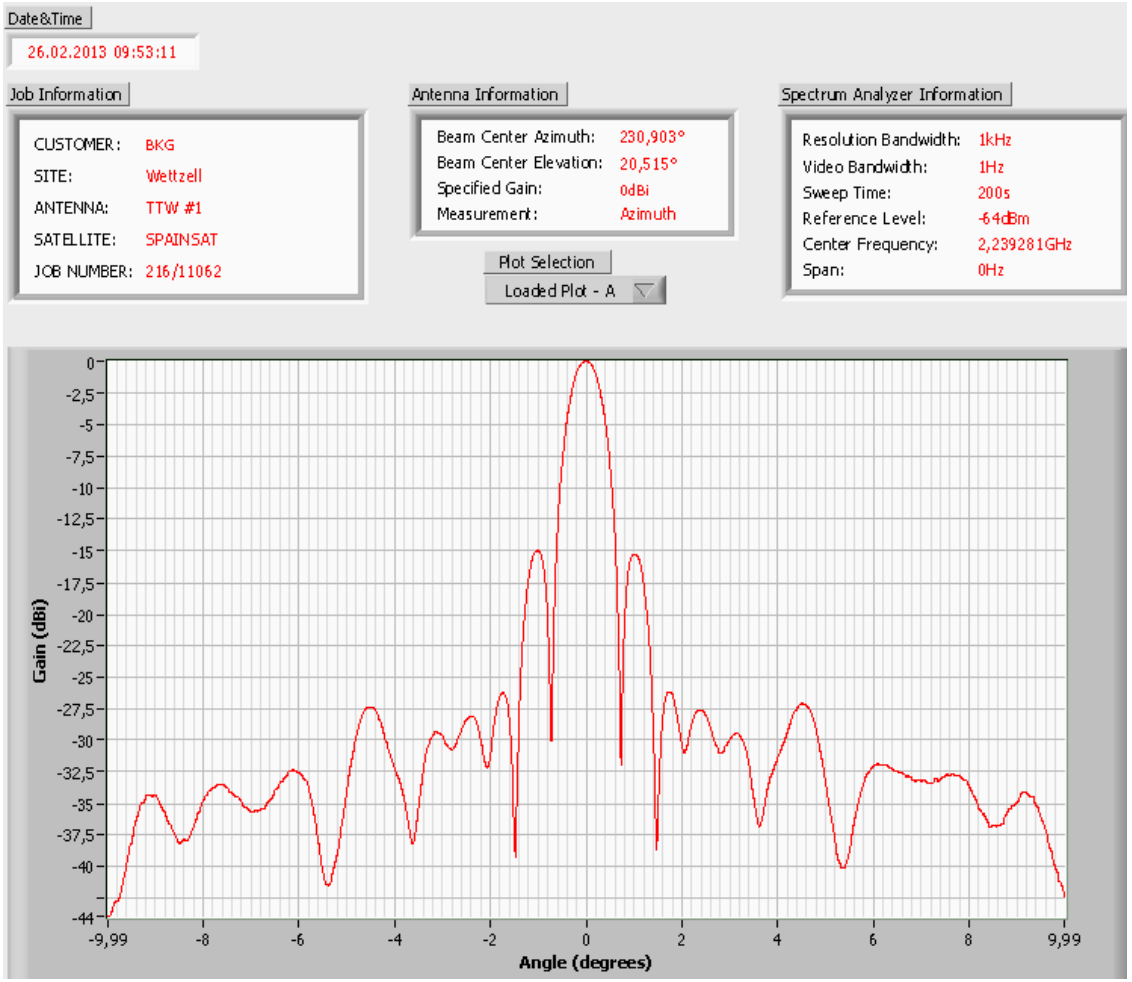


Date: 27.FEB.2013 22:45:20

Installed Triband-feed



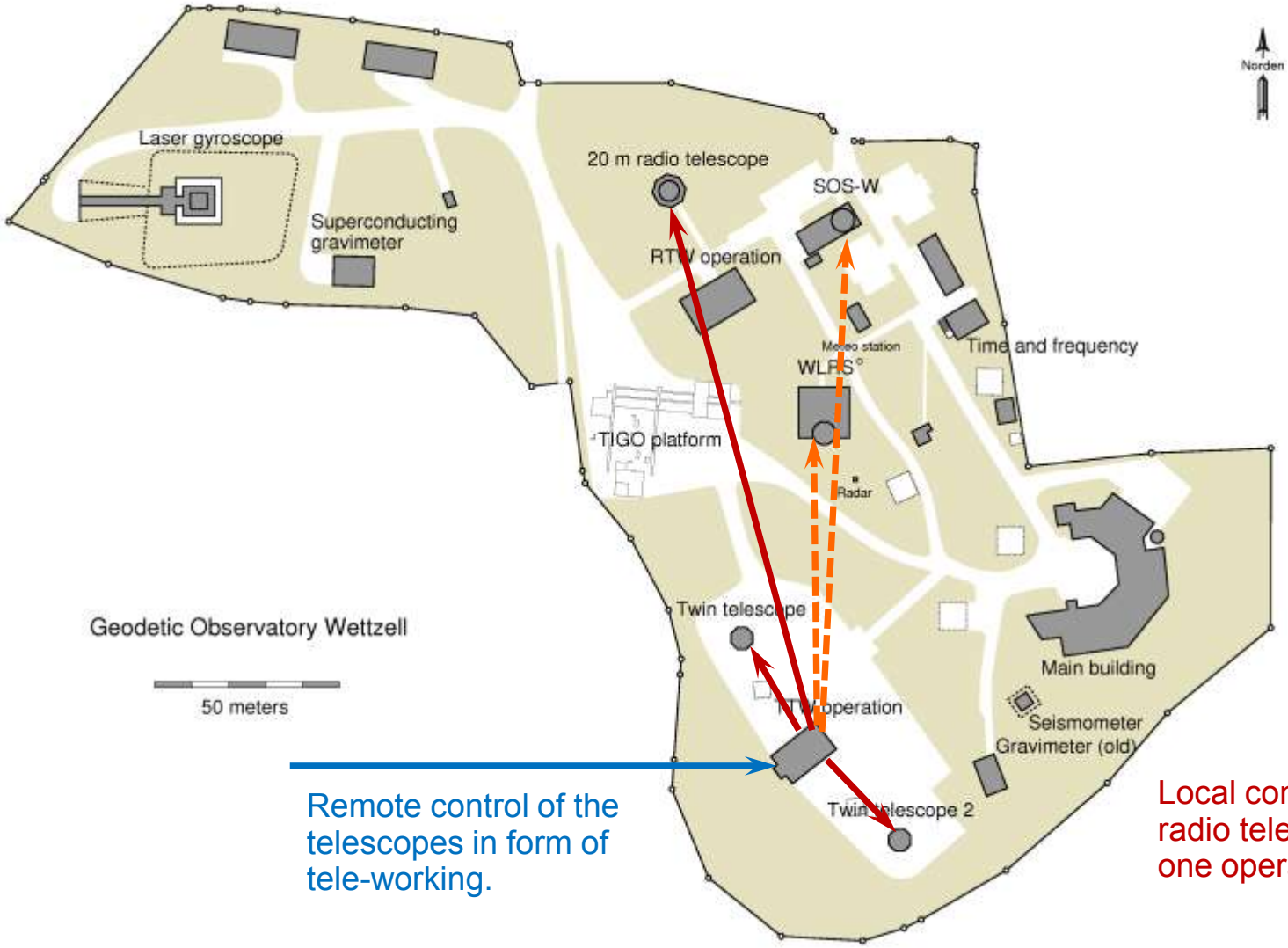
S-Band beam pattern



The Twin Radio Telescope Wettzell (TTW)

The idea behind the new control software

The idea behind the new control software

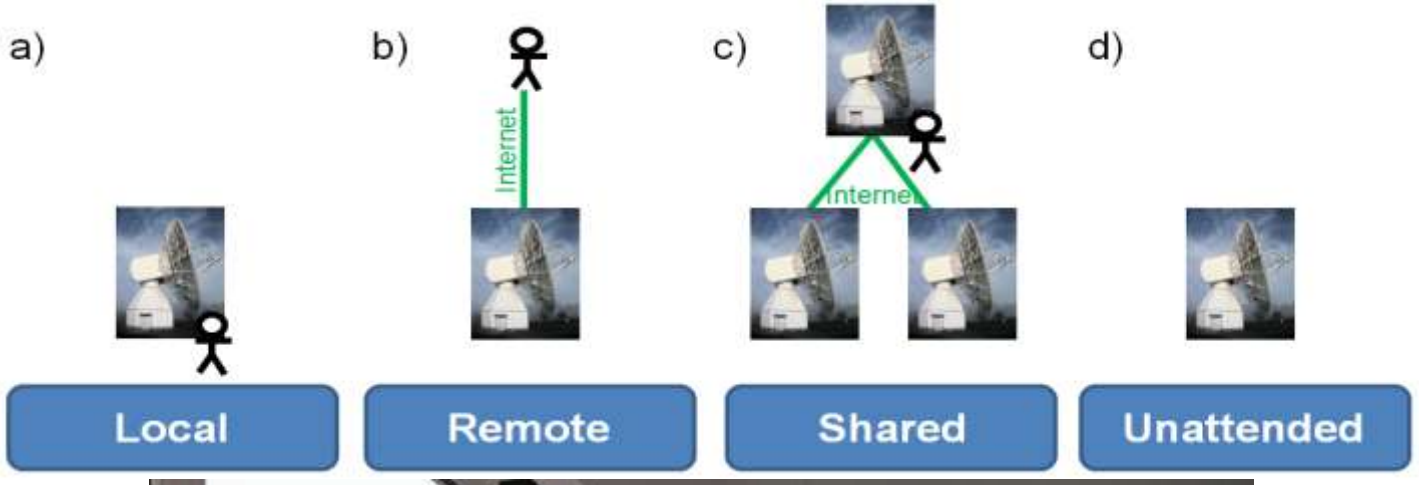


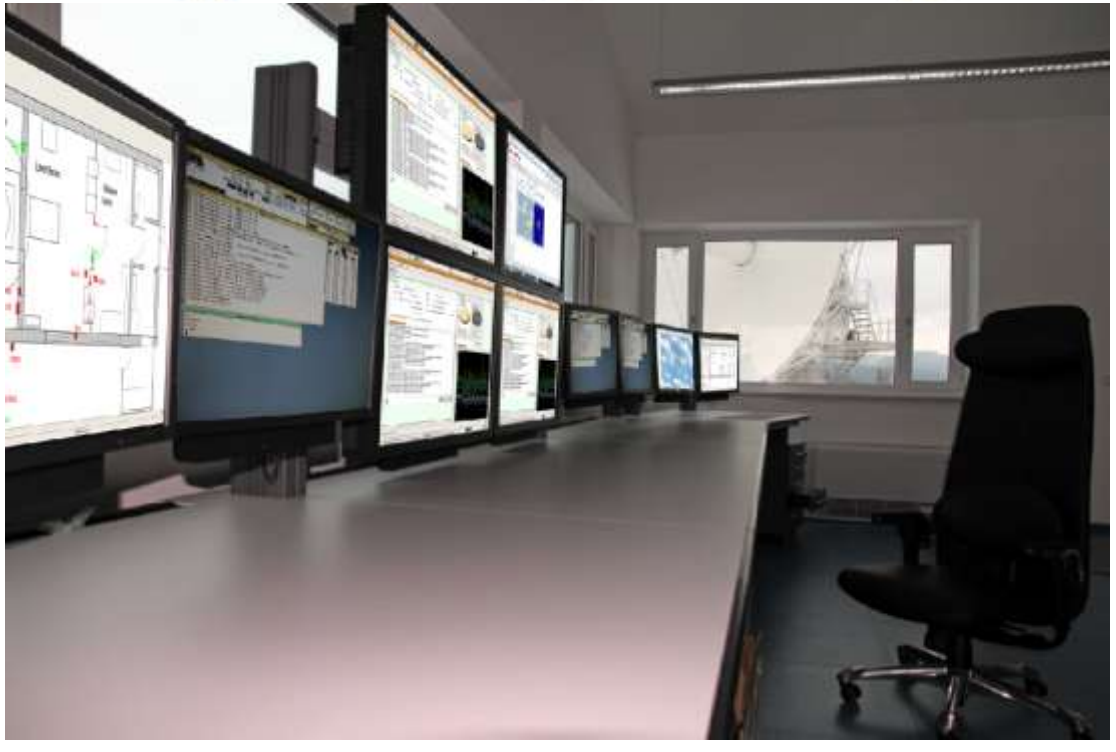
Remote control of the telescopes in form of tele-working.

Possible control of two SLR telescopes from the same operator room.

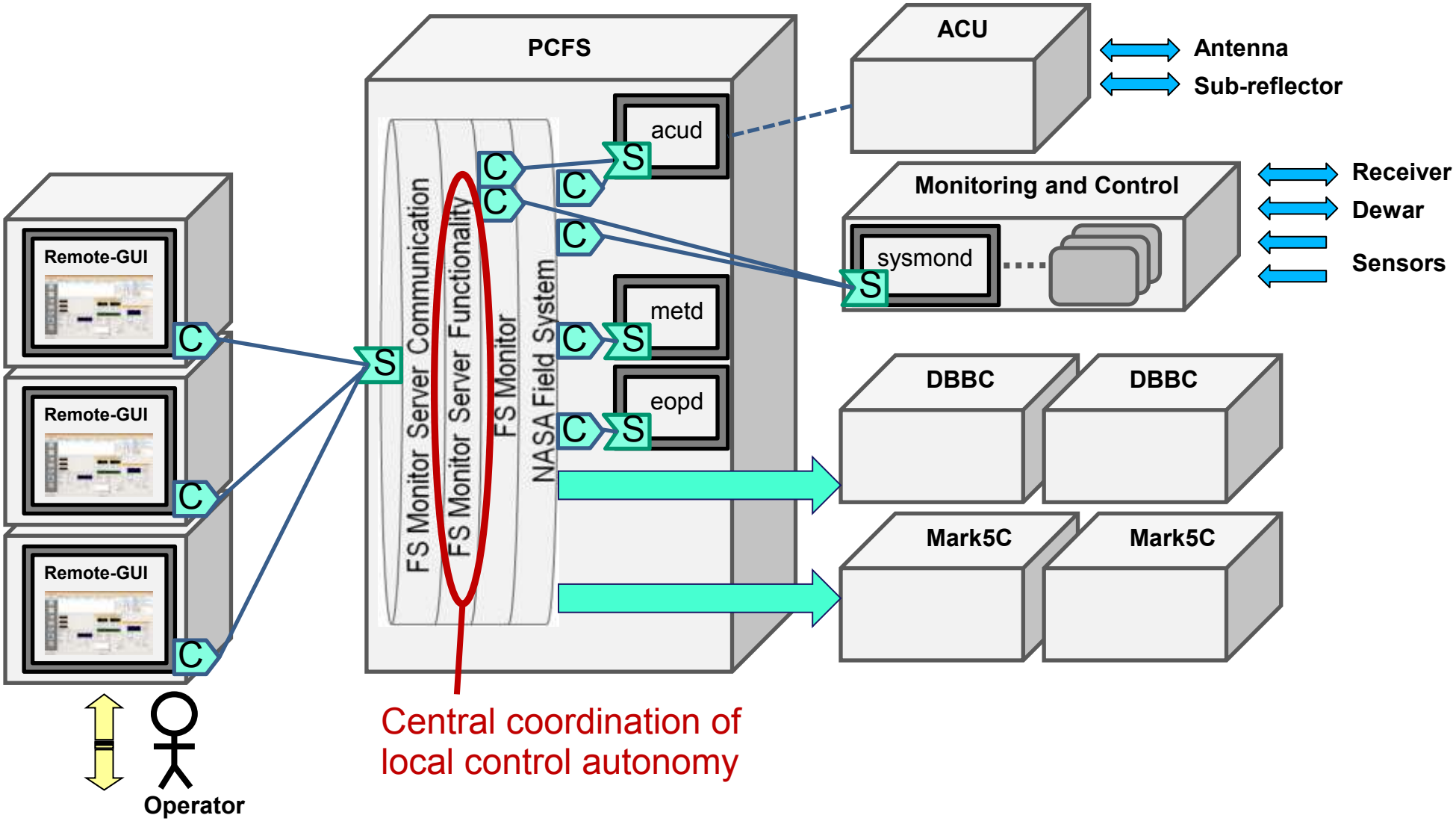
Local control of three radio telescopes from one operator room.

The idea behind the new control software





The idea behind the new control software



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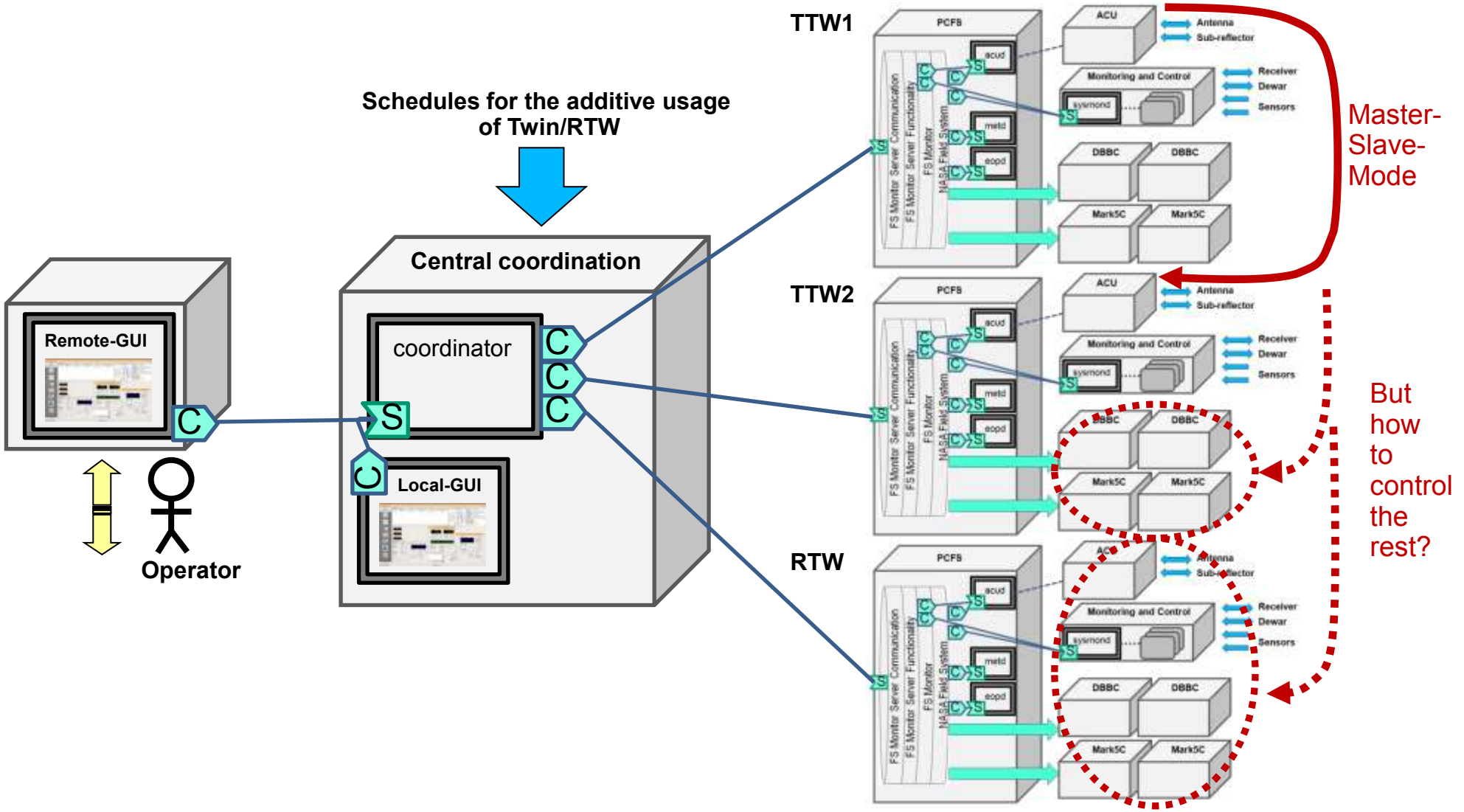
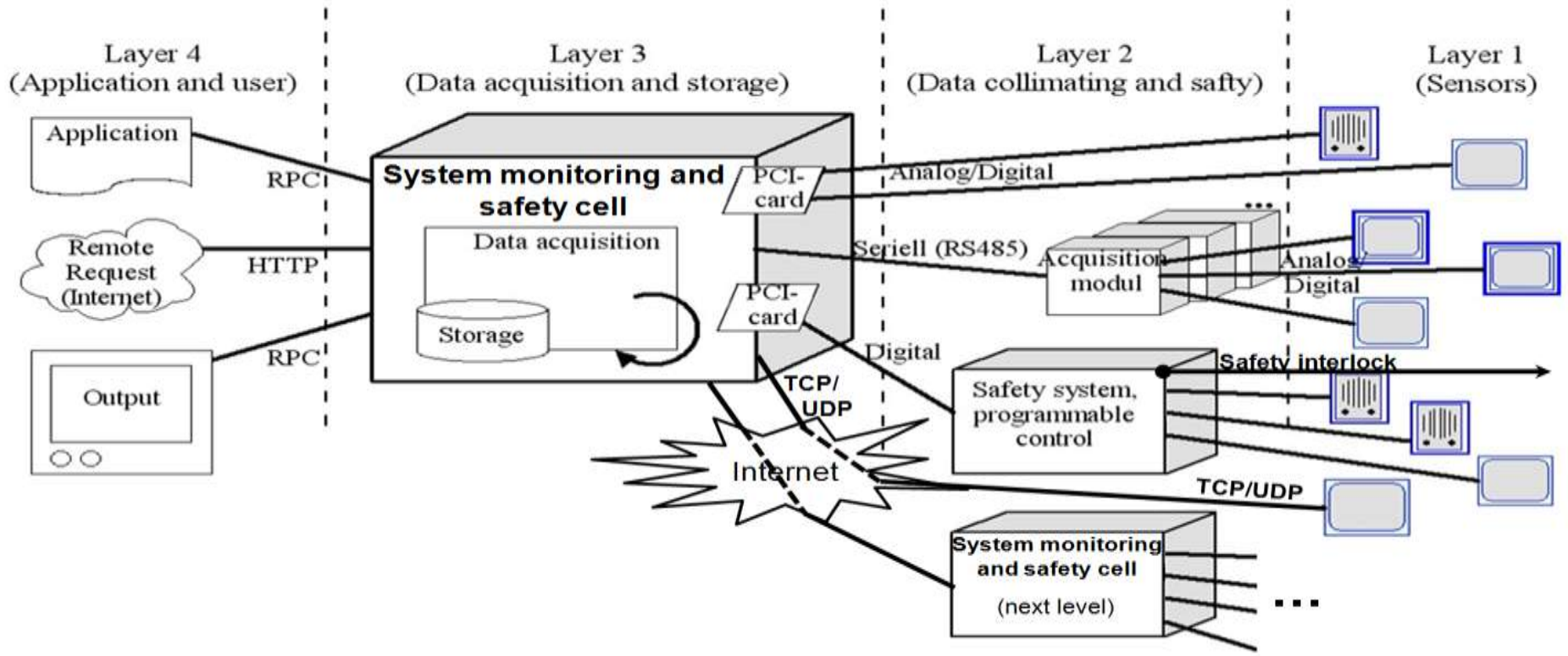


The Twin Radio Telescope Wettzell (TTW)

The idea behind the new control software

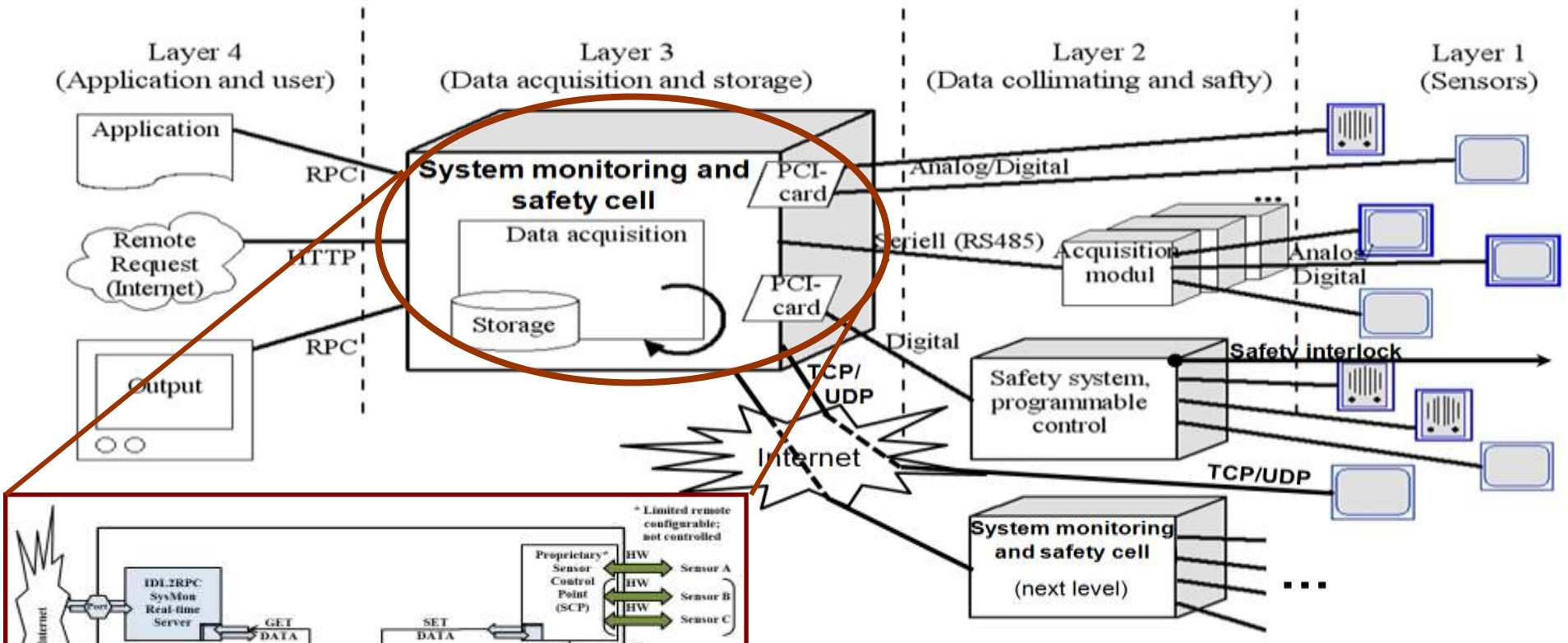
Safety

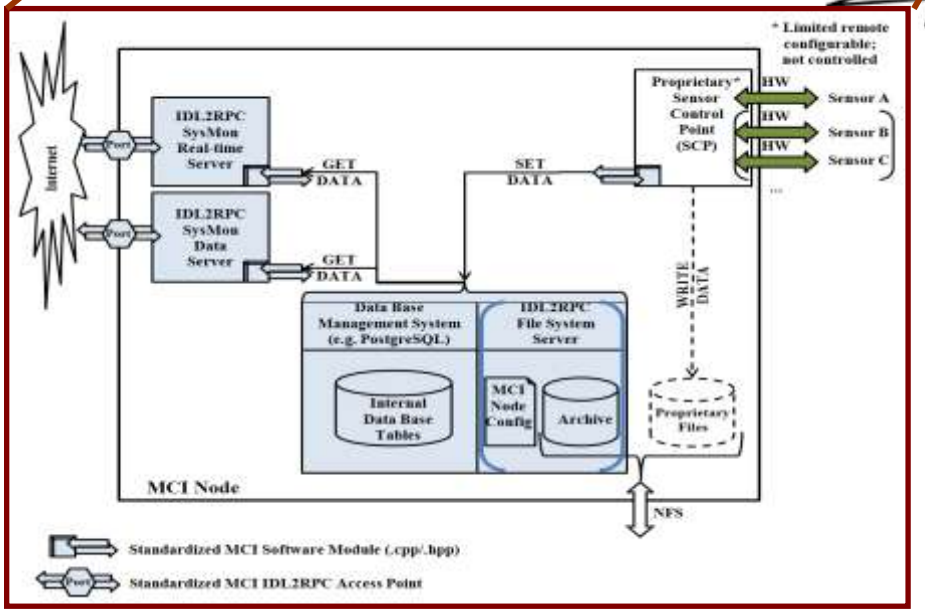
Safety



Monitoring and Control Infrastructure (MCI)

Safety





- Data for science and analysis
- Data for system operations
- Data for diagnosis

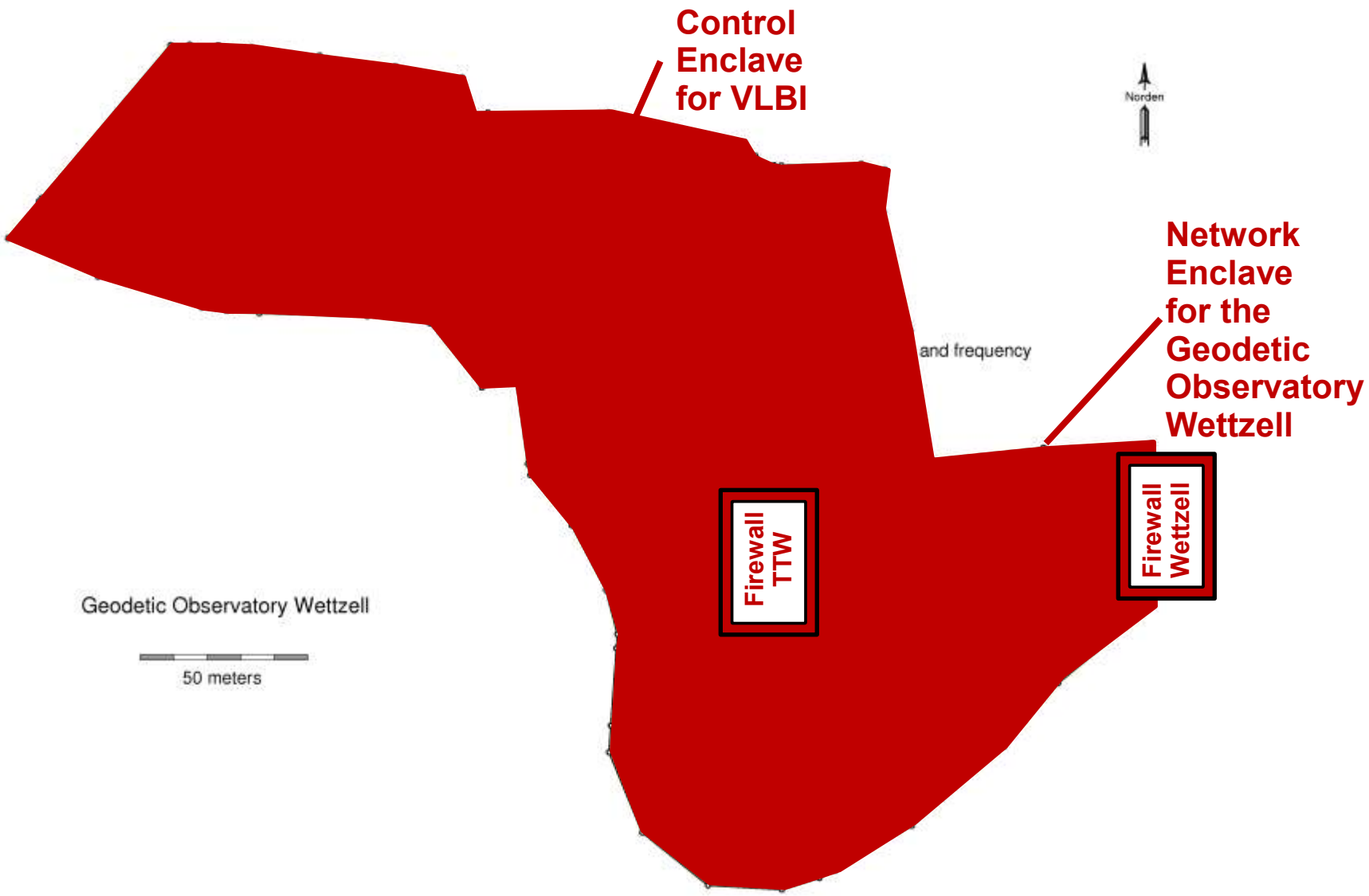
The Twin Radio Telescope Wettzell (TTW)

The idea behind the new control software

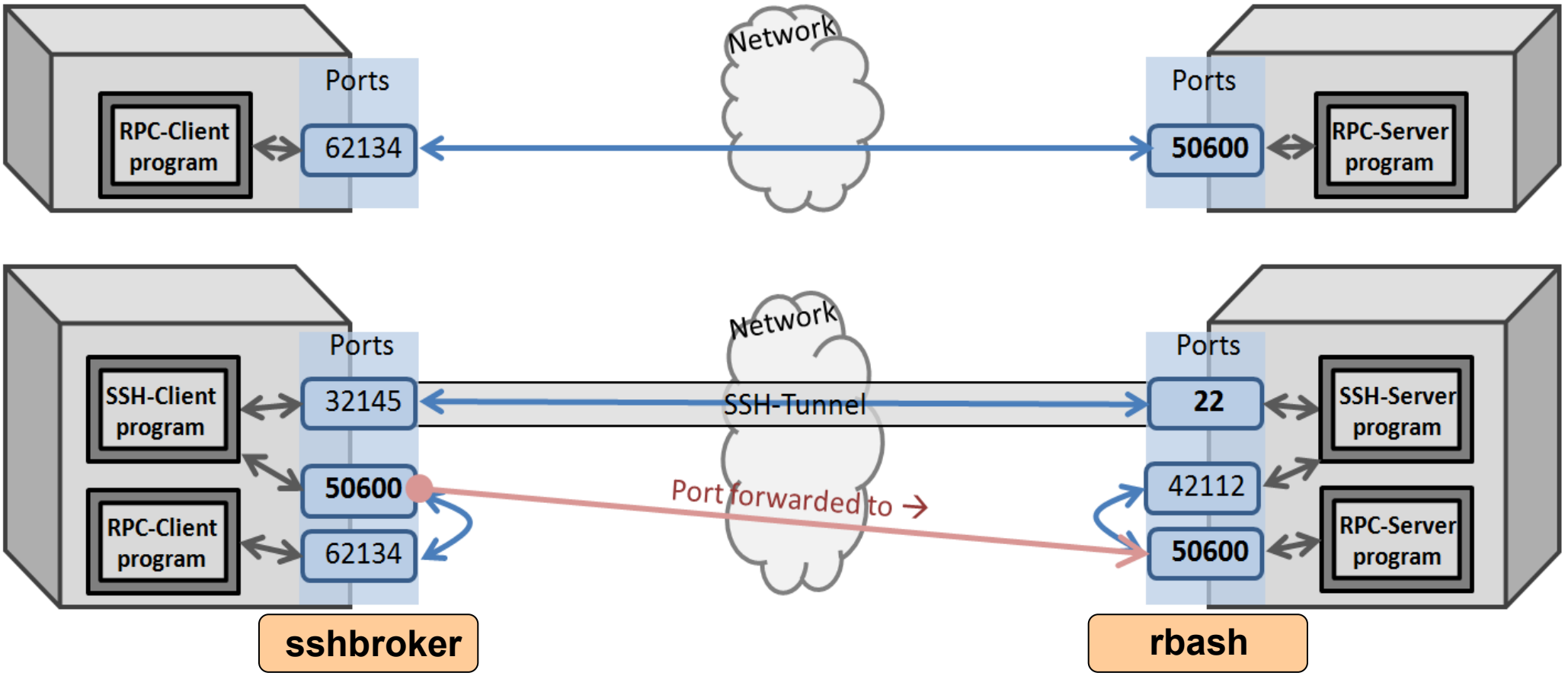
Safety

Security

Security


Control Enclave for VLBI
Norden
and frequency
Network Enclave for the Geodetic Observatory Wettzell
Firewall TTW
Firewall Wettzell
Geodetic Observatory Wettzell
50 meters

Security

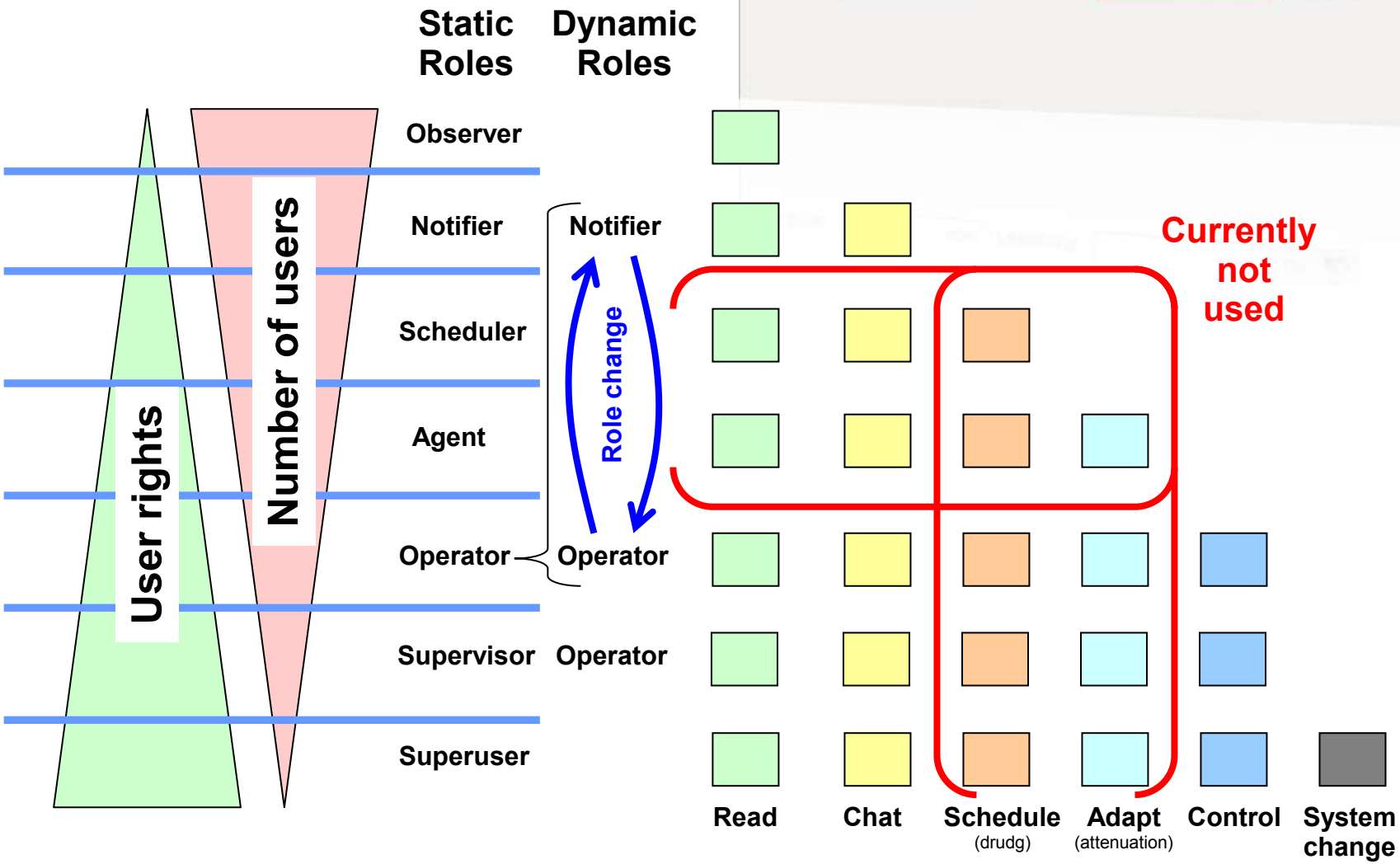


Tunneled e-RemoteCtrl

Wettzell Software Toolbox (well tested modules & components)

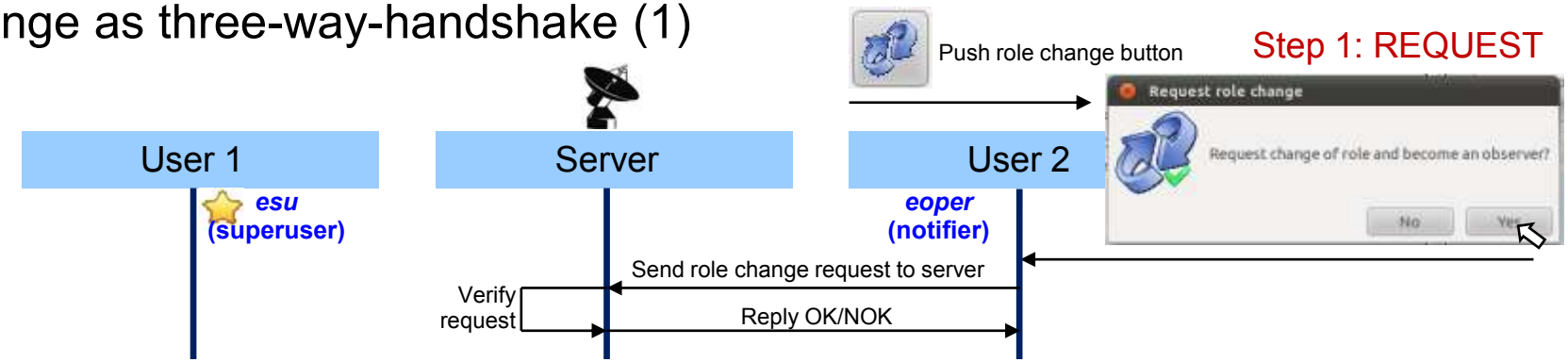
Security

User role management with authentication and authorization



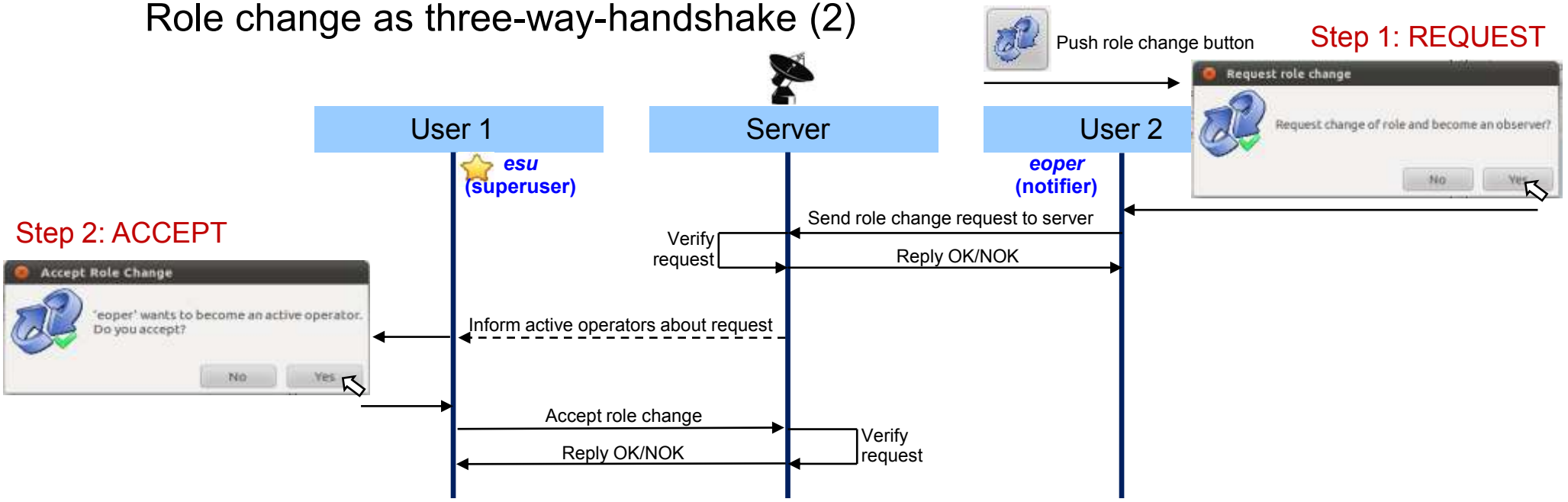
Security

Role change as three-way-handshake (1)



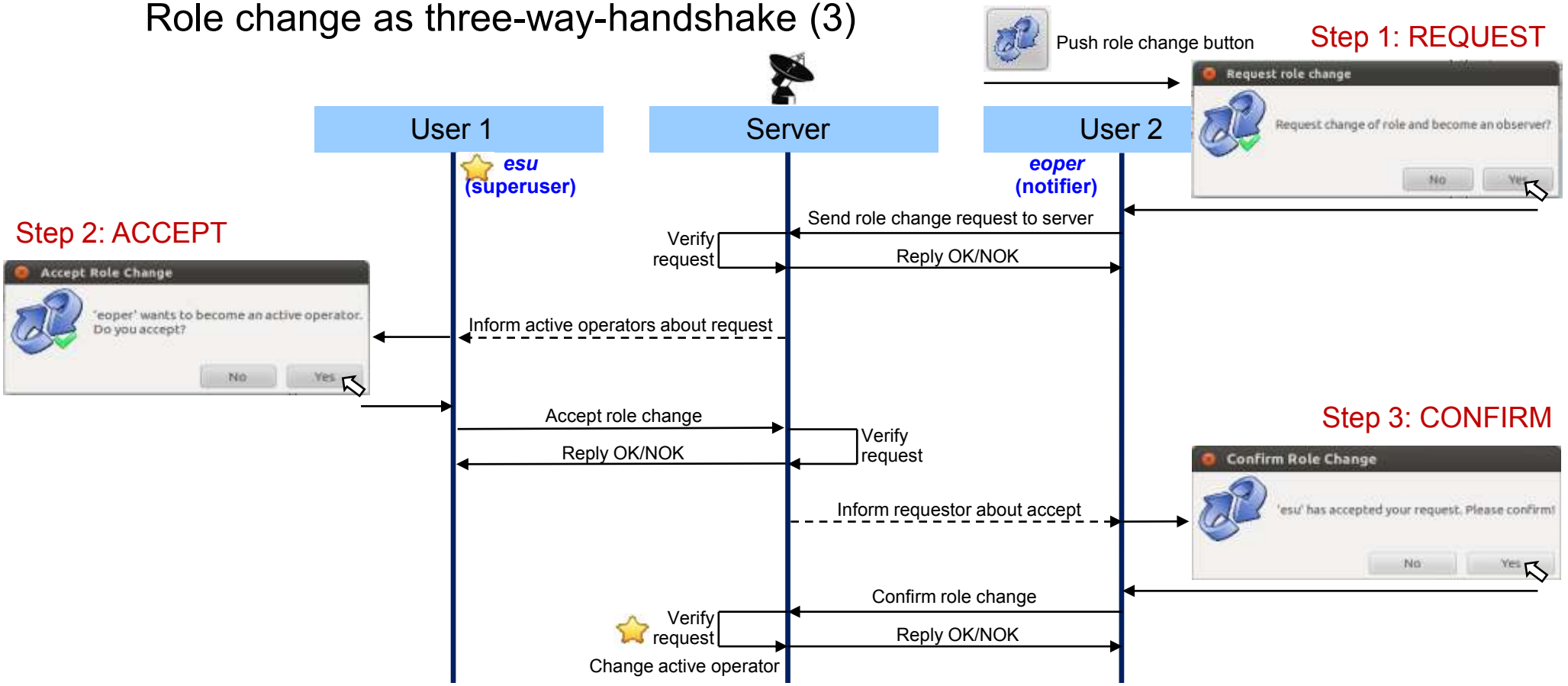
Security

Role change as three-way-handshake (2)



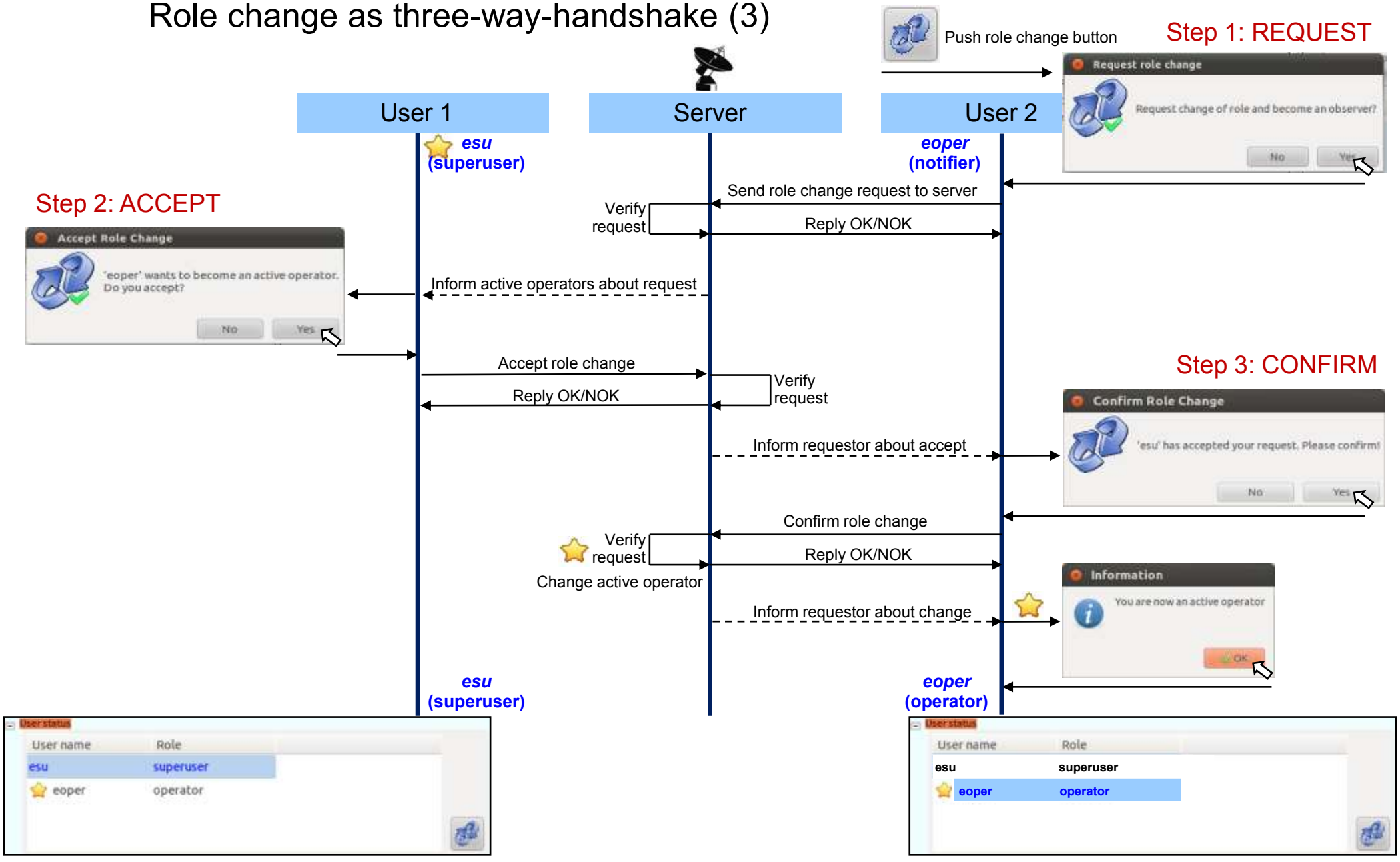
Security

Role change as three-way-handshake (3)



Security

Role change as three-way-handshake (3)



The Twin Radio Telescope Wettzell (TTW)

The idea behind the new control software

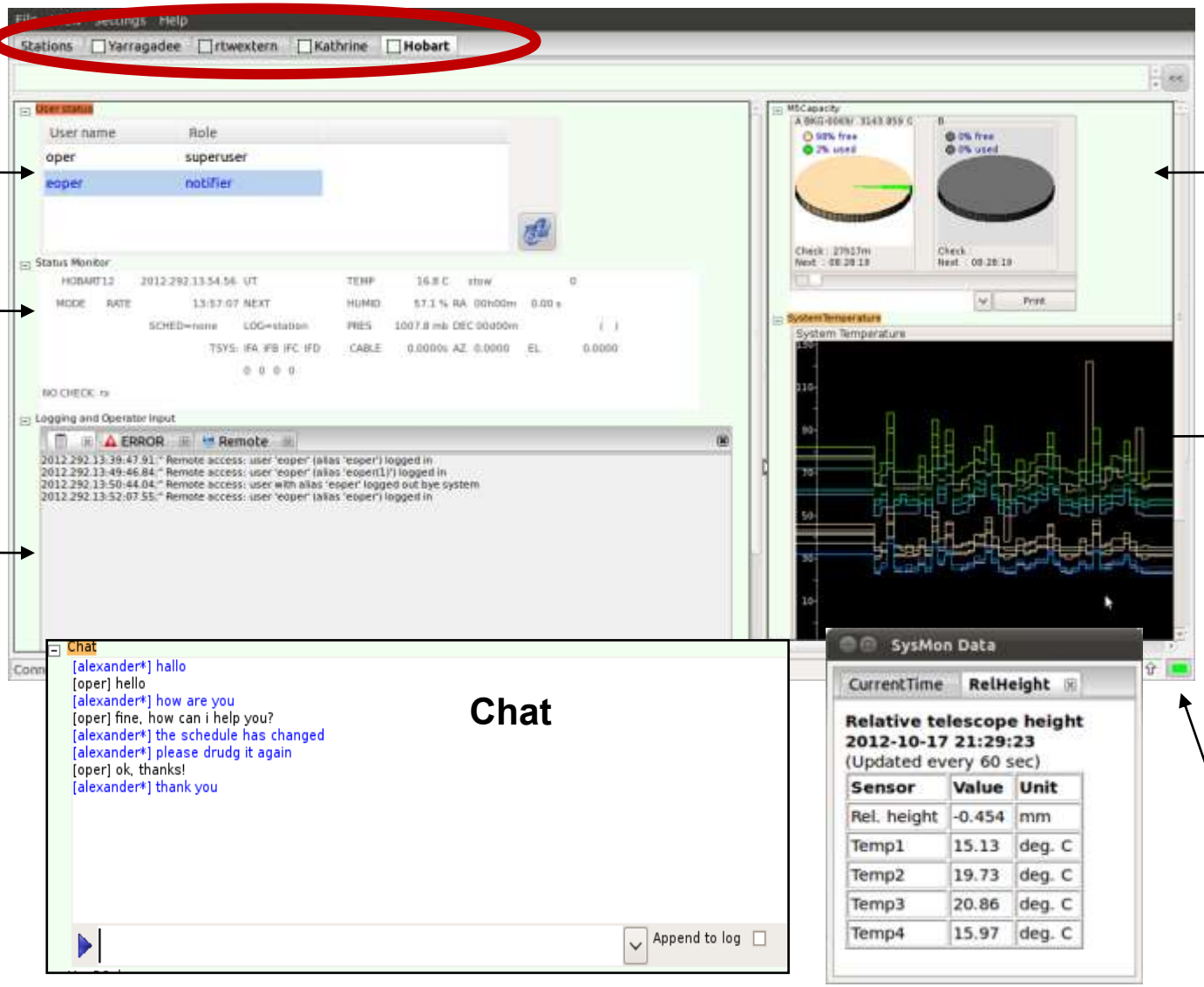
Safety

Security

Features

Features

Main window



User status

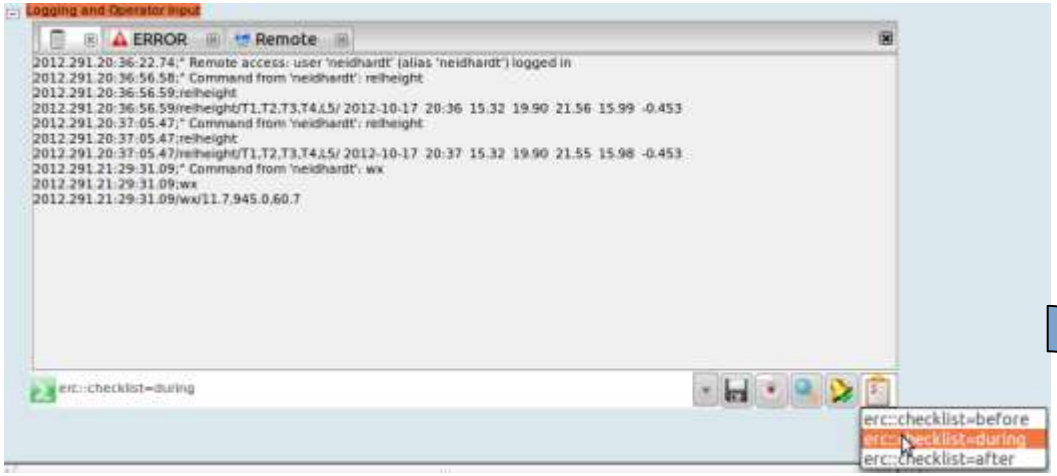
Status monitor

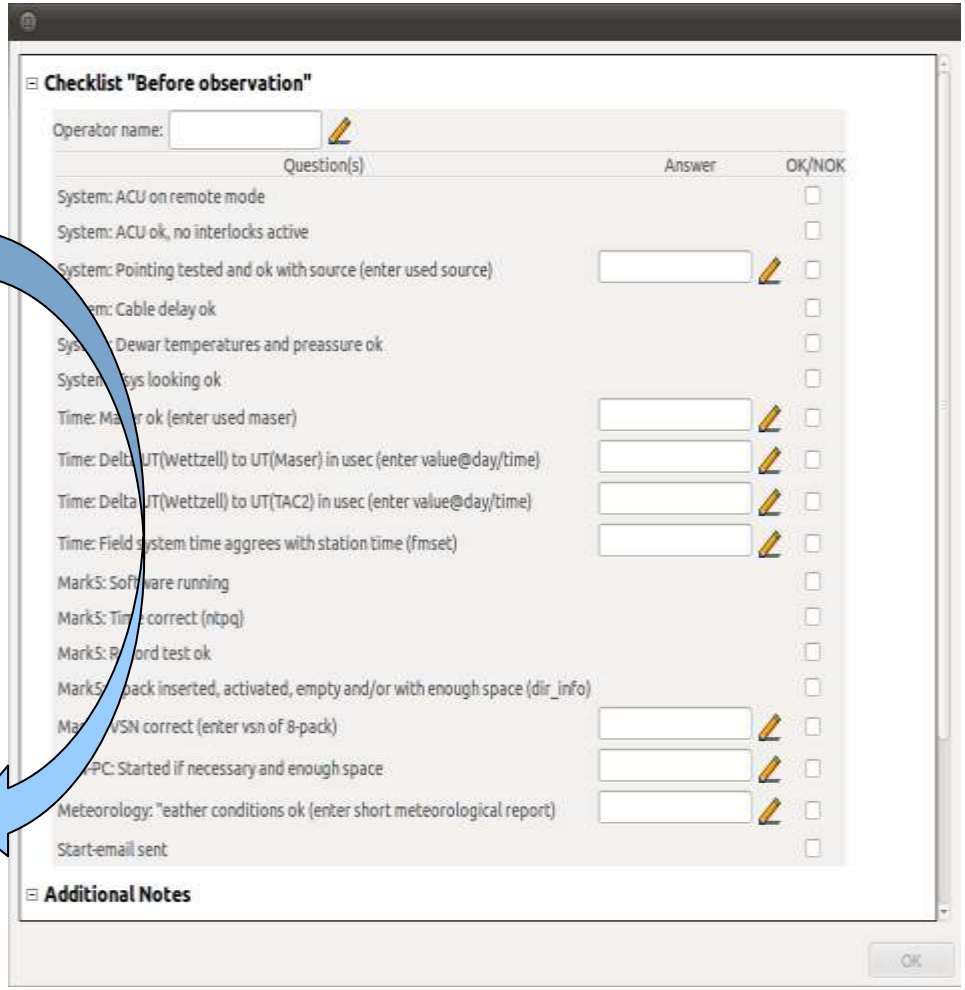
Logging & Command input

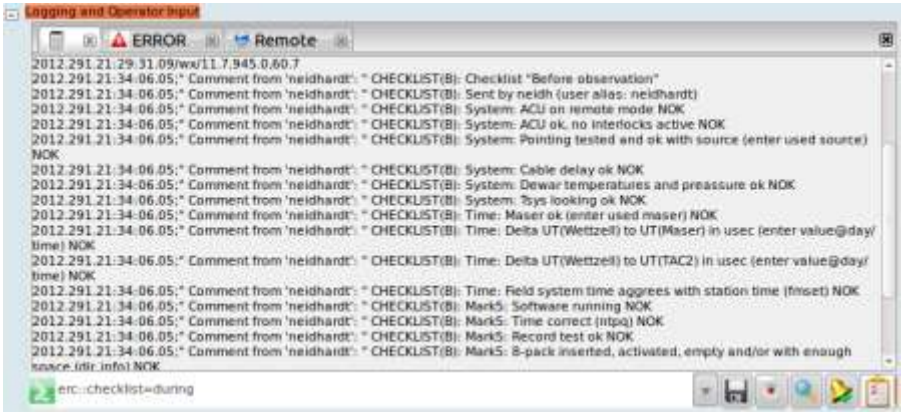
Chat

Features

Checklists

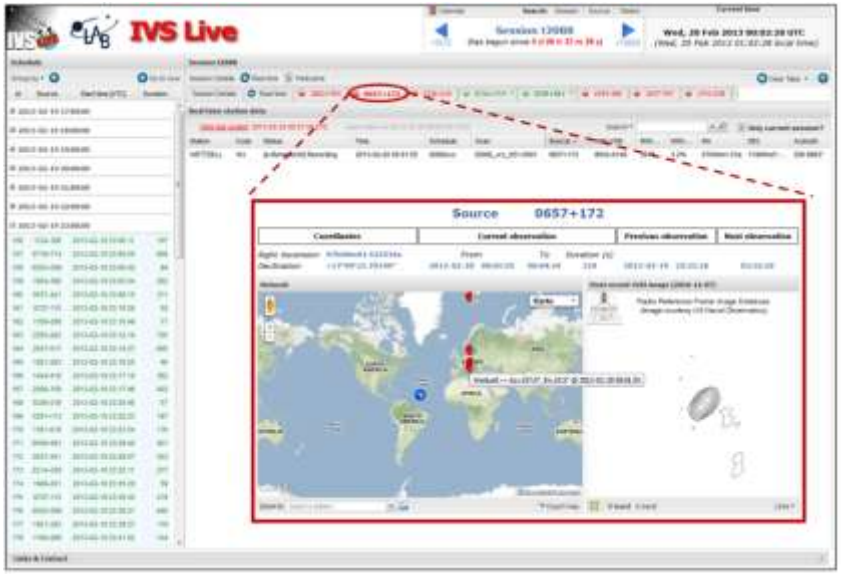


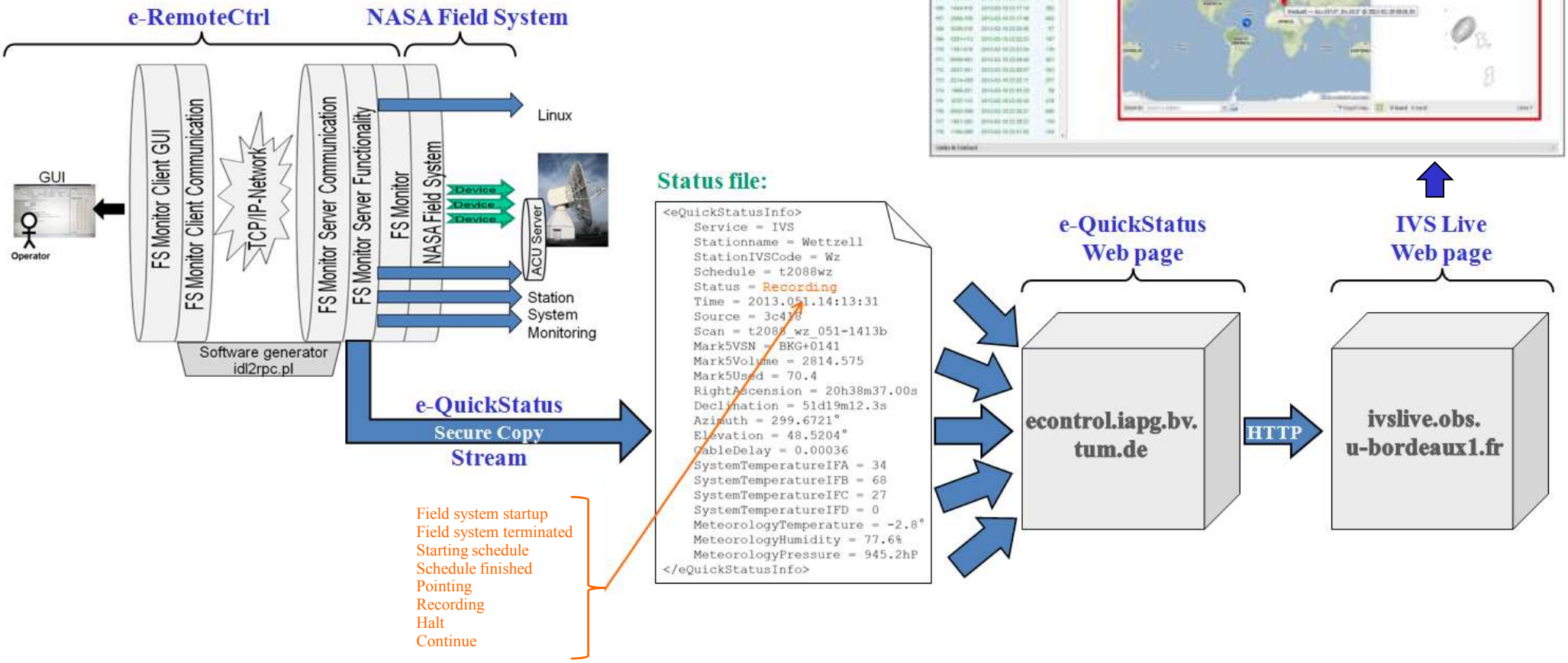




Features

e-QuickStatus
(see also the poster)





The Twin Radio Telescope Wettzell (TTW)

The idea behind the new control software

Safety

Security

Features

Testbed and e-RemoteCtrl network

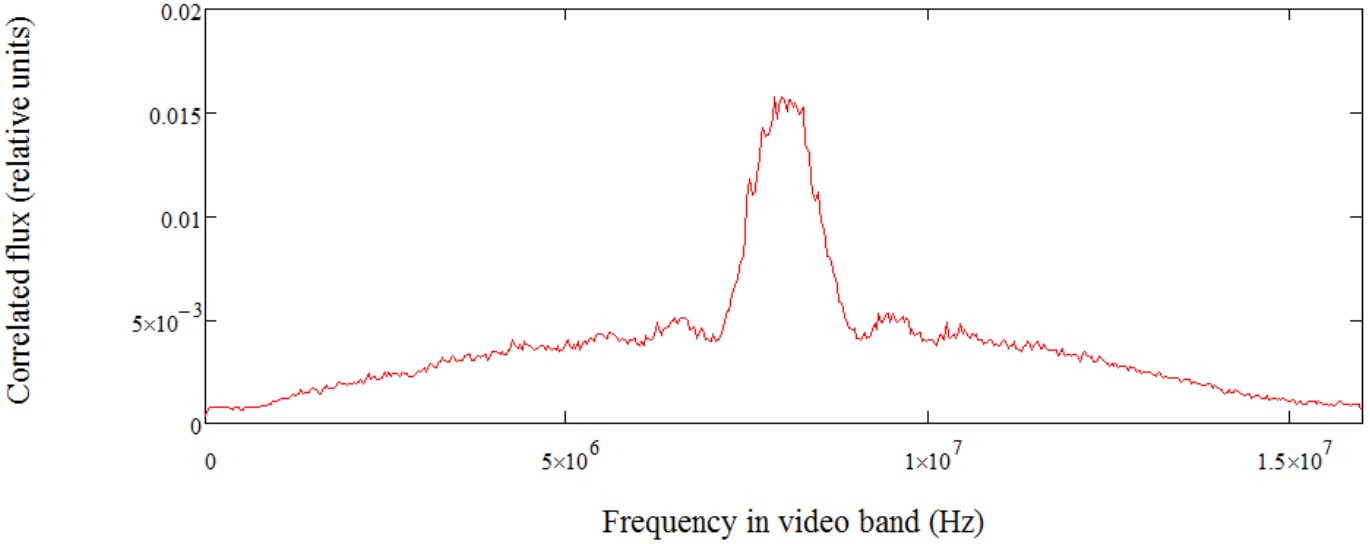
Test bed and e-RemoteCtrl network

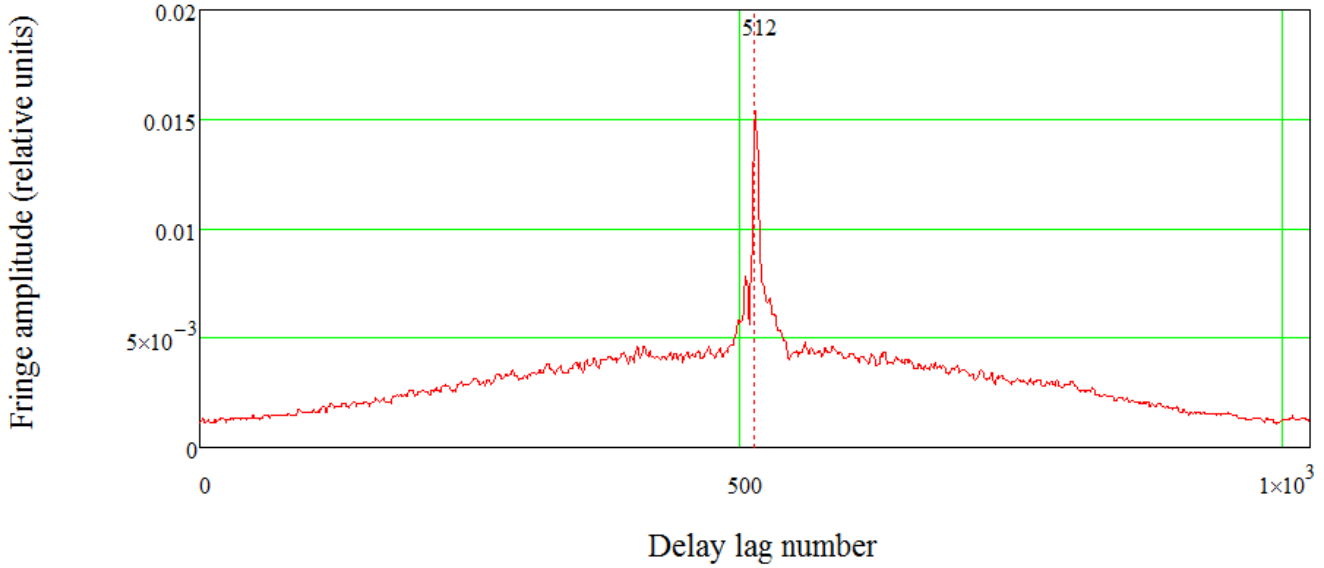
Many thanks to all stations, using the e-RemoteCtrl software!!!

Thank you

The software is available on the Web page http://www.econtrol-software.de

Correlated spectrum and correlation function in lag domain, scan1
Satellite tracking of Glonass with Onsala and 20m-RTW





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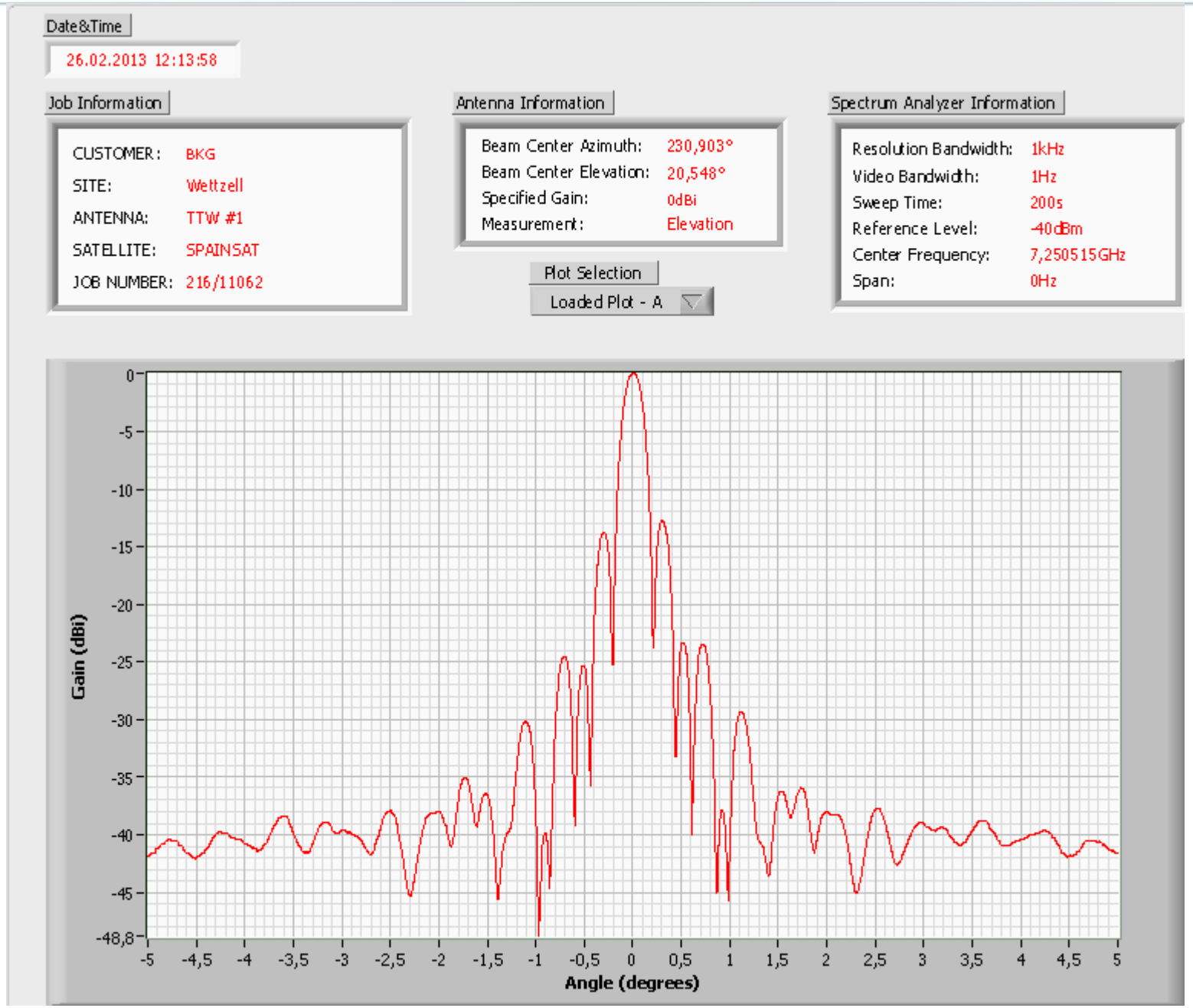

X-Band beam pattern