# e-RemoteCtrl: Concepts for VLBI station control as part of NEXPReS

FESG

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# NEXPReS

**N**ovel **EX**plorations **P**ushing **R**obust **e**-VLBI **S**ervices

# NEXPReS WP5/Task 3: Continuous quality monitoring & Station Remote Control

NEXPReS

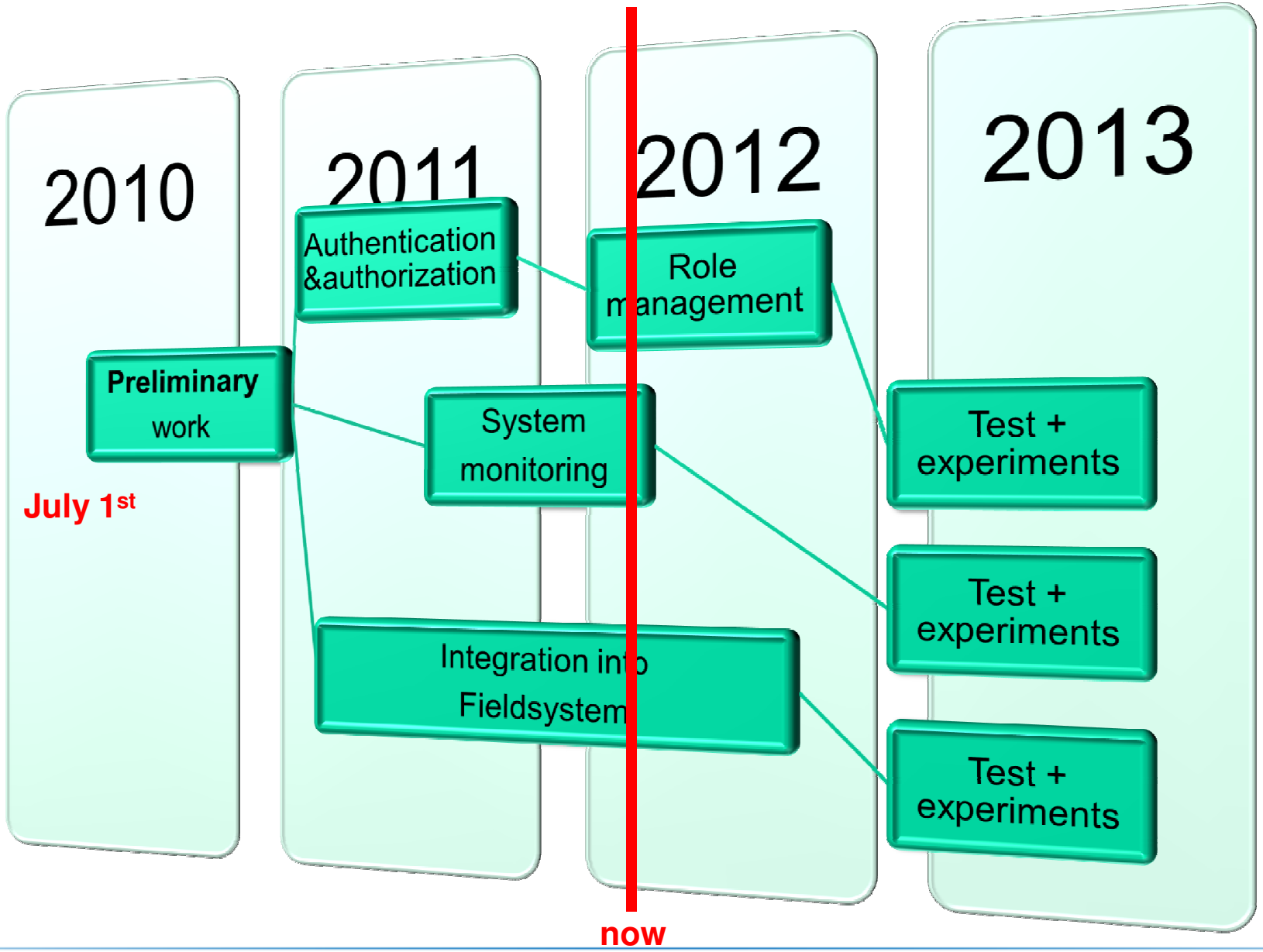
**N**ovel **EX**plorations **P**ushing
**R**obust **e**-VLBI **S**ervices

- three-year project
- aimed at further developing e-VLBI services of the European VLBI Network (EVN)
- incorporating e-VLBI into every astronomical observation conducted by the EVN.
-15 astronomical institutes and National Research and Education Network (NREN) providers
- e-Infrastructure project funded by the European Union's Seventh Framework Programme
- Four main technical activities:
    - Cloud Correlation
    - Dynamically Provisioned Network Resources
    - Computing in a Shared Infrastructure
    - Provisioning High-Bandwidth, High-Capacity Networked Storage

**WP5/Task 3:**
**(TUM, MPIfR, JIVE)**

- identify and re-act on observation failures in near real-time
- improve diagnostics
- allow direct (read) access to the field system control parameters
- extend the capabilities of the NASA Field System by
    - remote control with authentication, authorization and a operator role management
    - station and system monitoring

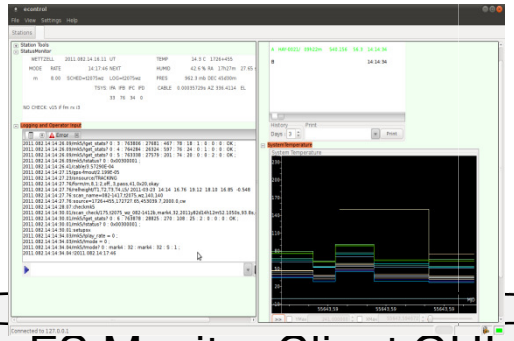
# NEXPReS WP5/Task 3: Continuous quality monitoring & Station Remote Control



# Remote Control ("e-RemoteCtrl" software)

# „e-RemoteCtrl“ software – the original test bed

# „e-RemoteCtrl“ software – the communication stack for a remote operator



e-RemoteCtrl

FS Monitor Client GUI

FS Monitor Client Communication

TCP/IP-Network

RPC

FS Monitor Server Communication

FS Monitor Server Functionality

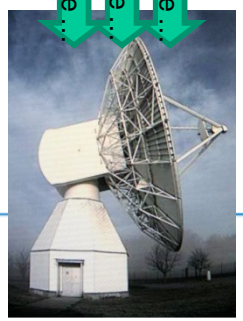
FS Monitor

NASA Field System

Device ...

Device ...

Device ...

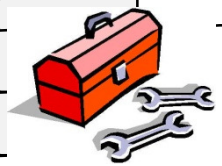


Graphical User Interface (GUI) Client (currently wxWidgets)

RPC Interface-definition

Communication generated with the software generator idl2rpc.pl

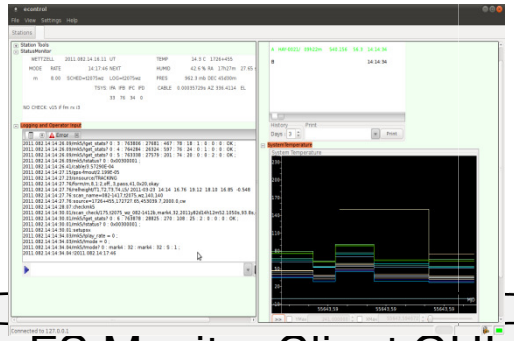
Server functionality



**Wettzell Software Toolbox (well tested SW modules)**

RPC = (Sun) Remote Procedure Calls
SSH = Secure Shell

# „e-RemoteCtrl“ software – the communication stack for a remote operator



e-RemoteCtrl

FS Monitor Client GUI

FS Monitor Client Communication

AES Encryption

NEW!

sshbroker

TCP/IP-Network

RPC

Establish& Control SSH tunnels

FS Monitor Server Communication

FS Monitor Server Functionality

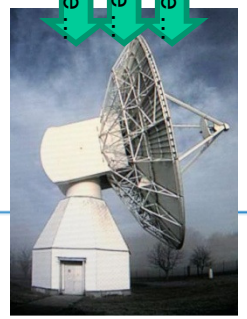
FS Monitor

NASA Field System

Device ...

Device ...

Device ...



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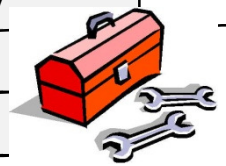
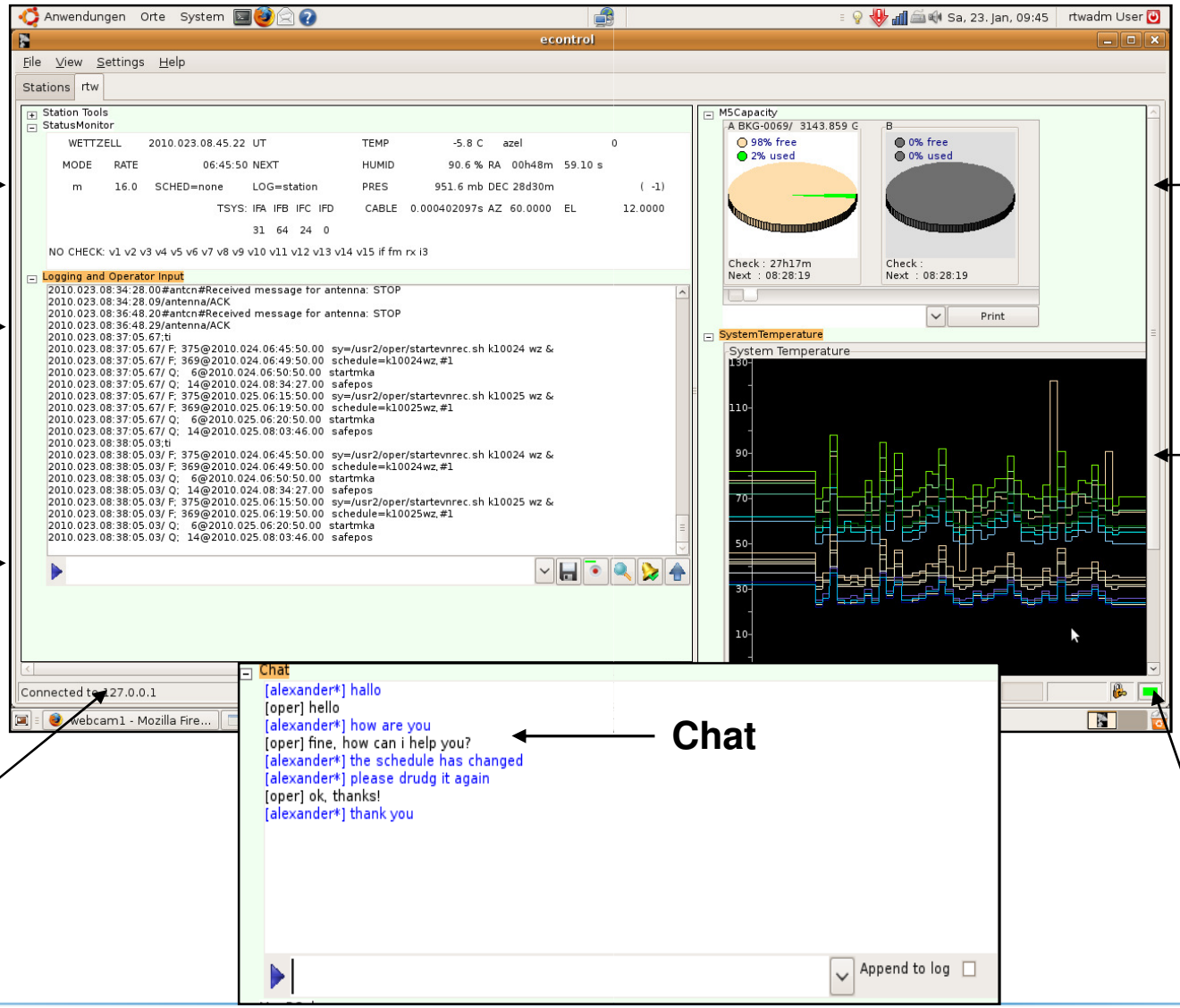


**Wettzell Software Toolbox (well tested SW modules)**

RPC = (Sun) Remote Procedure Calls
SSH = Secure Shell
AES = Advanced Encryption Standard

# „e-RemoteCtrl“ software – some impressions




Status monitor

Logging

User input

Connection information

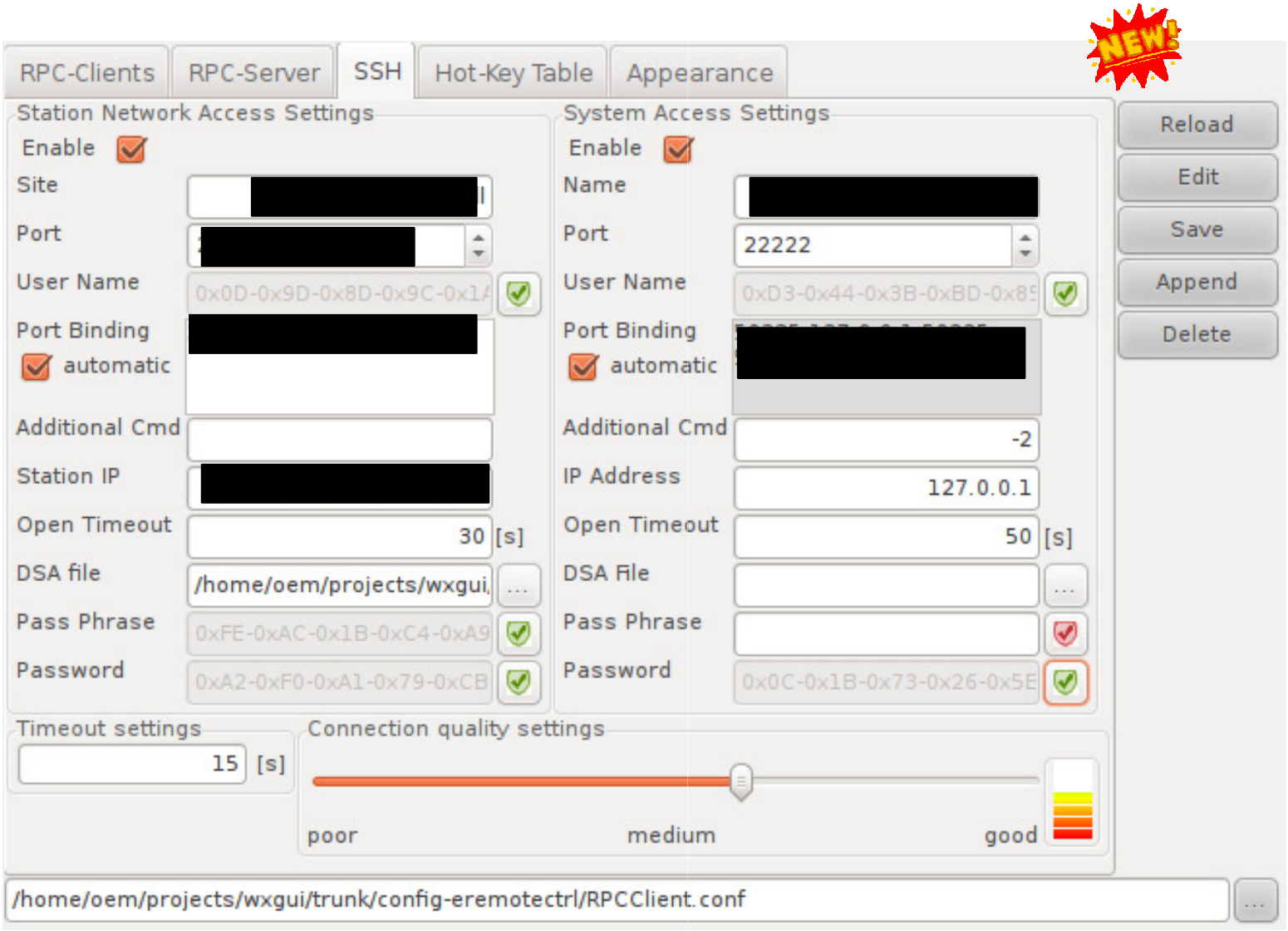
Chat

Mark 5 capacity

System temperature

Connection state

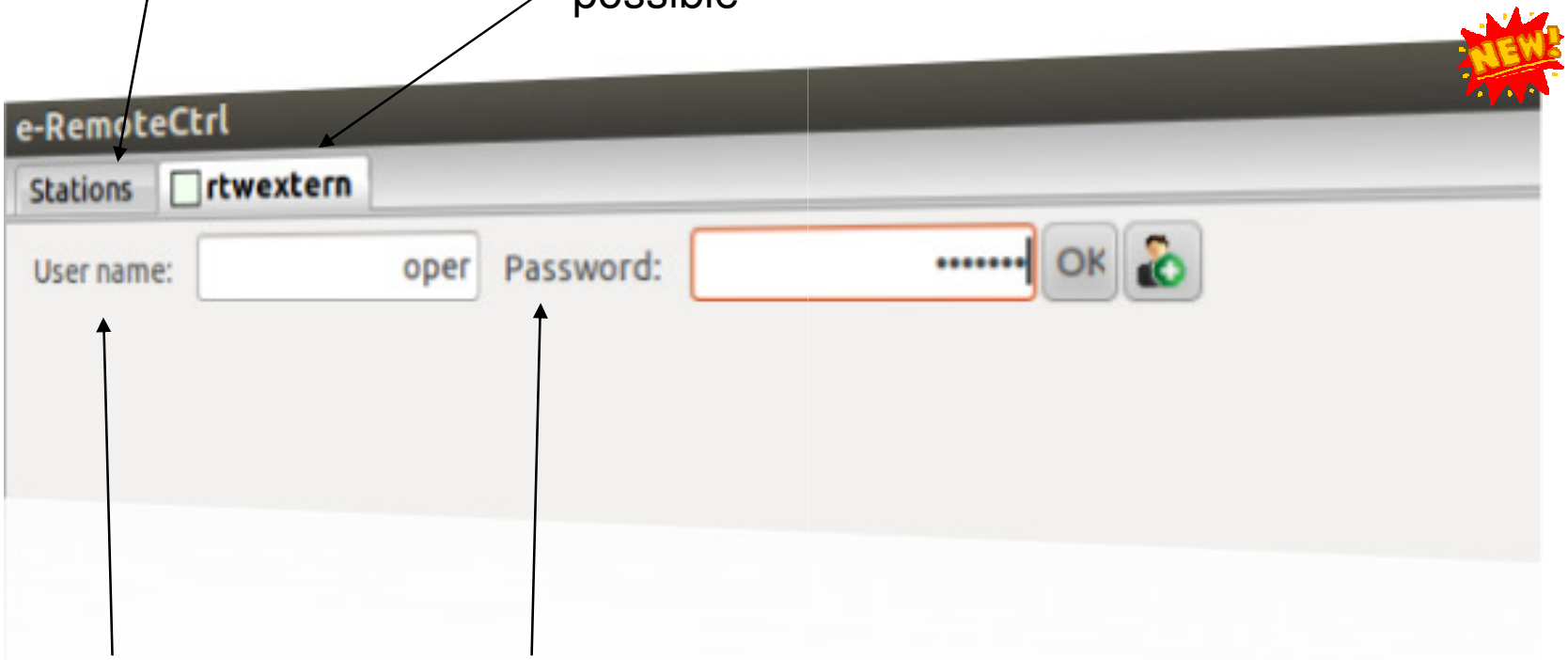
# „e-RemoteCtrl“ software – some impressions



# „e-RemoteCtrl“ software – some impressions

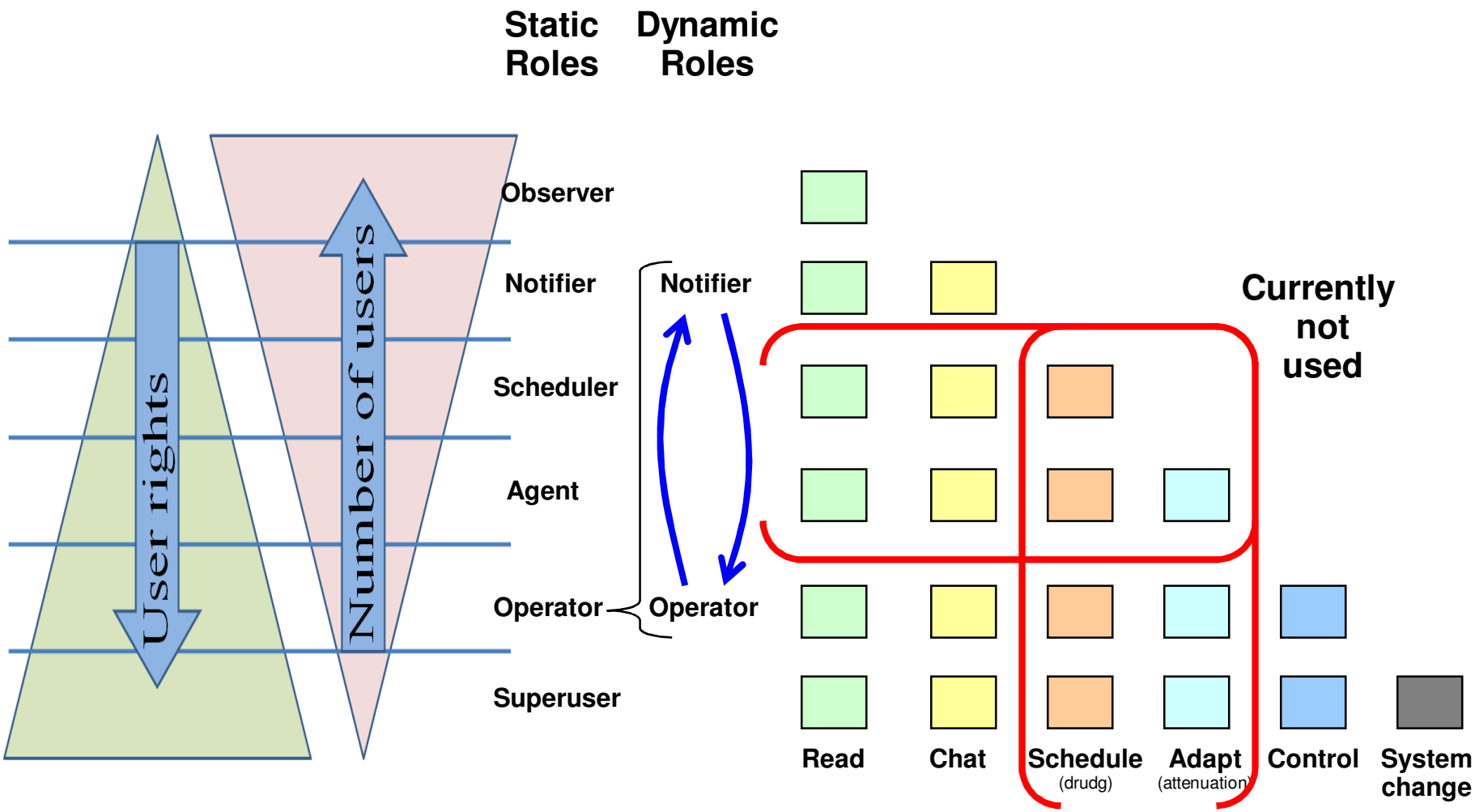
station overview

control of multiple telescopes is now possible




User name and password is required on startup

# User access roles and access rights



# SysMon
## System Monitoring

# SysMon – System Monitoring

- Collect data
  from several sensors at the telescope and site
- Visualize
  the data with graphs and diagrams
- Archive
  the collected data
- (React
  according to predefined rules )

→ Get a better knowledge about the system behavior during

1. Session
2. Post processing

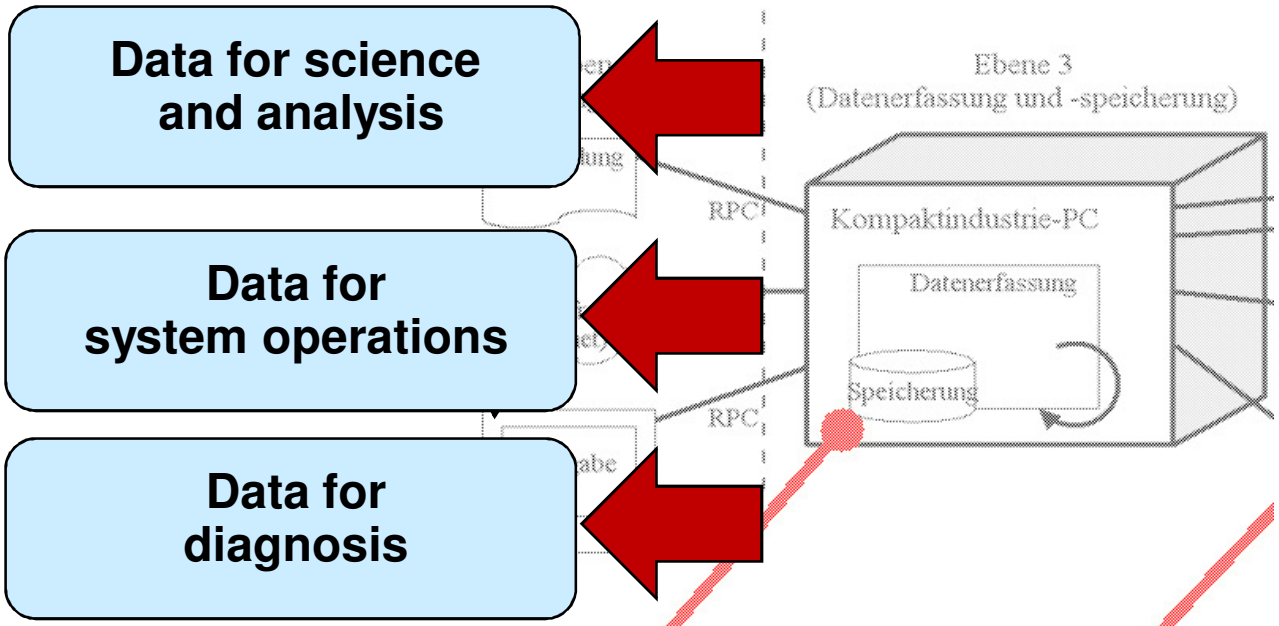
# SysMon – System Monitoring

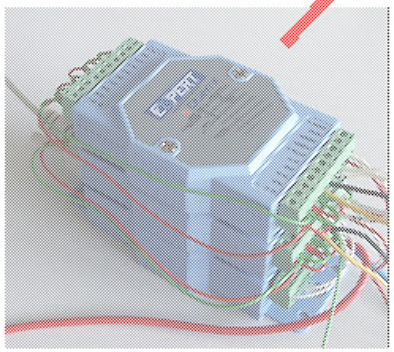
Local safety for people and systems in combination with reliability in operations

Meteo, WVR, Clock offsets, …
=> low sampling rates
=> as scheduled

Power supply, wind uploads, emergency stops, rack temp., …
=> medium sampling rates
=> permanently

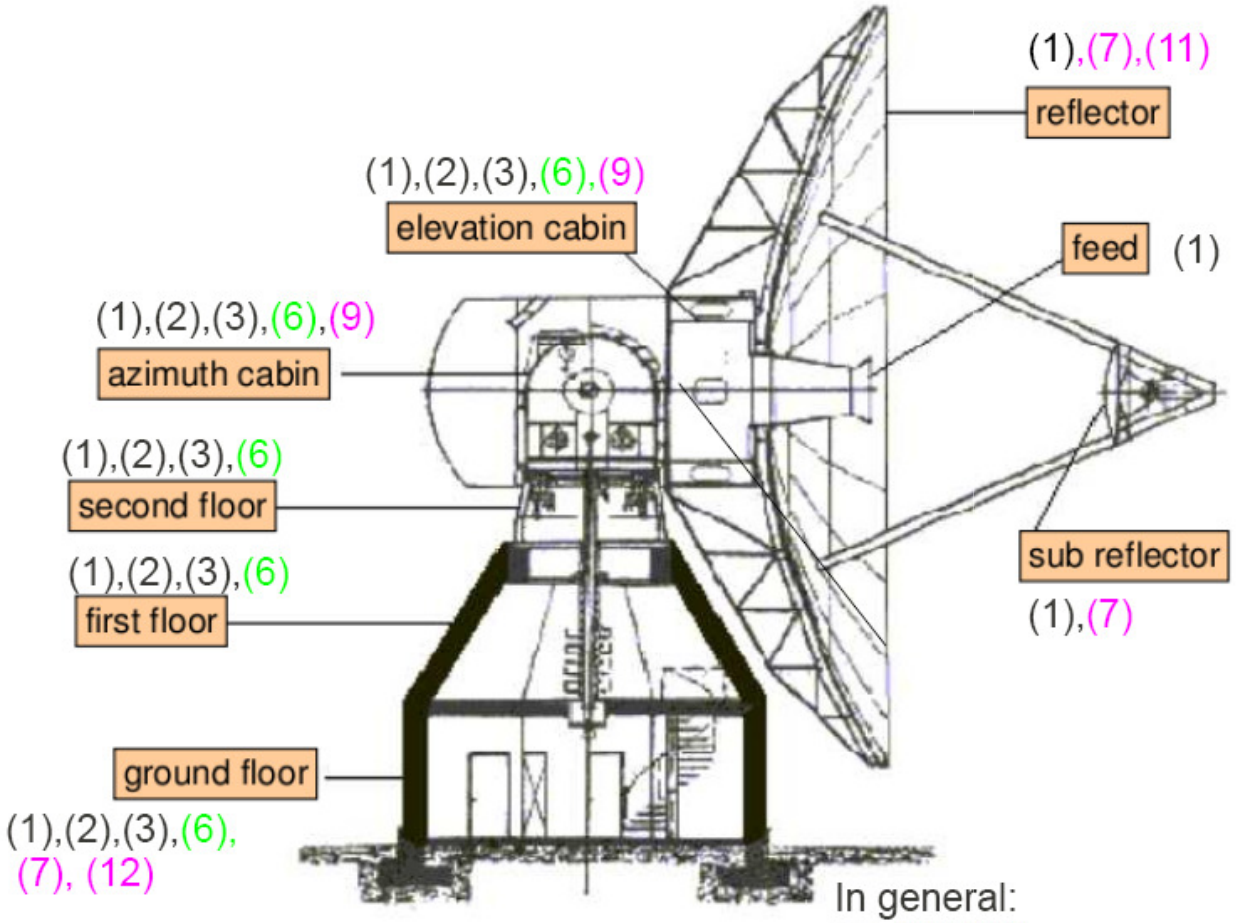
Servo currents, contouring errors, …
=> high sampling rates
=> on demand





See also:
Monitoring and Control Interface Collaboration Group

# SysMon – System Monitoring at Wettzell

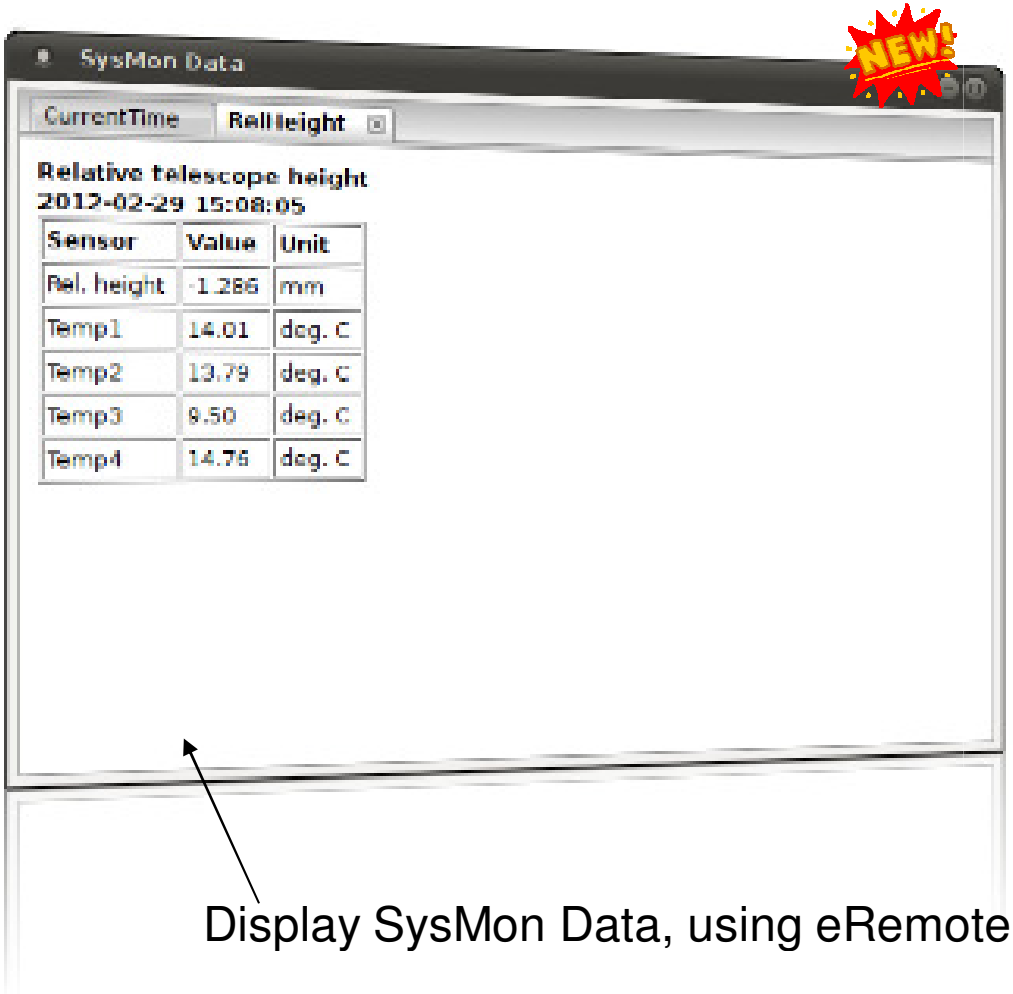


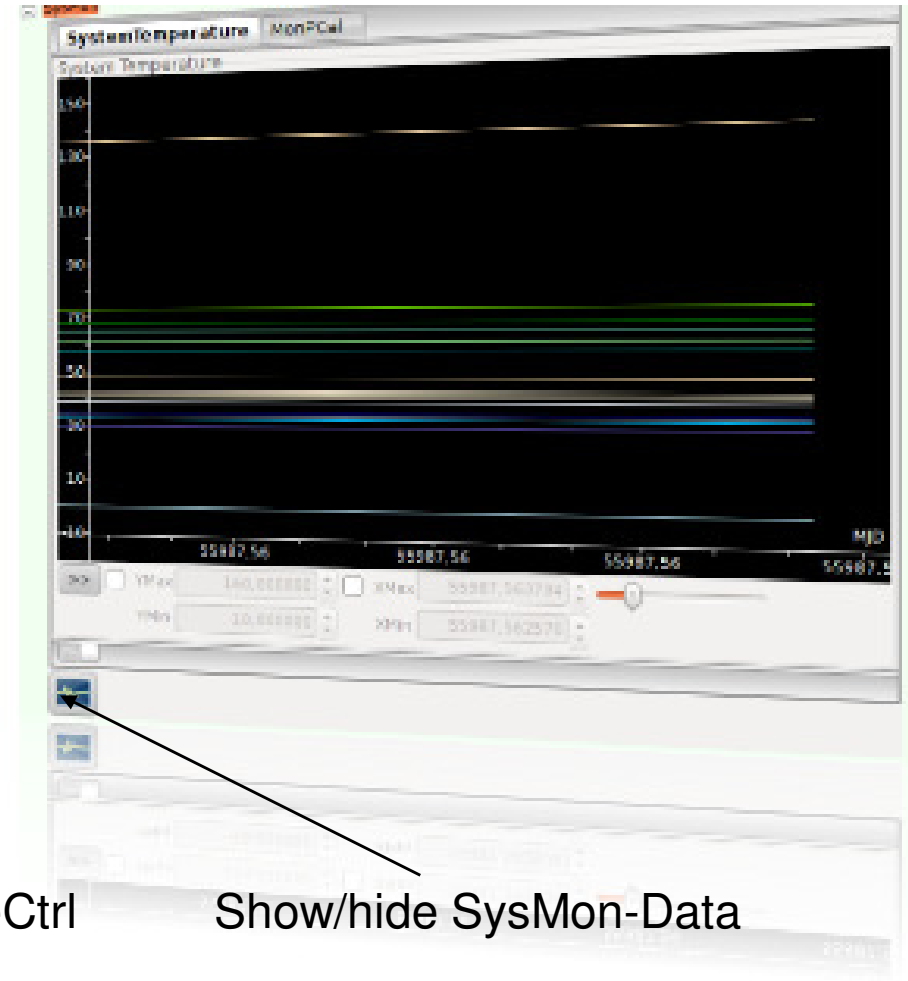

1. Temperature
2. Interlock States
3. Power
4. Activity states
5. Meteorology
6. Voltage (higher sampled)
7. Strains
8. Tilts
9. Positions
10. RFI
11. Structural integrity
12. ACU-Data

In general:
(5),(8),(10)

→ http://groups.google.de/group/vlbi2010-mci-collaboration/files

# SysMon – System Monitoring at Wettzell




Display SysMon Data, using eRemoteCtrl

Show/hide SysMon-Data

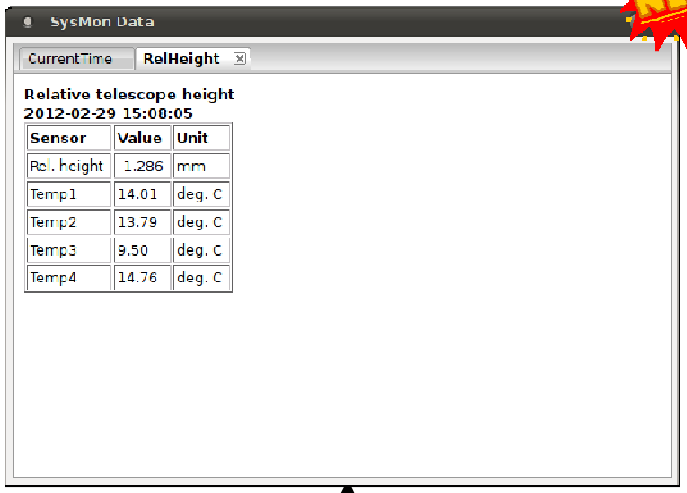
# SysMon Data in e-RemoteCtrl

NASA-Fieldsystem

SysMon

Station specific extensions
- ASCII text
- HTML

NEW!




NEW!

econtrol client

SSH - tunnels

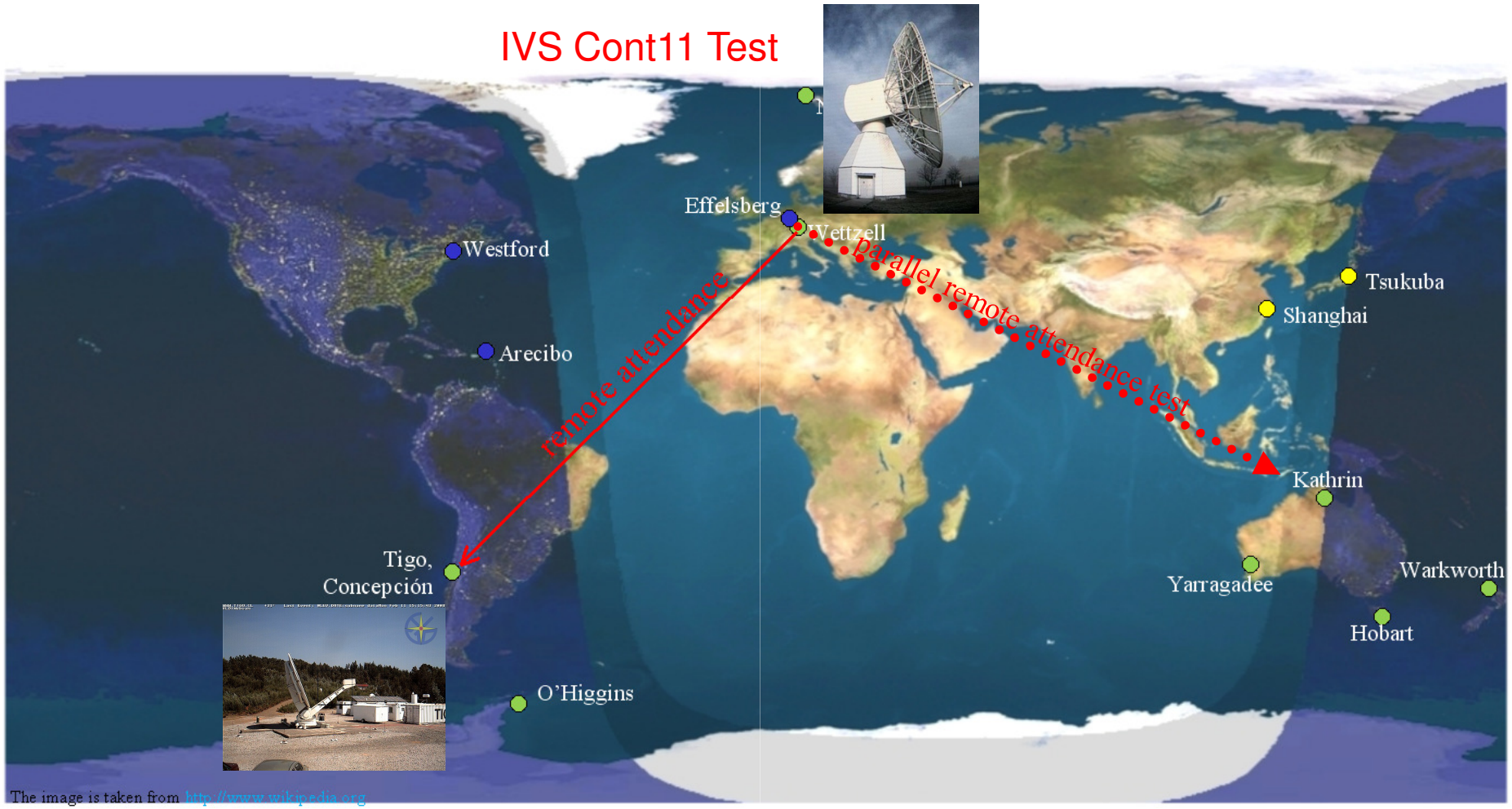
econtrol server

TCP/IP-Connection

sshbroker

# Current status – a “e-RemoteCtrl” network

# Current status – a “e-RemoteCtrl” network



**Thank you**

Software available under http://www.econtrol-software.de

Advertising for the poster session:

- Poster about usage of e-RemoteCtrl during CONT11
- Poster about continuous quality control during software development