- SysMon -
A robust and flexible remote monitoring system for VLBI and more

FESG

Martin Ettl (FESG/MPIFR)
ettl@fs.wettzell.de

Bundesamt für Kartographie und Geodäsie

Alexander Neidhardt (FESG), Matthias Mühlbauer (BKG), Martin Riederer (FH-Deggendorf), Gerhard Kronschnabel (BKG), Ed Himwich (NASA), Christopher Beaudoin (MIT Haystack Observatory), Christian Plötz (BKG), Reiner Dassing (BKG)

The idea to monitor a VLBI - antenna

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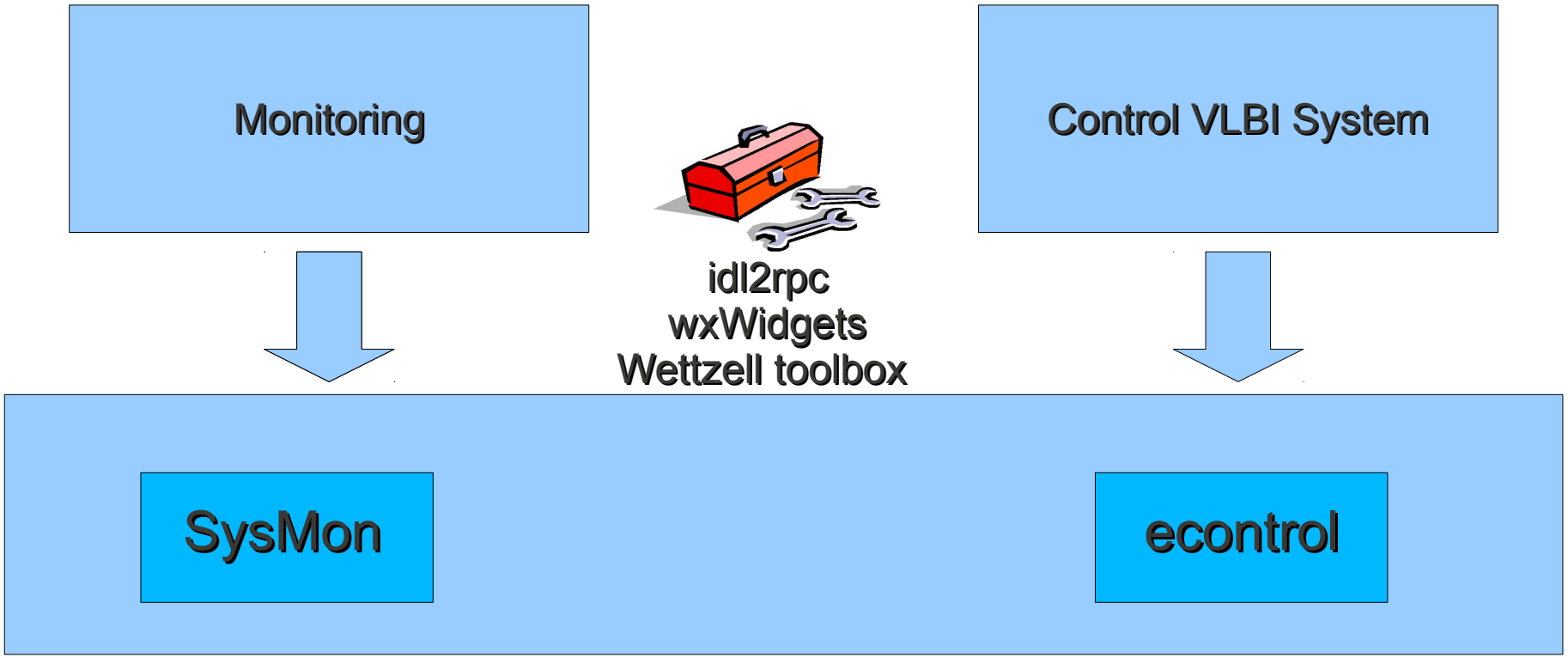
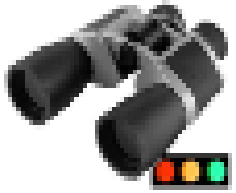


What means system monitoring?

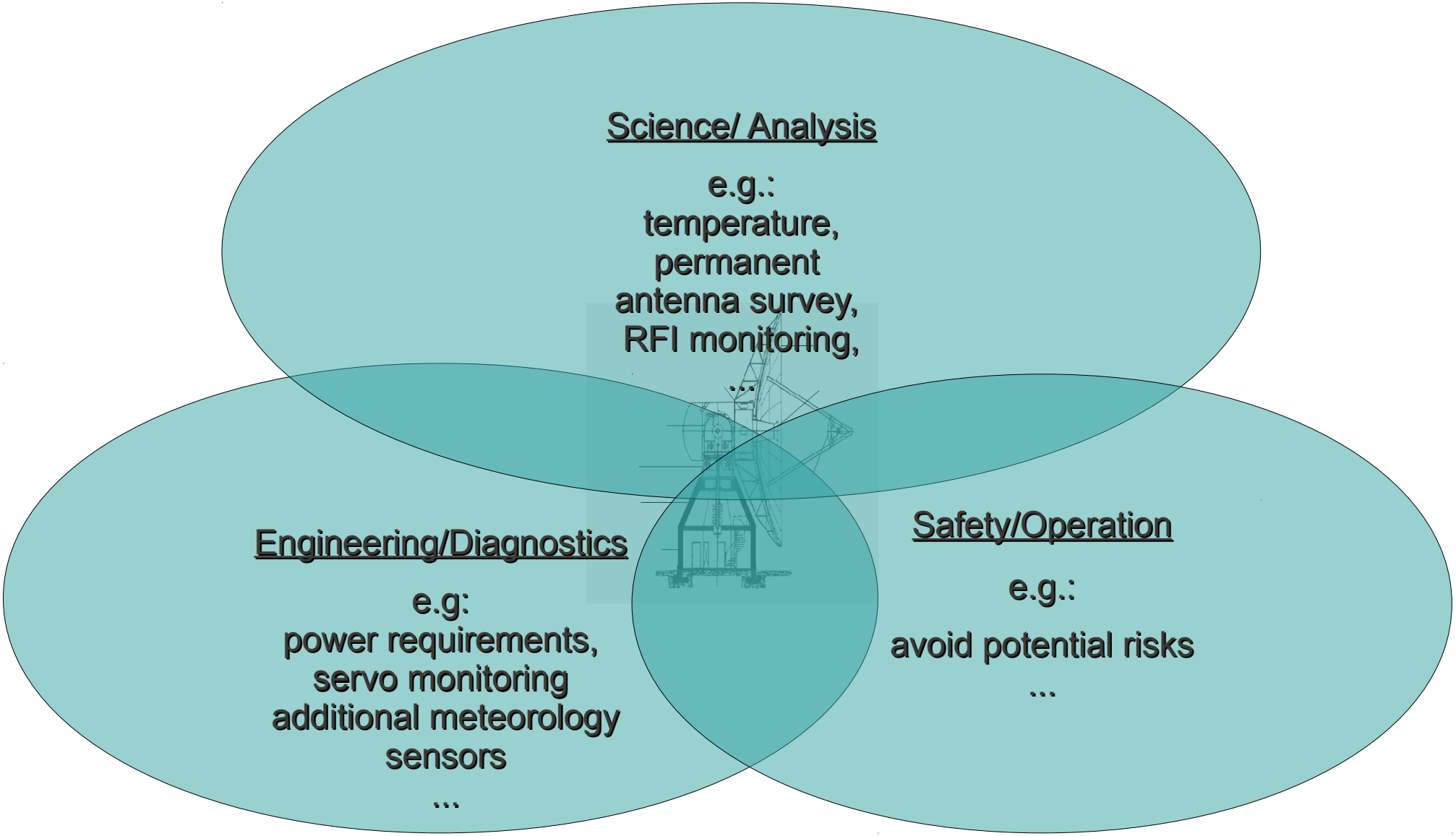
- **Collect data**
  from several sensors at the telescope and site
- **Visualize**
  the data with graphs and diagrams
- **Archive**
  the collected data

(**React**
according to predefined rules)



→ Get a better knowledge about the system behavior during
1. Session
2. Post processing

Monitoring in case of VLBI

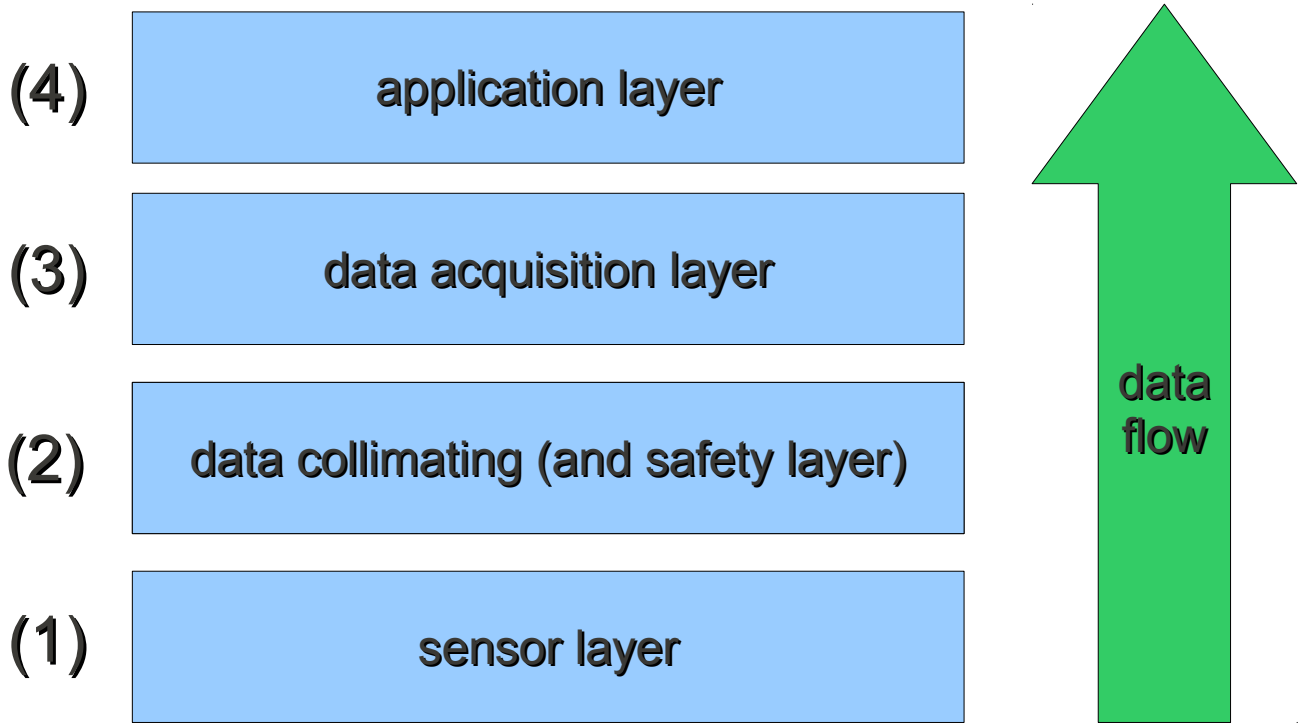


The idea of system monitoring

- Requirements
  - flexible design
  - design does not depend on a specific sensor type or number of sensors
  - Provides a way to store measured data for post processing (database, filesystem, ...)
  - works with idl2rpc
  - based on the same software components as e-control and SLR-software

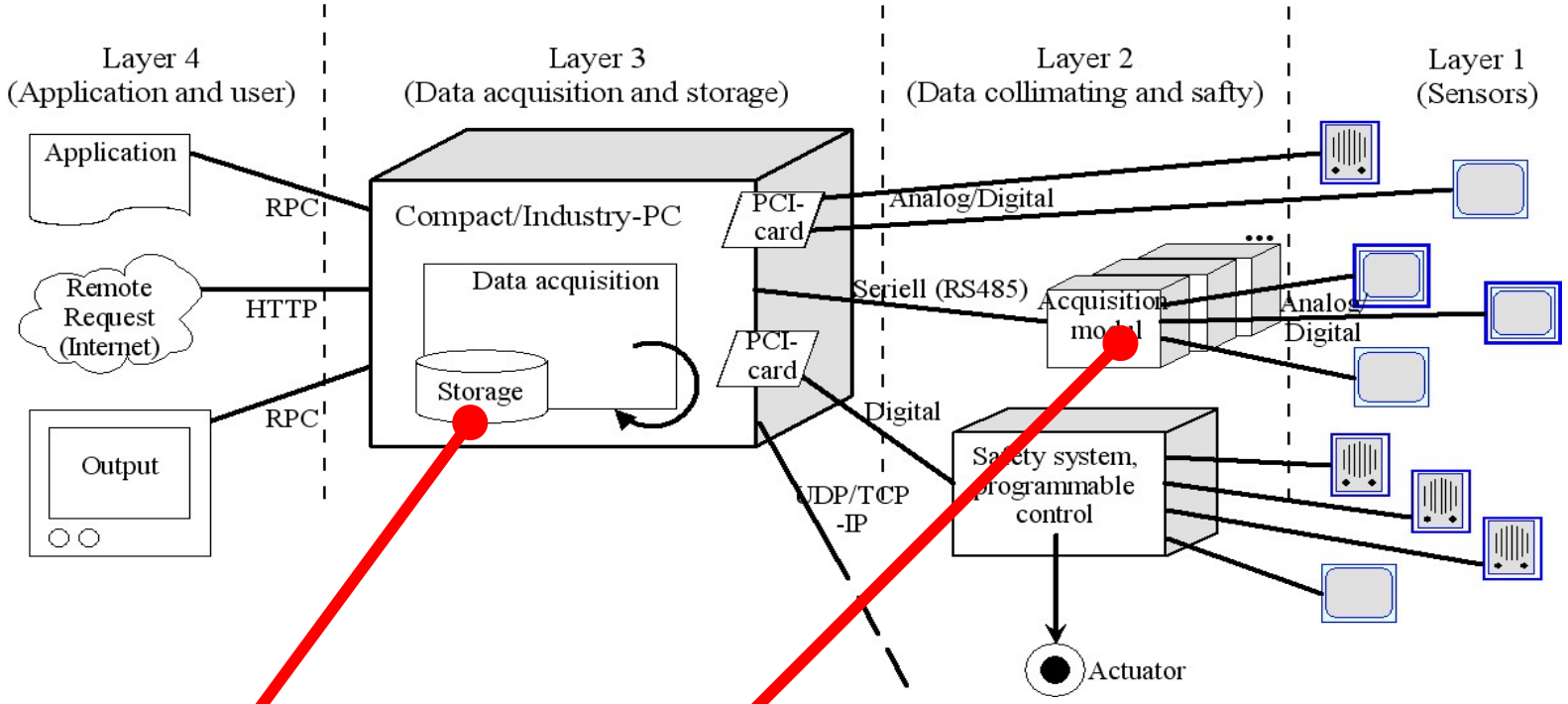
VLBI2010-MCI-Collaboration
http://groups.google.de/group/vlbi2010-mci-collaboration

The idea of system monitoring

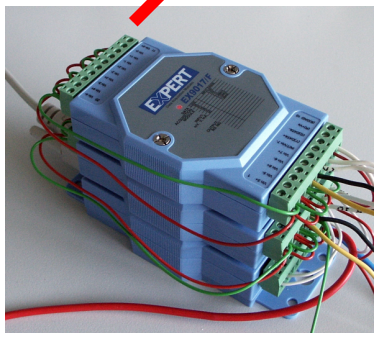


A fieldsystem extension – second (safety) monitoring system

Additional control of the system with system monitoring is under construction

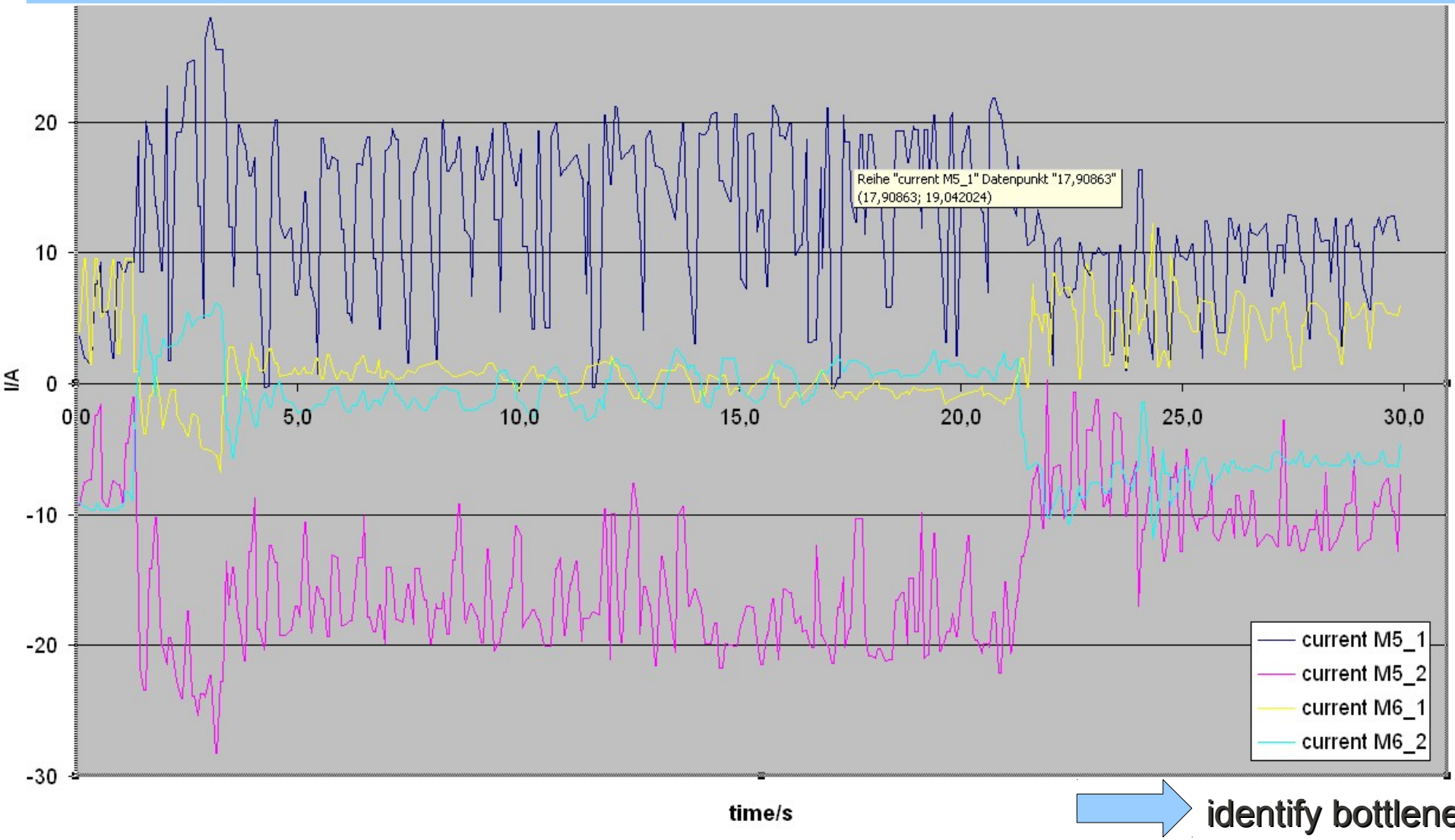


Receiver
ACU
Power
Switches
Temp.
Racks
Security
...



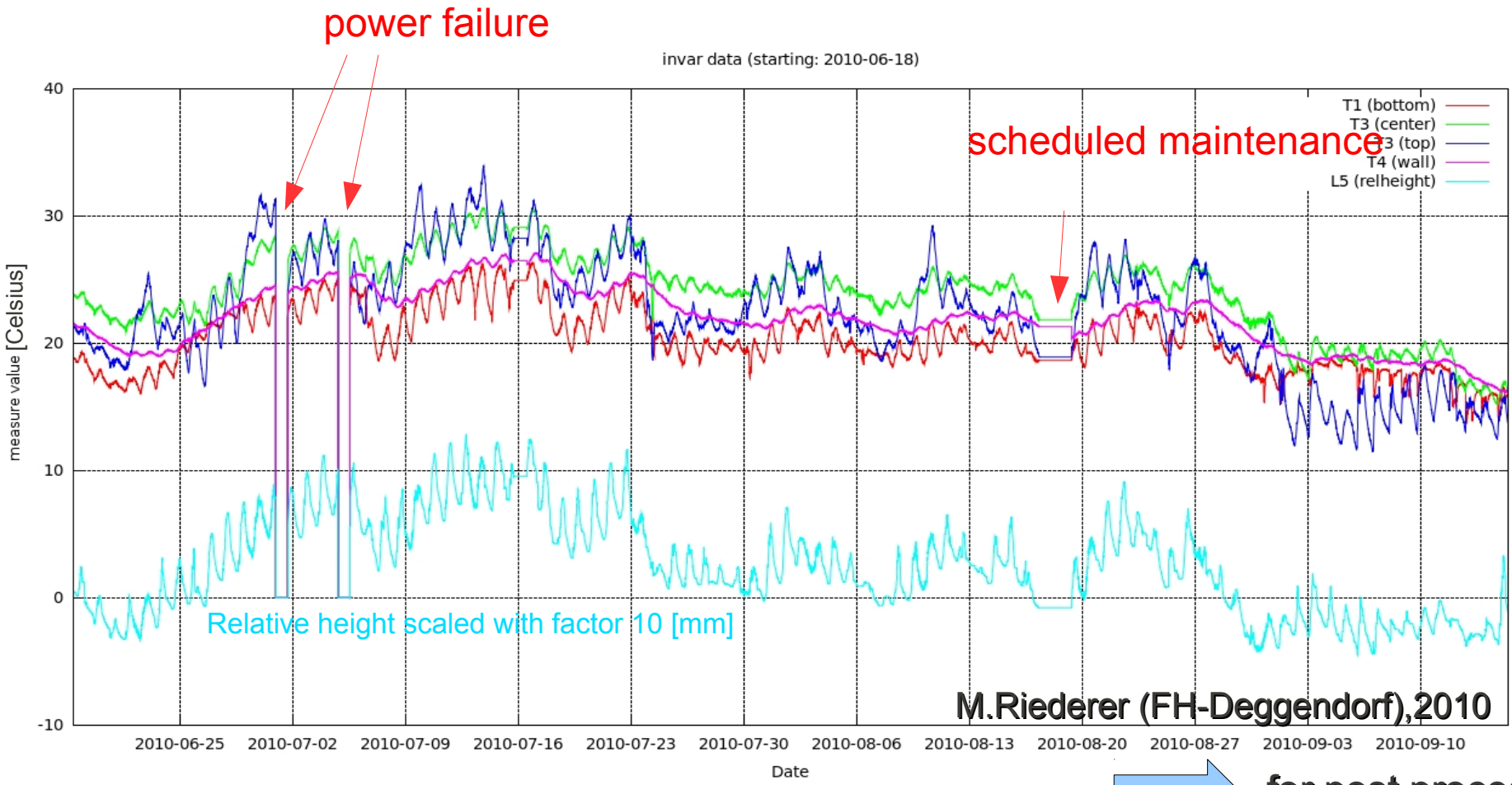
- Standard equipment on standard, robust architectures
- Modular, multi-layer system
- Open for several devices and sonsors
- Passive system for monitoring without actuators
- Linux-operating system (maybe minimal installation)
- Open Source
- C/C++
- Communication internal with idl2rpc-generator
- Vendor independence

Layer 1, RTW
current of elevation drives



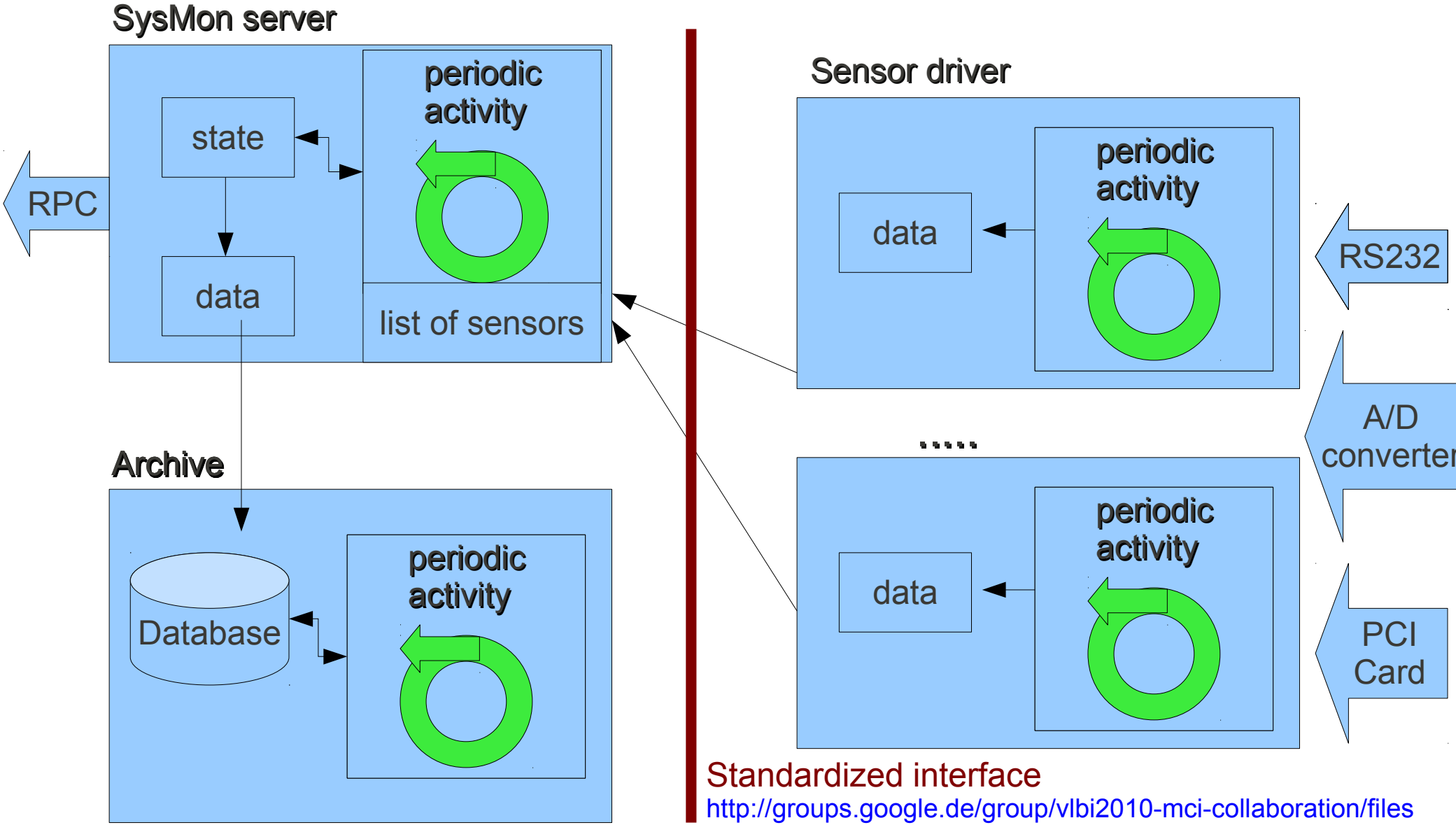
identify bottlenecks

Layer 1, RTW
invar and temperature sensor data



for post processing /analysis

Layer 2 and 3

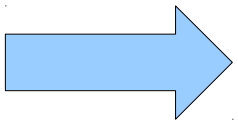

SysMon server
state
periodic activity
RPC
data
list of sensors
Archive
Database
periodic activity
Sensor driver
data
periodic activity
RS232
A/D converter
data
periodic activity
PCI Card
Standardized interface
http://groups.google.de/group/vlbi2010-mci-collaboration/files

Layer 4, Application

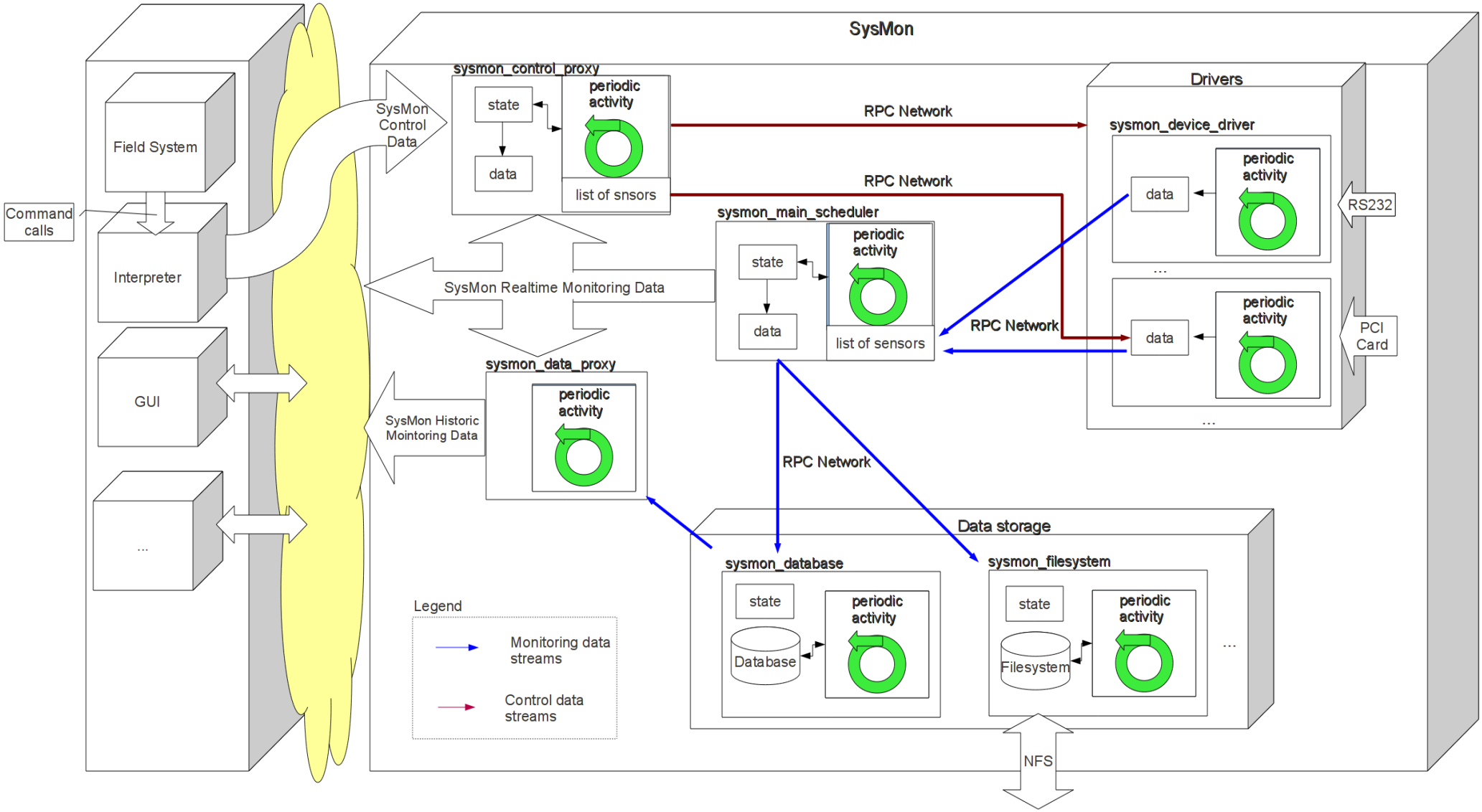
Graphical User Interface

- wxWidgets a cross platform C++ library (32 and 64-Bit)
- Many extensions have developed:
  - windsensor, polar plotting, ...

wxWidgets API						
wxMSW	wxGTK	wxX11	wxMotif	wxMac	wxCocoa	wxOS2
Win32	GTK+	Xlib	Motif	Carbon	Cocoa	PM
Win/Win CE	Unix/Linux			OS 9/OS X	OS X	OS/2



One software for multiple platforms
(due to current idl2rpc restrictions at the moment only Linux)

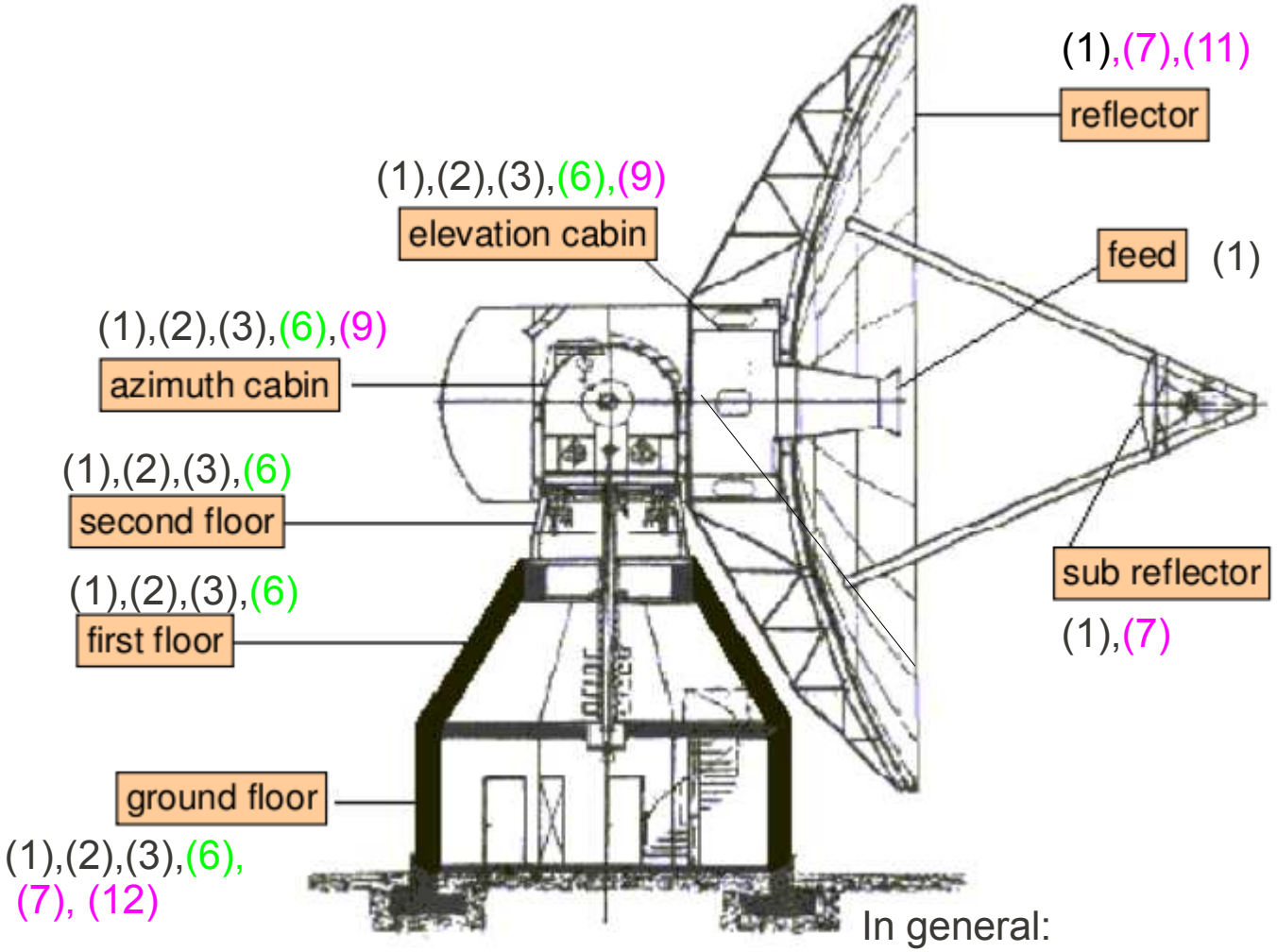

SysMon
Field System
Command calls
Interpreter
GUI
...
SysMon Control Data
sysmon_control_proxy
state
data
periodic activity
list of snsors
RPC Network
RPC Network
Drivers
sysmon_device_driver
data
periodic activity
RS232
...
data
periodic activity
PCI Card
...
sysmon_main_scheduler
state
data
periodic activity
list of sensors
RPC Network
SysMon Realtime Monitoring Data
sysmon_data_proxy
periodic activity
SysMon Historic Mointoring Data
RPC Network
Data storage
sysmon_database
state
Database
periodic activity
sysmon_filesystem
state
Filesystem
periodic activity
...
NFS
Legend
Monitoring data streams
Control data streams

What kind of sensors do we need in case of VLBI?

What kind of sensors do we need?

Sensor type	Category
• Temperature • Power • Activity states • Meteorology • Interlock states • ...	Safety and Operation
• Voltage (higher sampled) • ...	Engineering and Diagnostics
• Strains • Tilts • Positions • RFI • Structural integrity • ...	Science and Analysis

Sensor locations



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, what is the benefit?

- Get a better knowledge about the system and its behavior
- Make the system even more reliable
- Provide more information for analysis of VLBI data
- Can be used from remote (uses idl2rpc)
- Learn more about the systems “health” state
- Identify system weak points
- Reduce downtimes
- Reduce consequential costs
- Avoid potential human safety risks
- Also useful for other systems, e.g.: SLR, Ringlaser,...

⇒ Higher degree of automation

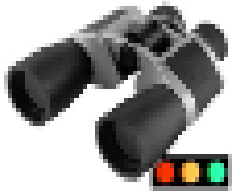
Future planes

Laser-ranging

SOSW
(first realization)

VLBI (Antarctica)

Monitoring
+
windsensor
(O'Higgins)



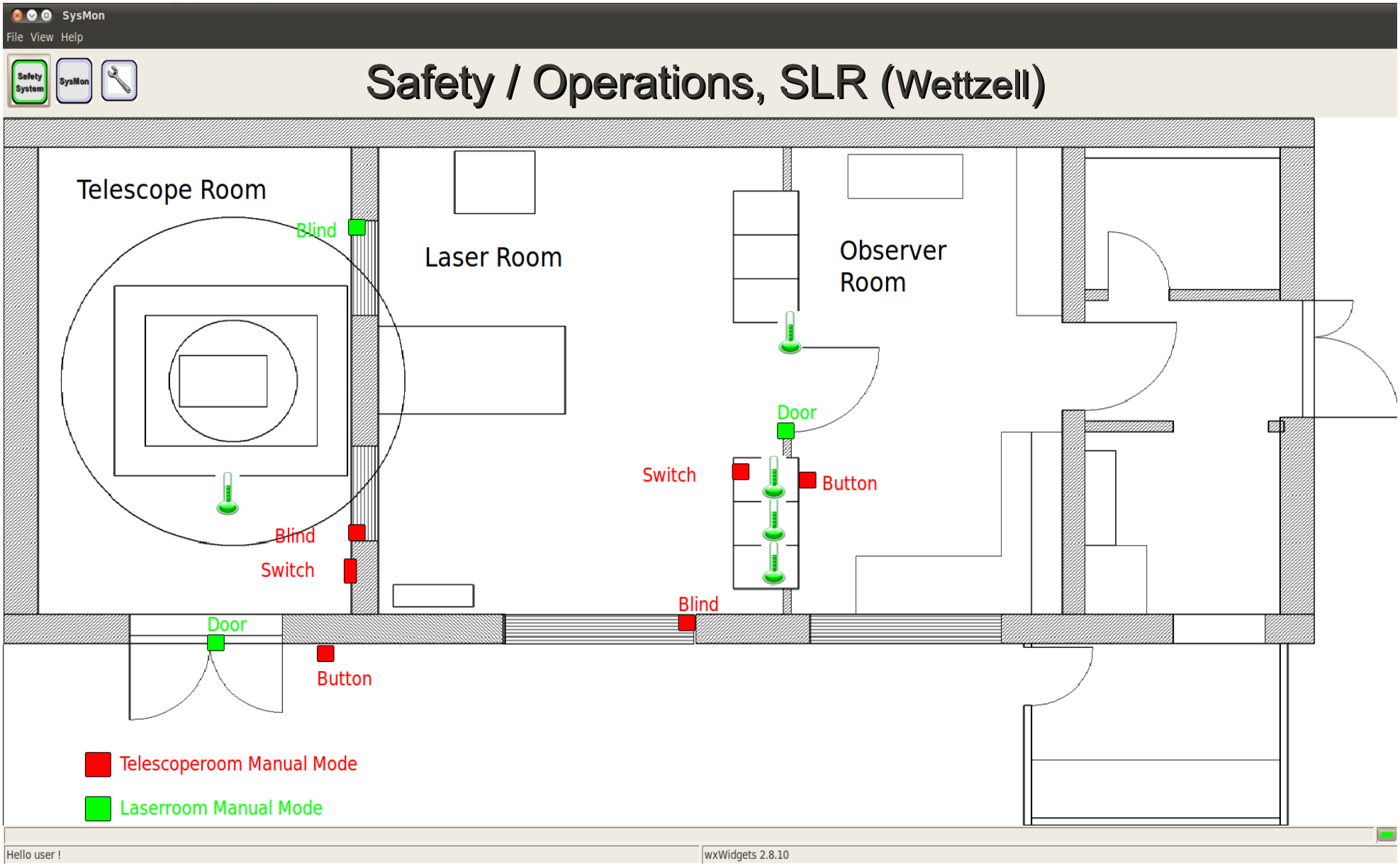
SysMon

GPS, Wettzell-Met

Meteo station

VLBI (Wettzell)

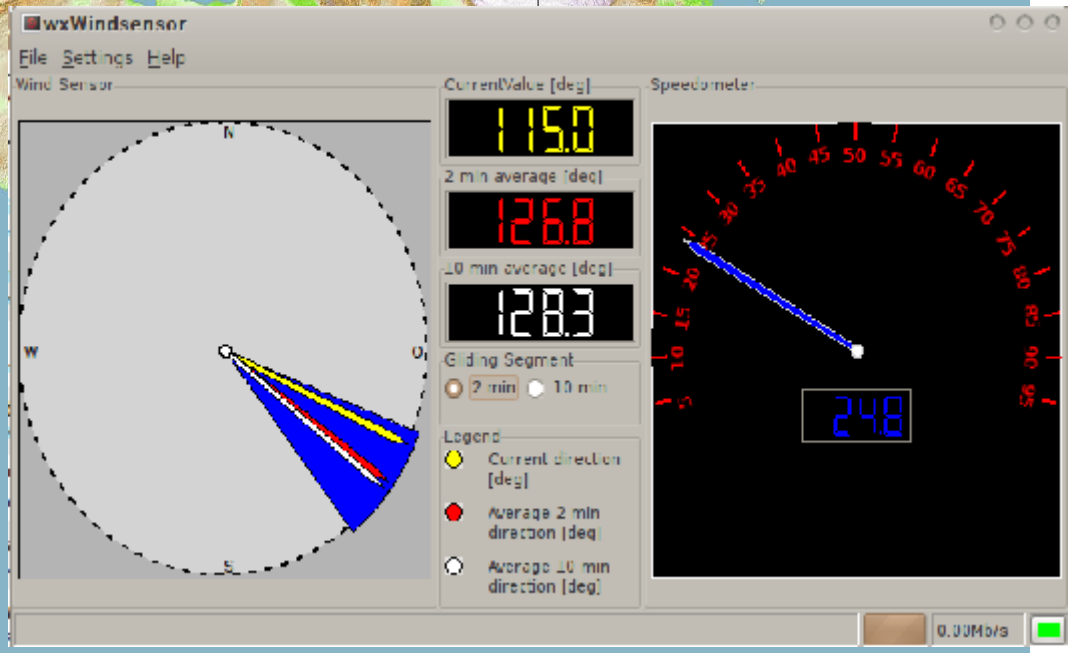
RTW,
Twin Telescopes


SysMon
File View Help
Safety System
SysMon
Safety / Operations, SLR (Wettzell)
Telescope Room
Blind
Laser Room
Observer Room
Door
Switch
Button
Blind
Switch
Blind
Door
Button
Telescoperoom Manual Mode
Laserroom Manual Mode
Hello user !
wxWidgets 2.8.10

Science/Analysis, VLBI (O'Higgins)

Wettzell

GARS O'Higgins



Thank you!