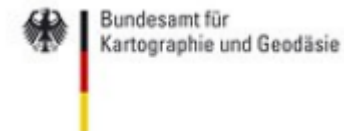


The Wettzell System Monitoring Concept and First Realizations

FESG

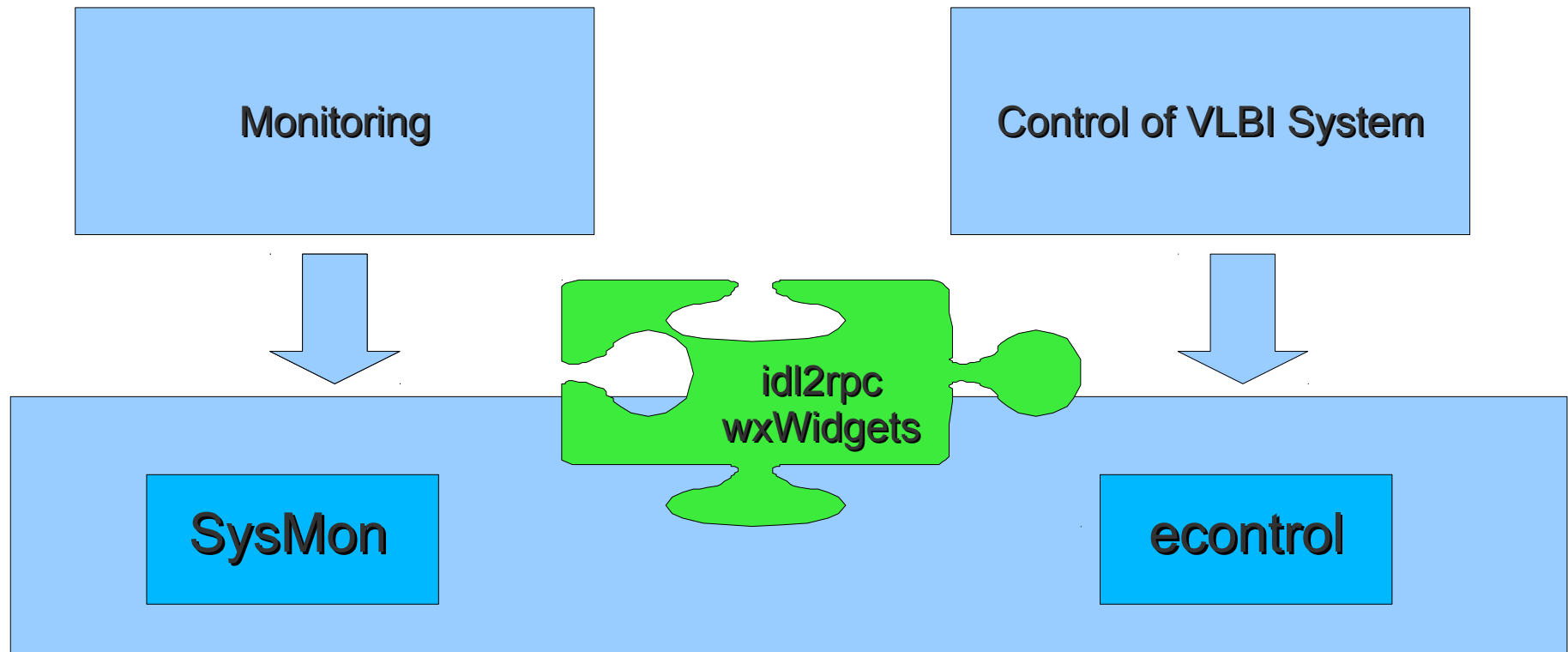
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Reiner Dassing (BKG)

The idea of monitoring system monitoring of an VLBI - Antenna

The idea of monitoring system monitoring of an VLBI - Antenna



What is system monitoring?

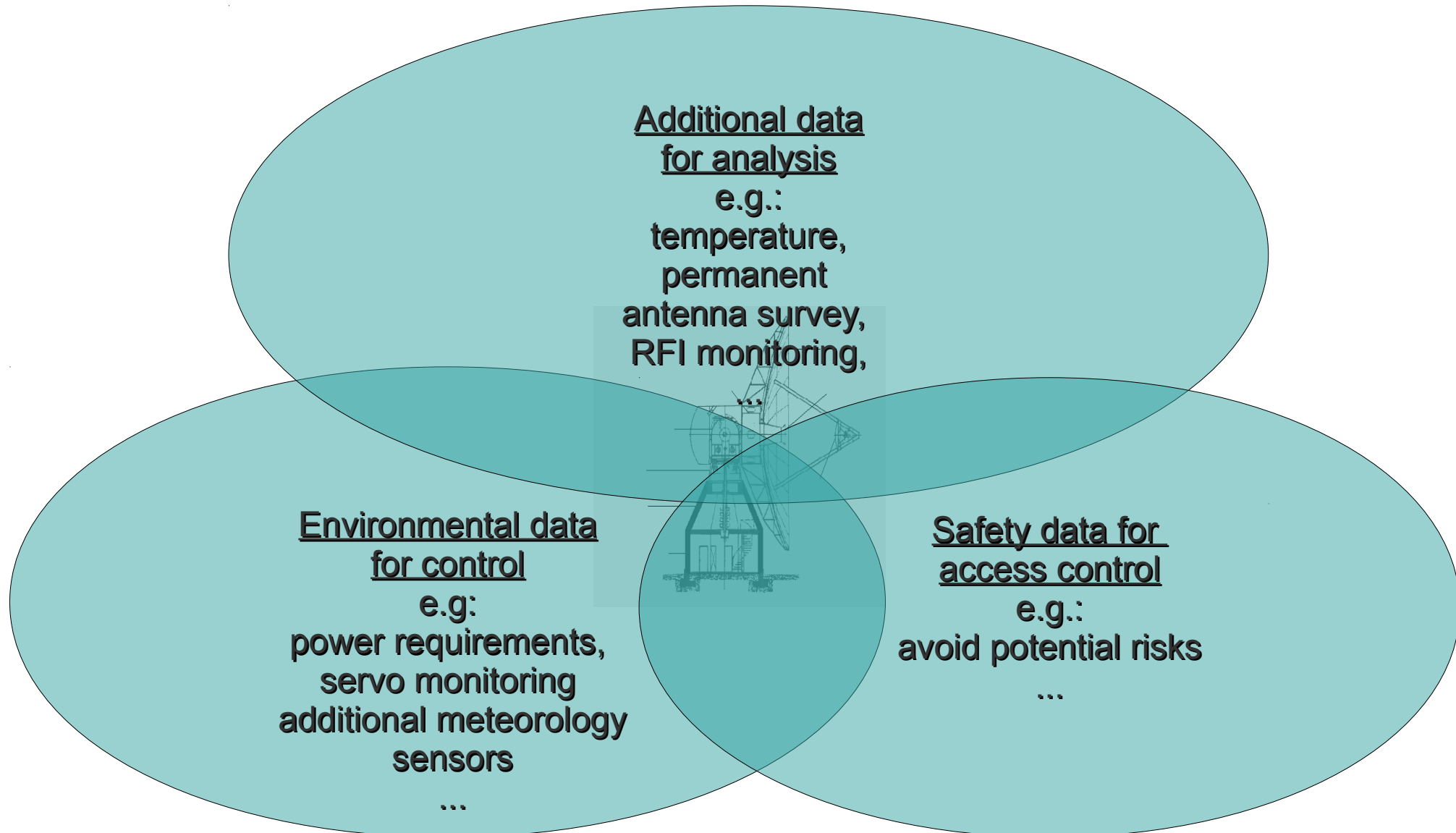
- **Collect data**
from several sensors at the telescope and site
- **Visualize**
the data with graphs and diagrams
- **Archive**
the collected data
- (**React**
according to predefined rules)



→ Get a better knowledge about the system behavior during

1. Session
2. Post processing

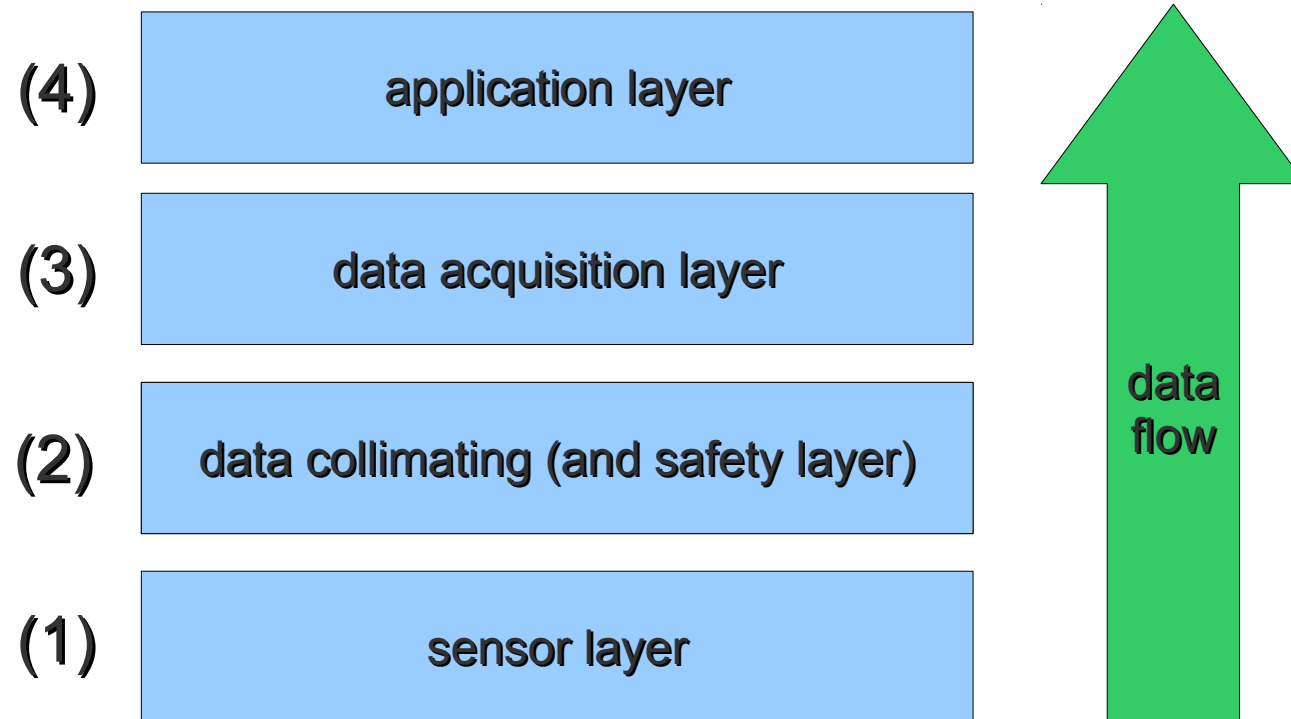
Monitoring in case of VLBI



The idea of system monitoring of a VLBI - antenna

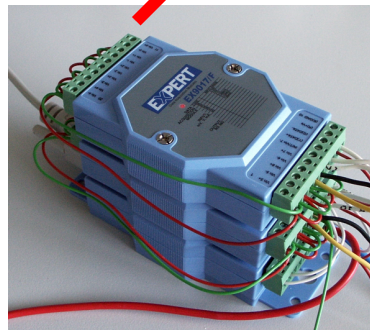
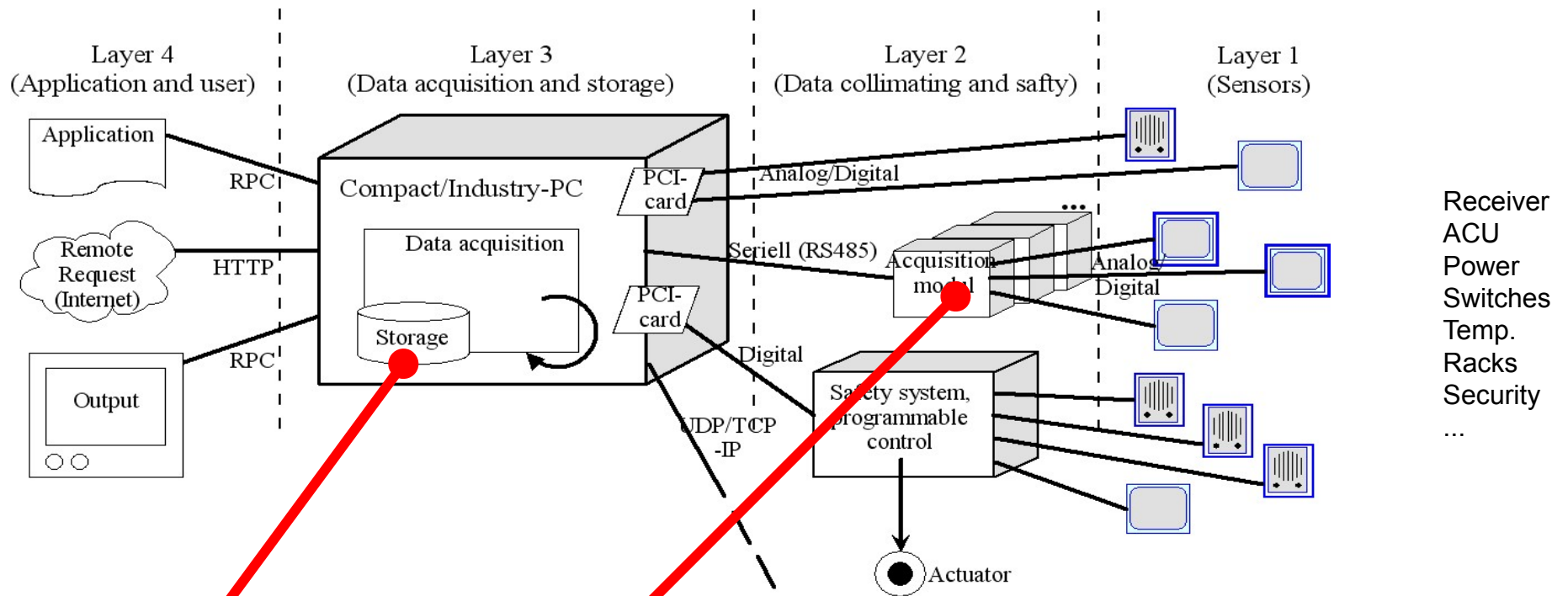
- Wishlist of what we need
 - flexible design
 - design does not depend on a specific sensor type or number of sensors
 - integrates a database that stores measured data for post processing
 - works with idl2rpc
 - based on the same software components as econtrol and SLR-software

The idea of system monitoring of a VLBI - antenna



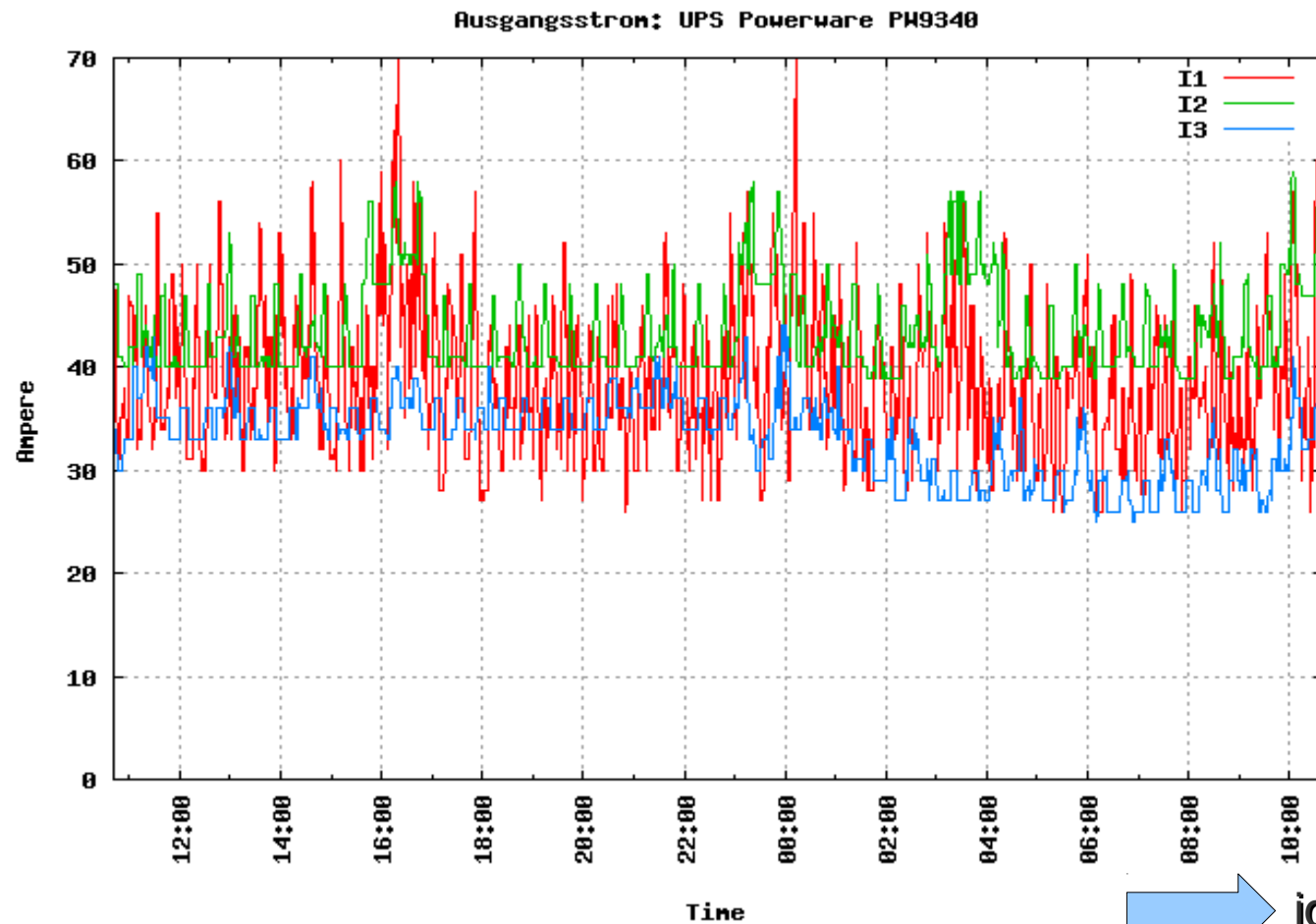
A fieldsystem extension – second (safety) monitoring system

Additional control of the system with system monitoring is under construction



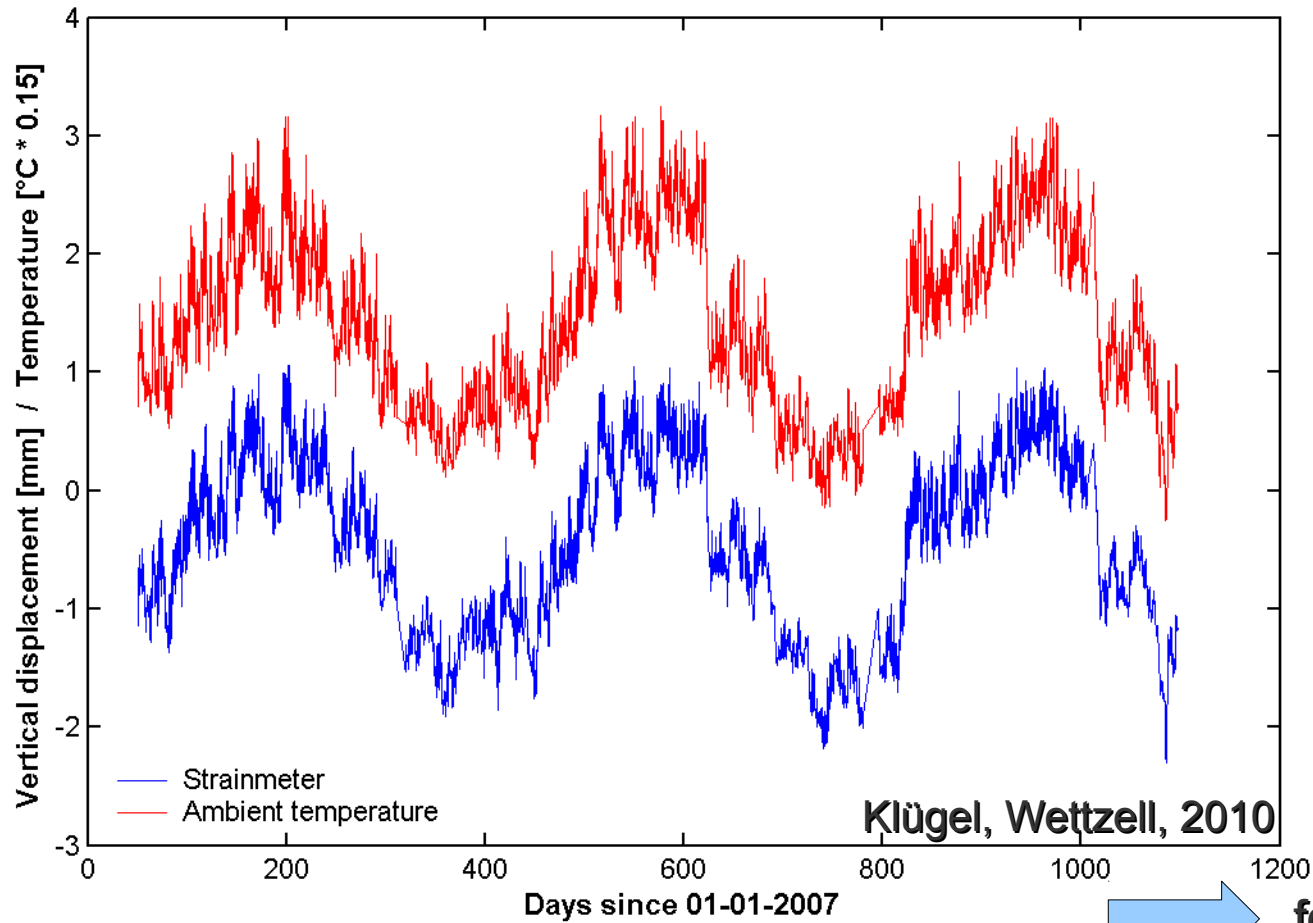
- Standard equipment on standard, robust architectures
- Modular, multi-layer system
- Open for several devices and sensors
- Passive system for monitoring without actuators
- Linux-operating system (maybe minimal installation)
- Open Source
- C/C++
- Communication internal with idl2rpc-generator
- Vendor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

Layer 1, O'Higgins output current



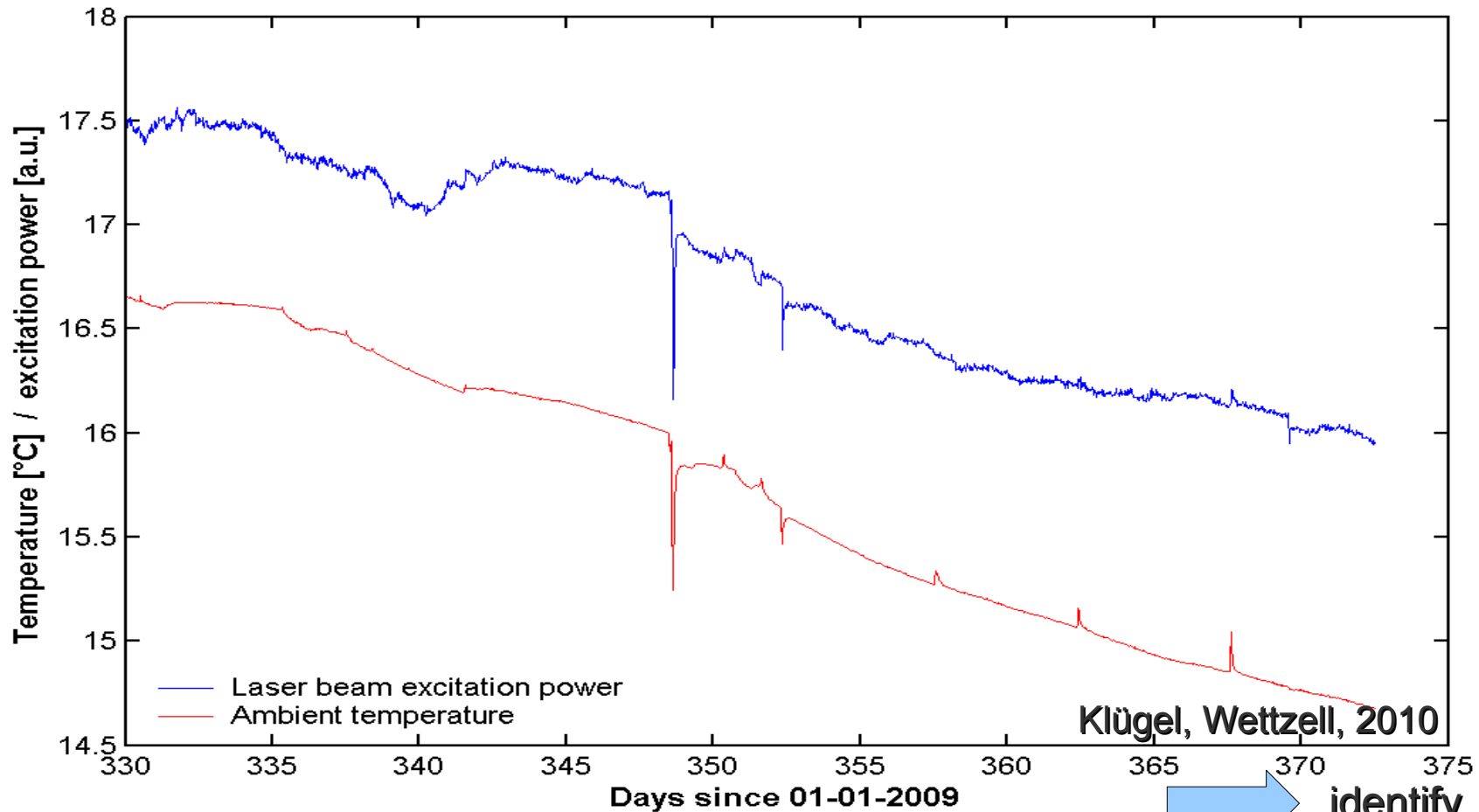
➔ identify bottlenecks

Layer 1, RTW strainmeter and temperature sensor data



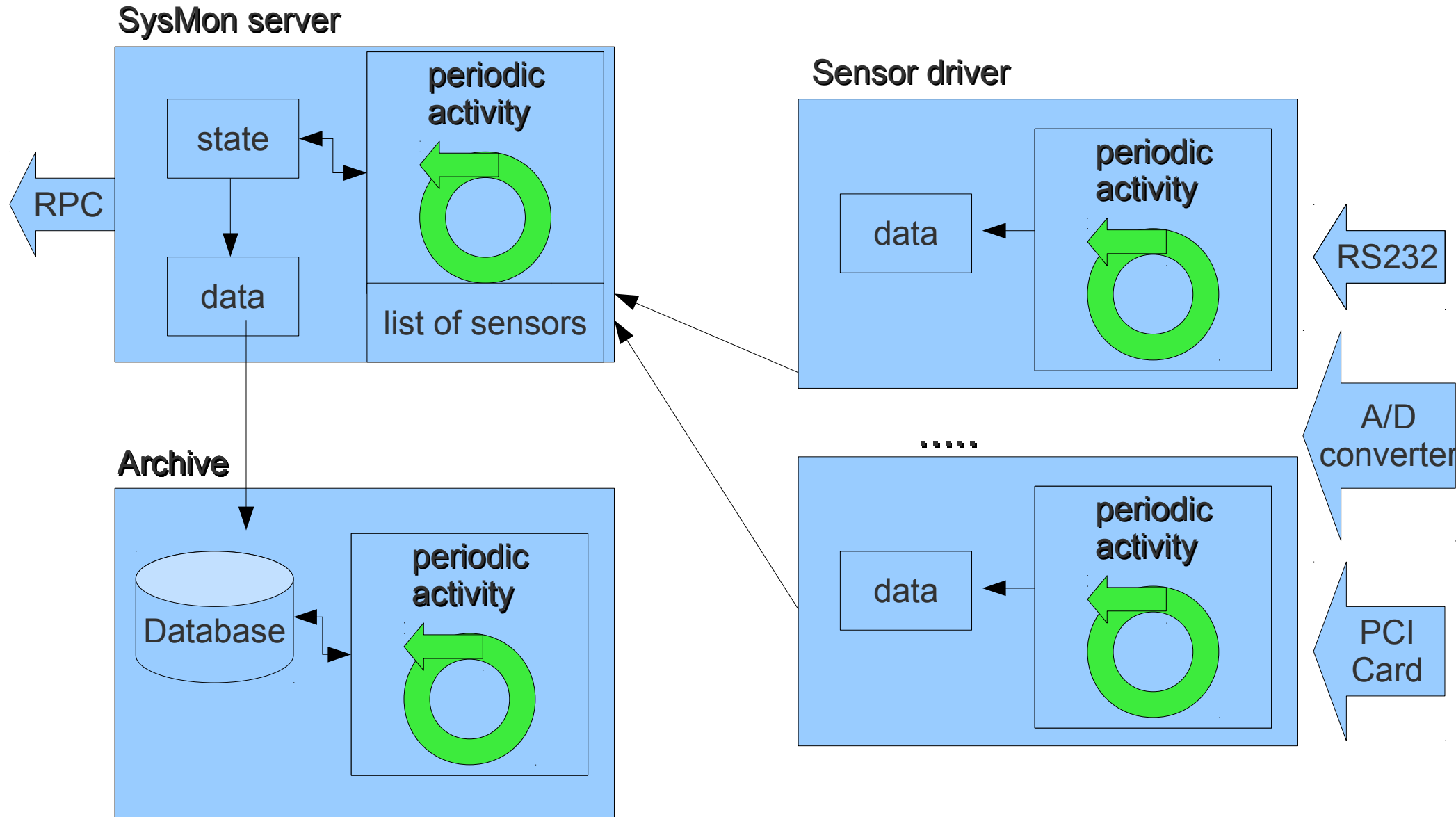
→ for post processing

Layer 1, Wettzell Ringlaser temperature and excitation power



→ identify correlations

Layer 2 and 3

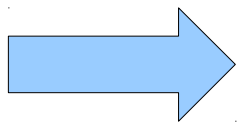


Layer 4, Application

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)

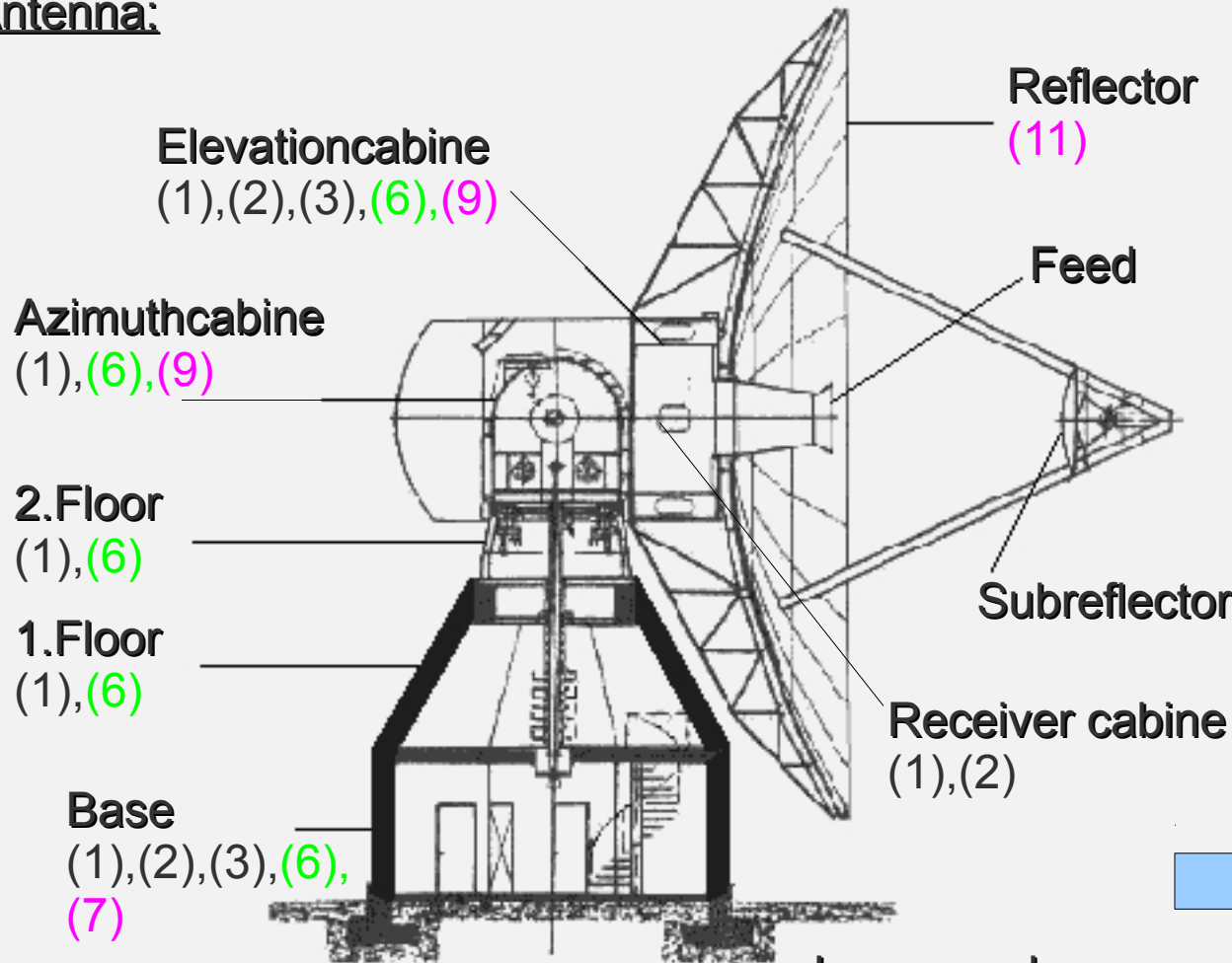
What kind of sensors do we need in case of VLBI?

What kind of sensors do we need?

Sensor type	Group
<ul style="list-style-type: none"> • Temperature • Voltage • Power • Activity states • Meteorology • ... 	<p>Environmental data</p>
<ul style="list-style-type: none"> • Interlock states • ... 	<p>Human safety</p>
<ul style="list-style-type: none"> • Strains • Tilts • Positions • RFI • Structural integrity • ... 	<p>Additional data for analysis</p>

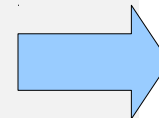
Where should (or could) the sensors reside?

Antenna:



1. Temperature
2. Voltage
3. Power
4. Activity states
5. Meteorology
6. Interlock states
7. Strains
8. Tilts
9. Positions
10. RFI
11. Structural integrity

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



Starting on March 2010, a student will make a case study about possible sensor locations in his master thesis.

What about RFI?

- **Sensors based on serial communication (RS232, low transfer rate, shielded cable, terminated endpoints) does not affect the system with RFI.**

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 (geodetic) systems, e.g.: SLR, Ringlaser,...
- ➔ Higher degree of automation

Future planes

SOSW
(first realization)

Station monitoring
+
windsensor
(O'Higgins)



SysMon

Meteo station

RTW,
Twin Telescopes

Live demonstration Windsensor data from O'Higgins

The software interface 'wxWindsensor' displays the following data:

- CurrentValue [deg]:** 1150
- 2 min average [deg]:** 1268
- 10 min average [deg]:** 1283
- Gliding Segment:** 2 min (selected)
- Speedometer:** 248

The circular plot shows the current wind direction (yellow) and its 2-minute (red) and 10-minute (white) averages. The speedometer shows a reading of 248. The status bar at the bottom indicates 'Hello wxWindsensor user !' and 'wxWidgets 2.8.10'.

Thank you!