



SLR-2.0

An overview about the new SLR/LLR control software from Wettzell

FESG

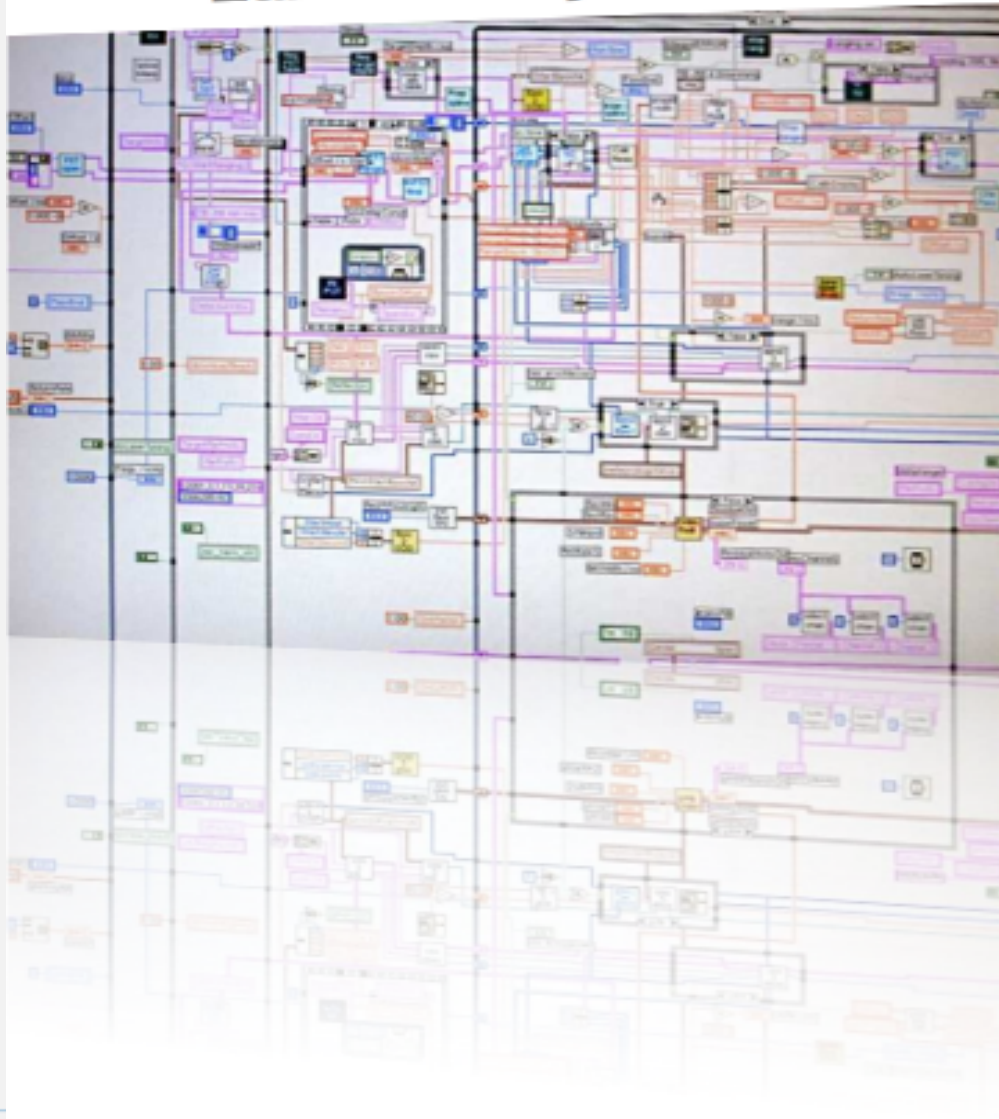
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Neidhardt (TUM), Lauber (TUM), Mühlbauer (BGK),
Plötz(BGK), Leidig (TUM), Eckl (BKG), L.Schreiber (FH-Deggendorf),
Riederer (BKG), Dassing (BKG)

SLR 1.0 (historically grown)

Lab View System

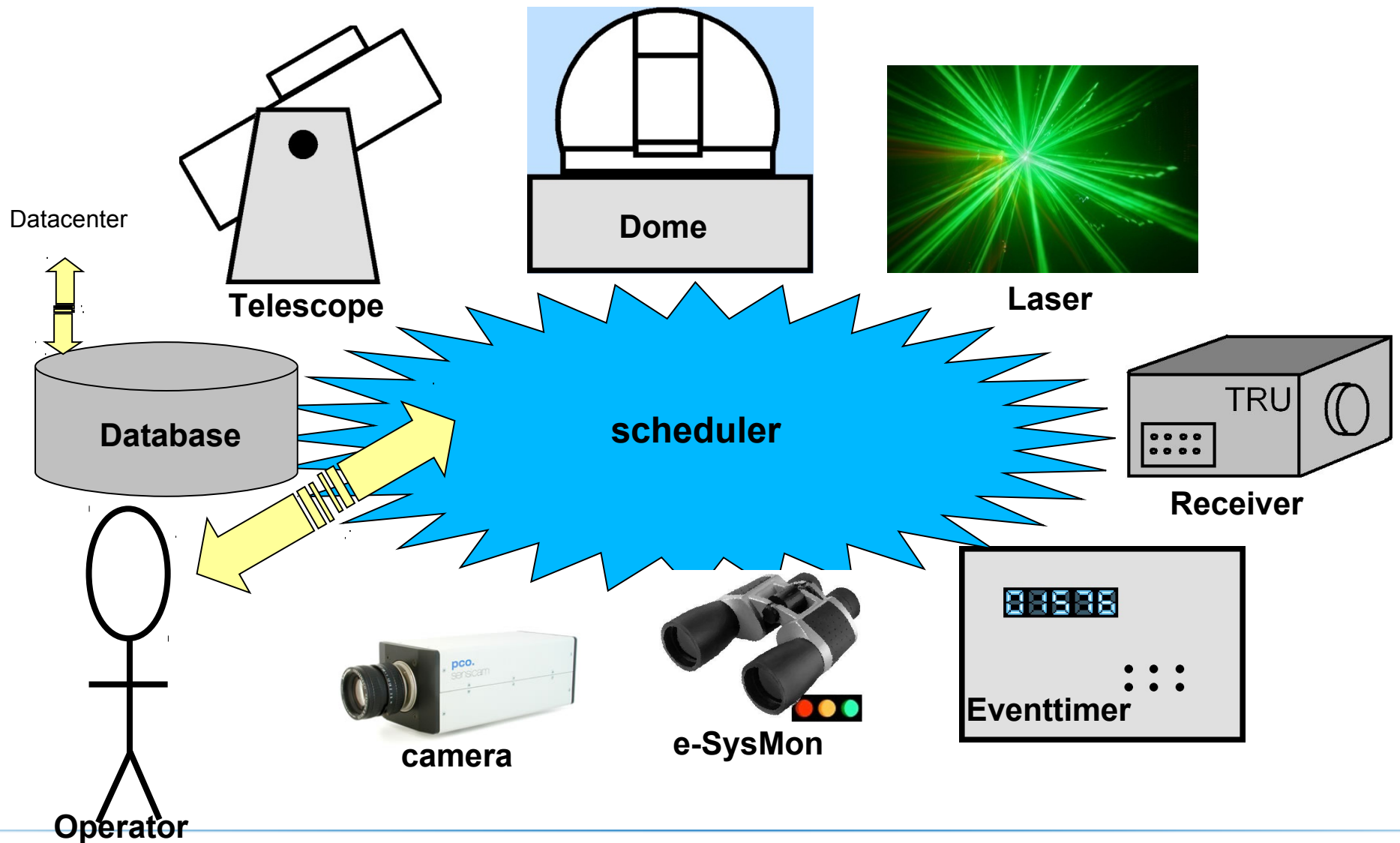


Issues:

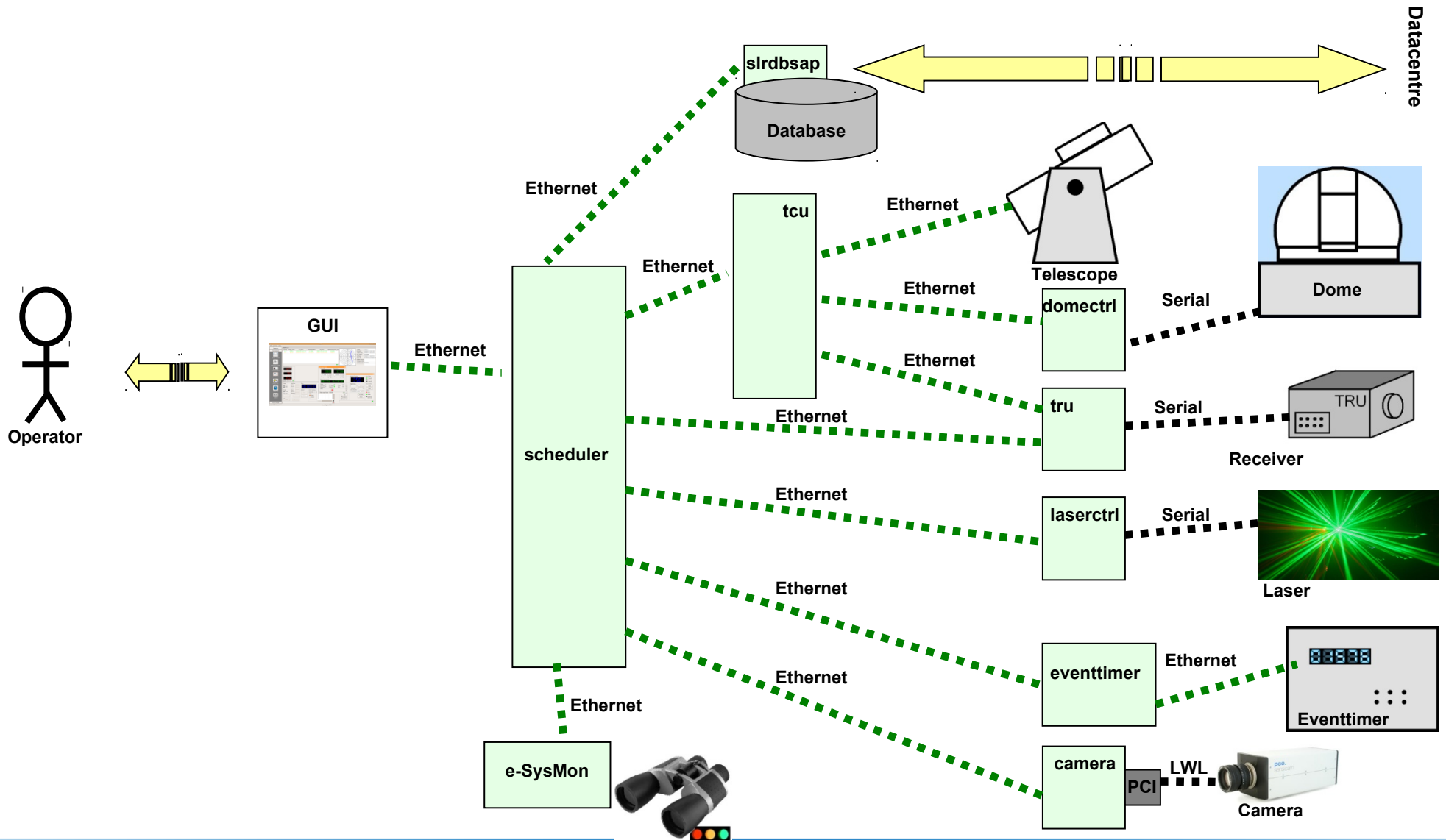
- old computer
- LabView 5.0
- upgrade?
- NI-card
(hardware)
- nearly no
documentation
- switching
between
satellites takes
too long

redesign

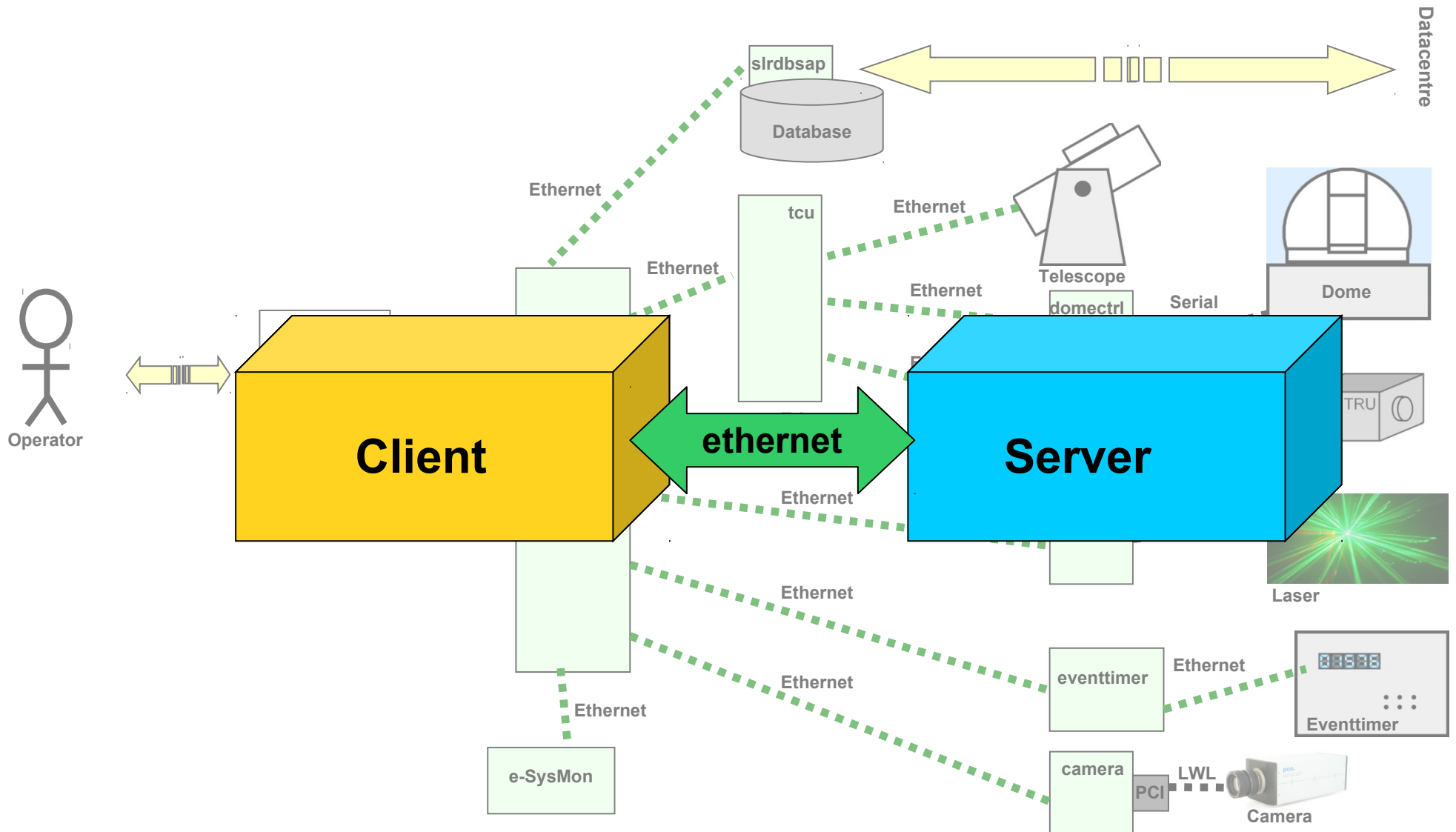
Decomposition into modules



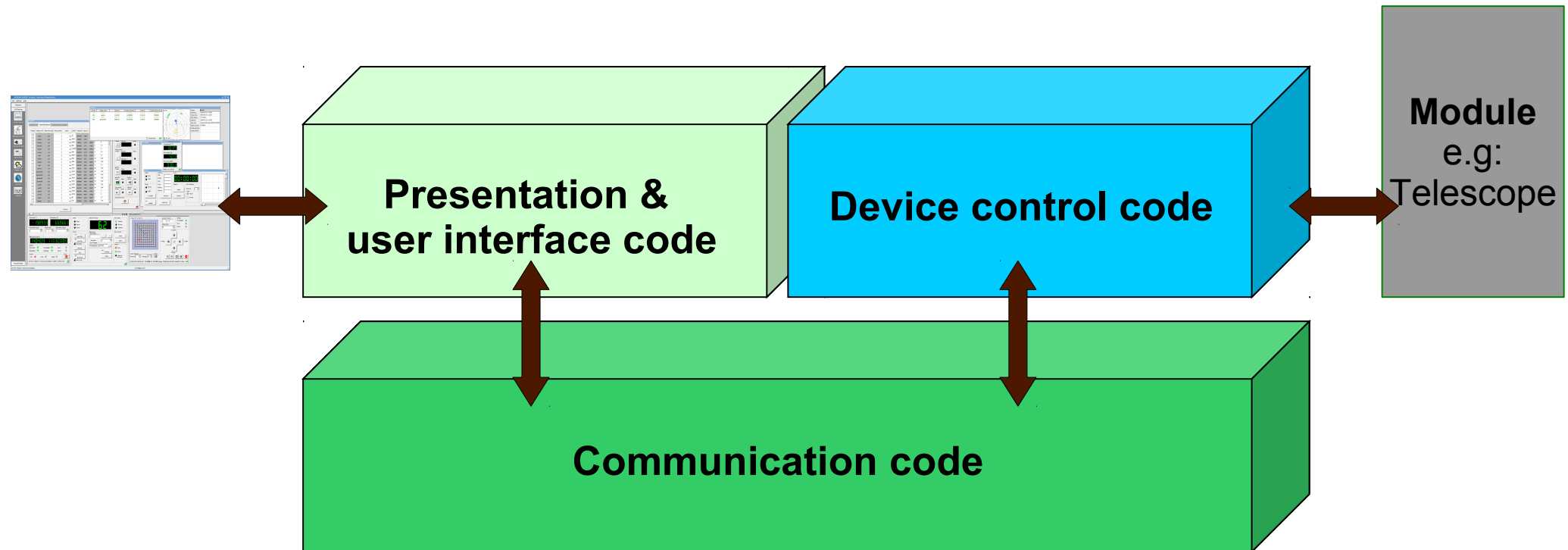
Internal architecture



Hierarchical Structure

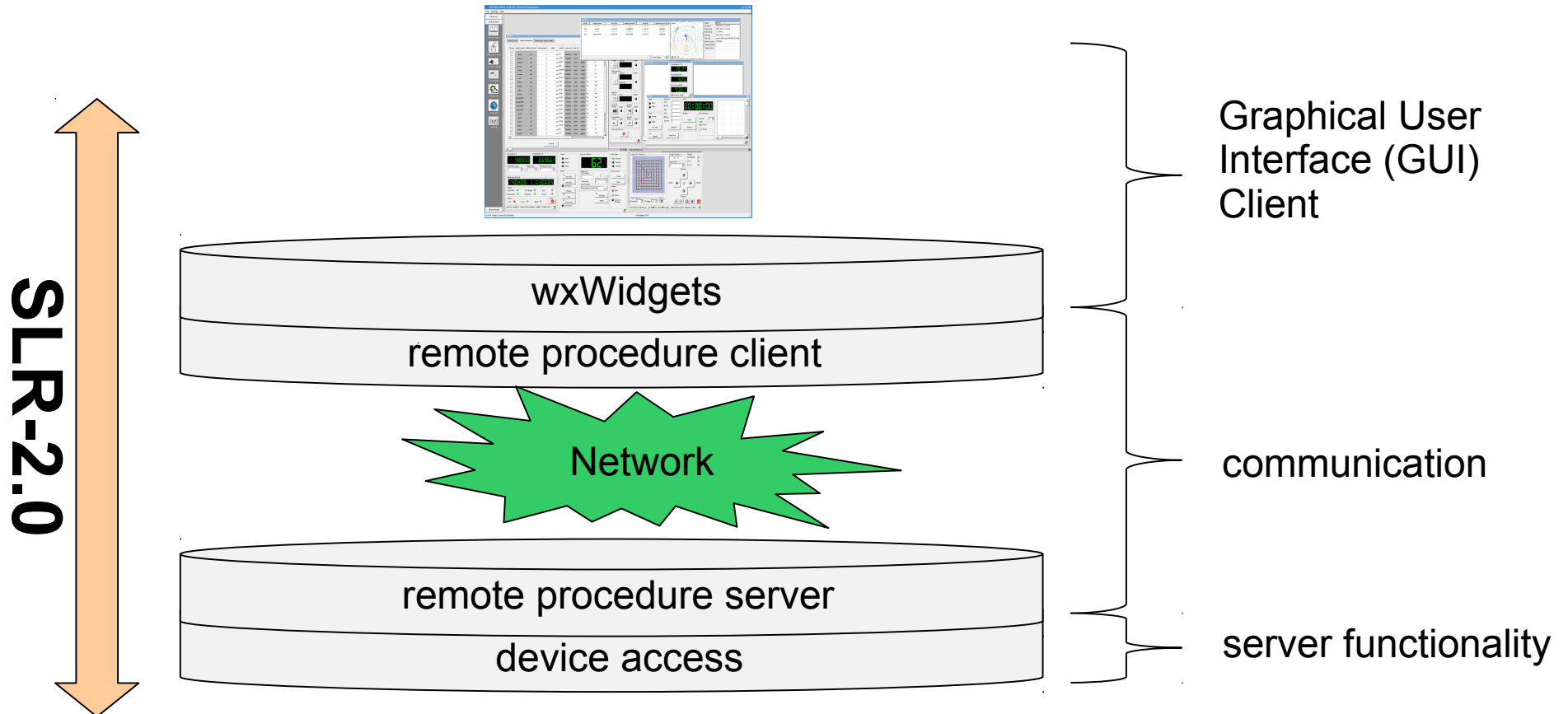


Separation of concerns



- strict separation between representation, processing and communication

Multiple Layers



RPC-Middleware, based on generic programming

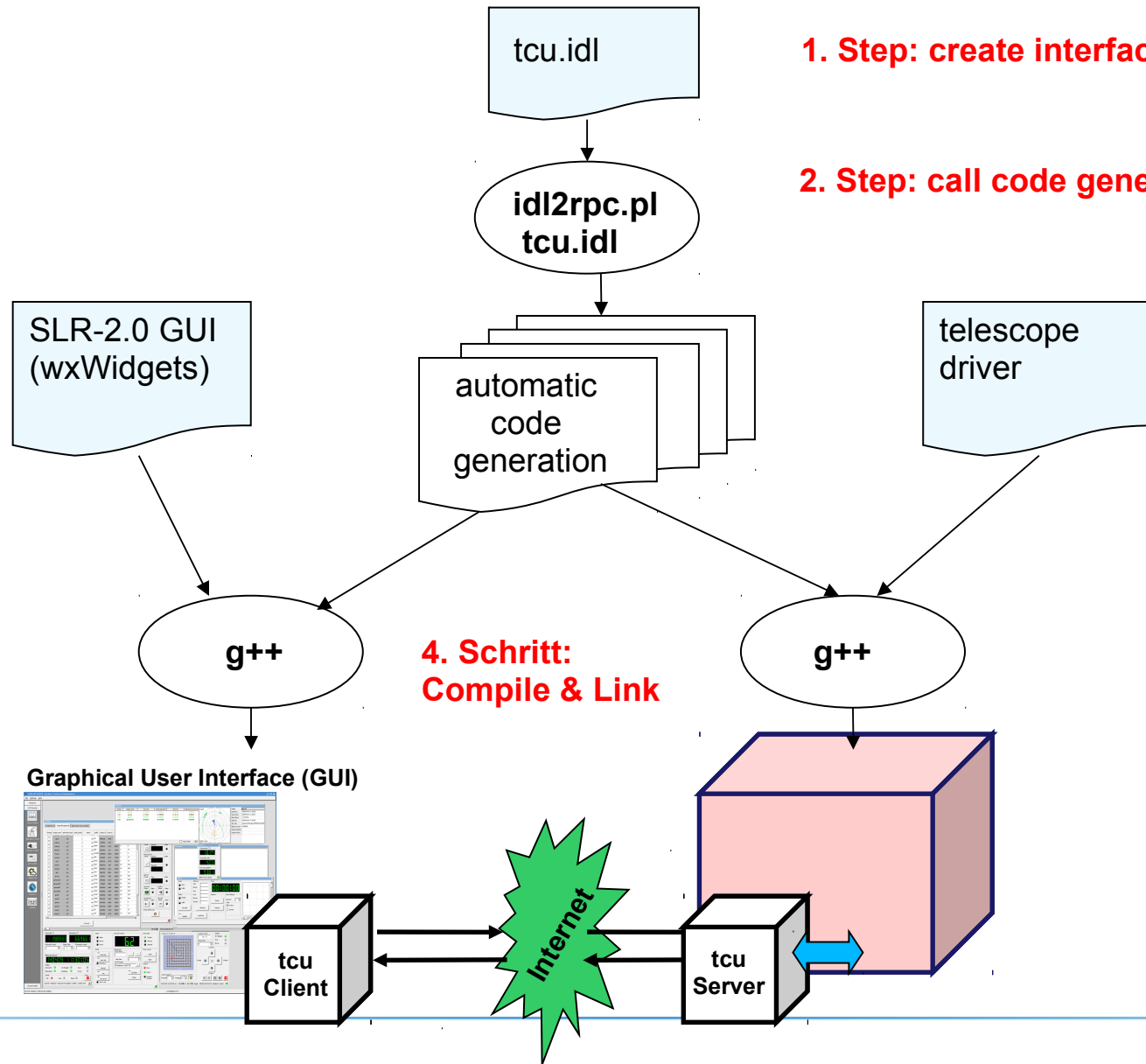
1. Step: create interface description

2. Step: call code generator

3. Step: implement generated server code (e.g.: call telescope driver)

4. Step: use generated client code in representation layer

4. Schritt: Compile & Link





Main Goals

- individual and independent interfaces
- semi-automation
- extensible and flexible design
- standardized and reliable (poster nr. 47)
- based on low-level but well proven communication protocols
- generic programming techniques to avoid individual network programming
- open source, nearly no proprietary software dependencies
- ANSI – C/C++ compliant software
- works on old and new Linux systems (32/64-Bit)



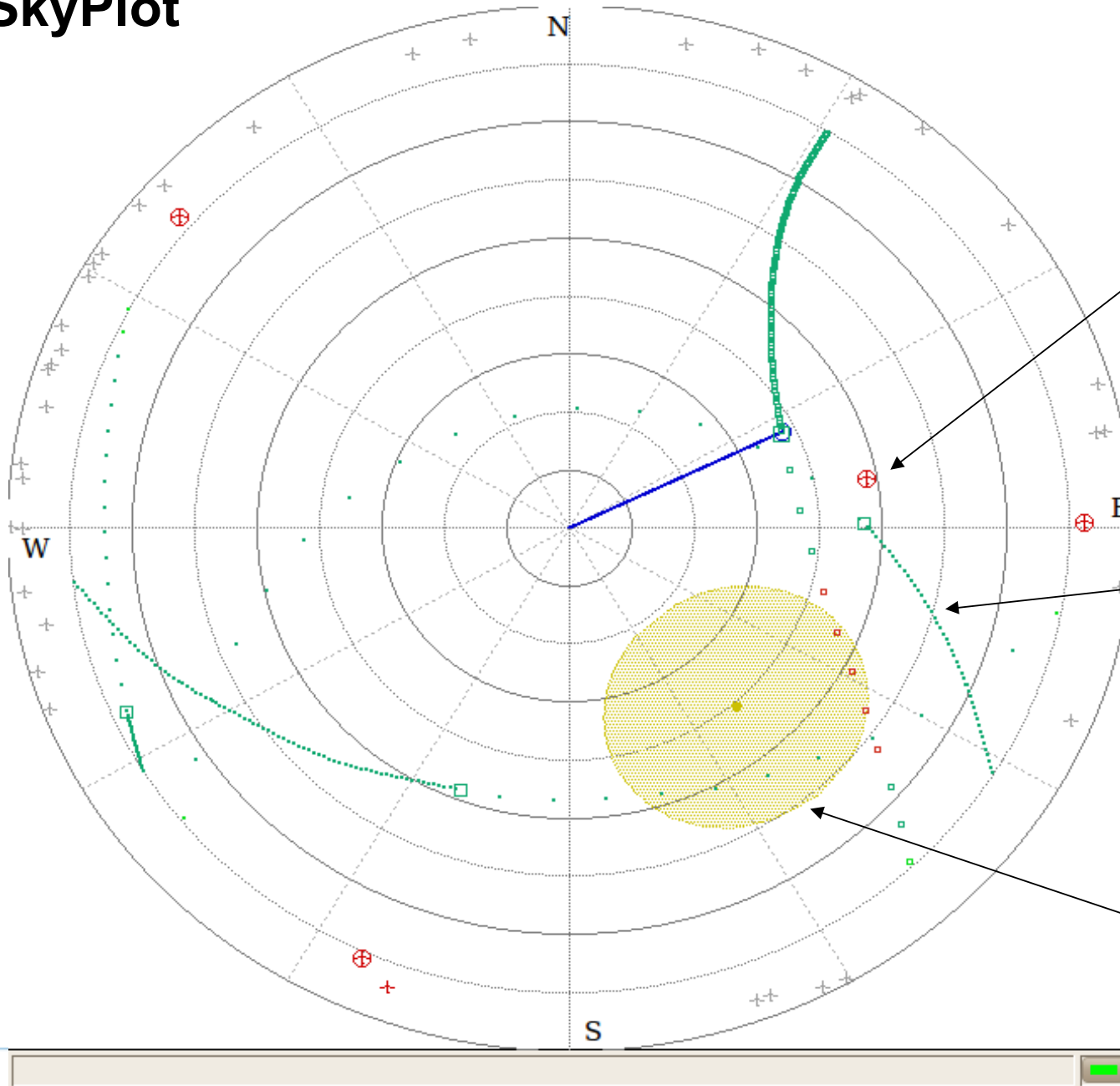
Graphical User Interface

The screenshot displays a complex graphical user interface for a radio telescope system. The interface is divided into several functional areas:

- Observer-Mode (Left Panel):** Contains icons for Observer, Mount Model, DeviceState, and TargetWindow.
- SatListCtrl (Top Left):** A table listing satellite targets with columns for priority, target, rise time, transit time, transit elevation, set time, and source.

priority	target	rise time	transit time	transit elevation	set time	source
2.12	glonass118	04:54:46	07:45:21	69.67	10:41:50	COD6191
2.07	glonass102	07:12:18	09:07:15	53.42	11:04:23	COD6191
1.85	lageos2	08:54:25	09:09:51	15.81	09:25:30	HTS6181
1.29	lro	03:06:53	08:05:37	43.07	13:36:23	FDF1
--- Future Slr Targets (+1 h) ---						
---	glonass120	09:29:56	10:17:08	16.22	11:04:54	COD6191
---	ers2	09:49:54	09:54:59	56.87	10:00:01	ESA6191
---	etalon1	09:58:09	12:34:01	83.05	14:50:40	HTS6181
---	lageos1	10:00:50	10:27:40	58.33	10:54:34	HTS6181
- TelescopeCtrl (Center):** Displays the current Azimuth Position (66) and Elevation (52.1770). It includes controls for Azimuth and Elevation inputs, step size, and telescope state (Closed, Moving, Opened).
- TelescopeAdjustment (Bottom Left):** Shows a grid for manual adjustment with Long/Cross step size (4/-6) and a Step Size of 2. It includes directional controls and an Auto Search function.
- Scheduler Ctrl (Bottom Center):** Contains checkboxes for Auto Track, Auto Cal, and Calibration, along with Cal Mode (Internal/External) and an InitET button.
- ReturnWindow (Right):** A scatter plot showing range bias over time. The x-axis is time (t) and the y-axis is range bias. A histogram below the plot shows the distribution of residuals with a mean of $2.73e-10$ [s] and a sigma of $5.52e-11$ [s].
- Admin-Mode (Bottom Left):** Shows system status including SLR-Info and connection status (Connected).

SkyPlot

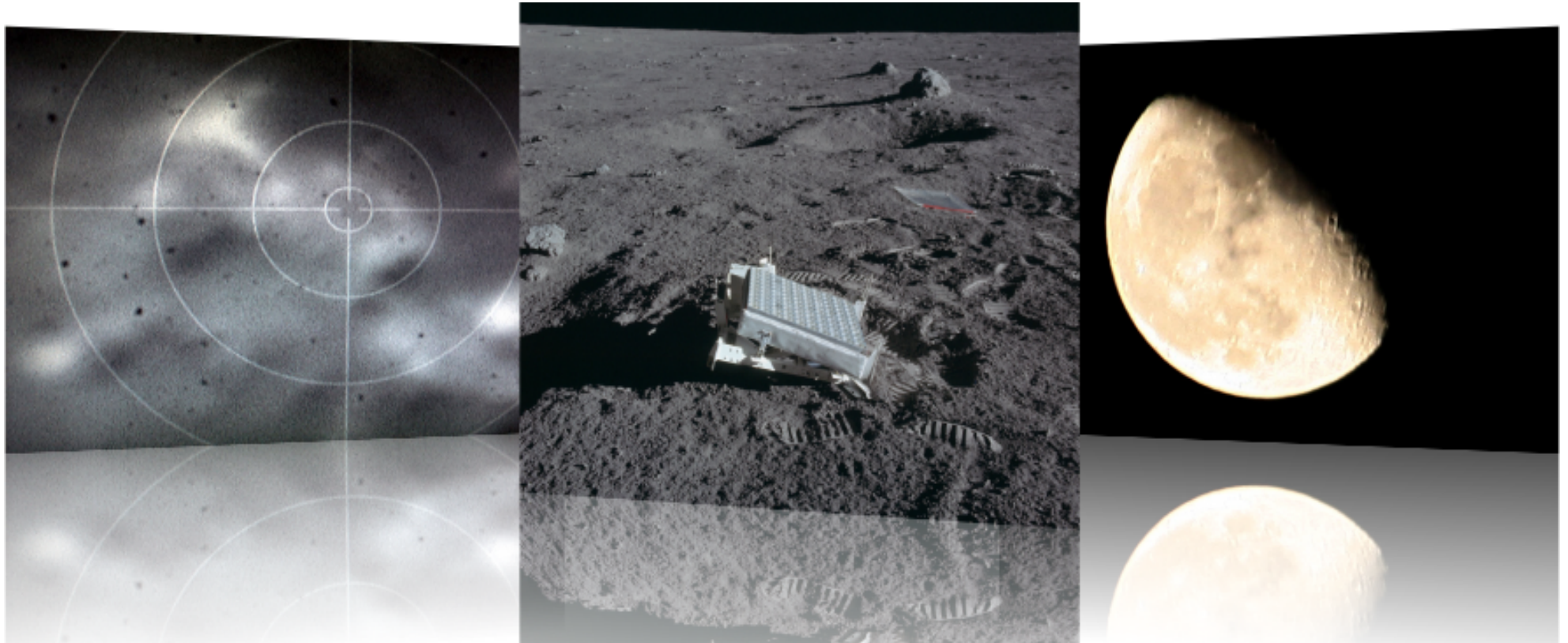


airplane

predicted
satellite
passage

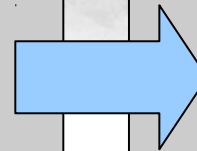
sun
avoidance
area

On the way towards LLR observations



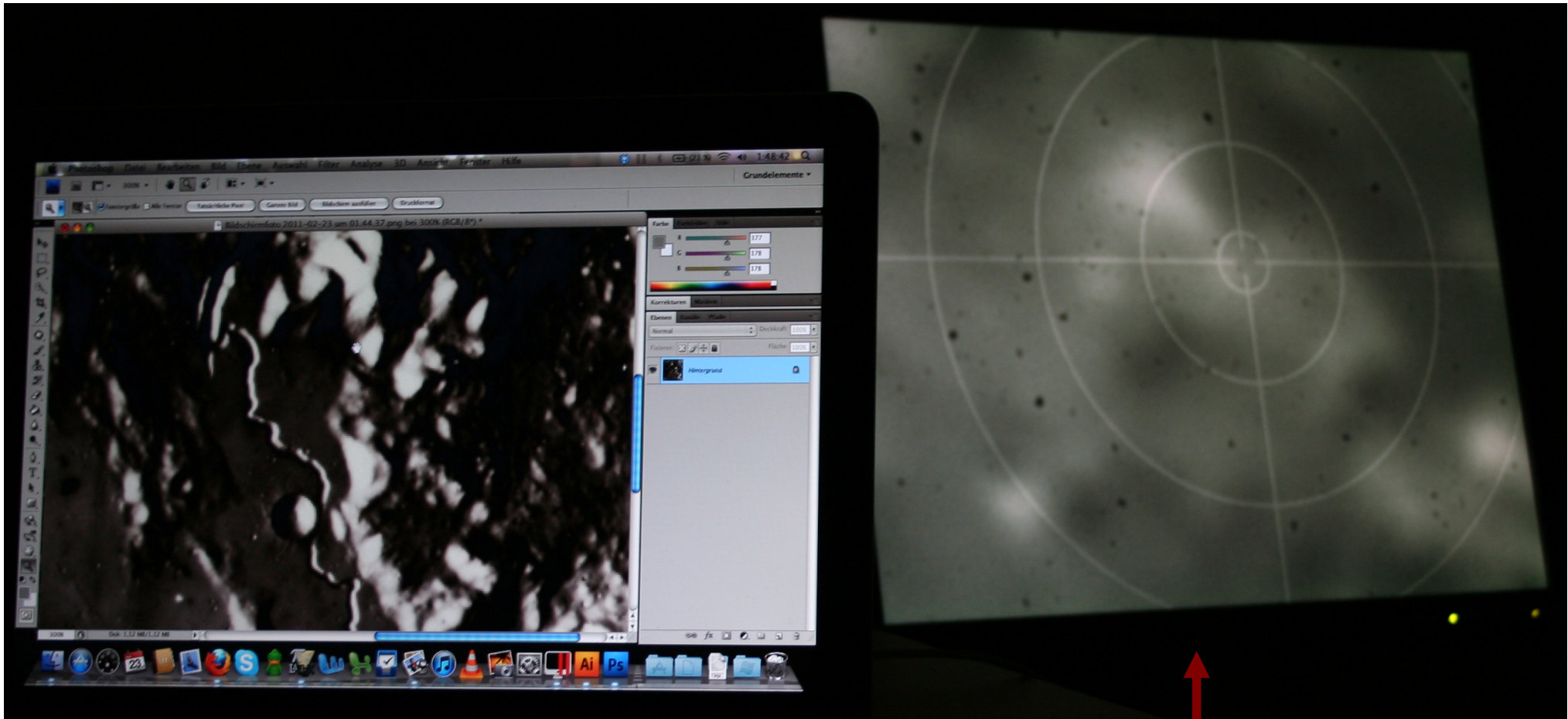
Diploma Thesis:

- comparison of LLR-prediction software (Grasse vs. Texas software)
- verification of Wettzell routines



Next steps:

- implement LLR observation mode in SLR 2.0



**Apollo 15 seen from
Wettzell**



Thank you!