

Binocular Observing with LUCIFER

scheduling and synchronisation

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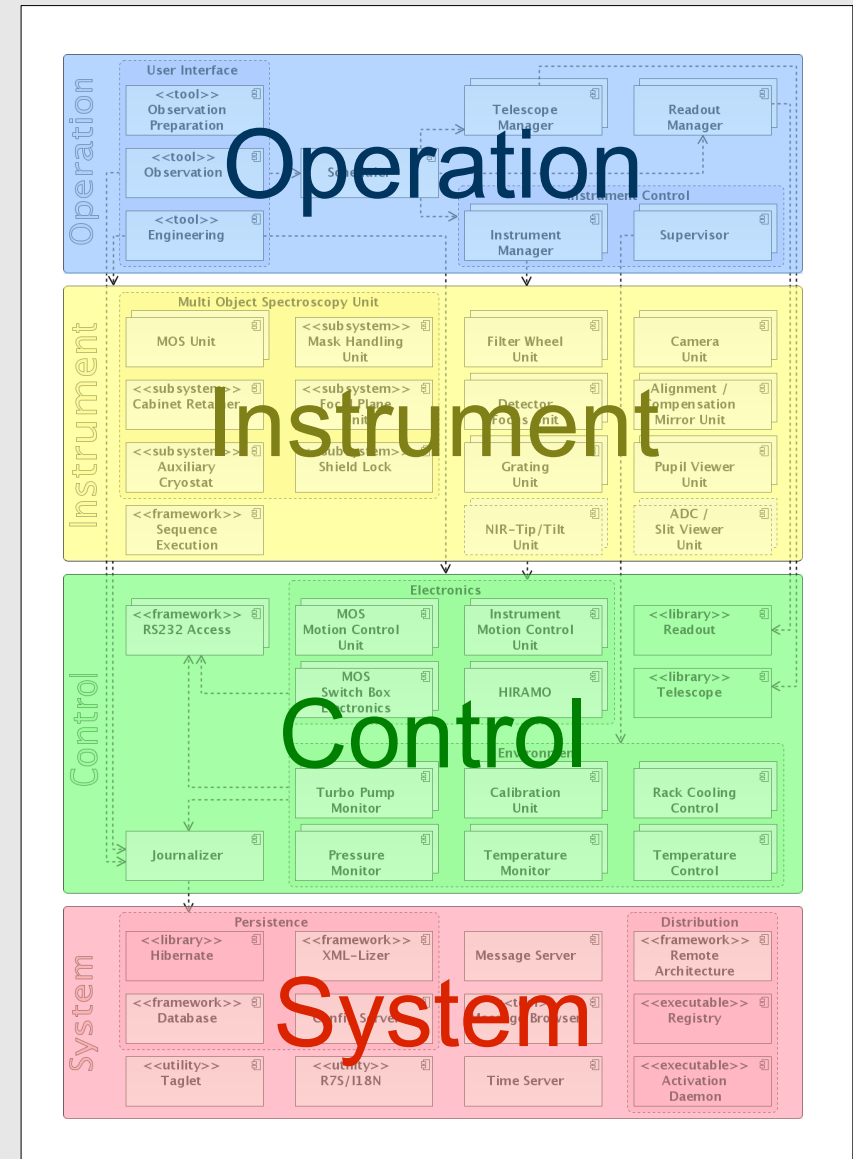


LUCIFER Software Development

- **Bochum:**
 - Alexander Pramskiy, Alexander Becker, Björn Kleemann, Dominik Bomans, Ralf-Jürgen Dettmar
 - instrument control software (LCSP, LMC)
- **Heidelberg:**
 - detector control software (GEIRS)
 - exposure time calculator (ETC)
 - script preparation (LSC) / checking software
- **Garching:**
 - mask preparation software (LMS)
- **Tucson:**
 - telescope software (TCS, IIF, IIFServer/ice)

Software Overview / Current Status

- Java / distributed system
- multi-tier architecture
 - some changes to Control and Instrument-Tier (new detector)
 - System, Instrument and Control-Tier ready for binocular observing
 - tests of new telescope and readout services are missing
 - Operation-Tier needs more changes / extensions than expected



Software-Architecture

Software Overview / Current Status

- new engineering access

The screenshot shows the LUCIFER Management Console interface. At the top, the system status is 'NOT RUNNING' with 'start', 'stop', and 'exit' buttons. Below, LUCIFER 1 and LUCIFER 2 statuses are also 'NOT RUNNING' with 'start' and 'stop' buttons. A tabbed interface shows 'all services', 'LUCIFER 1', 'LUCIFER 2', 'system', and 'engineering' tabs. The 'engineering' tab is active, displaying a table of services.

priority	start	type	use	name	state	tty
100	<input checked="" type="checkbox"/>	system	RMI Deamon	ONE rmid 60001	●	<input type="checkbox"/>
230	<input type="checkbox"/>	manual	Service	ONE 1 GEIRS Readout	●	<input type="checkbox"/>
230	<input checked="" type="checkbox"/>	system	Service	ONE 1 PortServer	●	<input type="checkbox"/>
230	<input checked="" type="checkbox"/>	system	Service	ONE 1 WebIO Calibration	●	<input type="checkbox"/>
230	<input checked="" type="checkbox"/>	system	Service	ONE 1 WebIO Electronics	●	<input type="checkbox"/>
250	<input type="checkbox"/>	manual	Service	ONE 1 CalibrationLamps	●	<input type="checkbox"/>
250	<input type="checkbox"/>	manual	Service	ONE 1 LUCIFER HIRAMO	●	<input type="checkbox"/>
250	<input type="checkbox"/>	manual	Service	ONE 1 LUCIFER MCU	●	<input type="checkbox"/>
250	<input type="checkbox"/>	manual	Service	ONE 1 MOS MCU	●	<input type="checkbox"/>
250	<input type="checkbox"/>	manual	Service	ONE 1 MOS SwitchBox	●	<input type="checkbox"/>
250	<input checked="" type="checkbox"/>	system	Service	ONE 1 PressureMonitor	●	<input type="checkbox"/>
250	<input checked="" type="checkbox"/>	system	Service	ONE 1 RackCoolingControl	●	<input type="checkbox"/>
250	<input checked="" type="checkbox"/>	system	Service	ONE 1 TemperatureControl	●	<input type="checkbox"/>
250	<input checked="" type="checkbox"/>	system	Service	ONE 1 TemperatureMonitor	●	<input type="checkbox"/>
300	<input type="checkbox"/>	manual	Service	ONE 1 Calibration Unit	●	<input type="checkbox"/>
300	<input type="checkbox"/>	manual	Service	ONE 1 Camera Unit	●	<input type="checkbox"/>
300	<input type="checkbox"/>	manual	Service	ONE 1 Compensation Mirror	●	<input type="checkbox"/>
300	<input type="checkbox"/>	manual	Service	ONE 1 Detector Unit	●	<input type="checkbox"/>
300	<input type="checkbox"/>	manual	Service	ONE 1 Filter Unit	●	<input type="checkbox"/>
300	<input type="checkbox"/>	manual	Service	ONE 1 Grating Unit	●	<input type="checkbox"/>
300	<input type="checkbox"/>	manual	Service	ONE 1 MOS Unit	●	<input type="checkbox"/>
300	<input type="checkbox"/>	manual	Service	ONE 1 Pupil Viewer	●	<input type="checkbox"/>
400	<input type="checkbox"/>	manual	Service	ONE 1 Instrument Manager	●	<input type="checkbox"/>
400	<input type="checkbox"/>	manual	Service	ONE 1 Readout Manager	●	<input type="checkbox"/>
400	<input type="checkbox"/>	manual	Service	ONE 1 Supervisor	●	<input type="checkbox"/>

Buttons at the bottom: 'switch to overview' and 'refresh table'.

Software Overview / Current Status

- new engineering access

The screenshot displays the LUCIFER Management Console interface. On the left, a sidebar lists services with checkboxes for manual or system control. The main area shows a grid of service status cards, categorized into four sections:

- Operation:** Contains cards for Supervisor, Readout Manager, Instrument Manager, Scheduler, Telescope Manager, and another set of Instrument Manager, Readout Manager, and Supervisor. Most are marked as OFFLINE.
- Instrument:** Contains cards for Pupil Viewer, Filter Unit, Camera Unit, Calibration Unit, MOS Unit, Grating Unit, Detector Unit, Compensation Mirror, GEIRS Readout, RackCoolingControl, and LUCIFER MCU. Many are OFFLINE.
- Control:** Contains cards for MOS MCU, MOS SwitchBox, LUCIFER HIRAMO, TemperatureControl, WebIO Electronics, TemperatureMonitor, WebIO Calibration, CalibrationLamps, PressureMonitor, and PortServer. Some are ONLINE, others OFFLINE.
- System:** Contains cards for ConfigServer, MessageServer, and TimeServer, all marked as ONLINE.

Software Overview / Current Status

- new engineering access

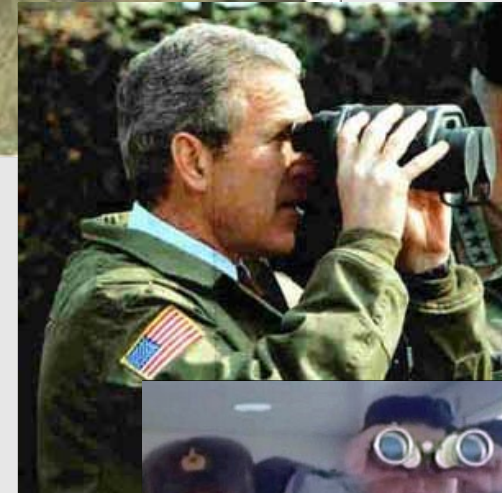
The screenshot displays the LUCIFER Management Console interface. At the top, a status bar shows 'system status: NO', 'LUCIFER 1 status: NO', and 'LUCIFER 2 status: NO'. Below this, a grid of service status boxes is visible, including Scheduler, Telescope Manager, Instrument Manager, Readout Manager, and Supervisor, all marked as 'OFFLINE'. A central 'Operation' panel shows various units like Calibration Unit, Camera Unit, Filter Unit, and Pupil Viewer, with some marked as 'OFFLINE' and others as 'ONLINE'. In the foreground, two 'TemperatureControl' windows are open. The left window, titled 'Lucifer ONE - 1 TemperatureControl -', shows a temperature of 64,94K for input channel A and 70,09K for input channel B. The right window, titled 'Lucifer TWO - 2 TemperatureControl -', shows a temperature of 64,98K for input channel A and 70,00K for input channel B. Both windows indicate 'UNKNOWN mode' and 'not ramping'. A large grey arrow with 'x2' points from the left window to the right one. The background also shows a 'ConfigServer' status as 'ONLINE'.

The Challenges of Binocular Observations

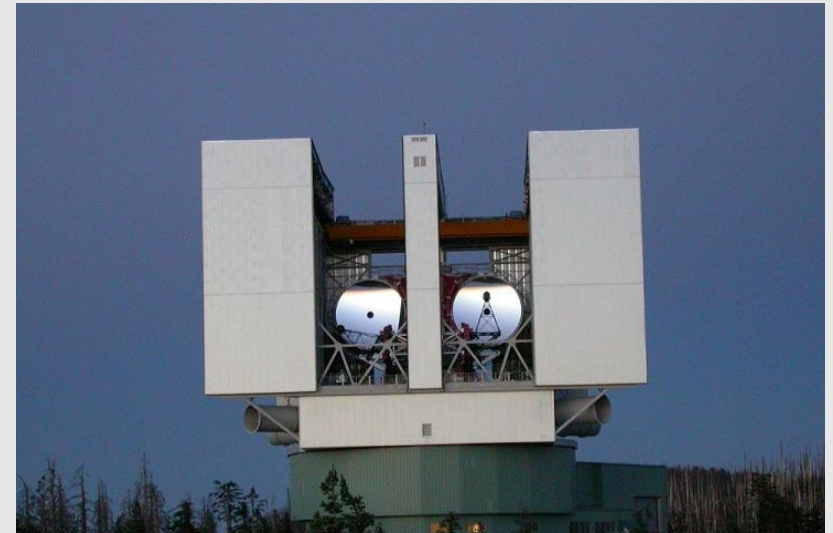
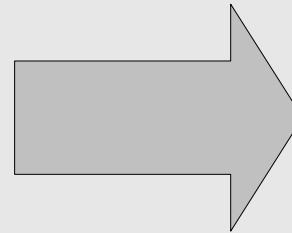
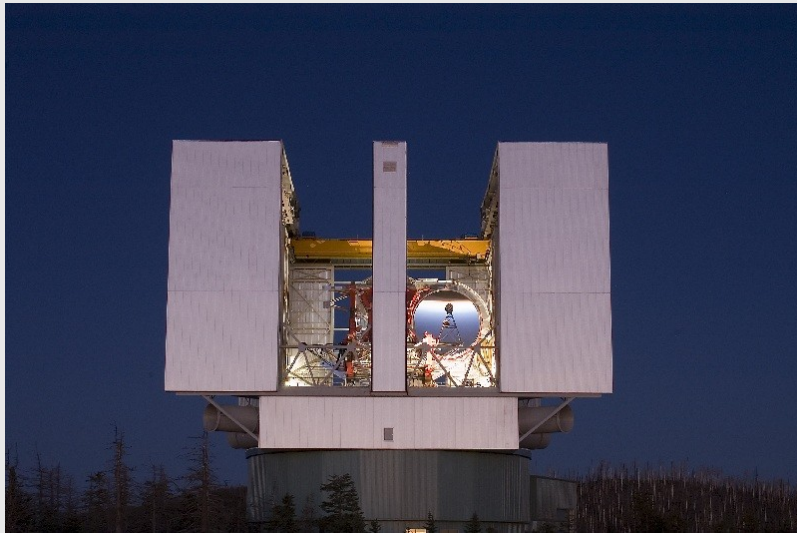


“mit dem Zweiten sieht man besser”

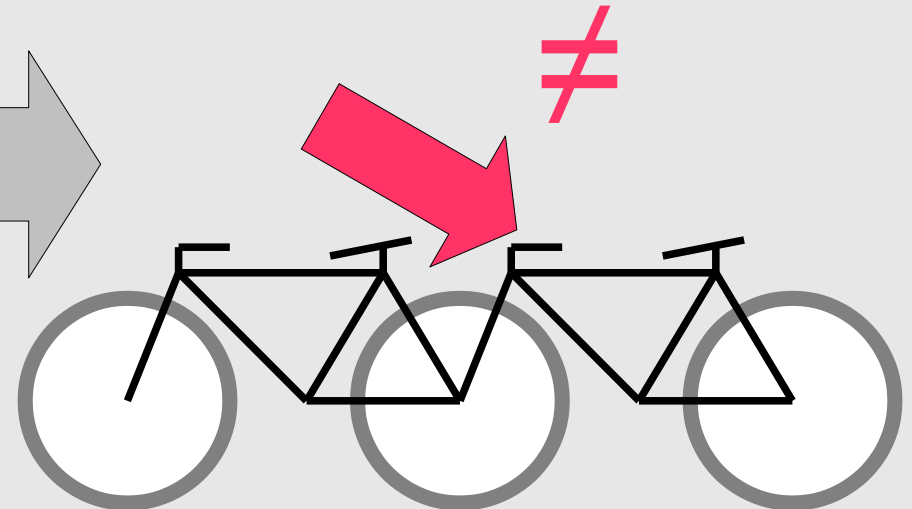
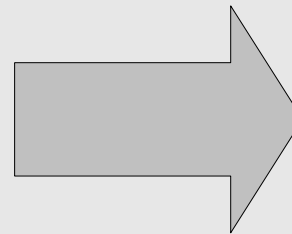
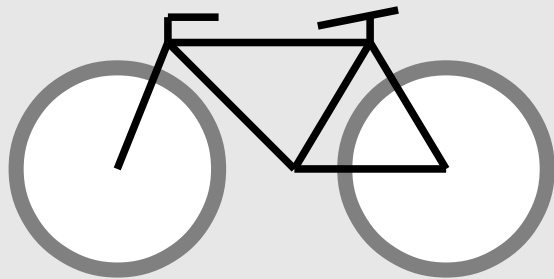
Witali Klitschko, 2003



The Challenges of Binocular Observations

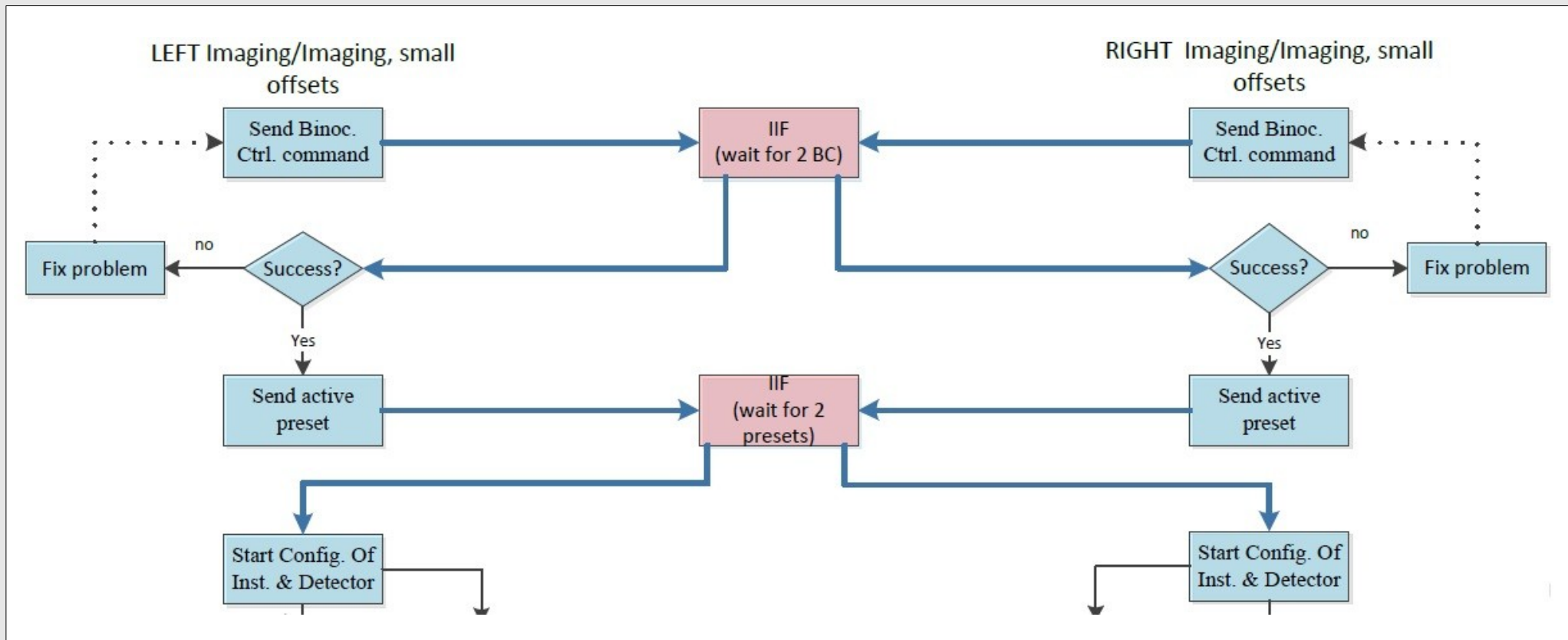


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The Challenges of Binocular Observations

- synchronization is done by telescope
- no scheduling / no data exchange
- two independent telescopes!



The Challenges of Binocular Observations

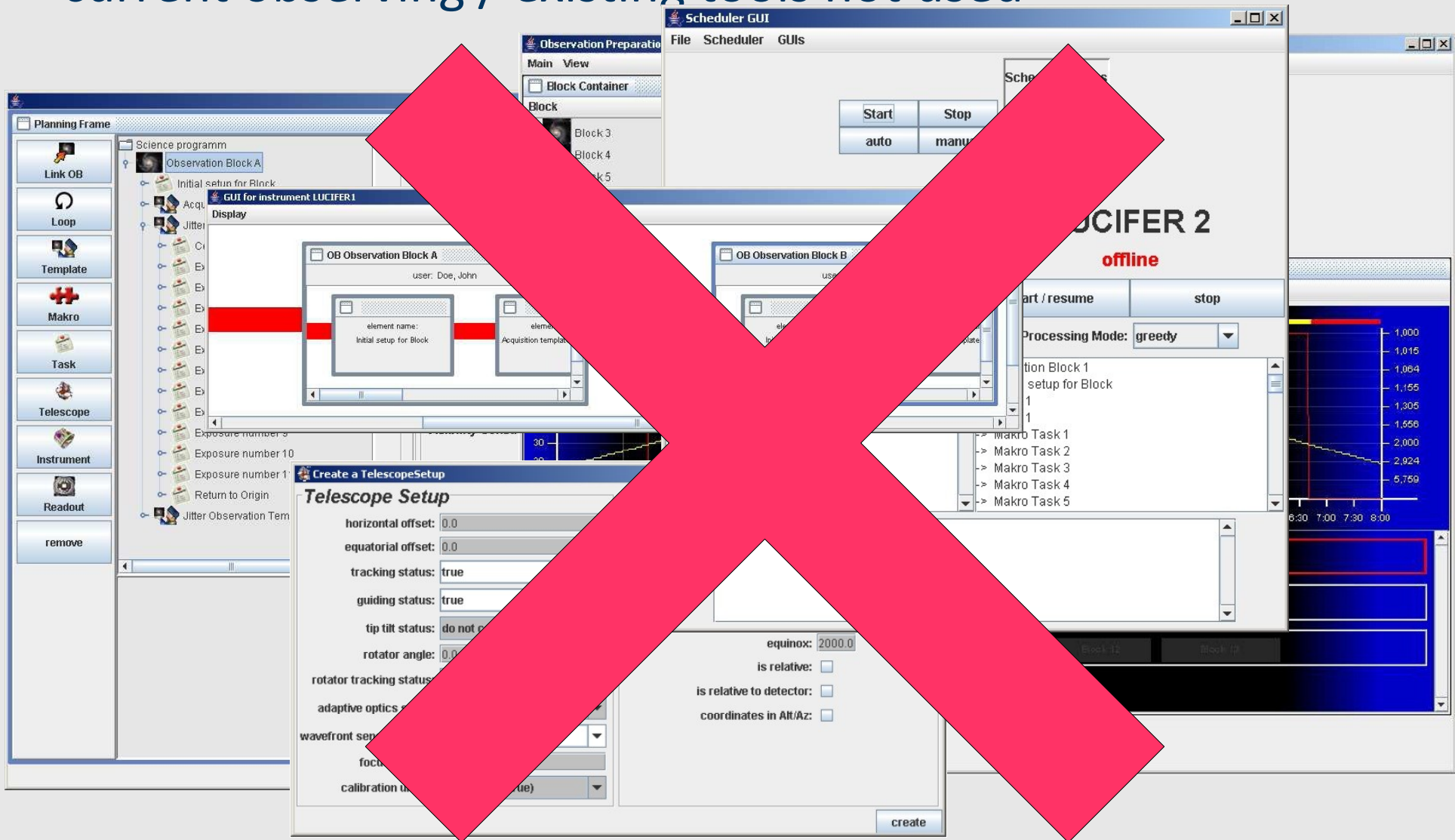
- current observing

The screenshot displays the 'Observation Preparation Tool For LUCIFER' software interface. It is divided into several main sections:

- Planning Frame:** A sidebar on the left with icons for 'Link OB', 'Loop', 'Template', 'Makro', 'Task', 'Telescope', 'Instrument', 'Readout', and 'remove'. The main area shows a tree view for 'Science programm' with 'Observation Block A' selected, containing sub-items like 'Initial setup for Block', 'Acquisition template for imaging', and 'Jitter Observation Template Rotated Sta'.
- Observation Description:** A central panel with fields for 'Block name: Observ', 'ID: vungzw', and 'comments:'. It also includes 'planned start time', 'planned end time', and 'Visibility Constr'.
- Block Container:** A list of blocks (Block 3 to Block 8) with a vertical stack of camera icons next to them.
- OB Information:** A table with columns 'block descripton', 'user', and 'additional info'. It shows 'priority: 10', 'start time: Wed Sep 27 20:01:00 CEST 2006', and 'end time: Wed Sep 27 21:23:20 CEST 2006'.
- Timeline:** A graph showing a parabolic curve representing the sun's path. The x-axis is time from 0:30 to 8:00. The y-axis is altitude from 30 to 90. Key events 'sunset' and 'sunrise' are marked. A green vertical bar highlights a specific time interval.
- Create a TelescopeSetup:** A dialog box with two tabs: 'Telescope Setup' and 'Pointing Setup'. The 'Telescope Setup' tab includes fields for 'horizontal offset', 'equatorial offset', 'tracking status', 'guiding status', 'tip tilt status', 'rotator angle', 'rotator tracking status', 'adaptive optics status', 'wavefront sensing status', 'focus position', and 'calibration unit in'. The 'Pointing Setup' tab includes 'angle alpha (RA / AZ / x-pixel)', 'angle delta (DEC / ALT / y-Pixel)', 'equinox', 'is relative', 'is relative to detector', and 'coordinates in Alt/Az'. A 'create' button is at the bottom.

The Challenges of Binocular Observations

- current observing / existing tools not used



The Challenges of Binocular Observations

- current observing

```
[ START_ARCHIVE_INFORMATION ]
PARTNER                =LBTB
PI_NAME                =ME
PROP_ID                =12345
[ END_ARCHIVE_INFORMATION ]

[ START_INSTRUMENT_SETUP ]
CAMERA                 =N3.75
FILTER                 =clear
GRATING_UNIT           =mirror
MASK_POSITION          =no_mask_in_use
FLEXURE_COMP           =on
[ END_INSTRUMENT_SETUP ]

[ START_TELESCOPE_SETUP ]
TARGET_NAME            =zero-position
TARGET_COORD           =00 00 00.0 +00 00 00.0
GUIDE_NAME             =NOMAD090_06_R16.42_d3.8
GUIDE_COORD            =00 00 04.77 +00 03 34.6
POSANGLE               =0.0
ROT_MODE               =position
TELESCOPE_MODE         =active
[ END_TELESCOPE_SETUP ]

[ START_READOUT_SETUP ]
DIT                    =10
NDIT                   =1
NEWFO                  =4
```

```
>_ ./executeLUCI1Script.sh my_observation.txt
```

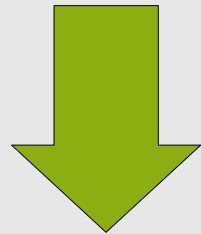
```
OFFSET_TYPE            =relative
COORD_SYS              =DETXY
[ END_OBSERVING_SETUP ]
```

The Challenges of Binocular Observations

- if everything is ok, binocular observations are easy,

but...

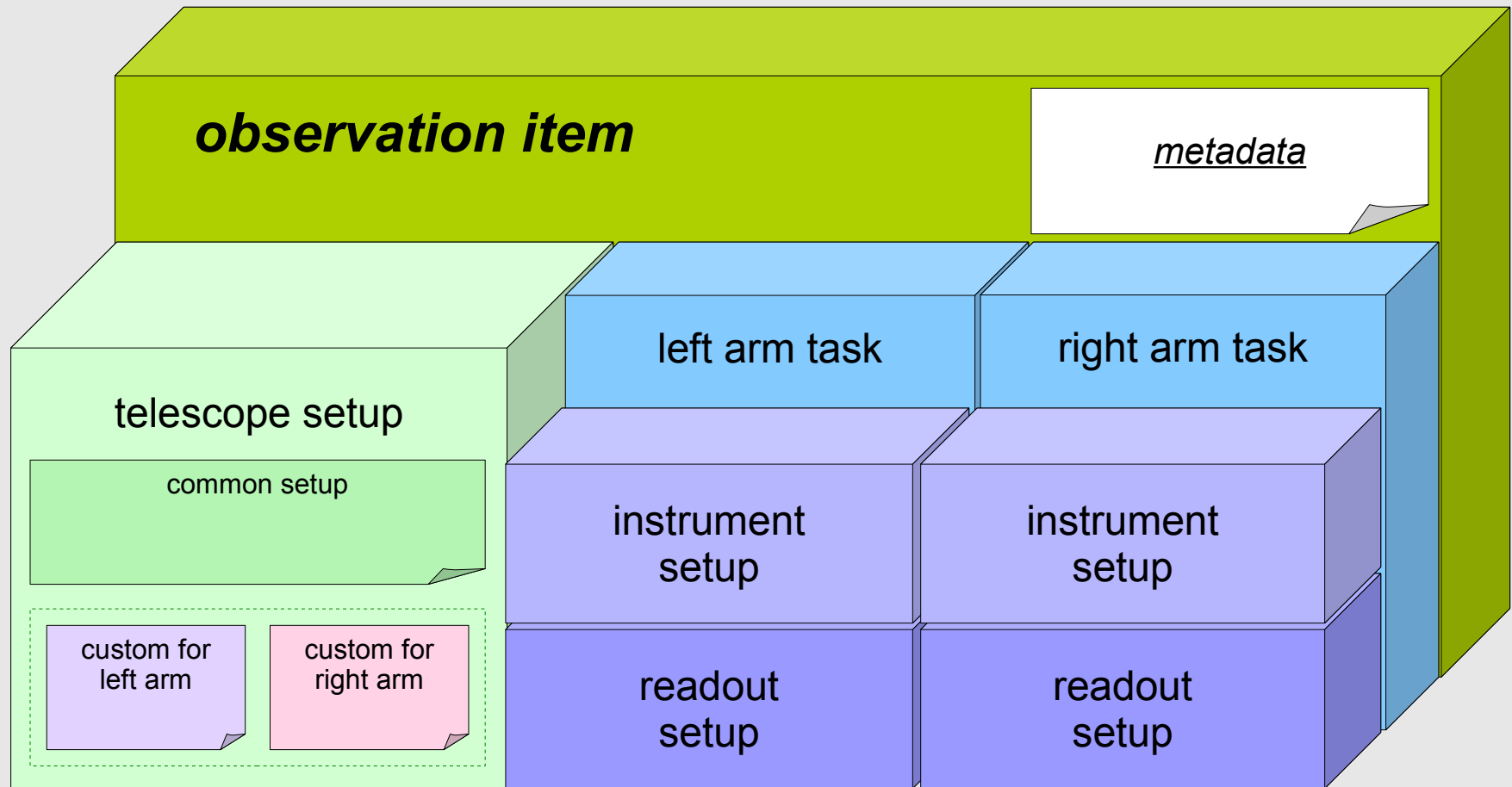
- how do we execute scripts in parallel?
- how do we synchronize actions?
- how can we determine what went wrong?
- what can we do in case of failures / error?



- currently all complexity is shifted to preparation phase!

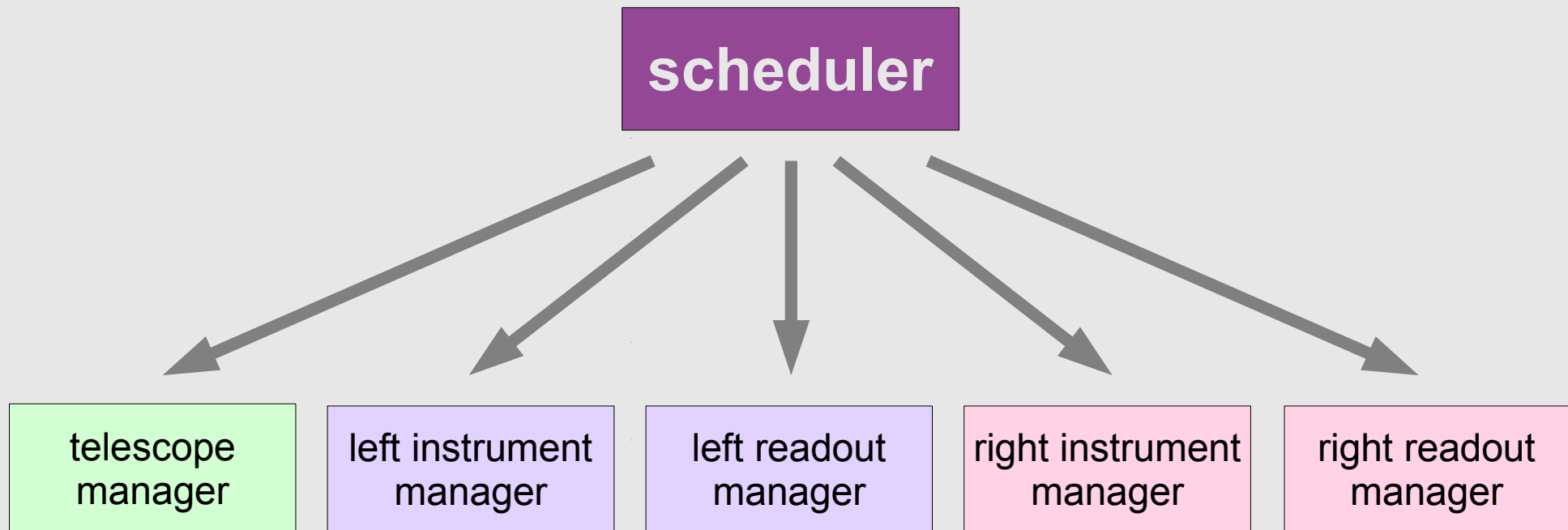
The Challenges of Binocular Observations

- a new data structure to describe observations



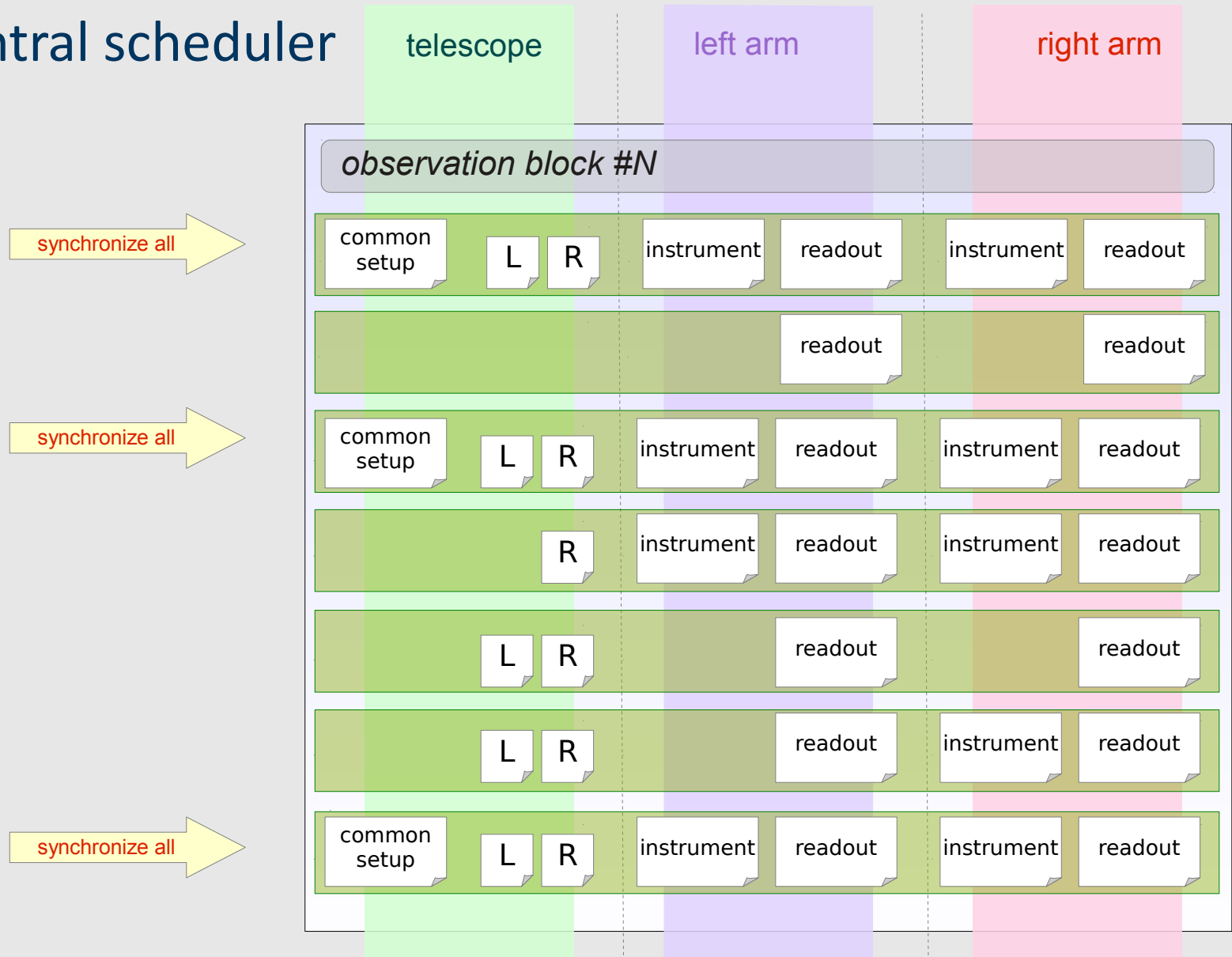
The Challenges of Binocular Observations

- a new central scheduler







The Challenges of Binocular Observations

- a new central scheduler



The Challenges of Binocular Observations

- to solve the issues we need:
 - new manager for instrument, readout and telescope 
 - a central scheduler 
 - a different way of describing observations 
 - an observation preparation tool 

visit us at the poster: Pramskiy + Polsterer