Upgrade of the OCM Observatory

New Control Software

CAMK Annual Meeting
2024

presented by:
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Araucaria PROJECT

OCA - set up, software environment & observers

I speaker:

Marek Górski

Member of the Araucaria Project

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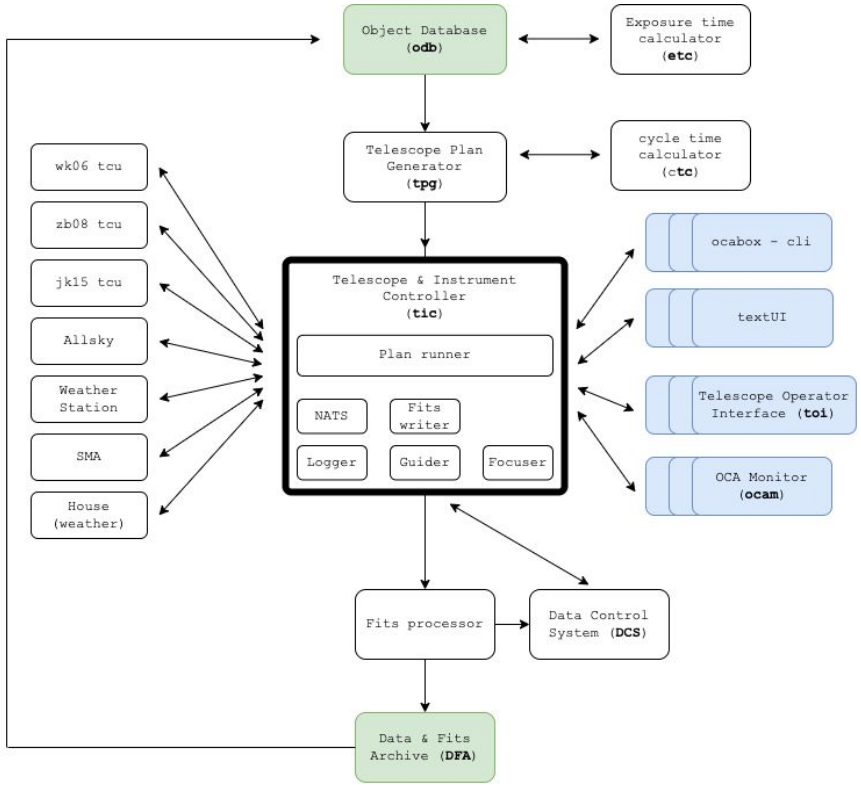
ASA training, installation, testing CCD, testing mount & components, network set-up, learning ASA, Andor (**SDK**), searching available technologies, **constant troubleshooting**

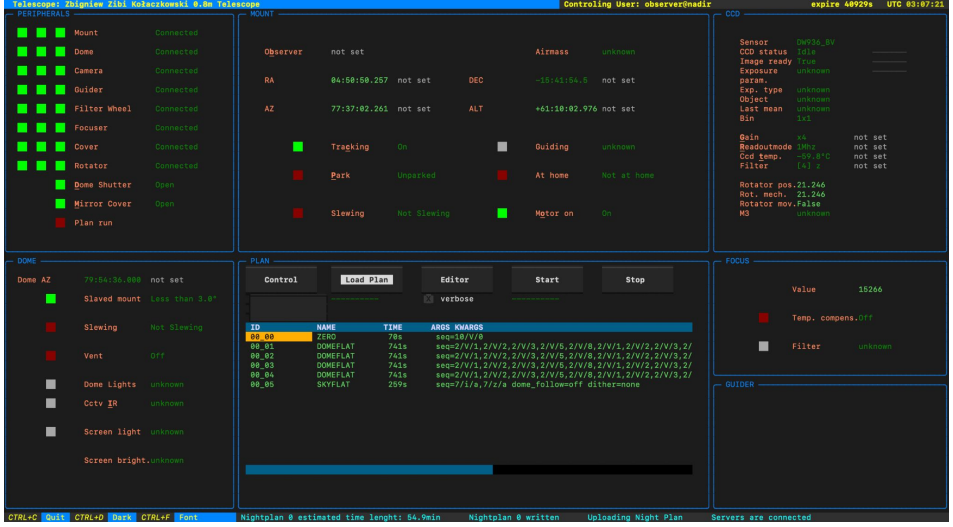
- cooperation with **all observers**
- **admins** (Krzysiek, Artur, Staszek, Przemek)
- Ernest Lasek, Piotr Wielgórski, Wojtek Pych

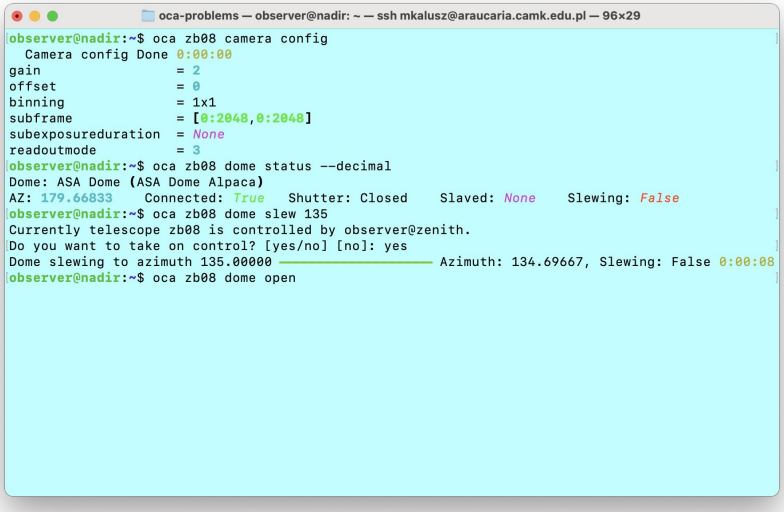
Complexity of OCM software



challenges - boundaries

- only **2 observers** for **5 telescopes**
- operator-focused control room
- remote control room (camk)
- **70** computers & VM's
- **30** systems
- ASA mount (alt-az, eq), Halfman
- optical CCD, NIR CCD, spectrometer
- different observing programs
- **fully automated** and fully remote software need
- existing software solutions do not meet our needs

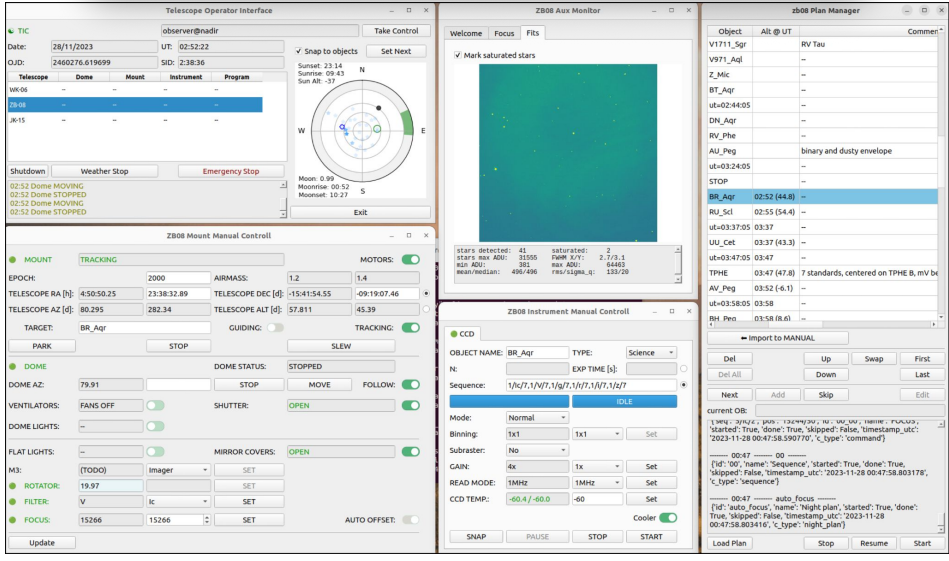




toi, textUI, ocabox-cli

- fully manual
- subsystem automation (guider, focus, sequence)
- fully automatic
- intuitive & user-friendly

normal-operations, **tests & troubleshooting**
(remote-access, system-isolation)




Another speaker:
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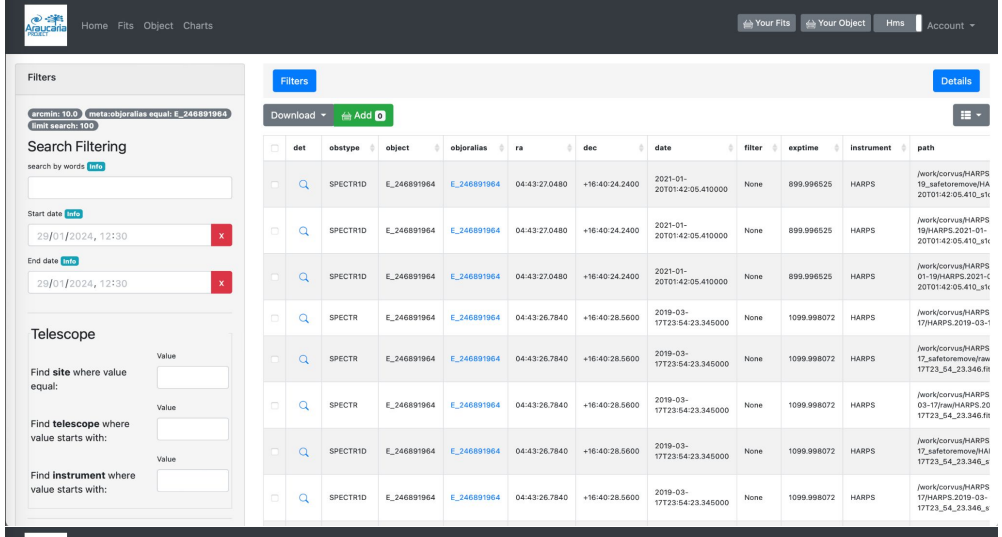
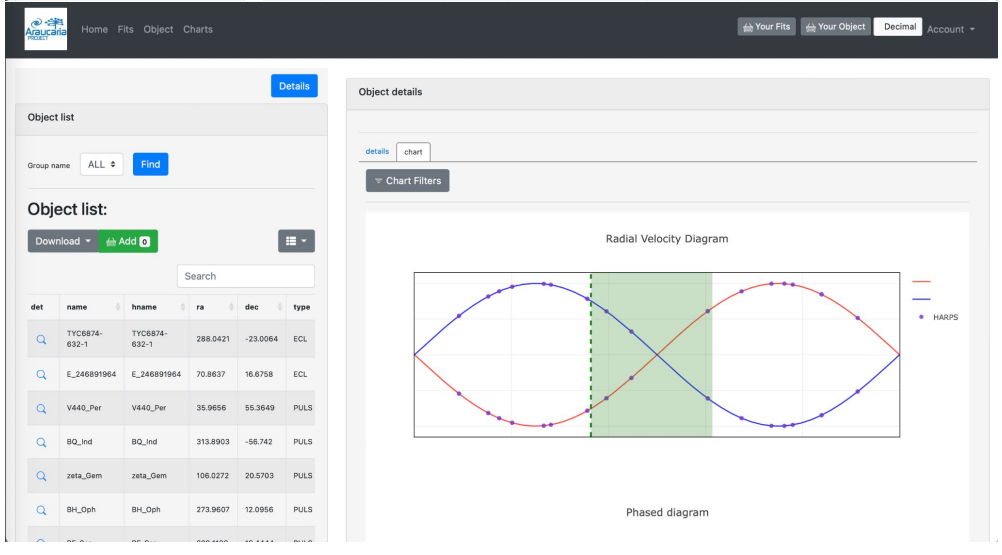
///AkondLab.

Araucaria Database

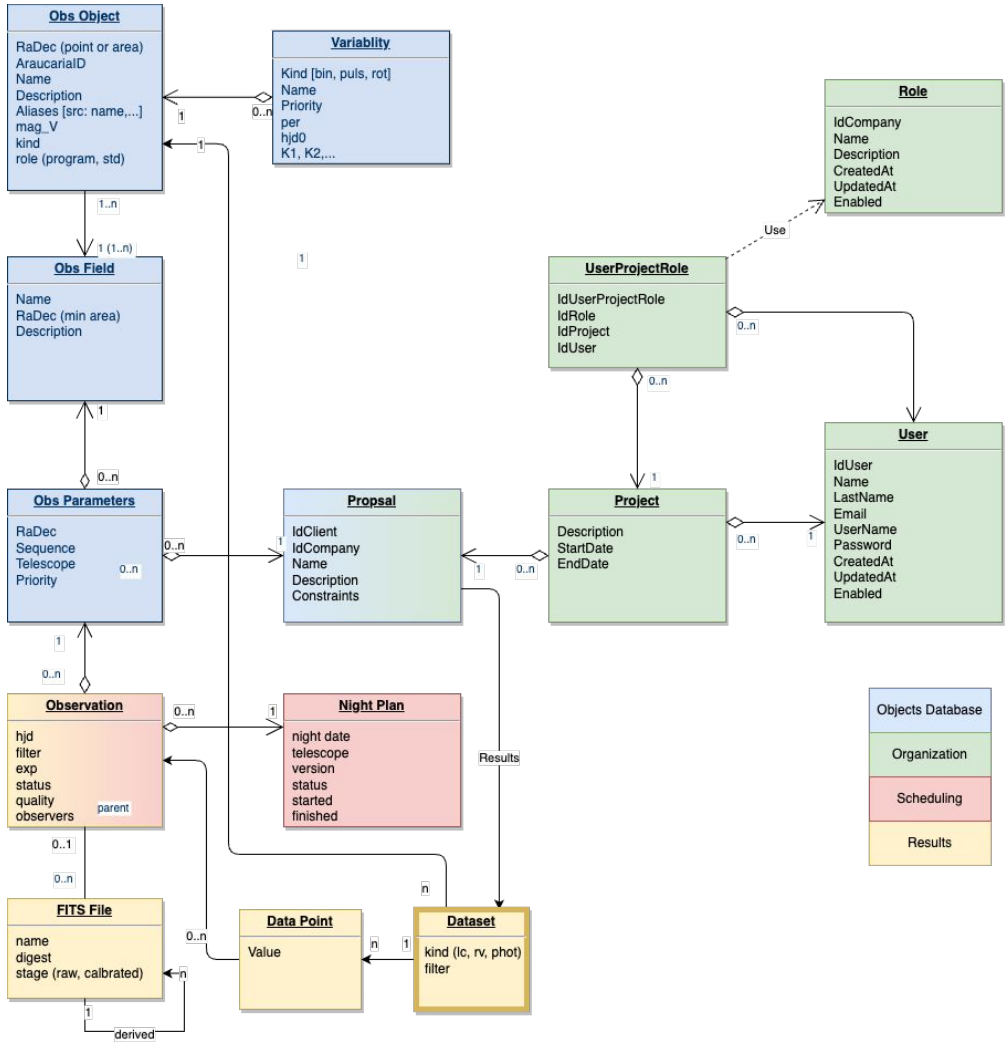
- **FITS Indexer:**
  Scans entire araucaria disk space for FITS files
  Calculates unique digest and discovers duplicates
  Determines instrument-independent metadata
- **FITS Database:**
  Stores and presents FITS files data
- **Object Database:**
  Stores and presents astronomica targets
- **Coverage Charts:**
  Plots phase coverage charts and timelines for targets, based on FITS files *hjd*





Araucaria Database

- **FITS** Database (existing): RAW, Calibrated, Spectroscopic
- **Objects** (existing): Targets, Fields, Variability
- **Organization**: Projects, Proposals, People
- **Scheduling**
- **Results**: Curves, Field photometry



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IT Architecture Foundations

- **Autonomy** - state of the internet connection does not affect operations
- **Modern** solutions and technologies - no technical debt
- **Python** language - as the programming language our group is familiar with
- **Container-ready Microservice** architecture
- **Redundancy** - no single point of failure thanks to distributed architecture
- **Local/Remote** - control rooms in Observatory and CAMK
- **Open Source** Software (MIT license). Universal software for different kinds of observatories
- Drivers for various telescope interfaces: **ASCOM**, ACS (Alma Common Software), INDI

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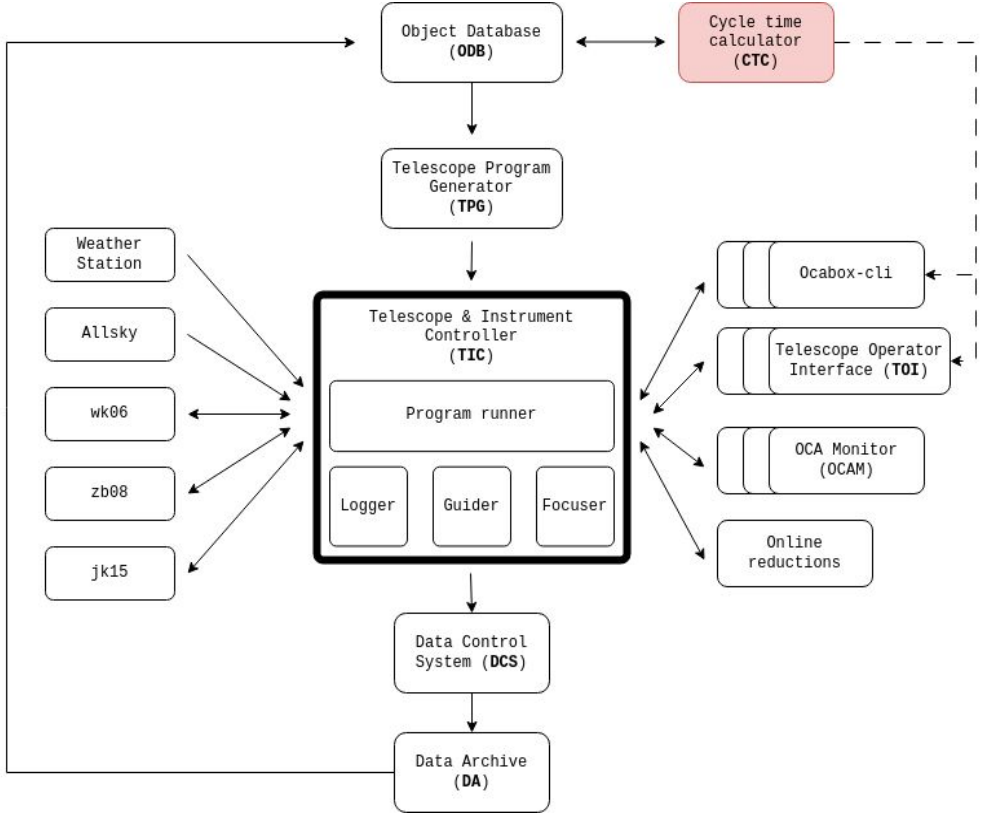
OCM software development

We are finishing the first iteration of software development, necessary to perform observations:

- Telescope and peripheral communications
- Night plan runner (new syntax)
- Graphical user interfaces (GUI)
- Remote operating
- Observations scheduler



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Visualization and preliminary data analysis

source: pixabay

The multitude of tools allows observers to simply and easily track simultaneous observations and verify the collected data. If they are occupied at observation time reporting and communication system allow to make “quick look” on parameters and if needed they have more detailed and specialized summary reports.

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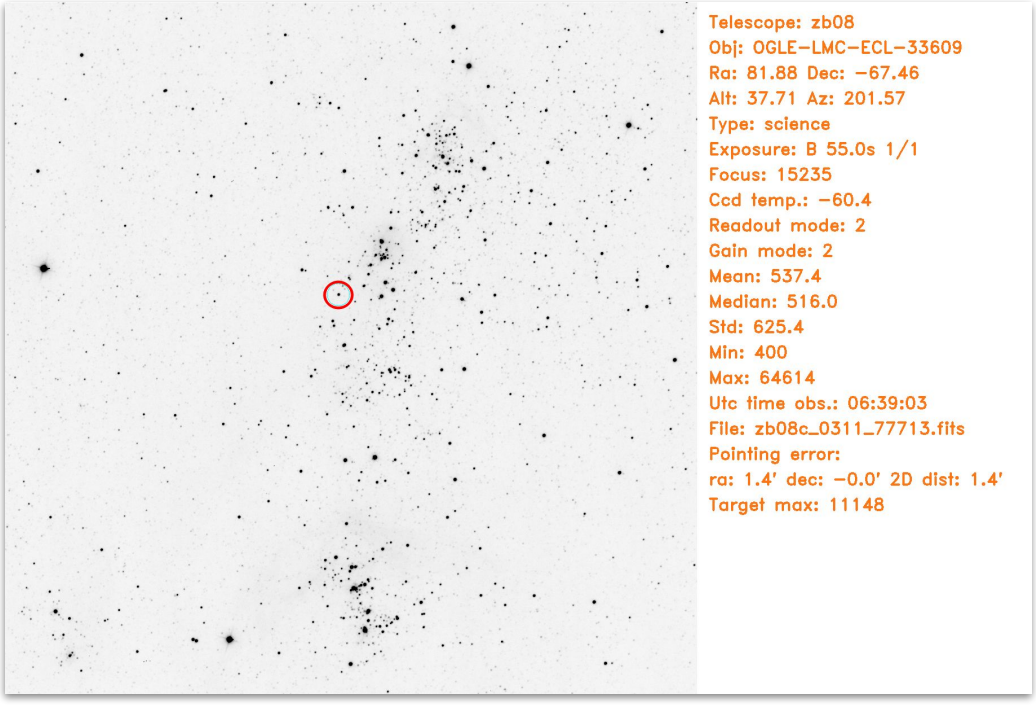
Real-time data processing

Gives observers and data users greater opportunities to easily control massive amounts of data, without unnecessary workload:

- Parameters display
- Telescope pointing verification
- Target saturation verification
- Instrumental calibrated images
- Photometry and light curves (ongoing)



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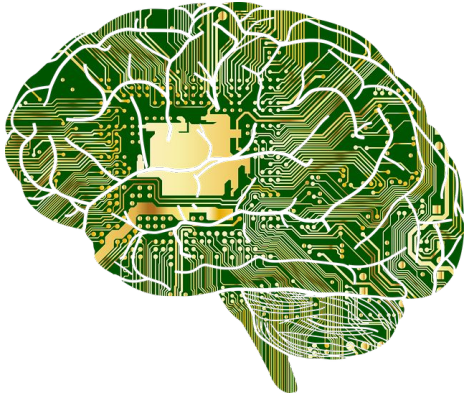
Machine learning and other modern analytics methods



source: pixabay

- Predicting Telescope Cycle Time
- Scheduling observations
- Automatic rating calibration and science data
- Faster and more reliable calibration and reduction methods
- Use of computer vision and object analysis
- other

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