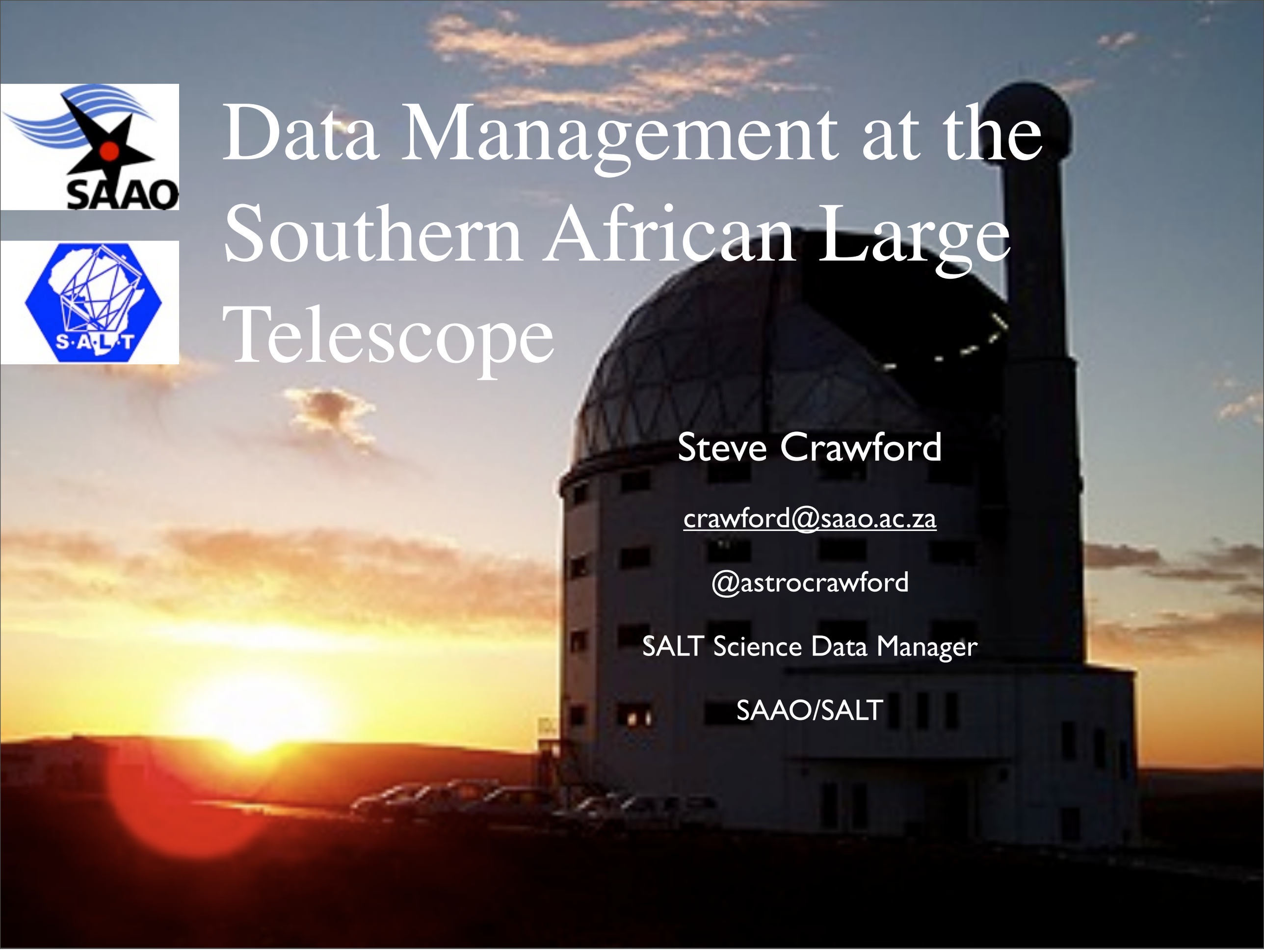


Data Management at the Southern African Large Telescope

Steve Crawford

crawford@saao.ac.za

@astrocrawford

SALT Science Data Manager

SAAO/SALT

Southern African Large Telescope

Description

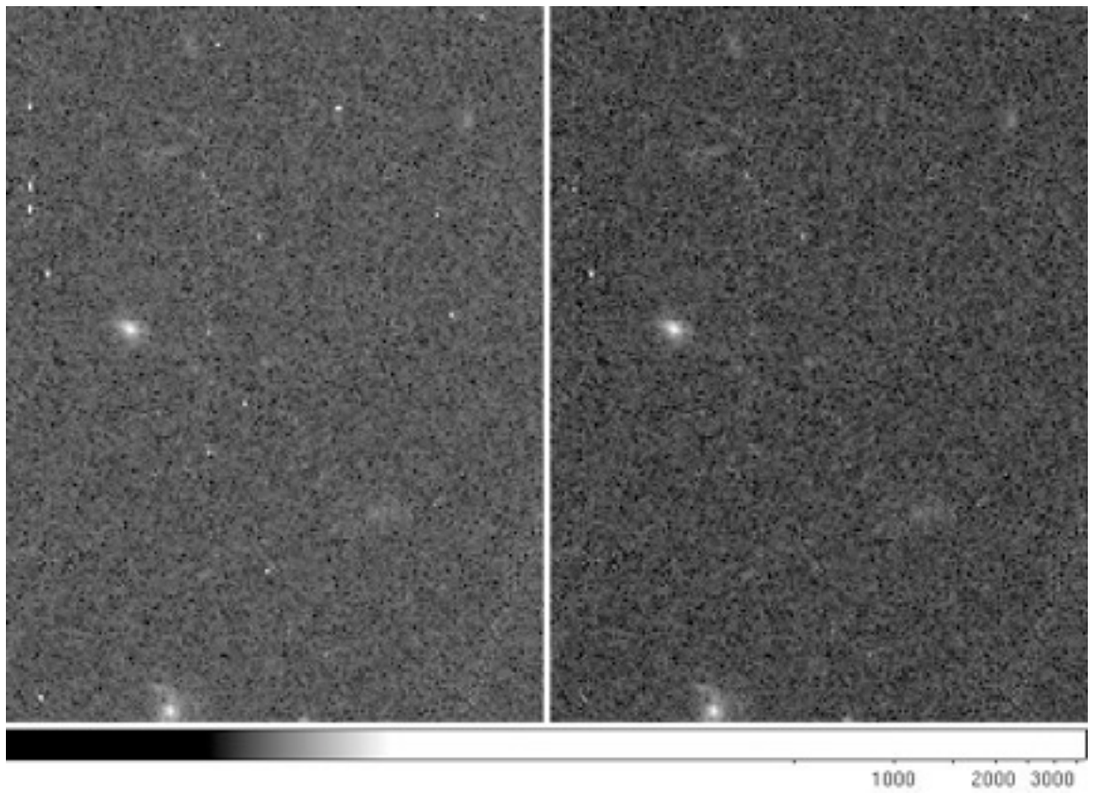
- Located in Sutherland South Africa
- 91 1m segments for 11m diameter
- fixed elevation

Advantages

- Economical
- Entirely Queue based
- Spectroscopic telescope
- Designed to explore the time domain

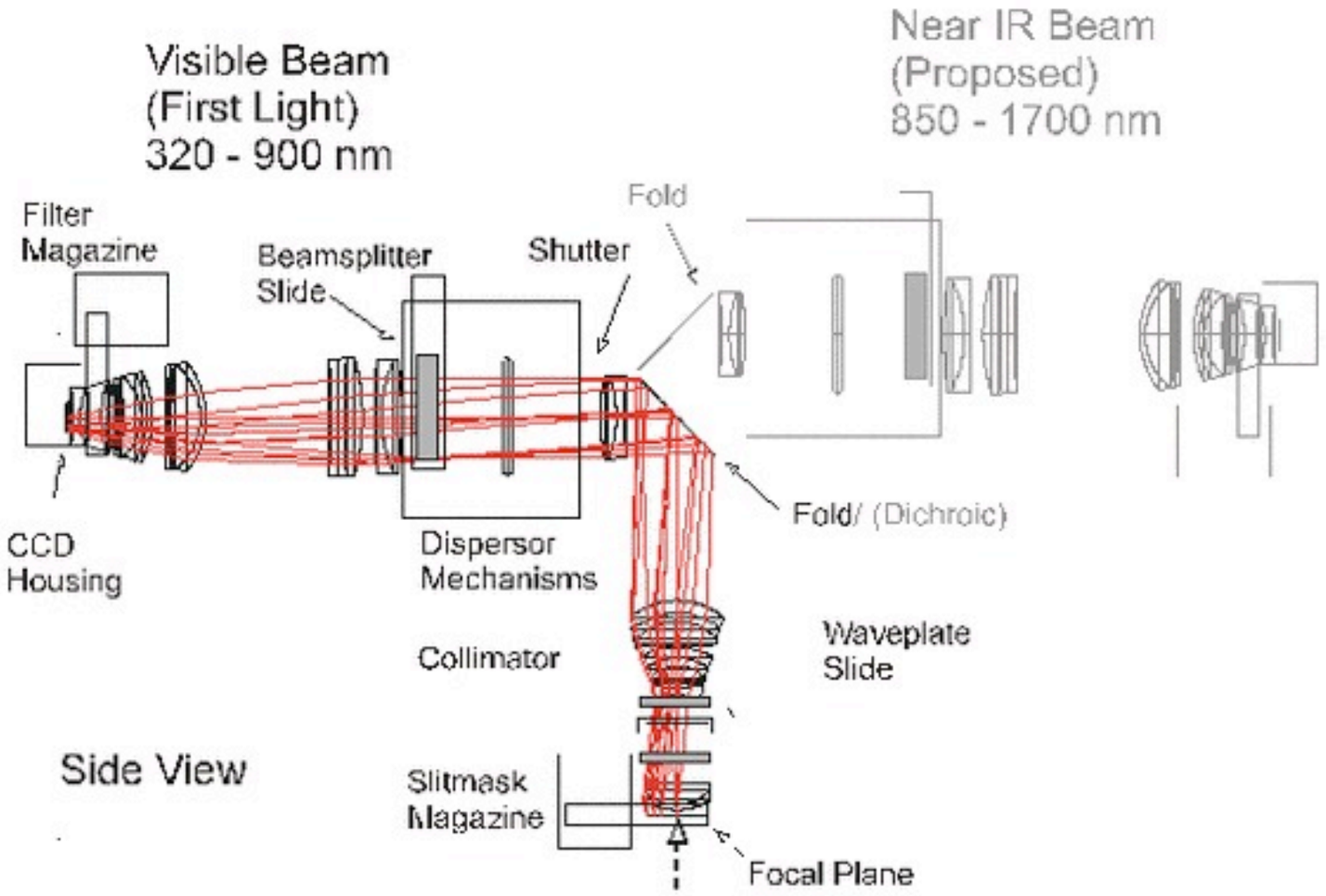
SALTICAM

Multi-mode imaging and acquisition camera. In full-frame mode, it has an 8x8' FOV. In slotmode, high-speed photometry (20 Hz) can be performed over a smaller field of view.



Darragh O'Donoghue

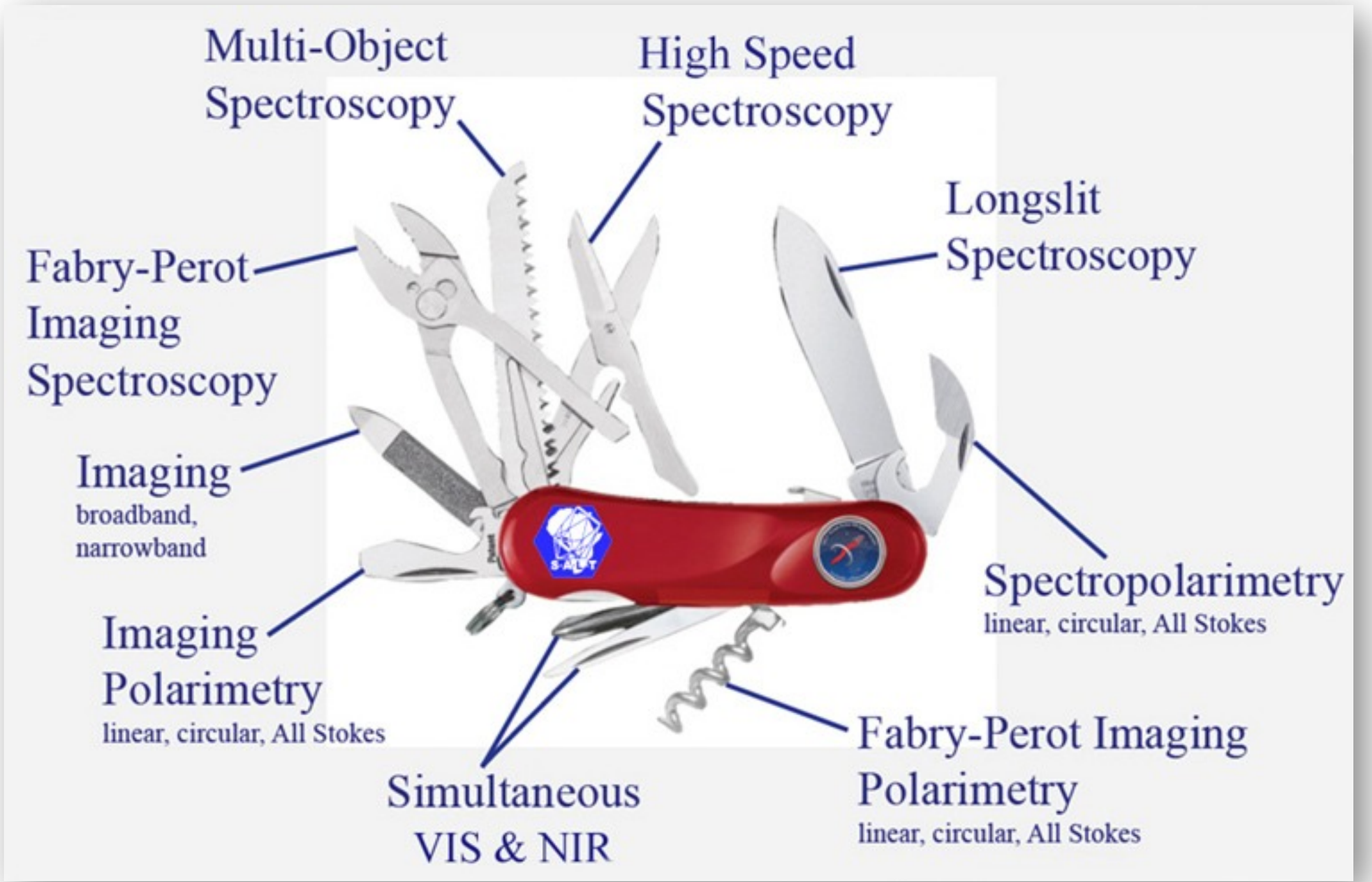
Robert Stobie Spectrograph



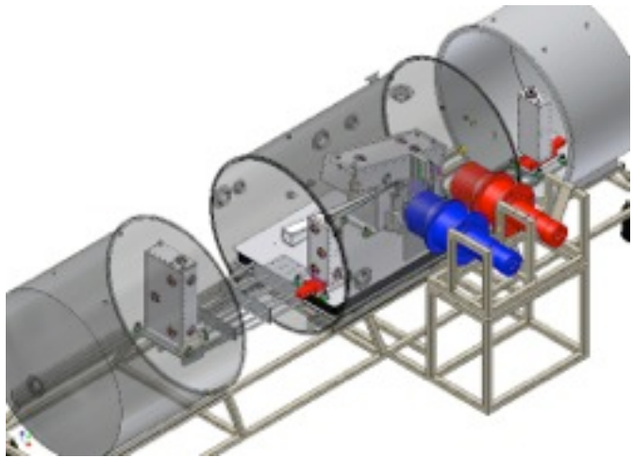
Highlights of RSS:

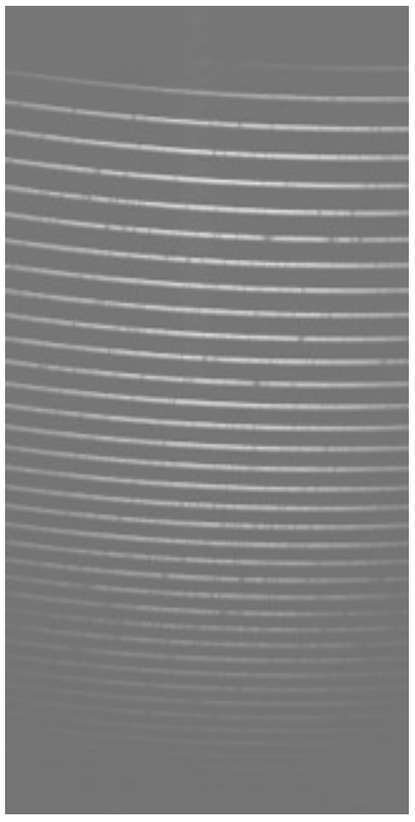
- UV Spectroscopy down to 3200 Å
- High throughput and resolution VPH gratings
- Fabry-Perot Modes
- Polarimetry
- High Speed

Ken Nordsieck, Ted Williams


Multi-Object
Spectroscopy
High Speed
Spectroscopy
Longslit
Spectroscopy
Fabry-Perot
Imaging
Spectroscopy
Imaging
broadband,
narrowband
Imaging
Polarimetry
linear, circular, All Stokes
Spectropolarimetry
linear, circular, All Stokes
Simultaneous
VIS & NIR
Fabry-Perot Imaging
Polarimetry
linear, circular, All Stokes

High Resolution Spectrograph



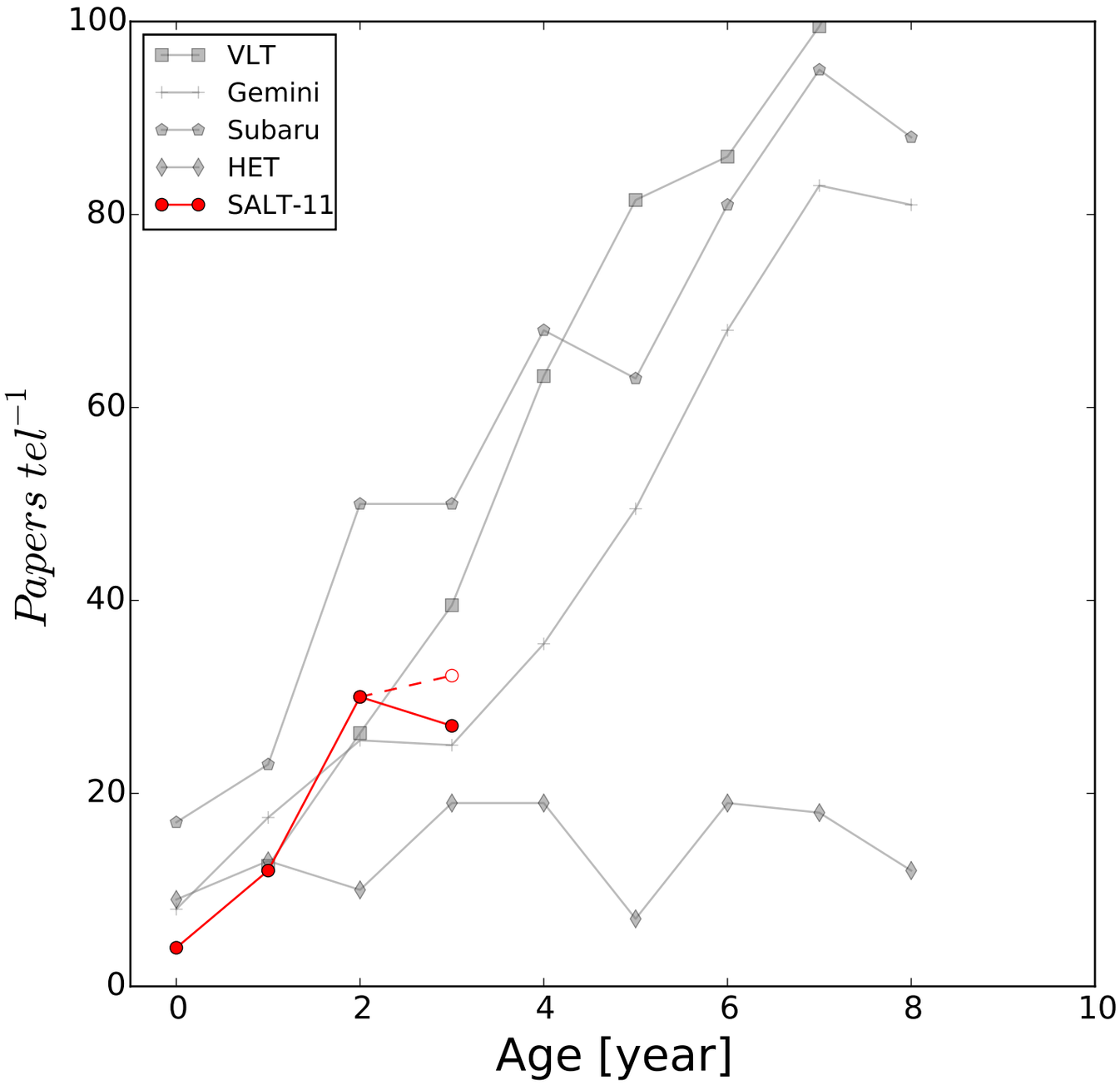


	High Resolution Mode	Medium Resolution Mode	Low Resolution Mode	High Stability
Fiber Diameter (arcsec)	1.56	2.23	2.23	1.56
Resolution	66800	37000	16200	66800
S/N~10 in 1800s exposure	16.5	17	18	15

PI: Ray Sharples

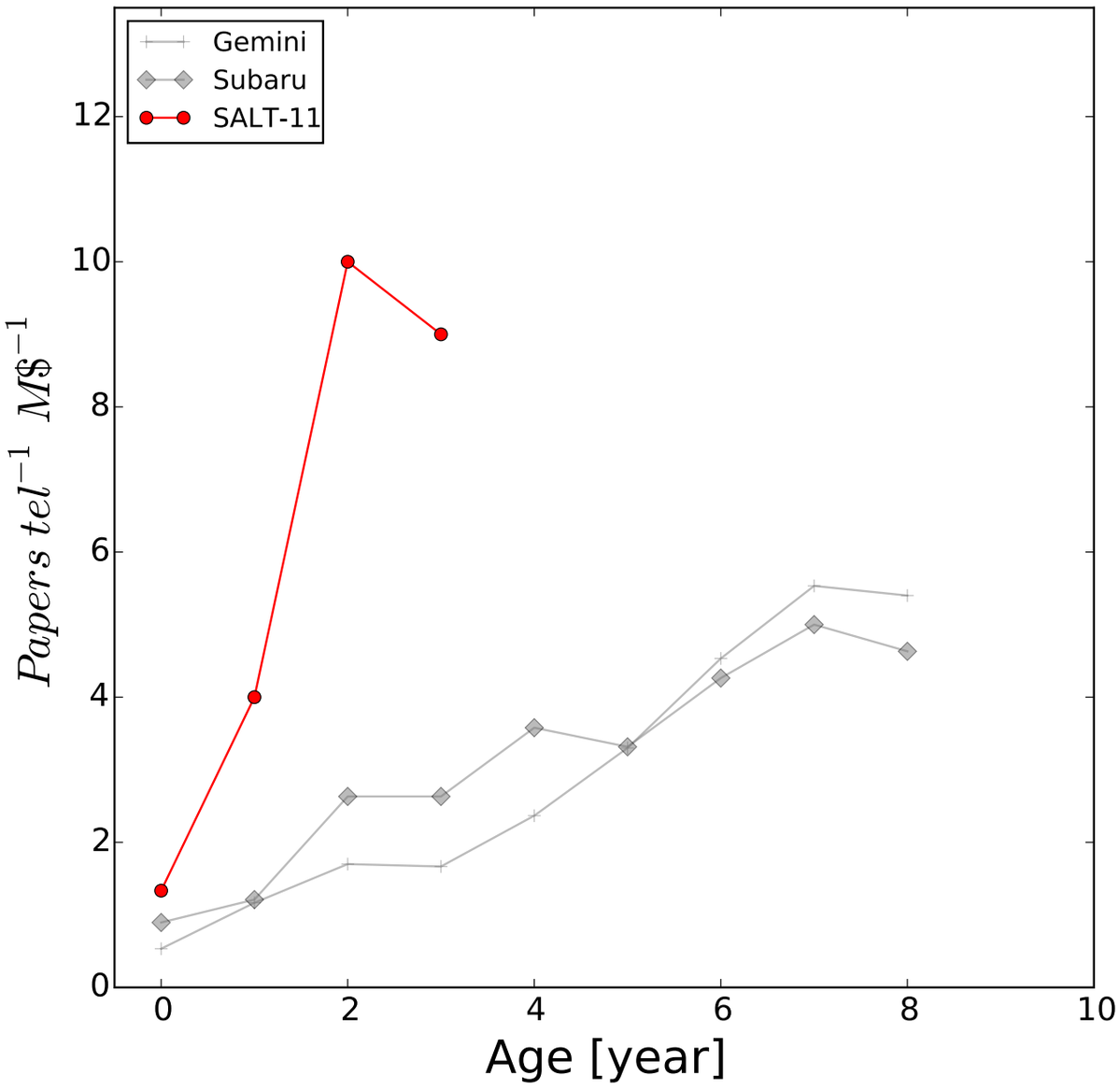
Scientific Productivity

Papers since the start of Science Operations



Scientific Productivity

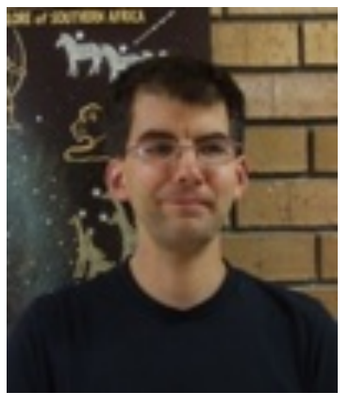
Normalized by operations cost



SALT's Impact Factor = 8.25

Astronomy Operations

- Head of AstroOps: Petri Vaisanen
- SALT Astronomers: Alexei Kniazev, Encarni Romero-Colmenero , Paul Kotze, Brent Miszalski, Eric Depagne
- SALT Science Data Manager: Steve Crawford
- User Software: Christian Hettlage
- IT Archive Support: Garith Dugmore



SALT Data Management

I. Preserve and archive the data
II. Rapid deliver of the data to the partners in the most useful form possible
III. Provide tools to make the most unique modes of SALT accessible
IV. Monitor the status of the telescope
V. Provide training to the community

How do we do this?

I. Open Source, generalized software but do not re-invent the wheel

II. Prioritize on delivering our data

III. Rely on our community for contributions and quality control

IV. Provide opportunities for contributions

V. Virtualize everything

Data Delivery

1.Partners located around the world

2. SALTFIRST runs during the night -- quick look reductions and makes the data available in real time

3.Data Pipeline

-Run at 10 am next day

-reduced data made available via ftp

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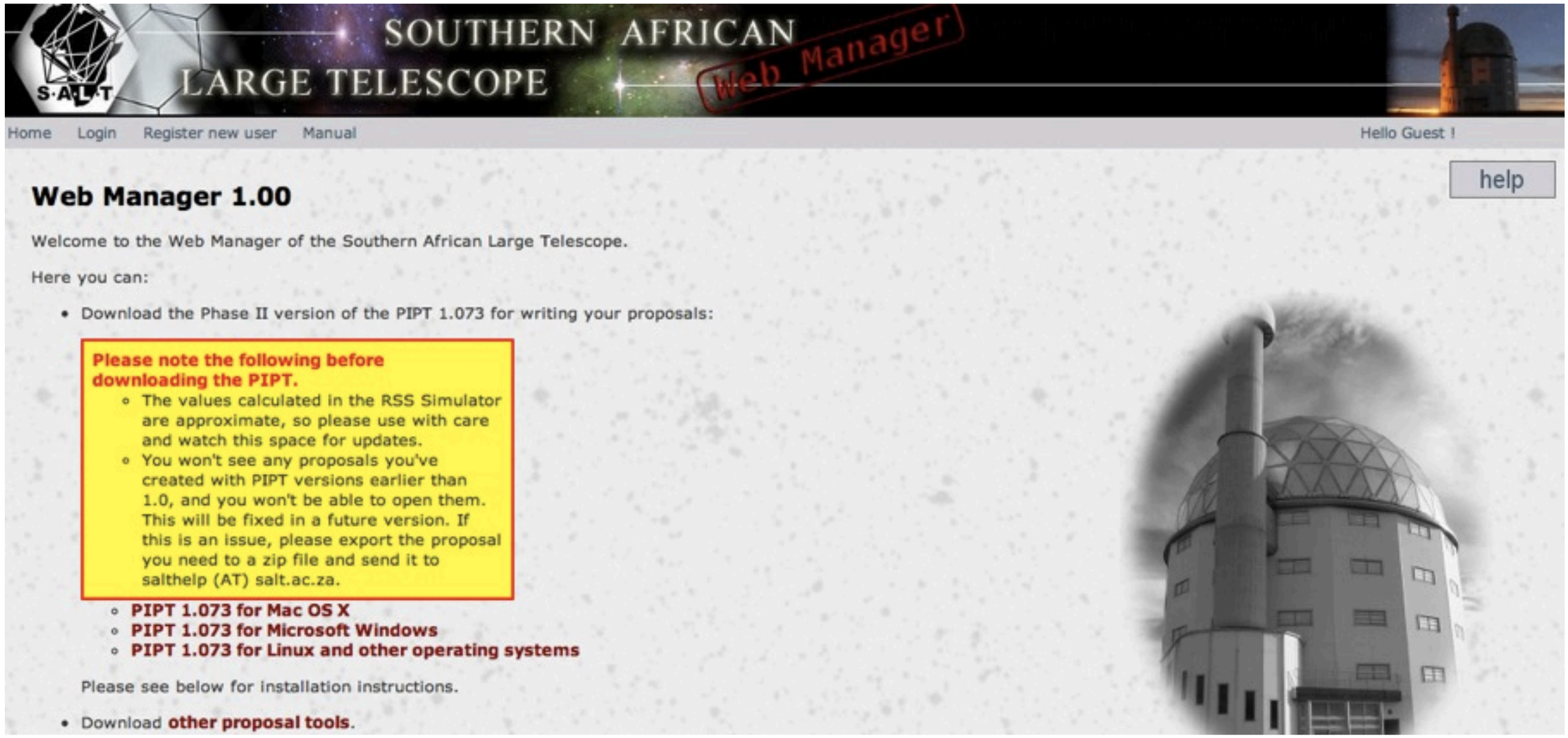
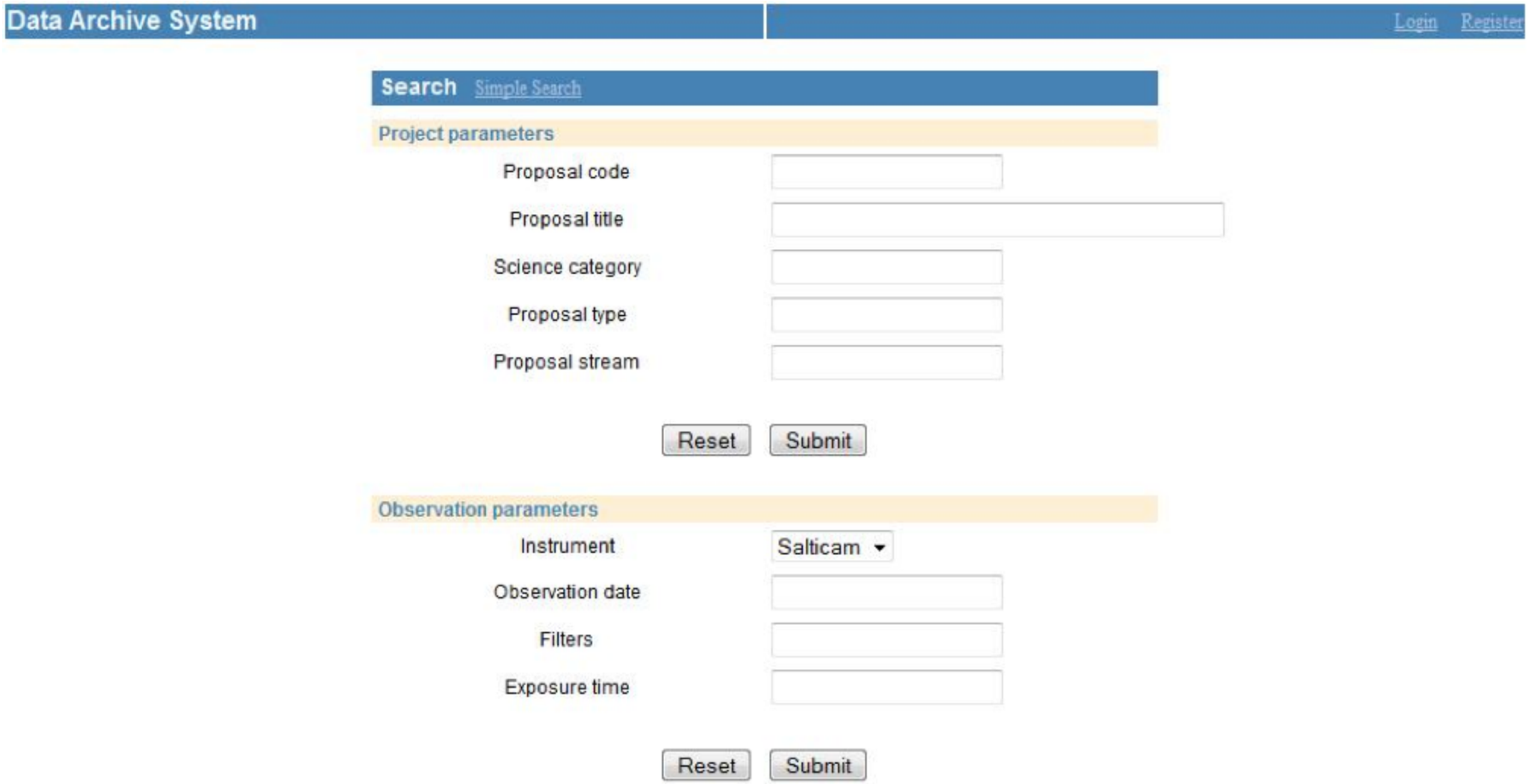
Web Manager



Web Manager--php web interface to the science databased. It is designed for use by both the SALT astronomers and the user community.

SALT-DAS



SALT-DAS--Developed by VO India to provide interface for archival data

PySALT v0.47

PySALT is the Python/PyRaf software package for SALT data reduction and analysis. The next version of PySALT package includes:

PIPETOOLS
Tasks to automate running the pipeline

SALTRED
Basic CCD data Reductions

SLOTTOOLS
Slotmode photometry And analysis tools

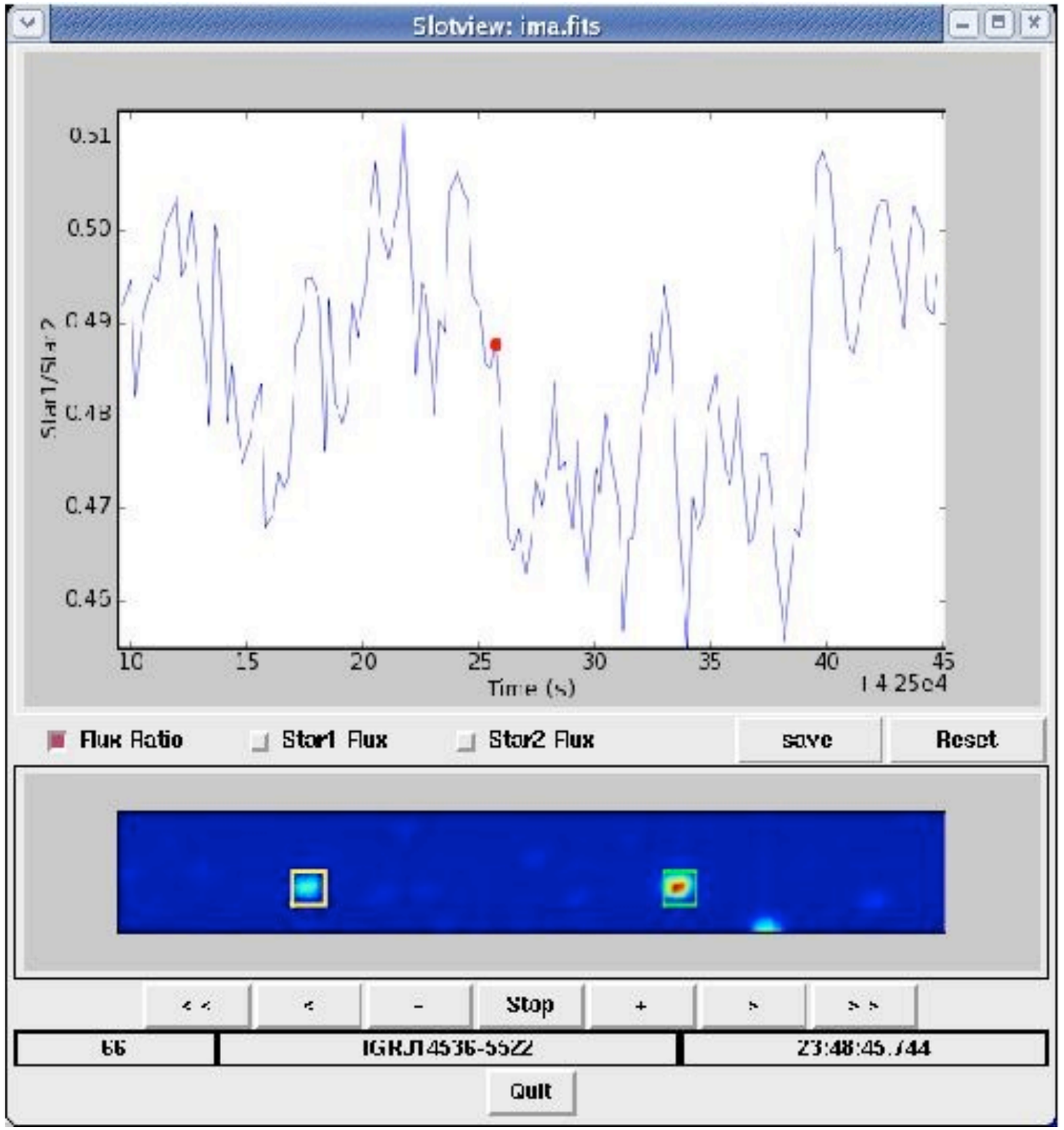
SPECTOOLS
Tools to provide wavelength and flux calibrated data

FPTOOLS
Fabry-Perot related software (still in development)

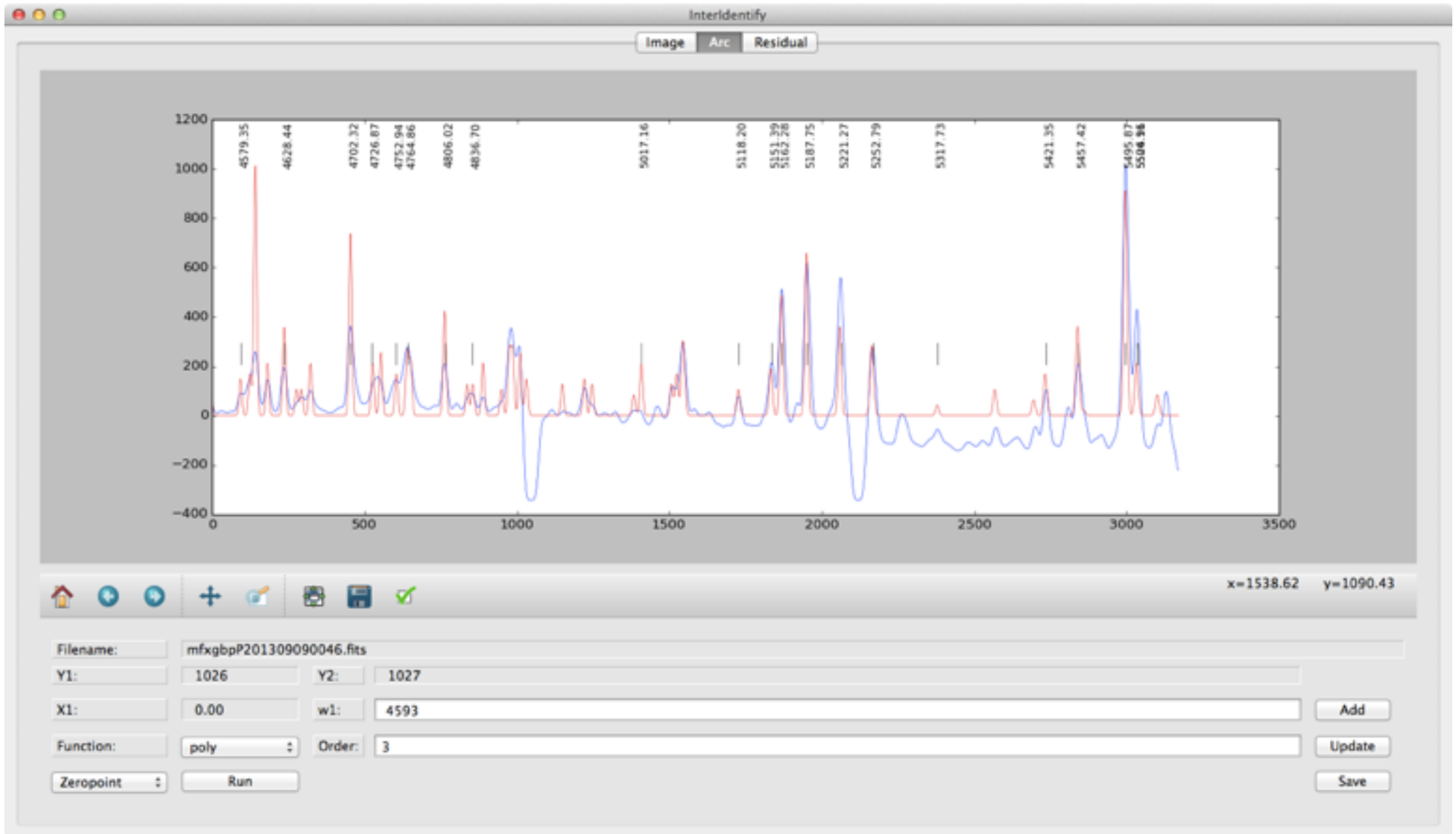
pyhrs
Tools for the high resolution spectrograph

http://www.pysalt.salt.ac.za/
https://github.com/saltastro/pysalt

User Tools


Slotview: ima.fits
0.51
0.50
0.49
0.48
0.47
0.46
Star1/Star2
10
15
20
25
30
35
40
45
Time (s)
1.4 25e4
Flux Ratio
Star1 Flux
Star2 Flux
save
Reset
Stop
66
IGRJ14536-5522
23:48:45.744
Quit

Long-Slit Reductions



Open Source..and Generalized

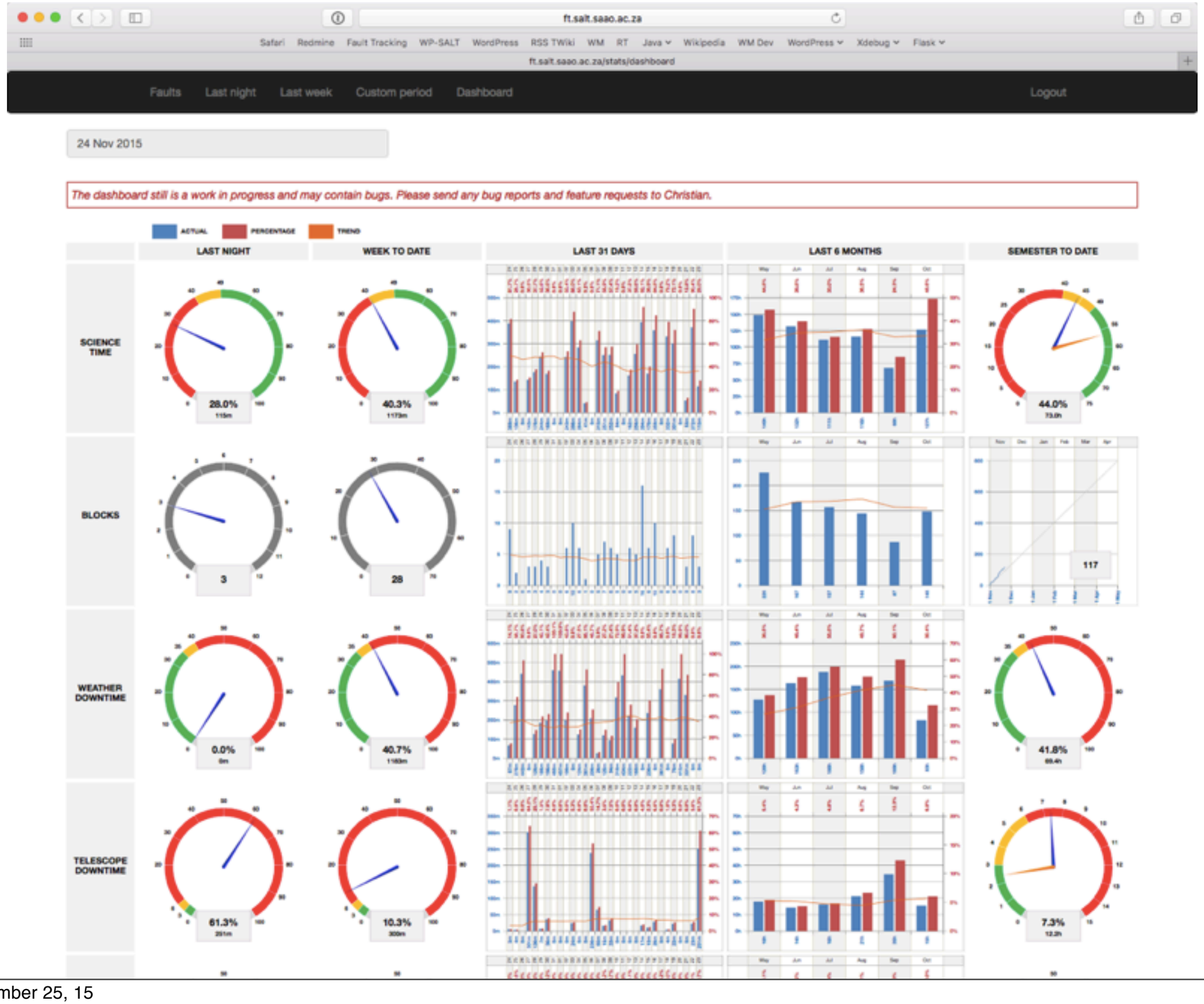
ccdproc: Astropy affiliated package for reducing optical/IR CCD data

specreduce: Reduction software for data from optical spectrographs

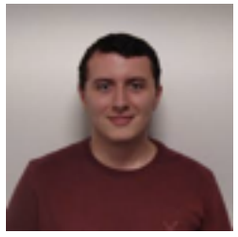
PySpectrograph: Models for optical spectrographs

All code available on github and contributions welcomed!

Data Monitoring



Community



Lessons Learned

I. Build on Previous Work

II. Pipelines = Papers

III. Community, Collaboration, and Sharing

Summary

With the small operations cost, full service mode, availability of reduced data, SALT is a cost effective observatory.

SALT leverages existing software and user expertise to provide a range of services with the help from a very small operations team.