TIPS AND TRICKS WHEN USING SALT

WITH CHRISTIAN HETTLAGE AND ENCARNI ROMERO COLMENERO

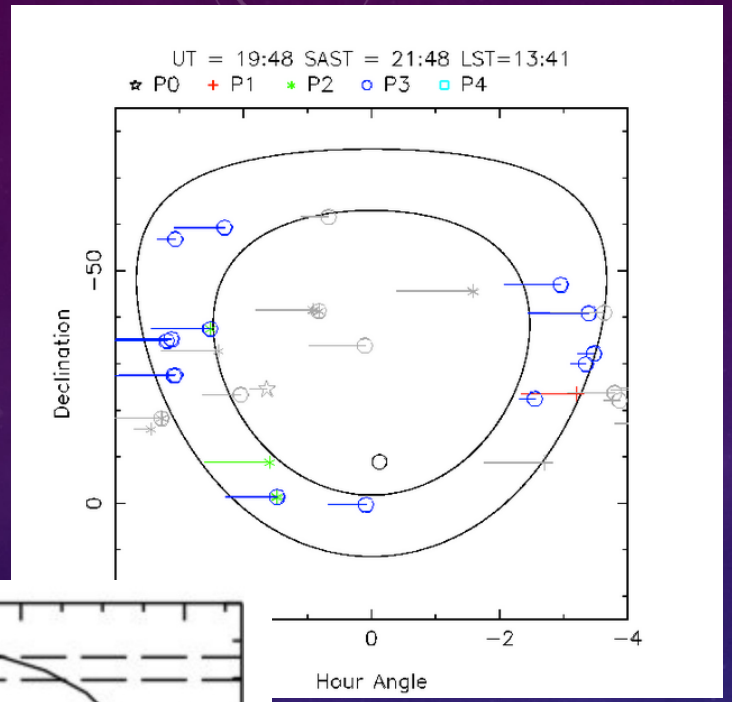
WHAT IS SALT ESPECIALLY GOOD AT?

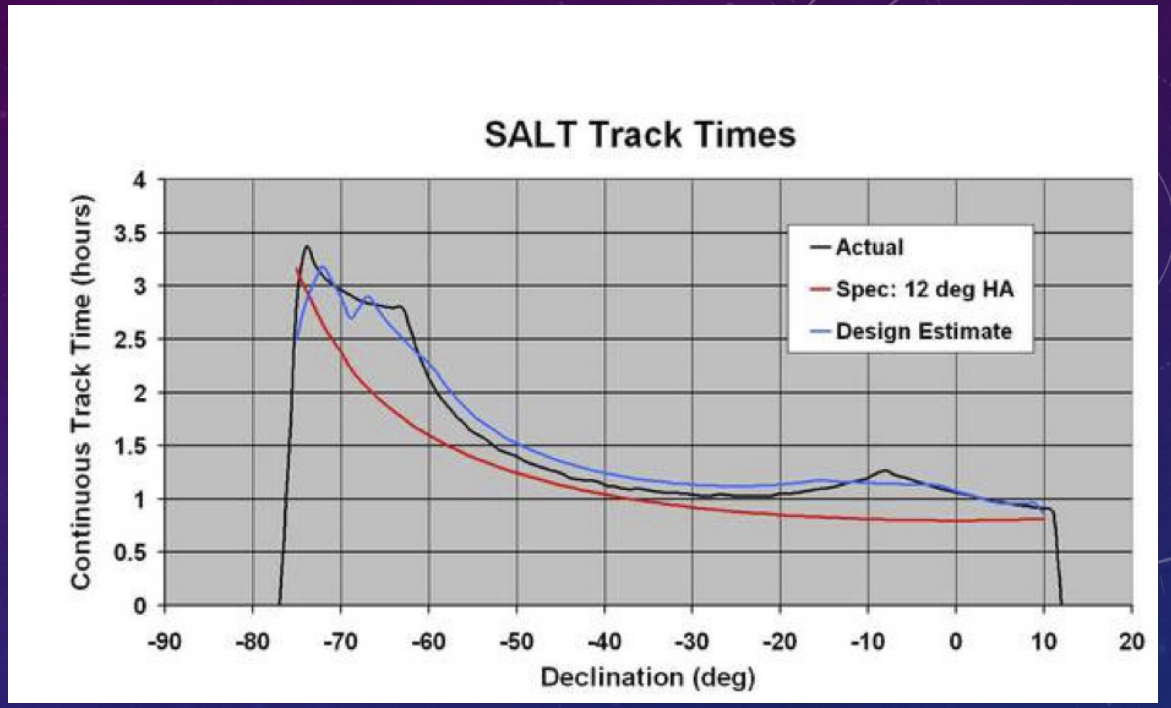
Telescope: Huge collecting power.

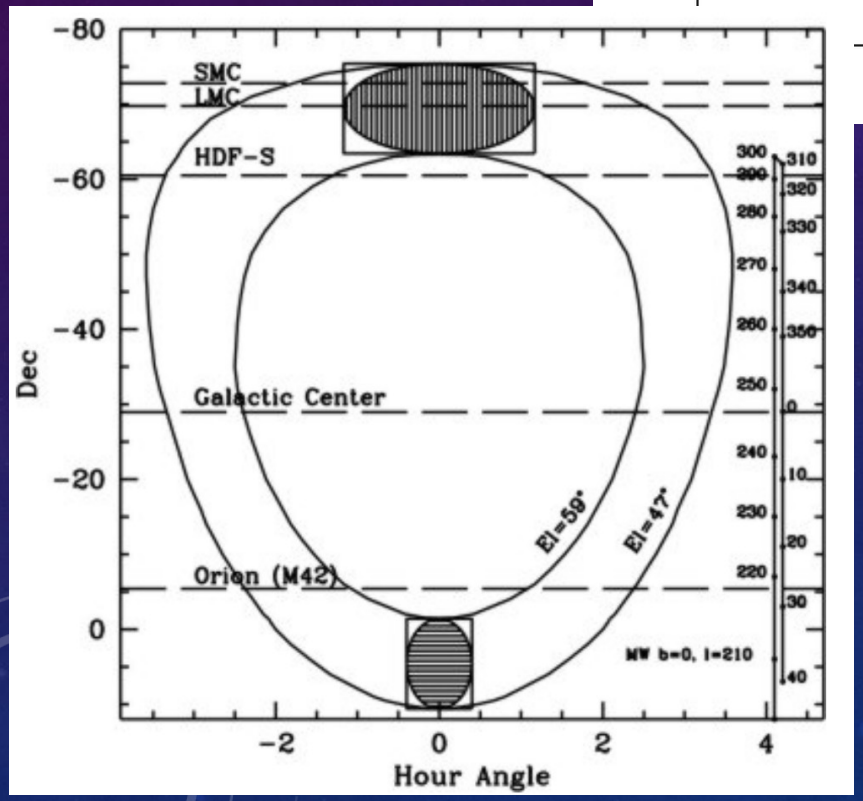
Site: Skies are very dark (22 mag/arcsec^2). Seeing only modest (median 1.4”)

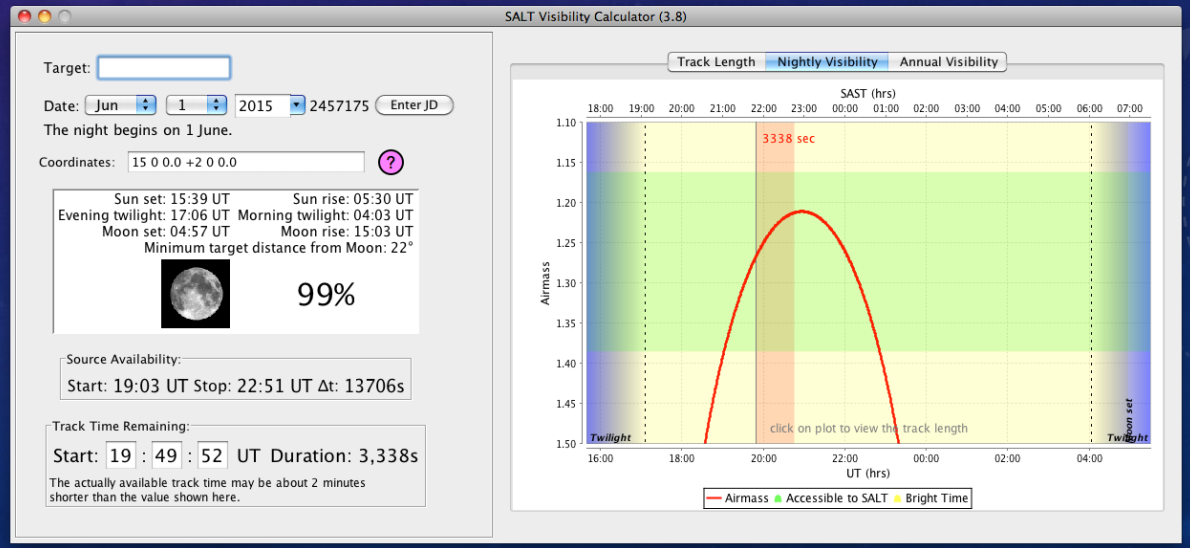
- Diffuse low-surface-brightness spectroscopy very competitive.
- Objects above background also observed very efficiently.
- Can change instruments and observing modes in seconds.
- Rapid reaction to ToOs.
- Some rare modes for large telescopes (MOS, Polarimetry, mixed modes, high-time res)

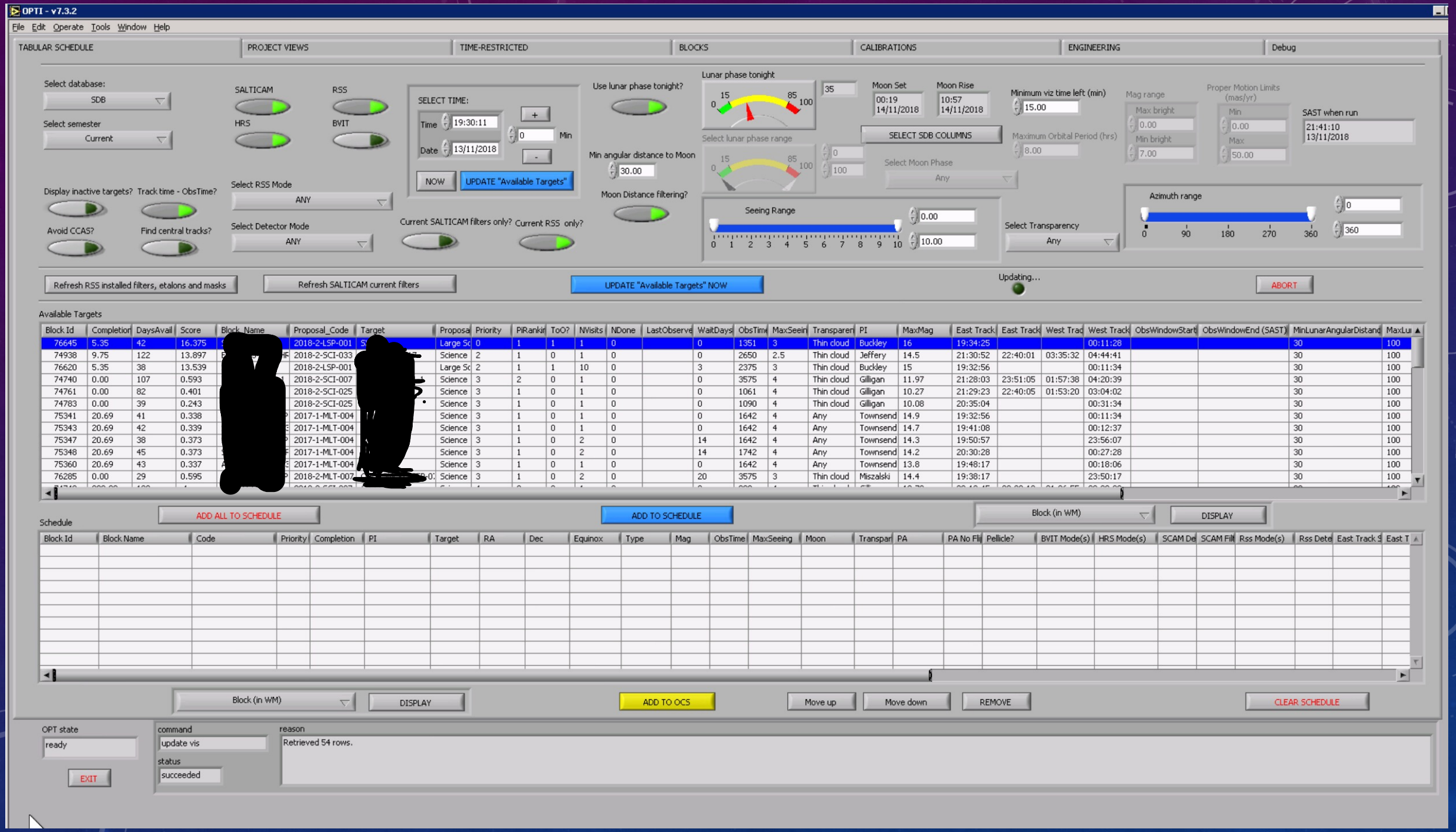
• SALT as a *spectroscopic survey telescope.* Most efficient programs are surveys with large pools of targets over the sky.


UT = 19:48 SAST = 21:48 LST=13:41
P0 P1 P2 P3 P4
Declination
-50
0
0
−2
−4
Hour Angle

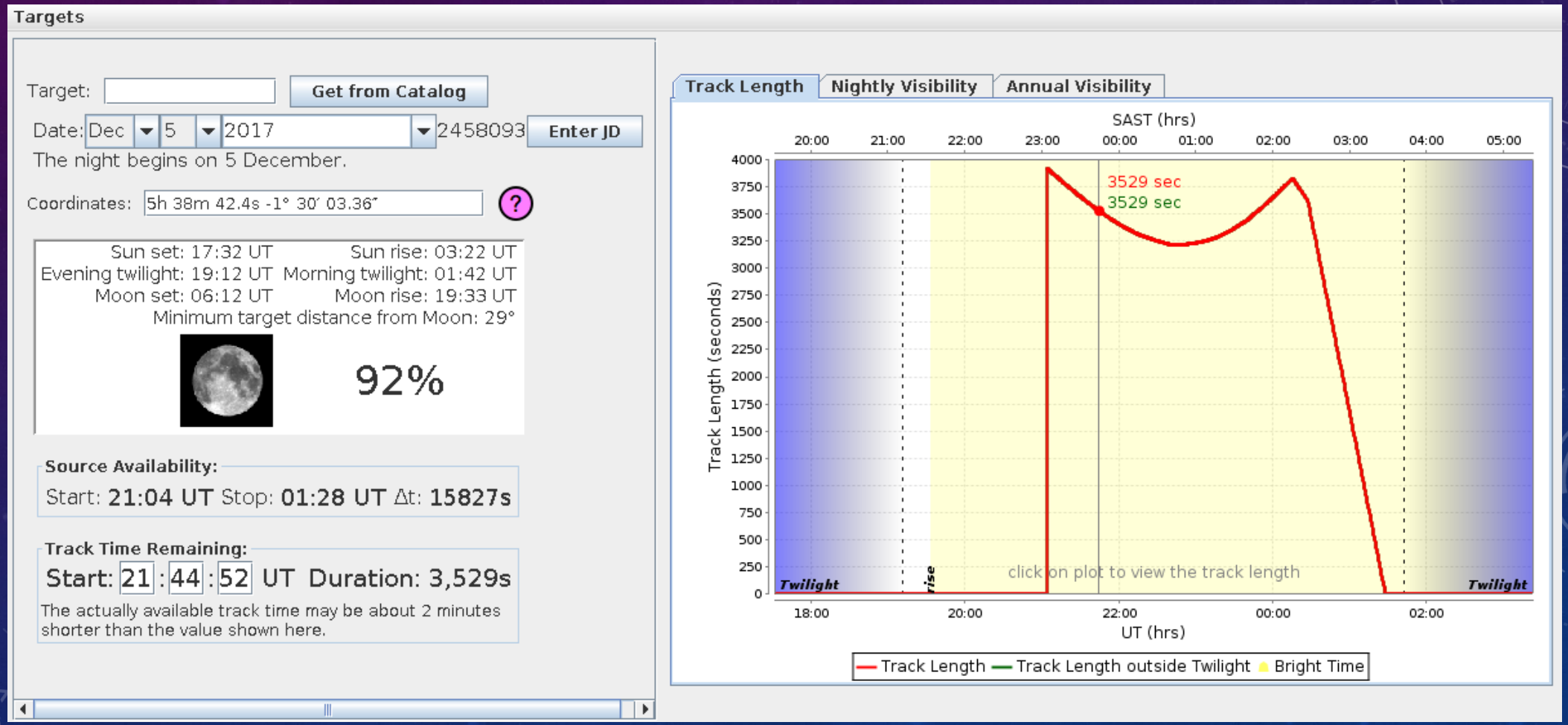

SALT Track Times
Continuous Track Time (hours)
4
3.5
3
2.5
2
1.5
1
0.5
0
-90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20
Declination (deg)
Actual
Spec: 12 deg HA
Design Estimate


-80
-60
-40
-20
0
Dec
SMC
LMC
HDF-S
Galactic Center
Orion (M42)
El=58°
El=47°
NW b=0, l=210
300 310 320 330 340 350 0 10 20 30 40
280 270 260 250 240 230 220
-2 0 2 4
Hour Angle

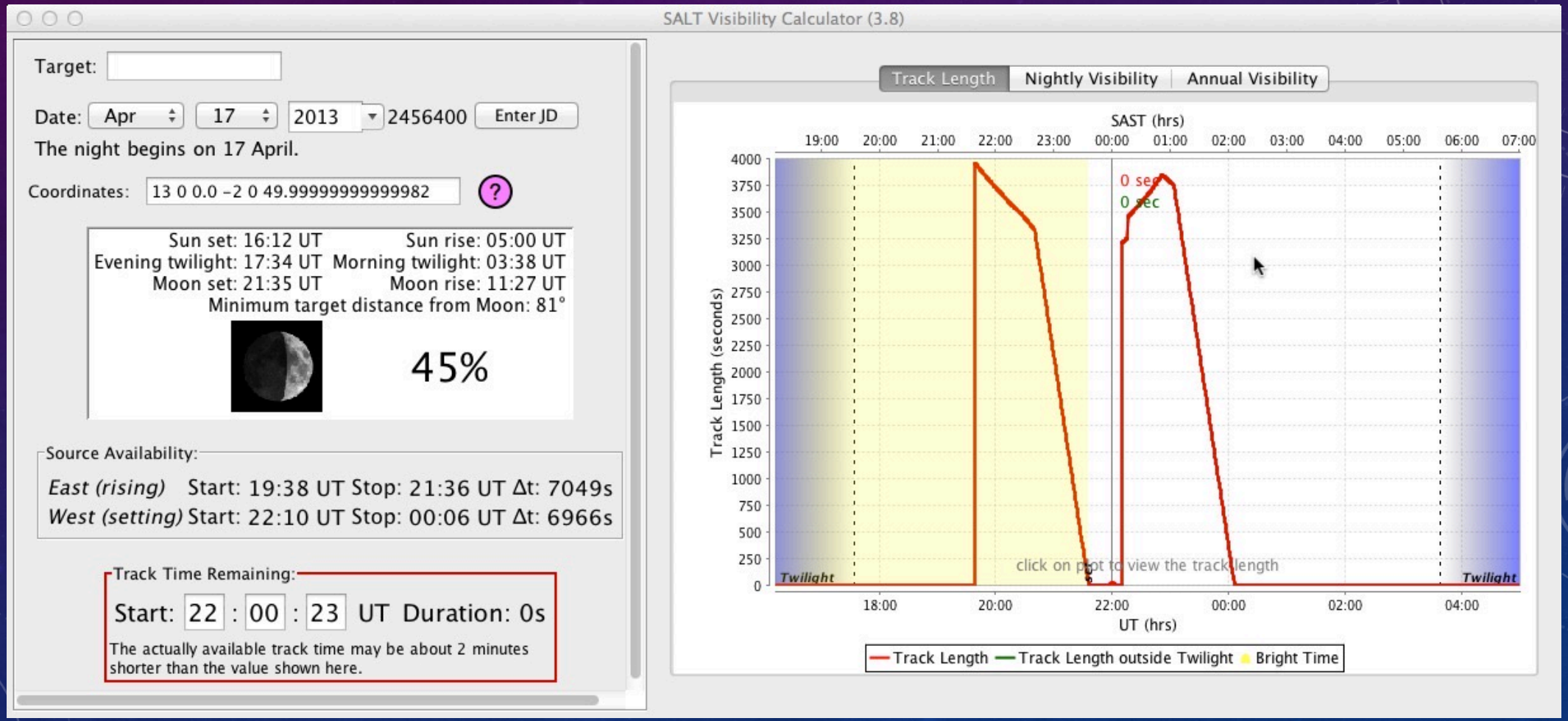

SALT Visibility Calculator (3.8)
Target:
Date: Jun 1 2015 2457175 Enter JD
The night begins on 1 June.
Coordinates: 15 0 0.0 +2 0 0.0
Sun set: 15:39 UT Sun rise: 05:30 UT
Evening twilight: 17:06 UT Morning twilight: 04:03 UT
Moon set: 04:57 UT Moon rise: 15:03 UT
Minimum target distance from Moon: 22°
99%
Source Availability:
Start: 19:03 UT Stop: 22:51 UT Δt: 13706s
Track Time Remaining:
Start: 19 : 49 : 52 UT Duration: 3,338s
The actually available track time may be about 2 minutes shorter than the value shown here.
Track Length
Nightly Visibility
Annual Visibility
SAST (hrs)
18:00 19:00 20:00 21:00 22:00 23:00 00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00
3338 sec
Airmass
1.10 1.15 1.20 1.25 1.30 1.35 1.40 1.45 1.50
Twilight
Moon set
Twilight
click on plot to view the track length
16:00 18:00 20:00 22:00 00:00 02:00 04:00
UT (hrs)
Airmass
Accessible to SALT
Bright Time


OPTI - v7.3.2
File Edit Operate Tools Window Help
TABULAR SCHEDULE
PROJECT VIEWS
TIME-RESTRICTED
BLOCKS
CALIBRATIONS
ENGINEERING
Debug
Select database:
SDB
Select semester
Current
SALTICAM
HRS
RSS
BVIT
SELECT TIME:
Time 19:30:11
Date 13/11/2018
NOW
UPDATE "Available Targets"
Use lunar phase tonight?
Min angular distance to Moon
30.00
Moon Distance filtering?
Lunar phase tonight
Select lunar phase range
Moon Set 00:19 14/11/2018
Moon Rise 10:57 14/11/2018
SELECT SDB COLUMNS
Select Moon Phase
Any
Minimum viz time left (min)
15.00
Maximum Orbital Period (hrs)
8.00
Mag range
Max bright 0.00
Min bright 7.00
Proper Motion Limits (mas/yr)
Min 0.00
Max 50.00
SAST when run
21:41:10 13/11/2018
Display inactive targets?
Track time - ObsTime?
Avoid CCAS?
Find central tracks?
Select RSS Mode
ANY
Select Detector Mode
ANY
Current SALTICAM filters only?
Current RSS only?
Seeing Range
Select Transparency
Any
Azimuth range
Refresh RSS installed filters, etalons and masks
Refresh SALTICAM current filters
UPDATE "Available Targets" NOW
Updating...
ABORT
Available Targets
Block Id | Completion | DaysAvail | Score | Block_Name | Proposal_Code | Target | Proposa | Priority | PiRankin | ToO? | NVisits | NDone | LastObserve | WaitDays | ObsTime | MaxSeein | Transparen | PI | MaxMag | East Track | East Track | West Trac | West Track | ObsWindowStart | ObsWindowEnd (SAST) | MinLunarAngularDistanc | MaxLu
76645 | 5.35 | 42 | 16.375 | 2018-2-LSP-001 | Large Sc | 0 | 1 | 1 | 1 | 0 | 0 | 1351 | 3 | Thin cloud | Buckley | 16 | 19:34:25 | 30 | 100
74938 | 9.75 | 122 | 13.897 | 2018-2-SCI-033 | Science | 2 | 1 | 0 | 1 | 0 | 0 | 2650 | 2.5 | Thin cloud | Jeffery | 14.5 | 21:30:52 | 22:40:01 | 03:35:32 | 04:44:41 | 30 | 100
76620 | 5.35 | 38 | 13.539 | 2018-2-LSP-001 | Large Sc | 2 | 1 | 1 | 10 | 0 | 3 | 2375 | 3 | Thin cloud | Buckley | 15 | 19:32:56 | 00:11:34 | 30 | 100
74740 | 0.00 | 107 | 0.593 | 2018-2-SCI-007 | Science | 3 | 2 | 0 | 1 | 0 | 0 | 3575 | 4 | Thin cloud | Gilligan | 11.97 | 21:28:03 | 23:51:05 | 01:57:38 | 04:20:39 | 30 | 100
74761 | 0.00 | 82 | 0.401 | 2018-2-SCI-025 | Science | 3 | 1 | 0 | 1 | 0 | 0 | 1061 | 4 | Thin cloud | Gilligan | 10.27 | 21:29:23 | 22:40:05 | 01:53:20 | 03:04:02 | 30 | 100
74783 | 0.00 | 39 | 0.243 | 2018-2-SCI-025 | Science | 3 | 1 | 0 | 1 | 0 | 0 | 1090 | 4 | Thin cloud | Gilligan | 10.08 | 20:35:04 | 00:31:34 | 30 | 100
75341 | 20.69 | 41 | 0.338 | 2017-1-MLT-004 | Science | 3 | 1 | 0 | 1 | 0 | 0 | 1642 | 4 | Any | Townsend | 14.9 | 19:32:56 | 00:11:34 | 30 | 100
75343 | 20.69 | 42 | 0.339 | 2017-1-MLT-004 | Science | 3 | 1 | 0 | 1 | 0 | 0 | 1642 | 4 | Any | Townsend | 14.7 | 19:41:08 | 00:12:37 | 30 | 100
75347 | 20.69 | 38 | 0.373 | 2017-1-MLT-004 | Science | 3 | 1 | 0 | 2 | 0 | 14 | 1642 | 4 | Any | Townsend | 14.3 | 19:50:57 | 23:56:07 | 30 | 100
75348 | 20.69 | 45 | 0.373 | 2017-1-MLT-004 | Science | 3 | 1 | 0 | 2 | 0 | 14 | 1742 | 4 | Any | Townsend | 14.2 | 20:30:28 | 00:27:28 | 30 | 100
75360 | 20.69 | 43 | 0.337 | 2017-1-MLT-004 | Science | 3 | 1 | 0 | 1 | 0 | 0 | 1642 | 4 | Any | Townsend | 13.8 | 19:48:17 | 00:18:06 | 30 | 100
76285 | 0.00 | 29 | 0.595 | 2018-2-MLT-007 | Science | 3 | 1 | 0 | 2 | 0 | 20 | 3575 | 3 | Thin cloud | Miszalski | 14.4 | 19:38:17 | 23:50:17 | 30 | 100
ADD ALL TO SCHEDULE
ADD TO SCHEDULE
Block (in WM)
DISPLAY
Schedule
Block Id | Block Name | Code | Priority | Completion | PI | Target | RA | Dec | Equinox | Type | Mag | ObsTime | MaxSeeing | Moon | Transpar | PA | PA No Fli | Pellicle? | BVIT Mode(s) | HRS Mode(s) | SCAM De | SCAM Filt | Rss Mode(s) | Rss Dete | East Track S | East T
Block (in WM)
DISPLAY
ADD TO OCS
Move up
Move down
REMOVE
CLEAR SCHEDULE
OPT state
ready
EXIT
command
update vis
status
succeeded
reason
Retrieved 54 rows.

VISIBILITY WINDOWS VS TRACK TIMES

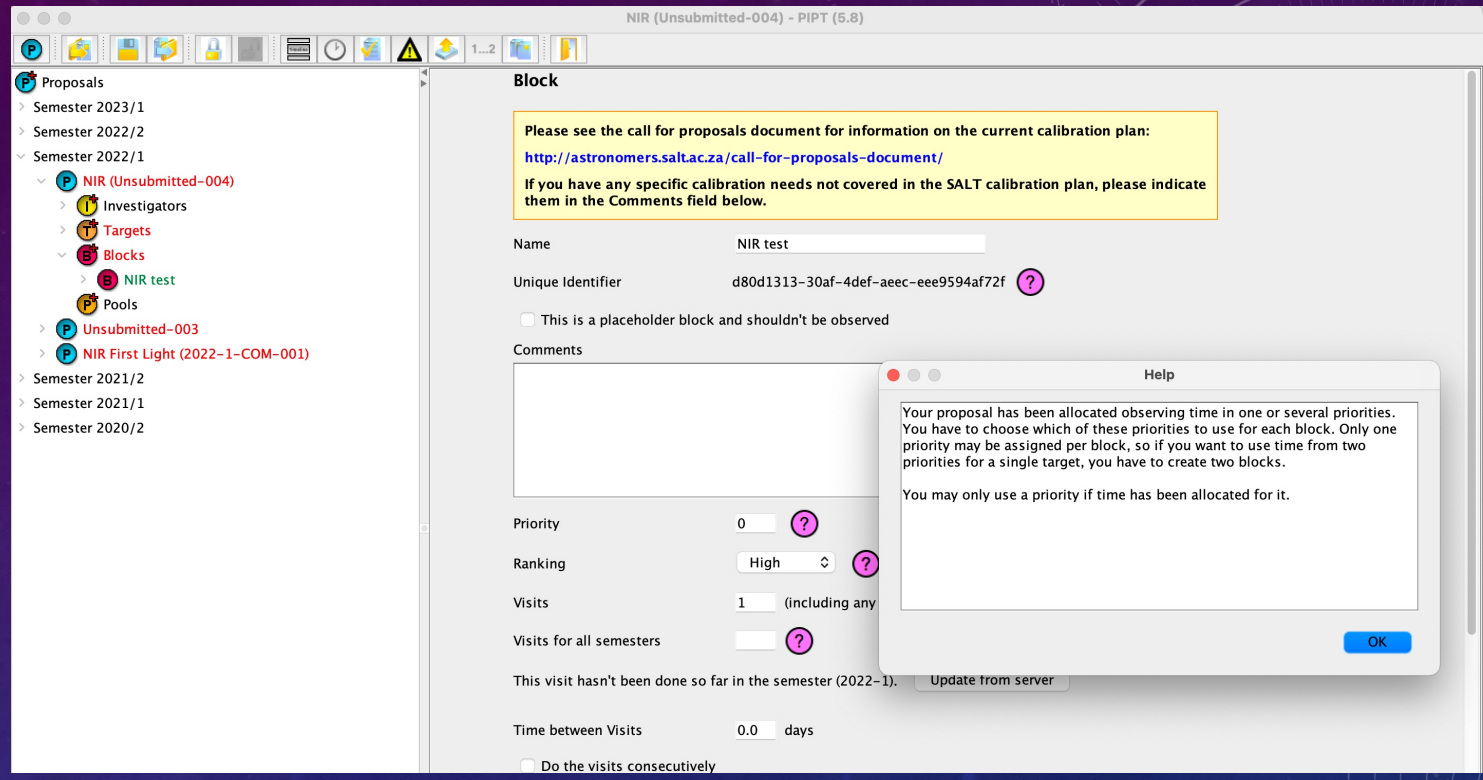


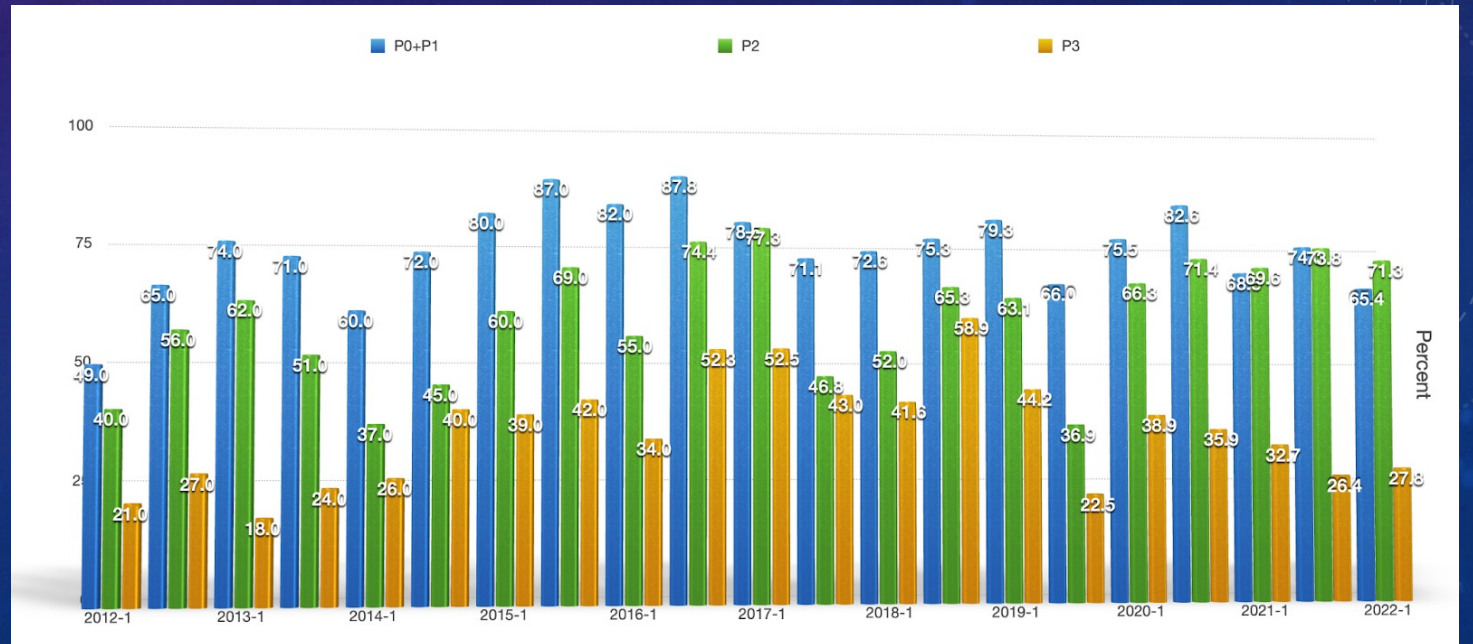
VISIBILITY WINDOWS VS TRACK TIMES



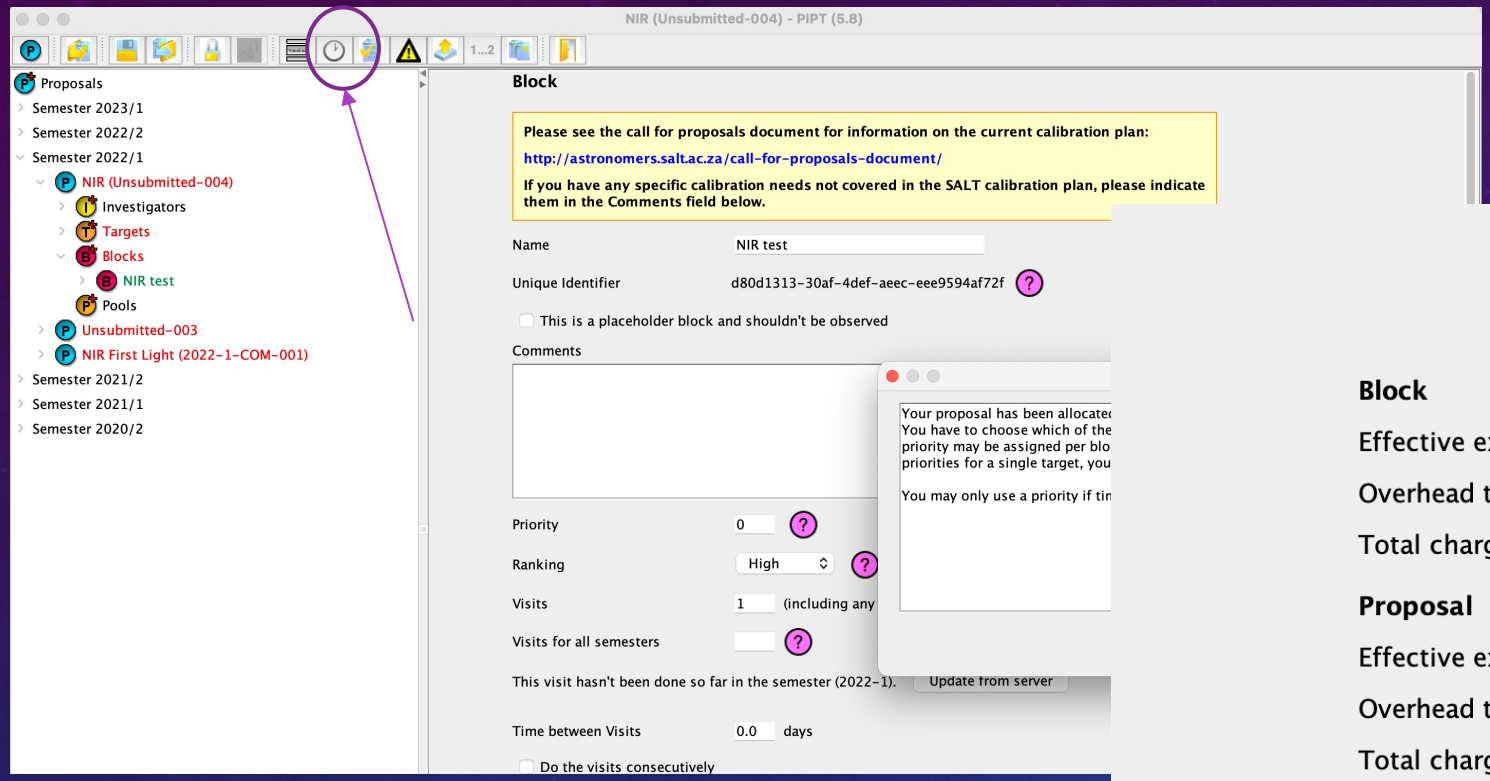
SOME MORE TRICKS…

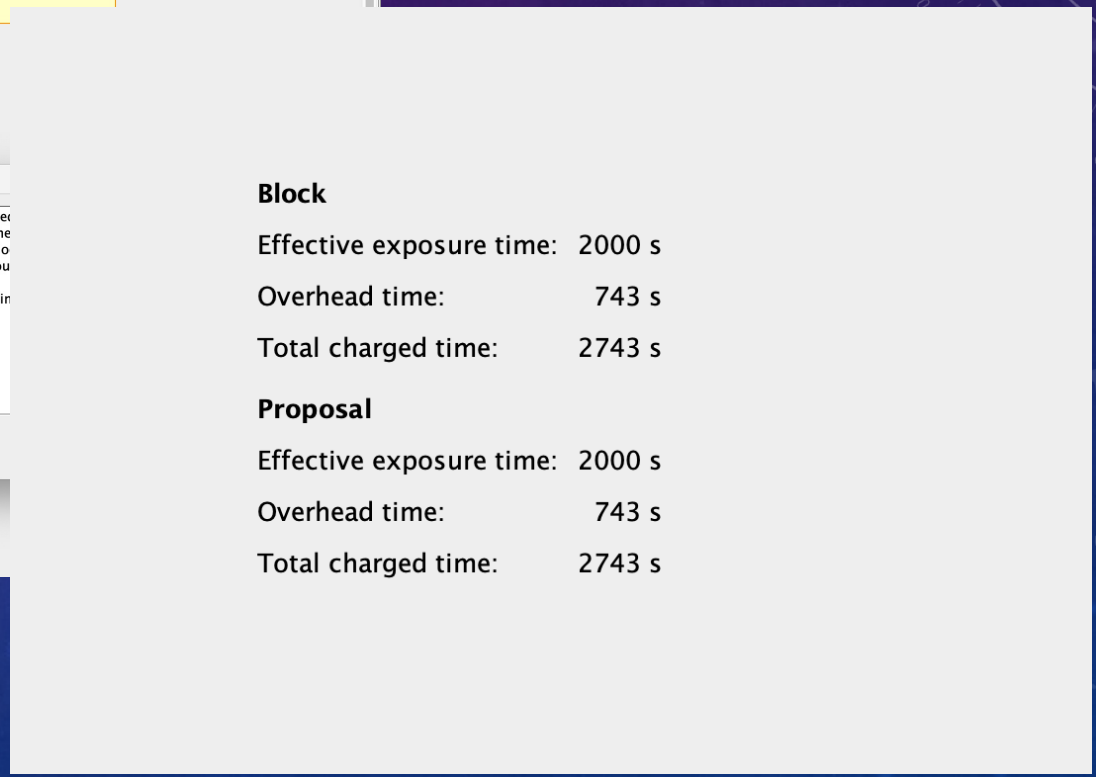
- Use the question marks Luke!
- Calibrations at the end of the science
- Bright time (e.g. >70% Lunar illumination)
- Lower your seeing requirements (>2”)
- Use Pools of optional targets.
  - Speak to us about automatic block creation
- Think about your priorities
  - P1 **most** competitive
- Use P4 wisely
  - 15–30 min long which are easy to plug into queue gaps
  - bright targets, easy to ID and acquire (eg 10–17 mag)
  - Any weather/Moon





.. A COUPLE MORE…





Do use the comments field – really useful for us

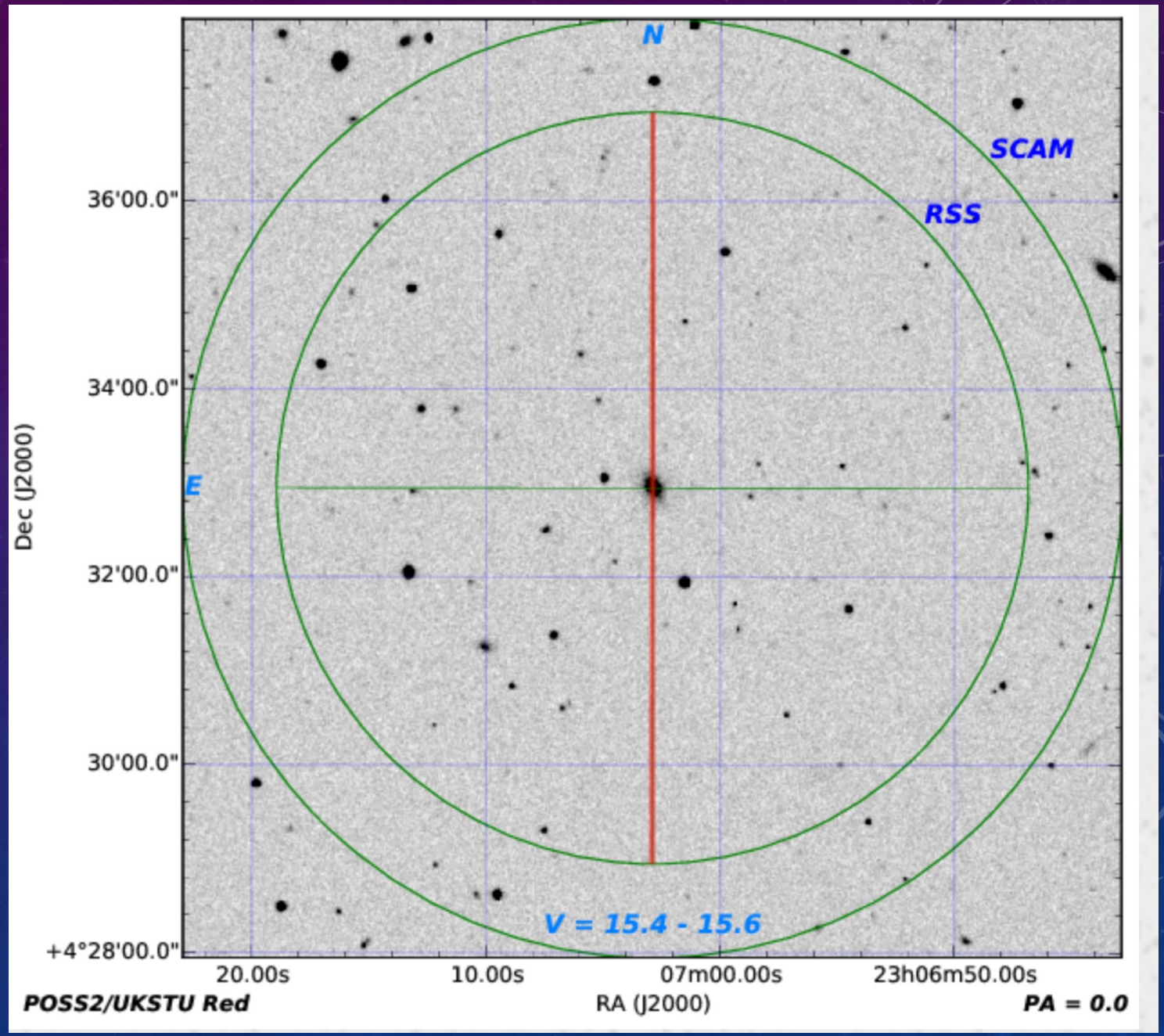
.. AND A FEW MORE…

- If ToO - Watch out for the Moon angular distance
- The wait period between visits of a block is a *minimum* time.
- Use Monitoring pools to monitor a target in different priorities with a single cadence – but use Wait Days too
- You will NOT get absolute fluxes from SALT – plan accordingly.
- RSS has a guider and keeps focus, and we can use SALTICAM filters – consider using it for imaging.
- BINNING:
  - RSS pixels are 0.125“x0.125“ spatially and our mean seeing is ~1.5. 4x4 binning gives 0.5”/bin.
  - Use x2 binning in wavelength with gratings PG0300, PG0700 and PG0900.
- Match your slit width to your science (and preferred seeing)
  - If too wide, you add too much sky and you lose resolution
  - If too narrow, you lose too much light and (depending on grating and binning) you may not really gain resolution.

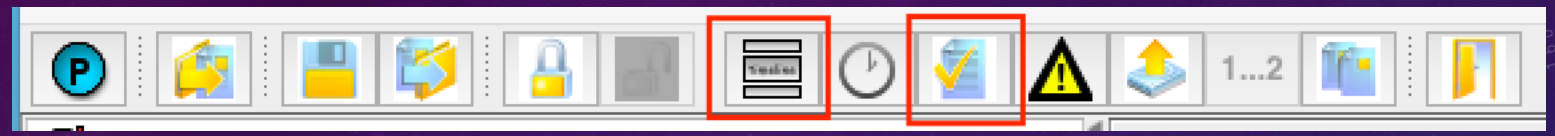
.. EVEN MORE...

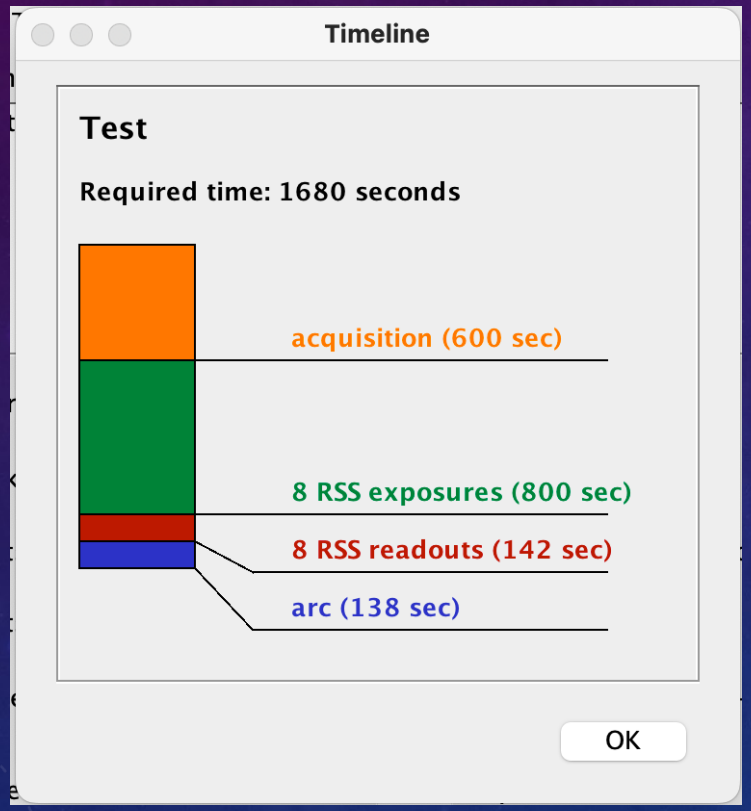
- Get the PIPT to generate the Finding Charts for you!
  - Verifies slit orientation
  - Verifies target coordinates
  - Check target brightness:
    - whether we'll need further FCs (if target is invisible)
    - Choose appropriate alignment star

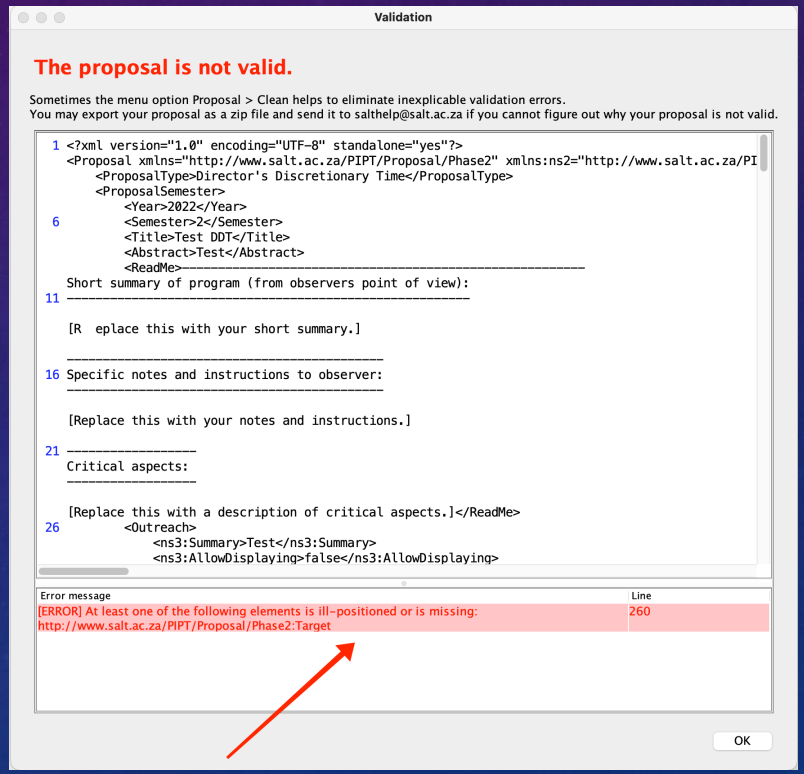
- Speak to us through salthelp@salt.ac.za
  - We aim to answer immediately, but at least within 24hrs
  - Please include your proposal code in the subject (if you have one)



TROUBLE-SHOOTING TIME







Click me!

STILL HAVING TROUBLE?

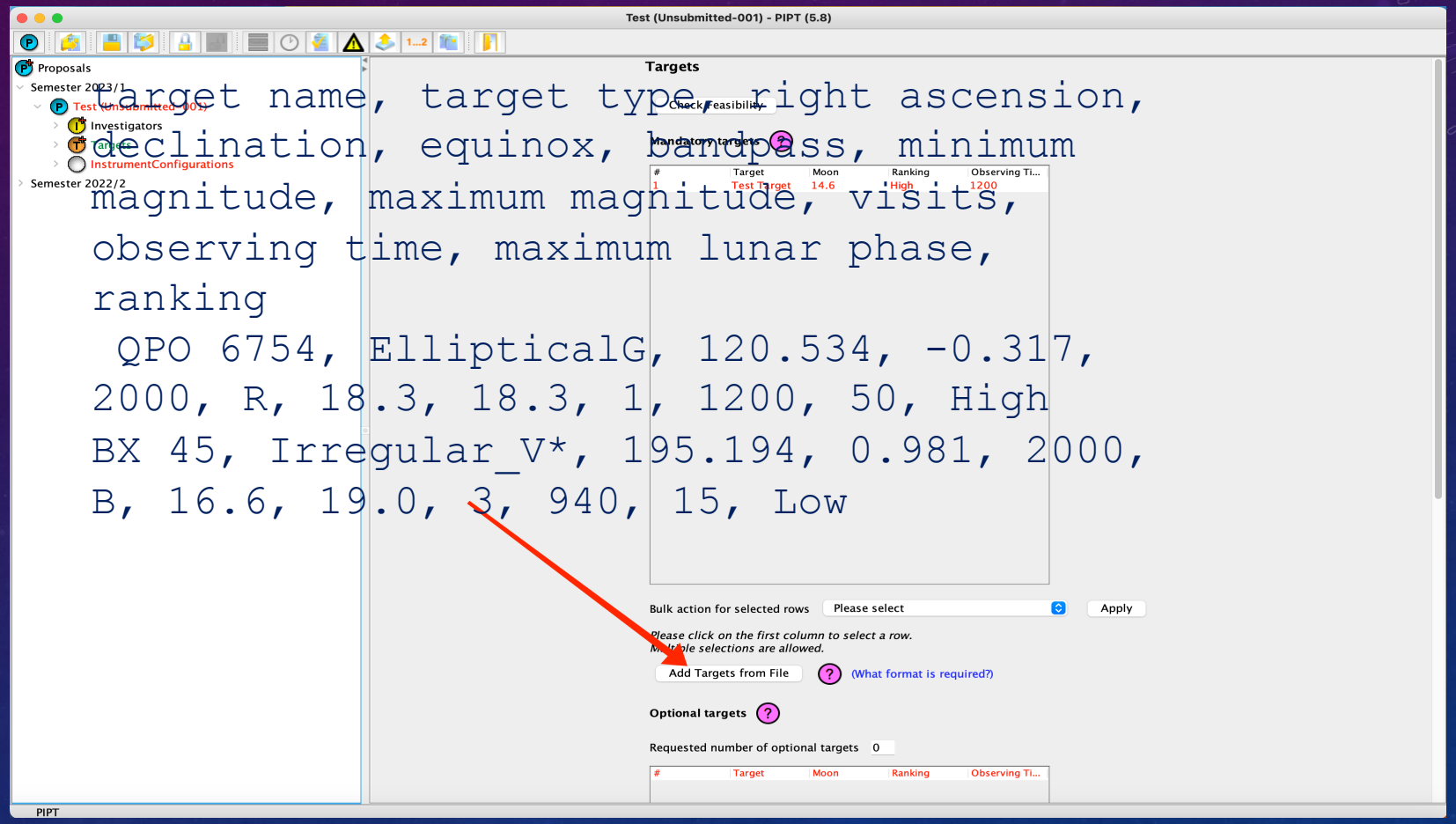
Use the menu item Proposal > Clean

Employ the time-honoured Windows method:
Save – Quit – Restart

Send an email to salthelp@salt.ac.za:

- Export the proposal as a zip file and attach it to the mail
- Include the proposal code (if applicable) in the subject

READ TARGETS FROM A CSV FILE



target name, target type, right ascension, declination, equinox, bandpass, minimum magnitude, maximum magnitude, visits, observing time, maximum lunar phase, ranking

QPO 6754, EllipticalG, 120.534, -0.317, 2000, R, 18.3, 18.3, 1, 1200, 50, High

BX 45, Irregular_V*, 195.194, 0.981, 2000, B, 16.6, 19.0, 3, 940, 15, Low

https://astronomers.salt.ac.za/importing-targets-into-the-pipt/

CREATE YOUR BLOCKS WITH PYTHON (OR C, OR FORTRAN, OR…)

- Create a block as similar as possible to your planned blocks as possible
- Export this block as a template
- Write a script which uses this template to generate XML files, with one block per file
- Replace placeholders like `---INSERT NAME---` with correct values
- Choose `auto-generated` as the finder chart path
- Save all the files in the same directory…
- … and import this directory into the PIPT
- In future, it might be possible to bypass the PIPT and submit your blocks directly with a script

Search for „Adding many blocks“ on http://pysalt.salt.ac.za/pipt-manual/html/pipt-manual.html.

QUESTIONS?