QUY NHON OBSERVATORY OVERVIEW

DONG NGUYEN TIEN
TUE NGUYEN-VAN
Quy Nhon Observatory, Explorascience Quy Nhon

LOCATION OF QUY NHON OBSERVATORY

QNO is a building of ExploraScience Quy Nhon, with the geographical coordinates:

Longitude 109.2102,

Latitude: 13.7947

Altitude: ~10 meter.

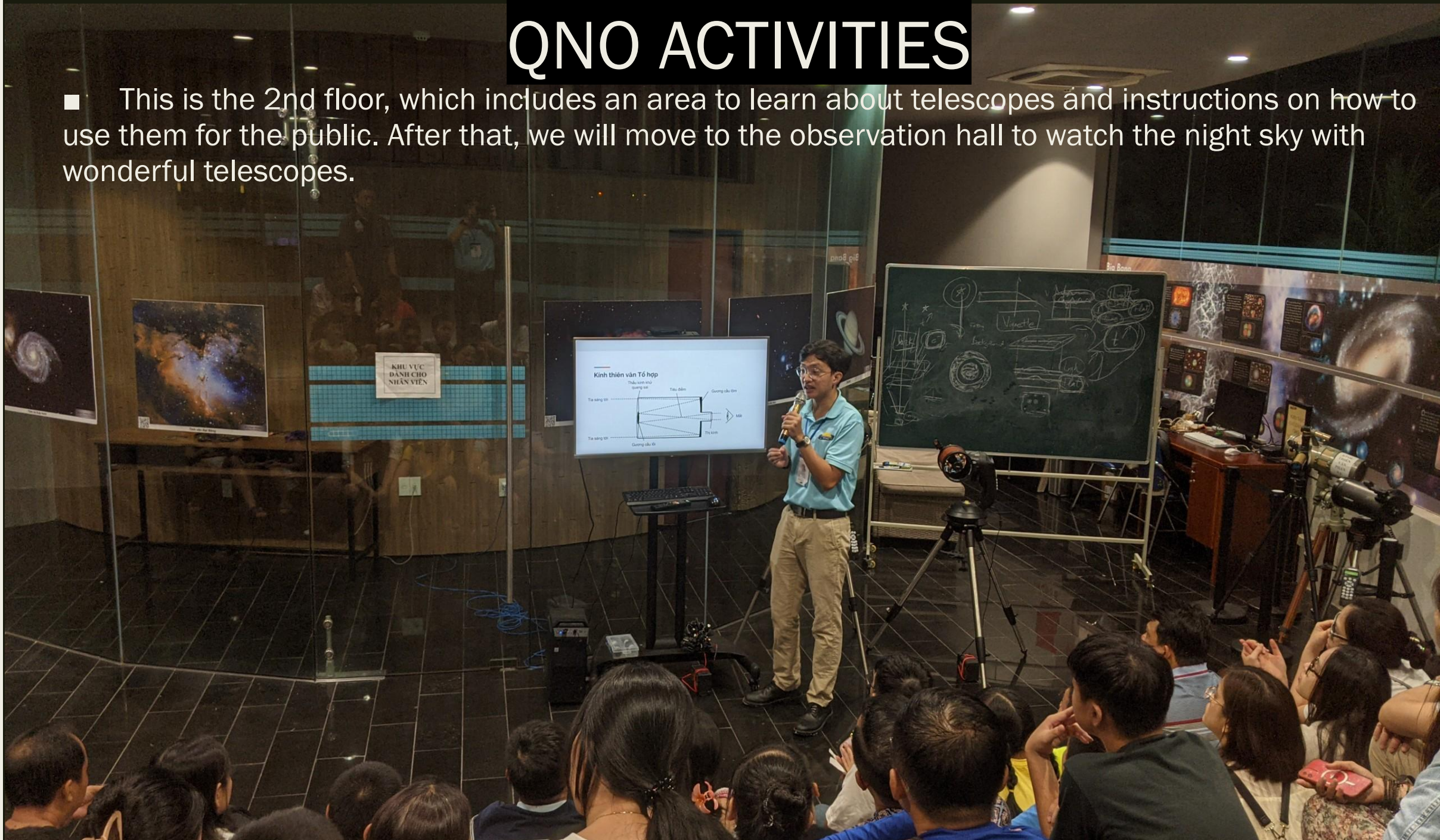
Here is equipped with a 600mm telescope

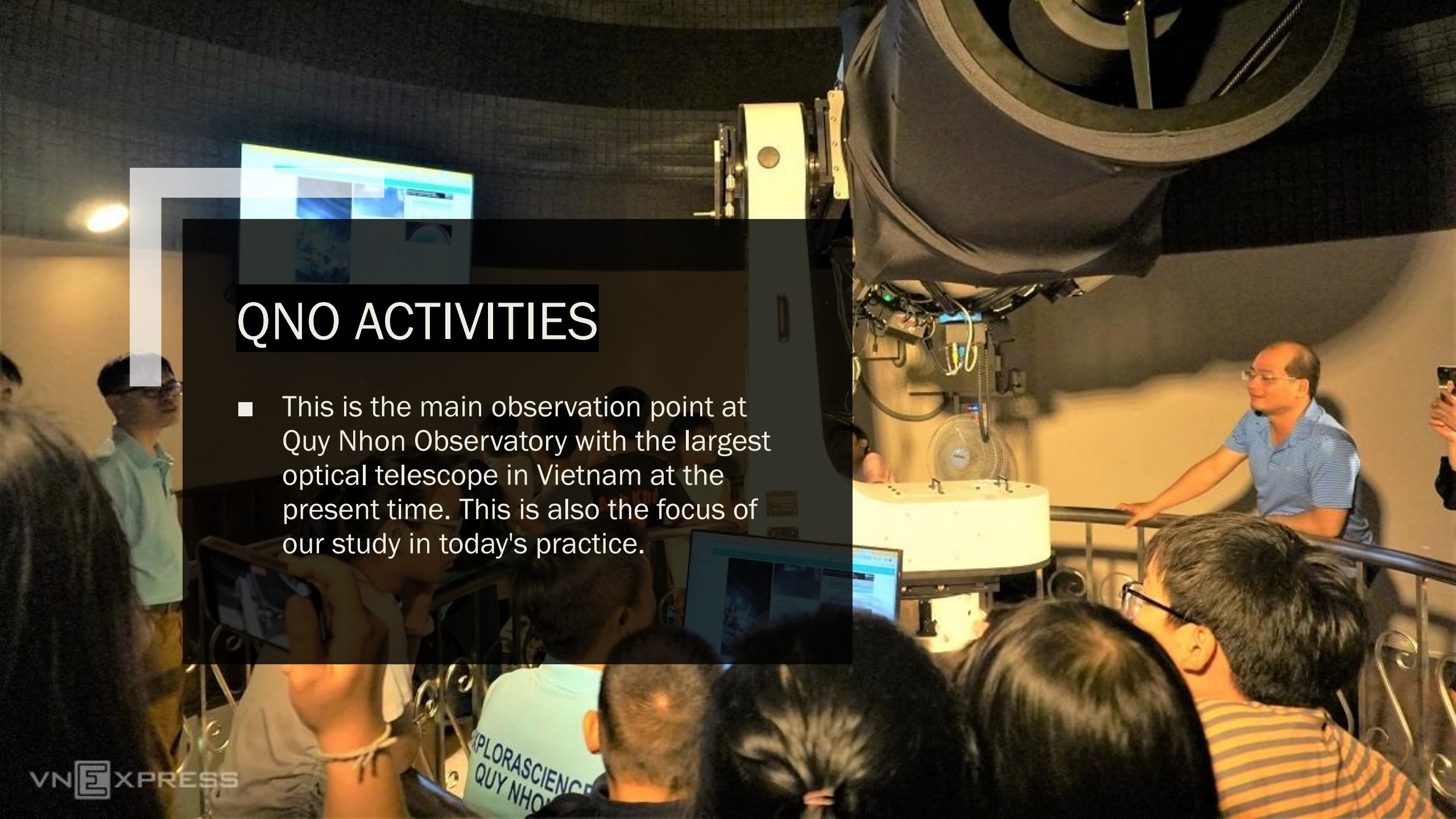
QNO ACTIVITIES

- Quy Nhon Observatory is a place to satisfy the passion for astronomy of the public and especially students.
- Currently, the telescope is not only used for popularizing scientific knowledge but also in conducting general research. We open the observatory every Wednesday and Saturday evening so everyone can come to study and experience.
- This is the first floor - history of astronomy, where the history of astronomy of mankind is summarized.

QNO ACTIVITIES

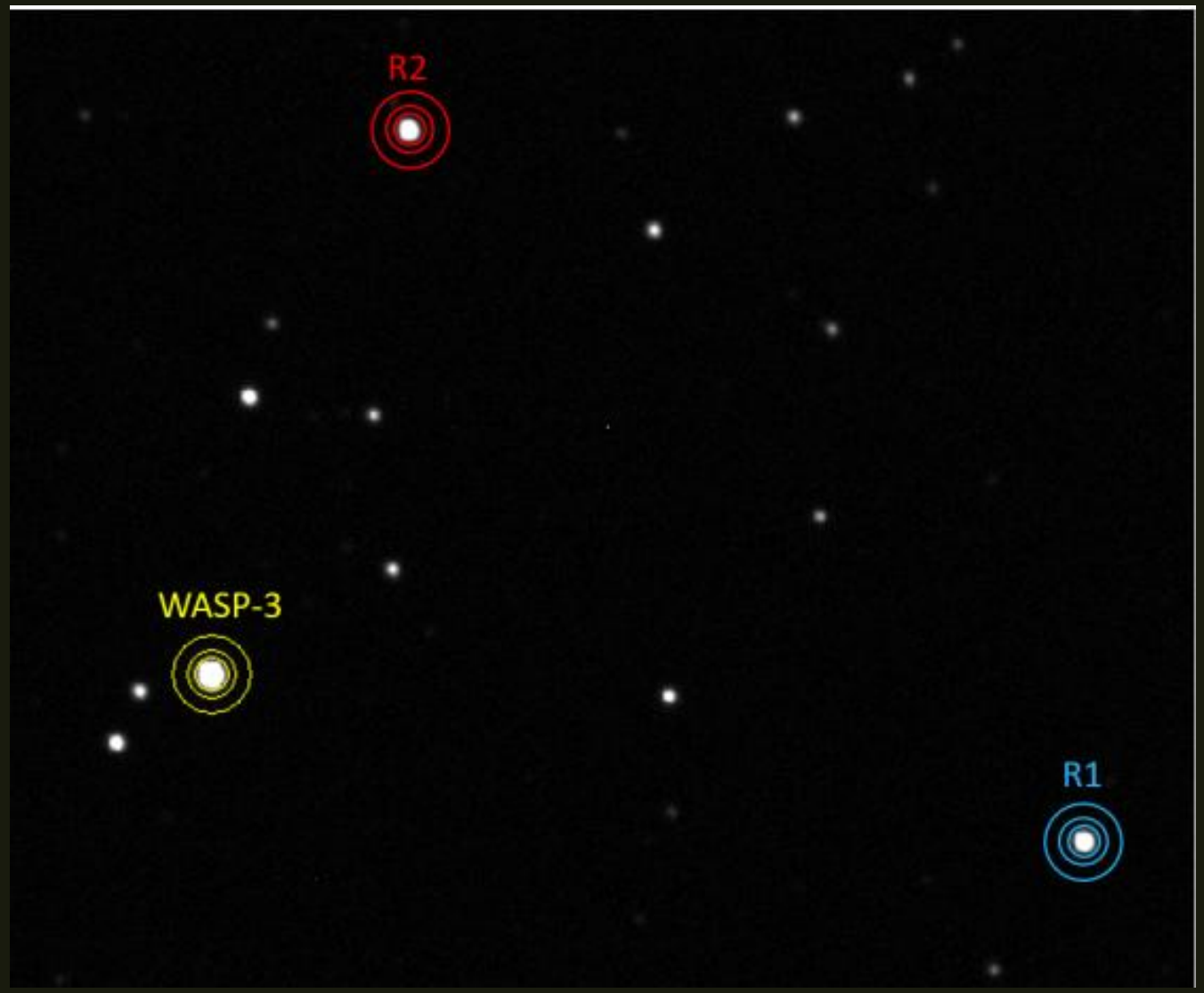
- This is the 2nd floor, which includes an area to learn about telescopes and instructions on how to use them for the public. After that, we will move to the observation hall to watch the night sky with wonderful telescopes.





QNO ACTIVITIES

- This is the main observation point at Quy Nhon Observatory with the largest optical telescope in Vietnam at the present time. This is also the focus of our study in today's practice.



QNO ACTIVITIES

- We have also used CDK 600 to publish articles in the international scientific journal SAG: Stars and Galaxies Vol. 6, id. 7, 2023 on December 28, 2023 with the name "First discovery of exoplanet transit in Vietnam“ by Nguyễn Văn Tuệ el al.

EQUIPMENT OF QUY NHƠN OBSERVATORY

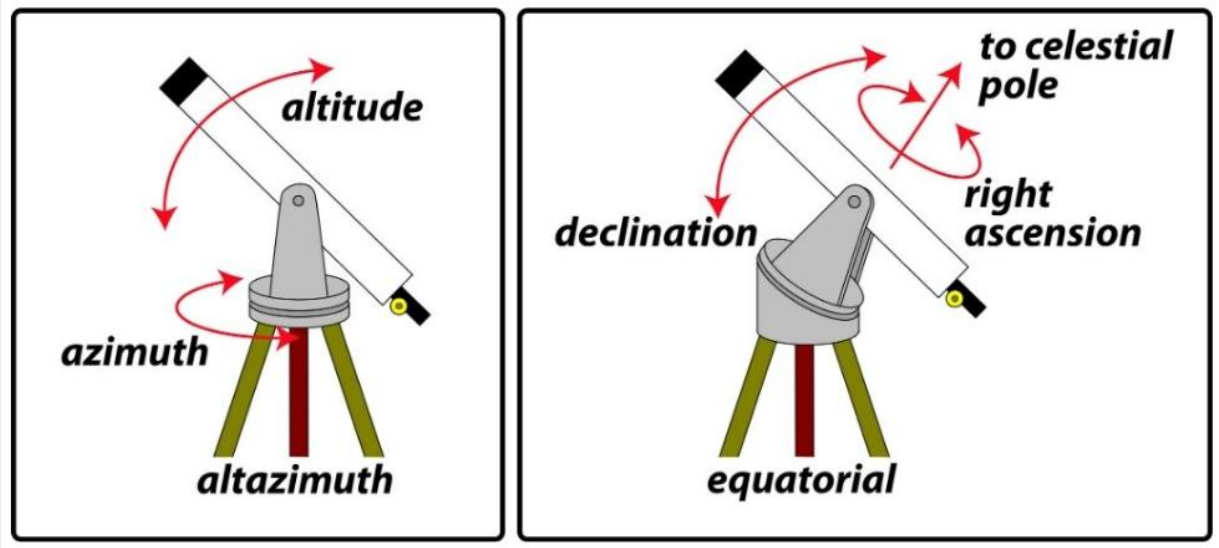
Corrected Dall-Kirkham (CDK) 600mm

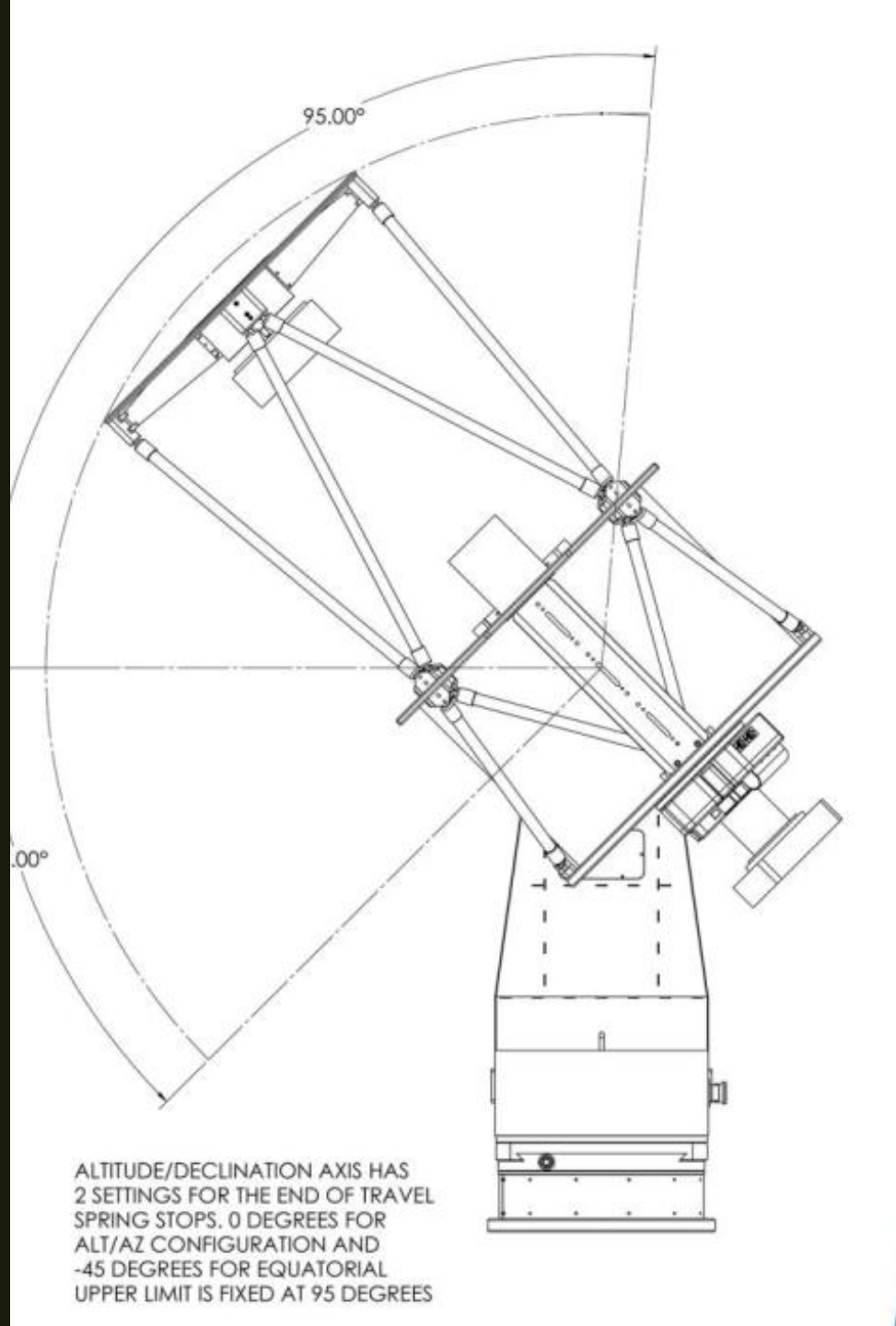
- The telescope name is CDK600, with the diameter of the main mirror reaching 600 millimeters
- CDK600 is a catadioptric telescope with a focal length of 4000mm combined with an automatic mount.
- The mount’s L600 slew speed is up to 50 degrees per second, this feature will help the telescope follow multiple objects precisely.

L-600 Mount

- Load capacity of 300 lbs (136 kg)
- Direct-drive motors on each axis for smooth, fast, and virtually silent movement of the telescope
- Slew speeds up to 50 degrees per second
- High resolution encoders on each axis for precise positioning
- Zero backlash
- Zero periodic error
- PointXP mount modeling software
- Alt/Az, or equatorial installation orientation

L-600 Mount


altitude
azimuth
altazimuth
to celestial pole
declination
right ascension
equatorial


95.00°
ALTITUDE/DECLINATION AXIS HAS
2 SETTINGS FOR THE END OF TRAVEL
SPRING STOPS. 0 DEGREES FOR
ALT/AZ CONFIGURATION AND
-45 DEGREES FOR EQUATORIAL
UPPER LIMIT IS FIXED AT 95 DEGREES

DOME

- Shielding the telescope from the environment is a Dome. The Dome is constructed with low thermal conductivity to keep the temperature unchanged avoiding bad effects on optical instruments. More over, the dome will follow the telescope during observations.
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CAMERA

- As you can see, The CMOS camera here is specially used for scientific purposes, it features a large sensor, high definition, along with cooler system, maintaining quality image for scientific research.
- In QNO we usually use **ZWO ASI2600MM Pro** and **SBIG Aluma AC4040** also have many camera orther depends on the desired data to be obtained

IN YOUR OPINION, WHY DO WE NEED TO COOL DOWN THE CAMERA WHILE TAKING A PHOTO?

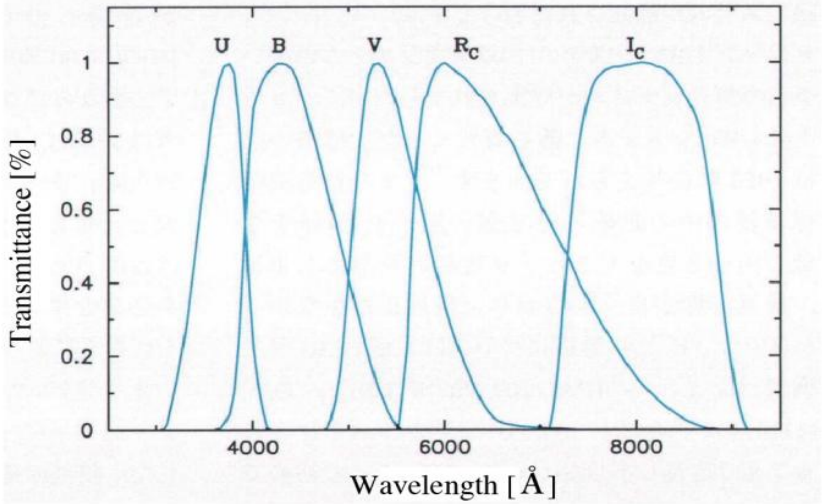
- ***While the camera is working, the sensor will continuously collect light from an object (photon) thus increasing the device's temperature, especially with long exposure settings. The higher the temperature, the more noise in the image (Dark noise, Dark current)***
- ***Normally, under good conditions, photons arriving at the sensor will cause the outermost electrons of the atoms to be released, creating an electrical signal that helps us capture an image. But in reality, sometimes the atoms on the sensor do not receive photons, but electrons are still released, creating a noise signal. To reduce this situation, we will cool the sensor, causing the lower energy atoms to release electrons more slowly when no photons are arriving at the sensor. We call this dark noise.***

WE USE COLOR FILTERS TO COMBINE COLORS TO CREATE BEAUTIFUL PHOTOS

- Specialized light filters help us easily collect light in the desired range suitable for observation purposes. Currently we use red, blue, green, H - Alpha, Oxygen, sulfur filters. They are important tools in astronomical research.

(4) Photometric System

We measure the magnitude of stars using a certain set of filters. There are some standard sets of filters such as the "Johnson-Cousins sytem". We express magnitudes simply "*B*", "*V*", "*R*", etc.



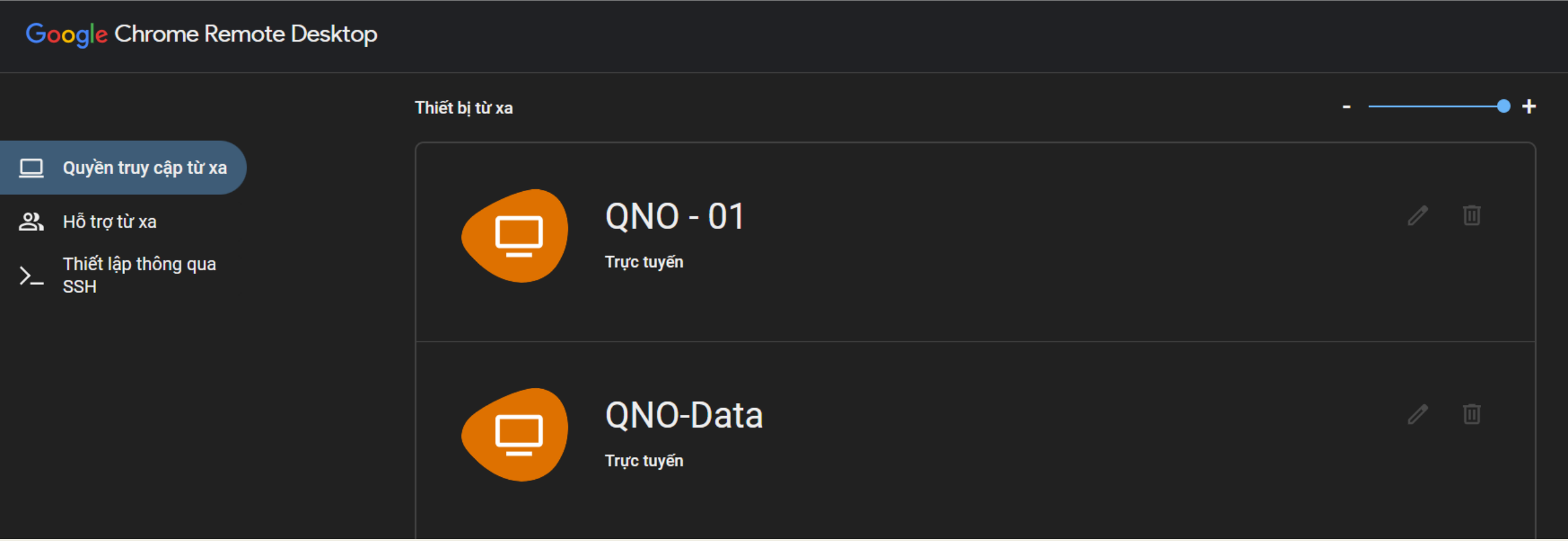
U: 0.35μm
B: 0.44μm
V: 0.55μm
R: 0.66μm

11

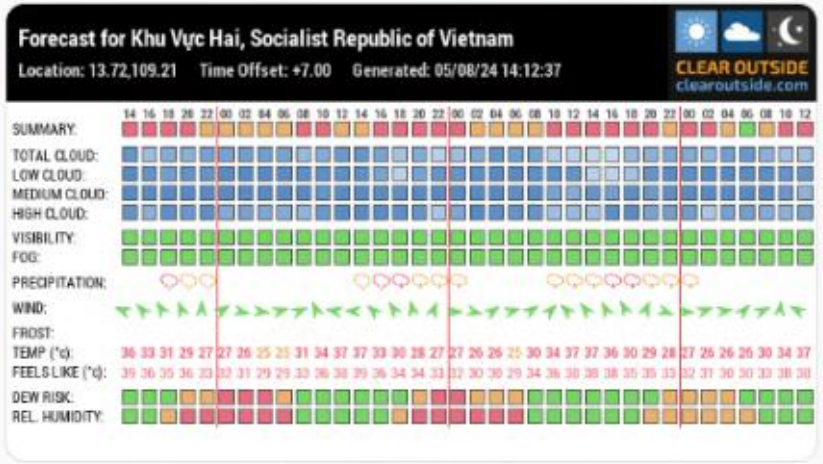
SBIG AO-X Adaptive Optics

- Atmospheric turbulence, wind, vibration can make the difference between a perfect shot and a bad one. Small, very fast moveents that are too hard for your auto-guider or telescope drive to correct for, but are easily picked up by your camera's sensitive CCD sensor, resulting in "egg" shaped stars. Adaptive optics was born to handle this.
- SBIG's adaptive optics use a closed loop system which means that your AO will check the position of the guide star after every move and make adjustments on the following movement. Working in tandem with your remote guider, the result is continuous corrections whic are ultra precise over the course of a long exposure.

OPERATING SOFTWARE



CHROME REMOTE



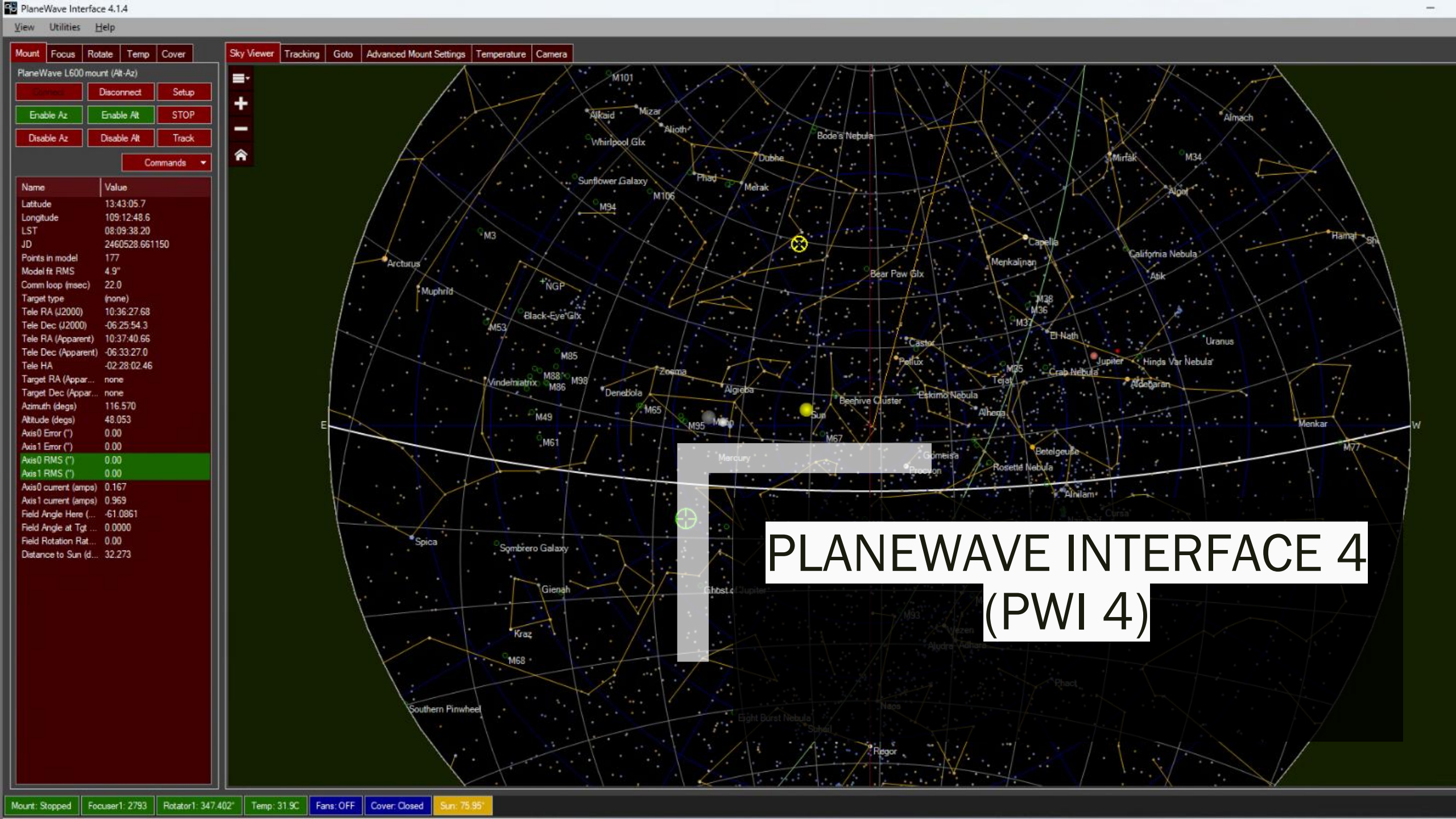
Hệ thống điều khiển

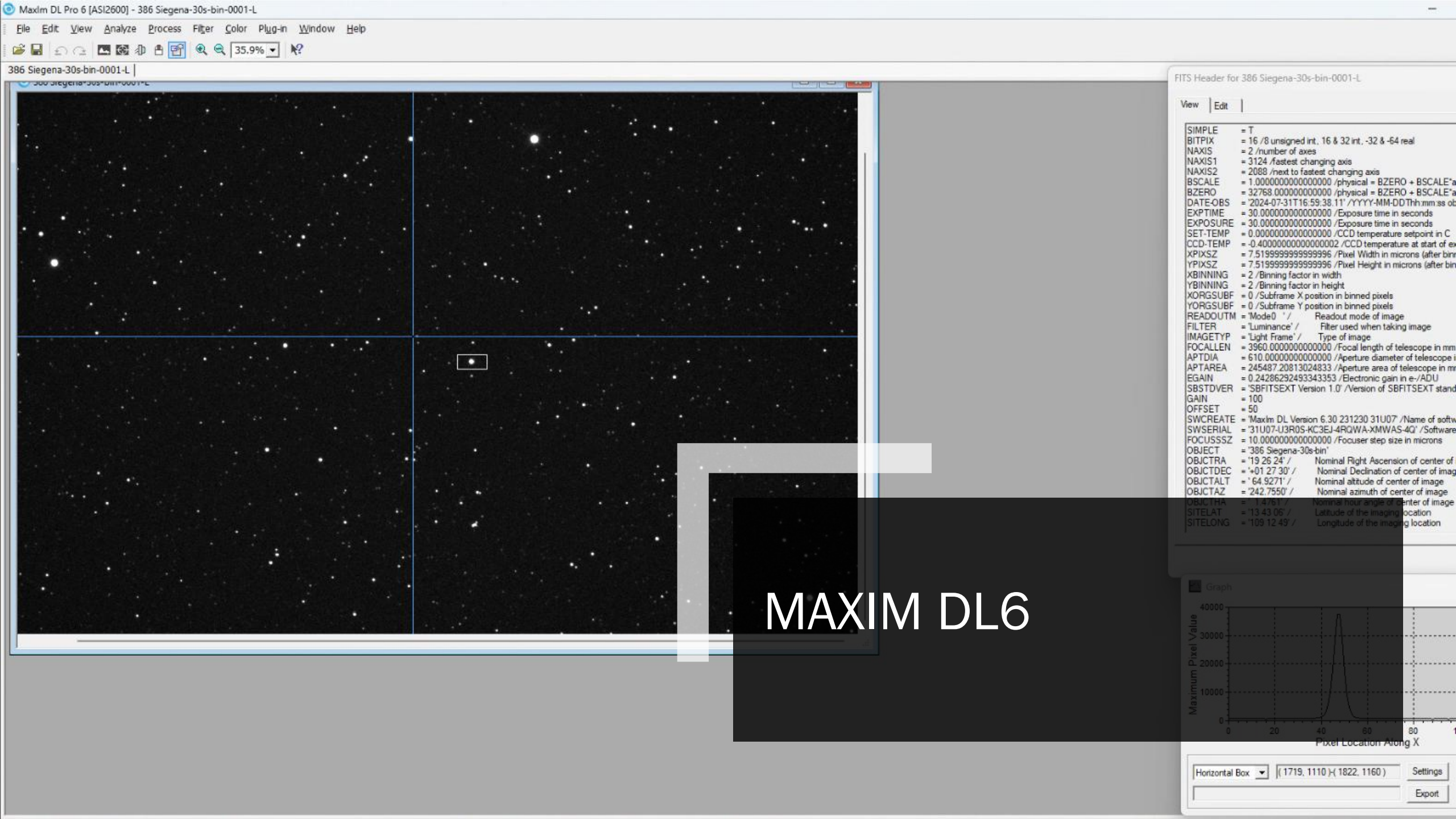
	Trạng thái mưa	Không mưa
	Đóng Dome 10 hours ago	
	Mở Dome Yesterday	
	PC - Telescope 4 days ago	
	Cảm biến - Camera bầu trời 4 days ago	

Nhật ký thay đổi

August 5, 2024

Đóng Dome turned off
5:01:00 AM - 10 hours ago


PlaneWave Interface 4.1.4
View
Utilities
Help
Mount
Focus
Rotate
Temp
Cover
PlaneWave L600 mount (Alt-Az)
Connect
Disconnect
Setup
Enable Az
Enable Alt
STOP
Disable Az
Disable Alt
Track
Commands
Name
Value
Latitude 13:43:05.7
Longitude 109:12:48.6
LST 08:09:38.20
JD 2460528.661150
Points in model 177
Model fit RMS 4.9"
Comm loop (msec) 22.0
Target type (none)
Tele RA (J2000) 10:36:27.68
Tele Dec (J2000) -06:25:54.3
Tele RA (Apparent) 10:37:40.66
Tele Dec (Apparent) -06:33:27.0
Tele HA -02:28:02.46
Target RA (Appar... none
Target Dec (Appar... none
Azimuth (degs) 116.570
Altitude (degs) 48.053
Axis0 Error (") 0.00
Axis1 Error (") 0.00
Axis0 RMS (") 0.00
Axis1 RMS (") 0.00
Axis0 current (amps) 0.167
Axis1 current (amps) 0.969
Field Angle Here (... -61.0861
Field Angle at Tgt ... 0.0000
Field Rotation Rat... 0.00
Distance to Sun (d... 32.273
Sky Viewer
Tracking
Goto
Advanced Mount Settings
Temperature
Camera
M101
Alkaid
Mizar
Alioth
Whirlpool Glx
Bode's Nebula
Dubhe
Sunflower Galaxy
Phad
Merak
M106
M94
M3
Arcturus
Muphrid
NGP
Black-Eye Glx
M53
M85
M88
M98
M86
Vindemiatrix
Zosma
Denebola
Algieba
M65
M95
M49
M61
Sun
M67
Beehive Cluster
Eskimo Nebula
Alhena
Mercury
Gomeisa
Procyon
Betelgeuse
Rosette Nebula
Alnilam
Spica
Sombrero Galaxy
Gienah
Kraz
M68
Southern Pinwheel
Ghost
Jupiter
Regor
Capella
Menkalinan
Bear Paw Glx
M38
M36
M37
El Nath
Castor
Pollux
Tejat
Crab Nebula
Jupiter
Hinda Var Nebula
Aldebaran
Uranus
Menkar
M77
Almach
Mirfak
M34
Algol
California Nebula
Atik
Hamal
E
W
PLANEWAVE INTERFACE 4
(PWI 4)
Mount: Stopped
Focuser1: 2793
Rotator1: 347.402°
Temp: 31.9C
Fans: OFF
Cover: Closed
Sun: 75.95°


Maxim DL Pro 6 [ASI2600] - 386 Siegena-30s-bin-0001-L
File Edit View Analyze Process Filter Color Plug-in Window Help
35.9%
386 Siegena-30s-bin-0001-L
FITS Header for 386 Siegena-30s-bin-0001-L
View Edit
SIMPLE = T
BITPIX = 16 /8 unsigned int, 16 & 32 int, -32 & -64 real
NAXIS = 2 /number of axes
NAXIS1 = 3124 /fastest changing axis
NAXIS2 = 2088 /next to fastest changing axis
BSCALE = 1.0000000000000000 /physical = BZERO + BSCALE*a
BZERO = 32768.000000000000 /physical = BZERO + BSCALE*a
DATE-OBS = '2024-07-31T16:59:38.11' /YYYY-MM-DDThh:mm:ss ob
EXPTIME = 30.000000000000000 /Exposure time in seconds
EXPOSURE = 30.000000000000000 /Exposure time in seconds
SET-TEMP = 0.0000000000000000 /CCD temperature setpoint in C
CCD-TEMP = -0.40000000000000002 /CCD temperature at start of ex
XPIXSZ = 7.5199999999999996 /Pixel Width in microns (after bin
YPIXSZ = 7.5199999999999996 /Pixel Height in microns (after bin
XBINNING = 2 /Binning factor in width
YBINNING = 2 /Binning factor in height
XORGSUBF = 0 /Subframe X position in binned pixels
YORGSUBF = 0 /Subframe Y position in binned pixels
READOUTM = 'Mode0 ' / Readout mode of image
FILTER = 'Luminance' / Filter used when taking image
IMAGETYP = 'Light Frame' / Type of image
FOCALLEN = 3960.0000000000000 /Focal length of telescope in mm
APTDIA = 610.00000000000000 /Aperture diameter of telescope i
APTAREA = 245487.20813024833 /Aperture area of telescope in m
EGAIN = 0.24286292493343353 /Electronic gain in e-/ADU
SBSTDVER = 'SBFITSEXT Version 1.0' /Version of SBFITSEXT stand
GAIN = 100
OFFSET = 50
SWCREATE = 'MaxIm DL Version 6.30 231230 31U07' /Name of softw
SWSERIAL = '31U07-U3R0S-KC3EJ-4RQWA-XMWAS-4Q' /Software
FOCUSSSZ = 10.000000000000000 /Focuser step size in microns
OBJECT = '386 Siegena-30s-bin'
OBJCTRA = '19 26 24' / Nominal Right Ascension of center of
OBJCTDEC = '+01 27 30' / Nominal Declination of center of imag
OBJCTALT = '64.9271' / Nominal altitude of center of image
OBJCTAZ = '242.7550' / Nominal azimuth of center of image
SITELAT = '13 43 06' / Latitude of the imaging location
SITELONG = '109 12 49' / Longitude of the imaging location
Graph
Maximum Pixel Value
40000
30000
20000
10000
0
0
20
40
60
80
Pixel Location Along X
Horizontal Box
(1719, 1110)-(1822, 1160)
Settings
Export
MAXIM DL6


THANKS FOR
LISTENING