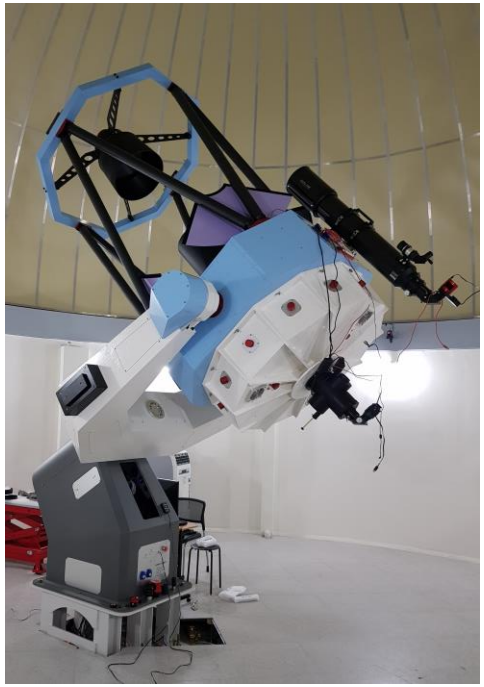
에스엘랩
SPACE LIGHT LABORATORY

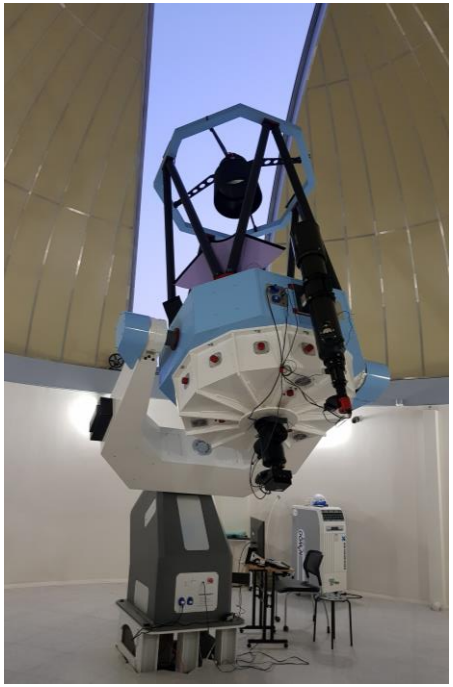
ASTERA1200

White Paper
v1.1 (June 5, 2020)

Dramatic leap of Meter class Telescope

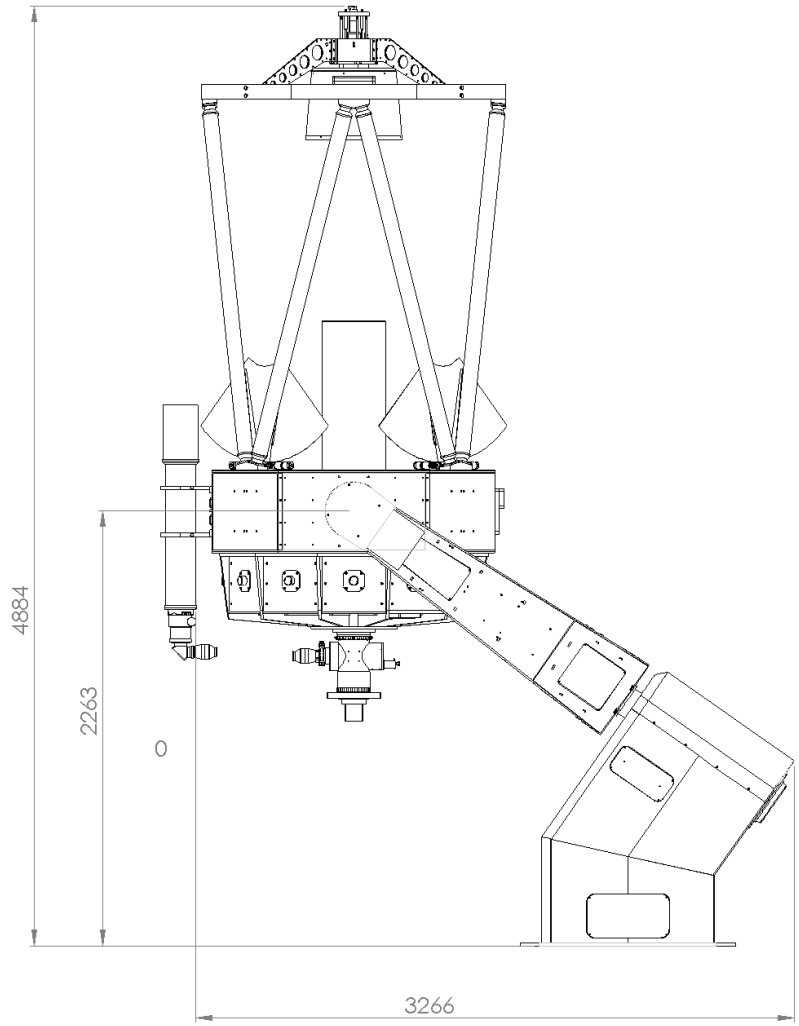
ASTERA 1200 Research Grade telescope



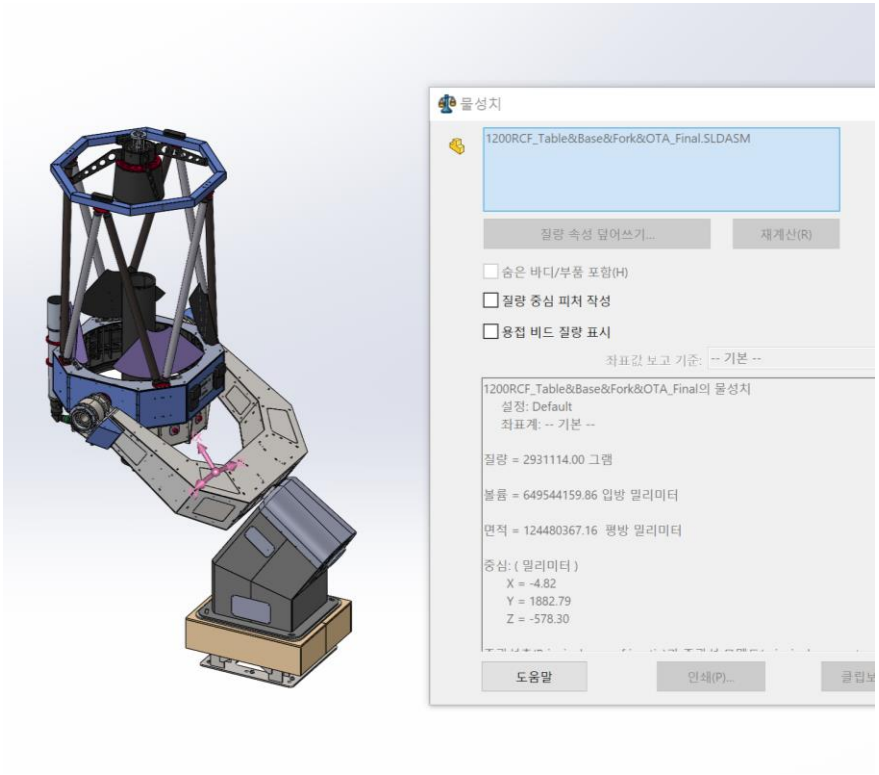


- D : 1205mm f/l : 10,093mm F8.4
- Wide Flat Field Ritchey Chretien (2 mirrors & 2 Lens)
- Astrositall CO115M (M1, M2)
- Direct Drive Equatorial Mount
- Max Slewing Speed : 5 degree/Sec
- Full Remote Control System
- Manufacturing and Optical Design : SLLAB, INC Korea

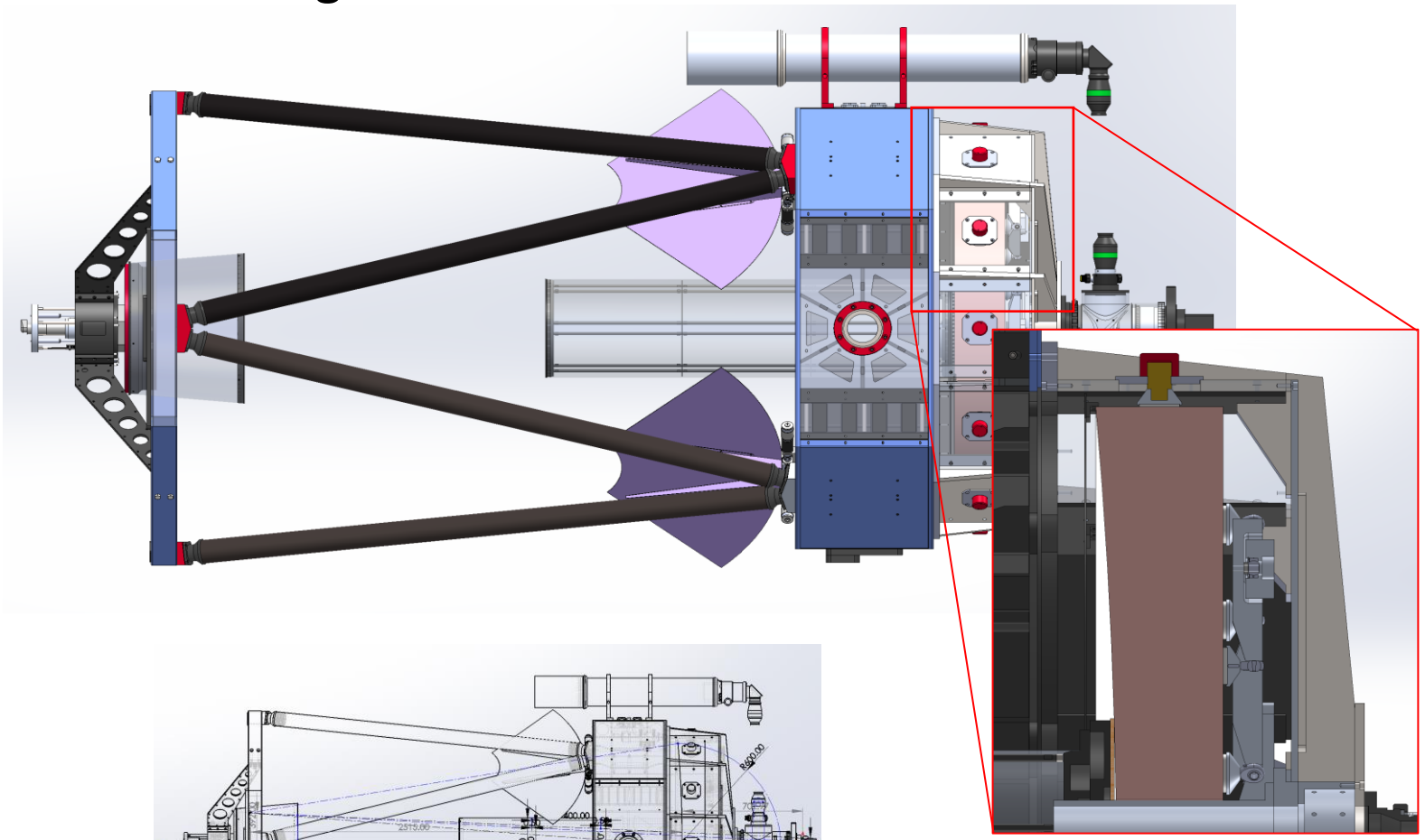
System Dimension and Total Weight



- Total Weight : 2,970kg
- Primary Mirror Weight : 385kg

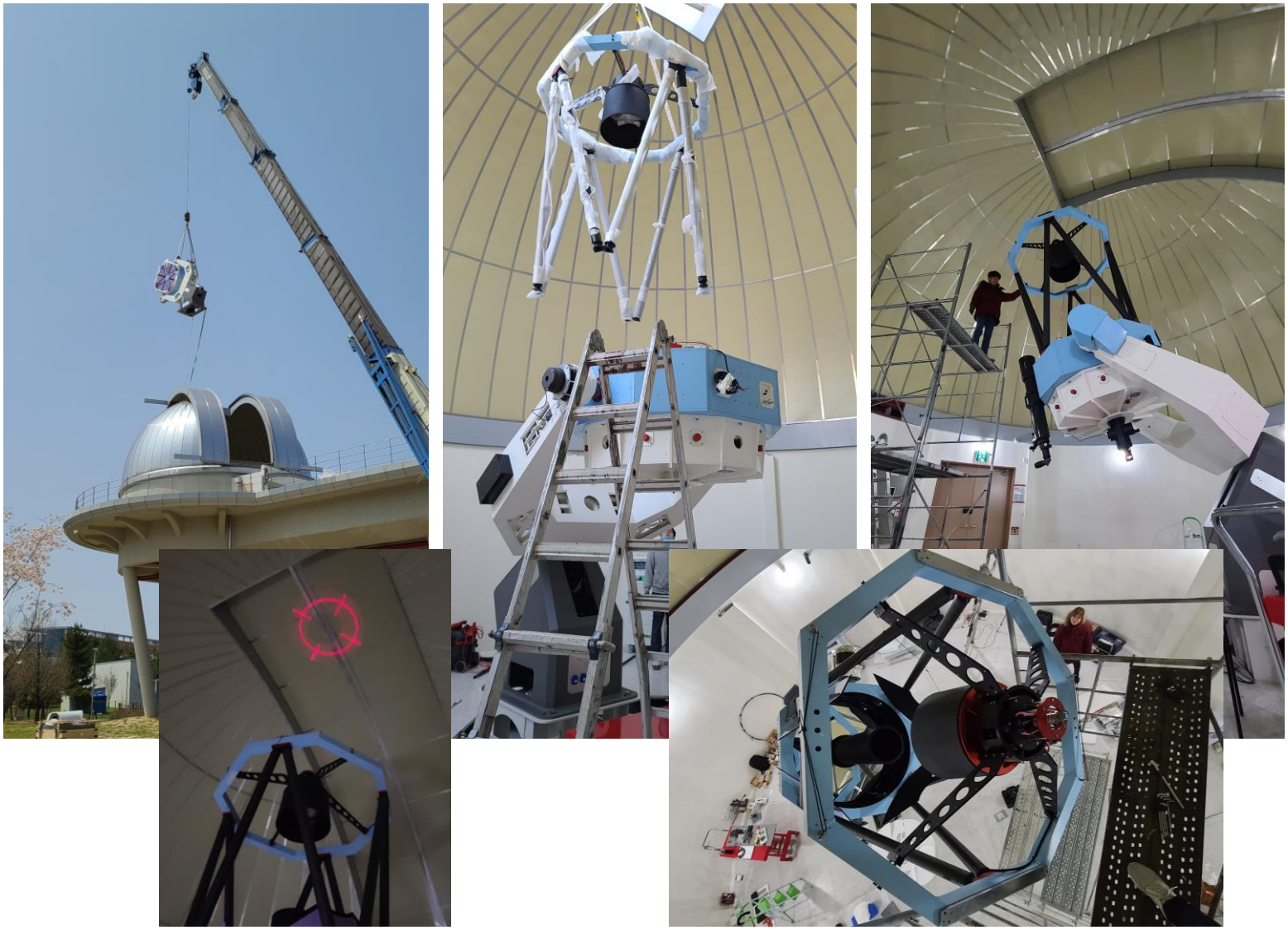


Optical Tube Diagram

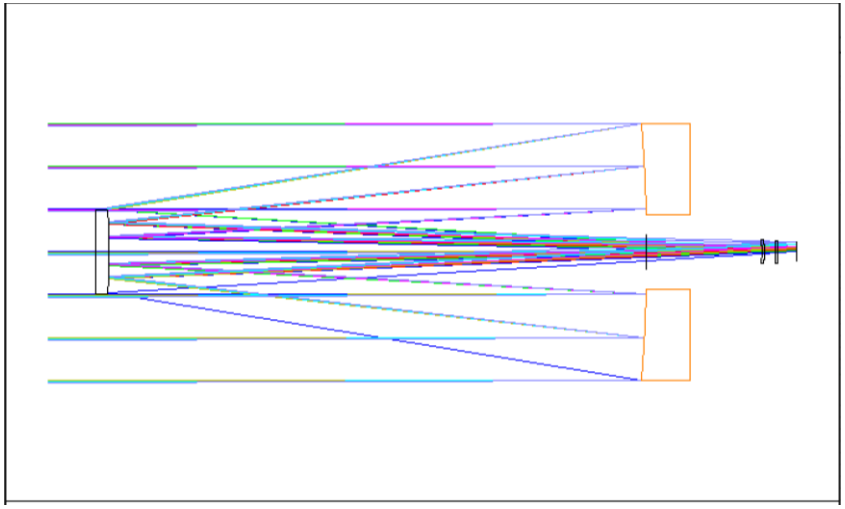


Manufacturing Process

Installation Process



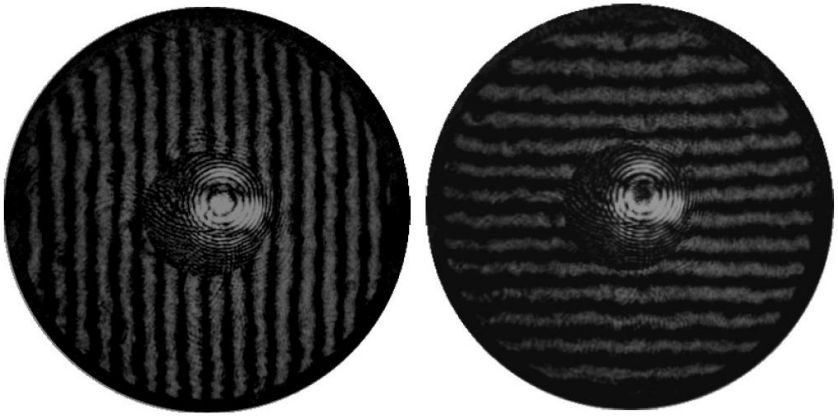
Optical Data of ASTERA1200



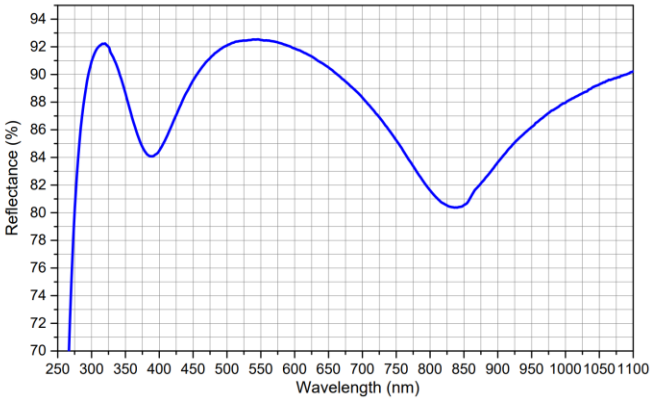
Img. Optical Diagram

	Measured Data
Type	Ritchey Chretien
M1 Diameter	1205.0mm
M2 Diameter	392mm
Focal Length	10,093mm
Back Focus	700mm
System Accuracy	λ/8.696 @ 633nm PtV Wavefront
	λ/55.56 RMS
	0.98 Stehl Ratio
coating	Al+SiO2, ρ(λ)90.1%
Field Corrector	2lens 2group
coating	Fully Multi coated

System interferograms

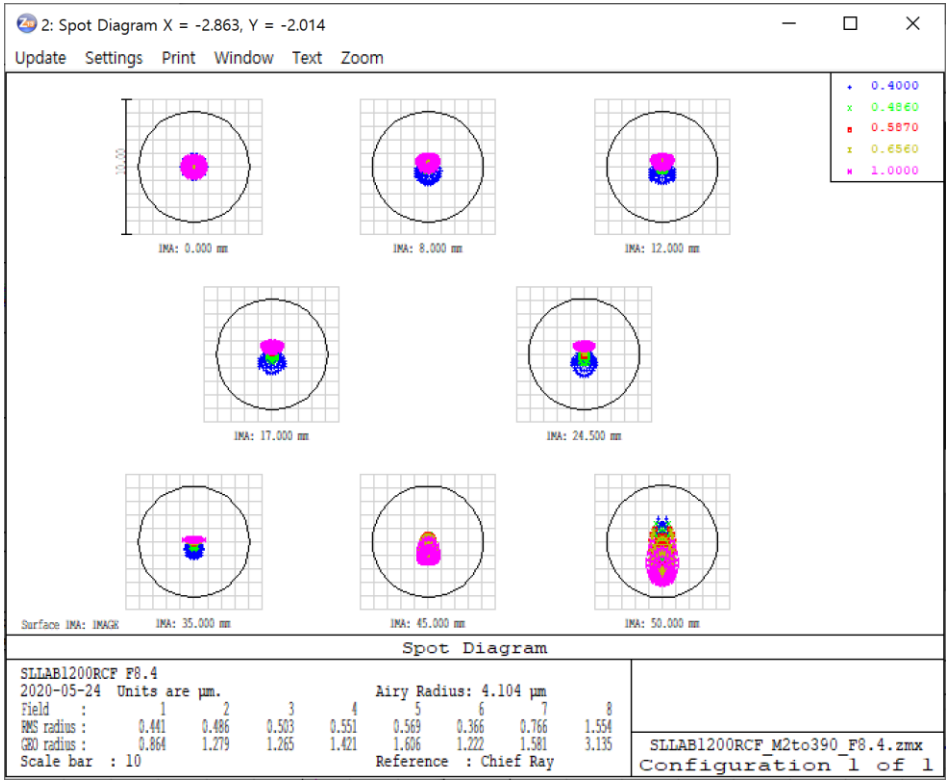


Img. autocollimation with flat reference mirror

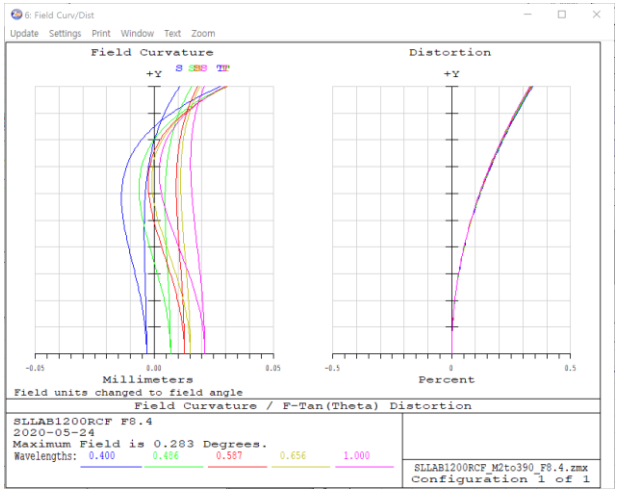


Img. Al-p coating RC-1200

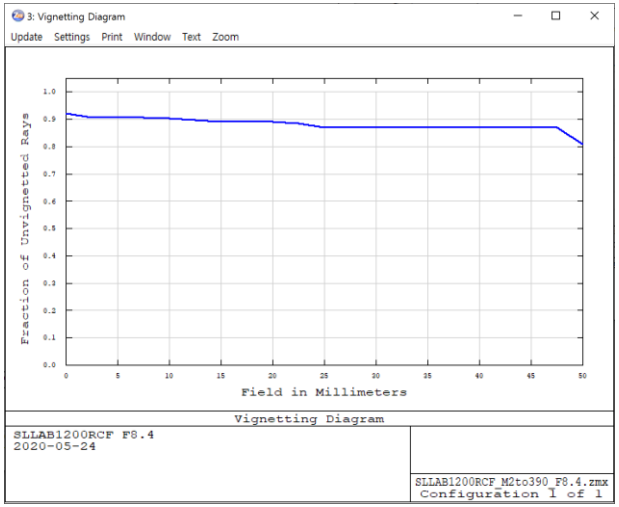
Focal Plane Size



Img. Spot Diagram of ASTERA1200



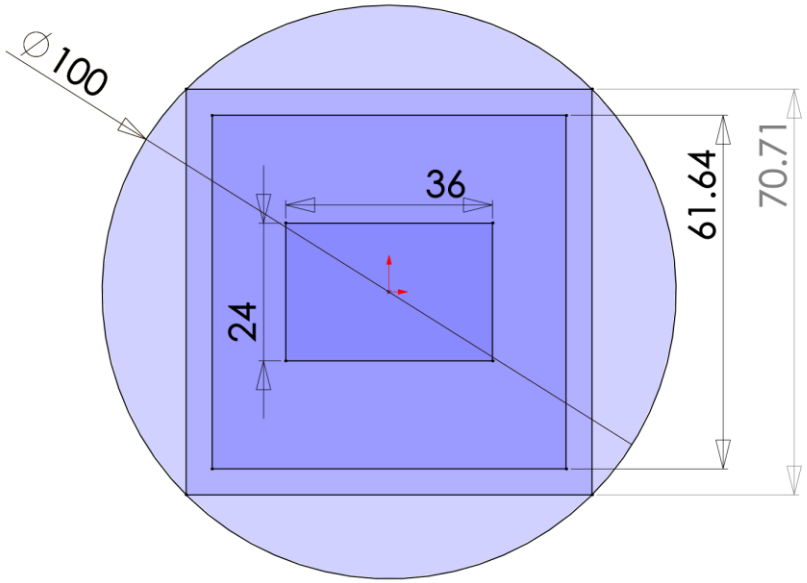
Img. Field Curvature and Distortion



Img. Vignetting Diagram

- Effective Image circle(Diameter) : 100mm
- RMS Spot Diameter : 0.88um (On Axis) to 3.11 um (50mm)
- Optical Design by SLLAB, INC

Suitable Detector Size



Img. Effective Focal Plane Diameter (Unit : mm)

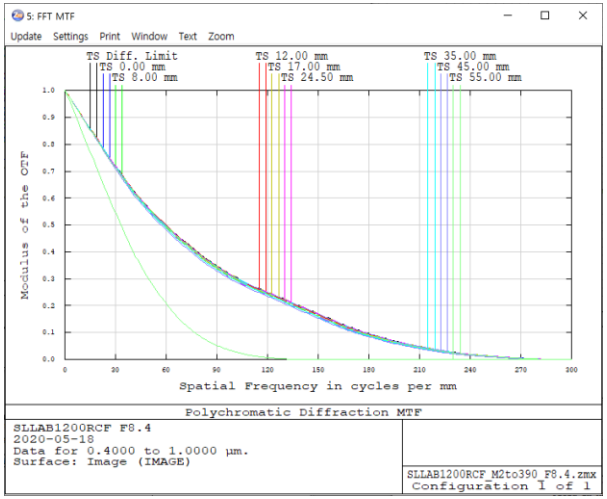
Img. Effective imaging area of ASTERA1200 with KL6060

ASTERA1200 offer
enough image circle for FLI KL6060.

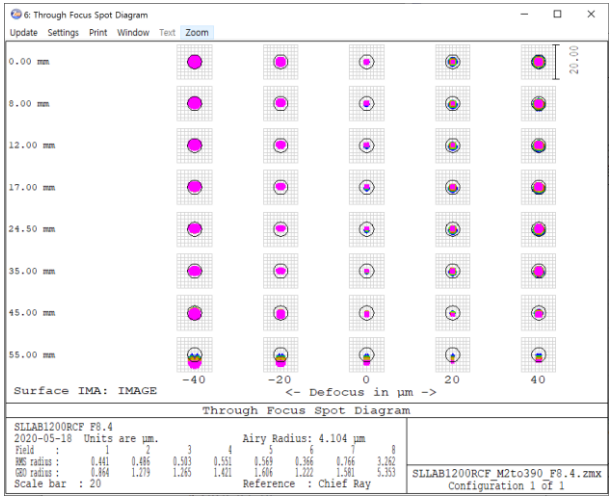
Table. Pixel, Image size of ASTERA1200 with KL6060

	X axis	Y axis	Diagonal
Size	20.94 arcmin	20.94 arcmin	29.61 arcmin
pixel	6144	6144	8689

Optical Datas / Spot Diagram without Filed Corrector

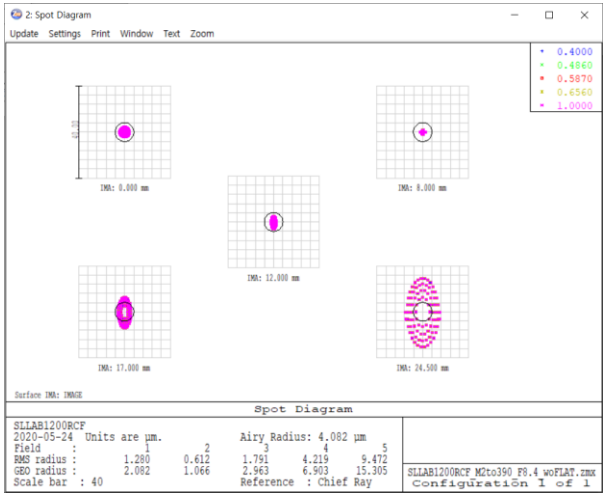


Img. Field Curvature and Distortion



Img. Through Focus Spot Diagram

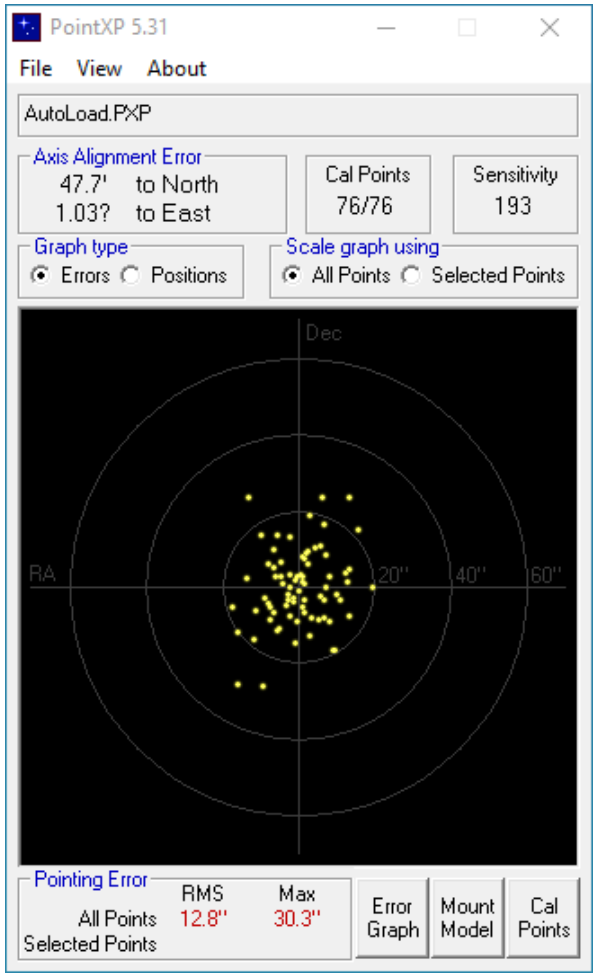
Even though +/- 40um offset, all spot size is smaller than airy disk



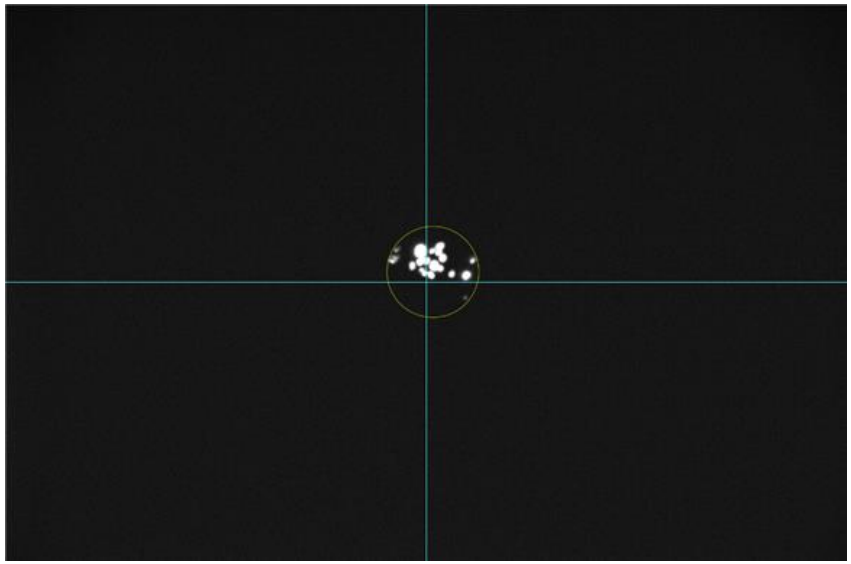
Img. Spot Diagram without Field Flattener

Img. CCD / Visual Port Changer (Standard Include)

Pointing and Tracking Accuracy of ASTERA 1200



Img. Pointing Error data by PointXP of SiTechExe



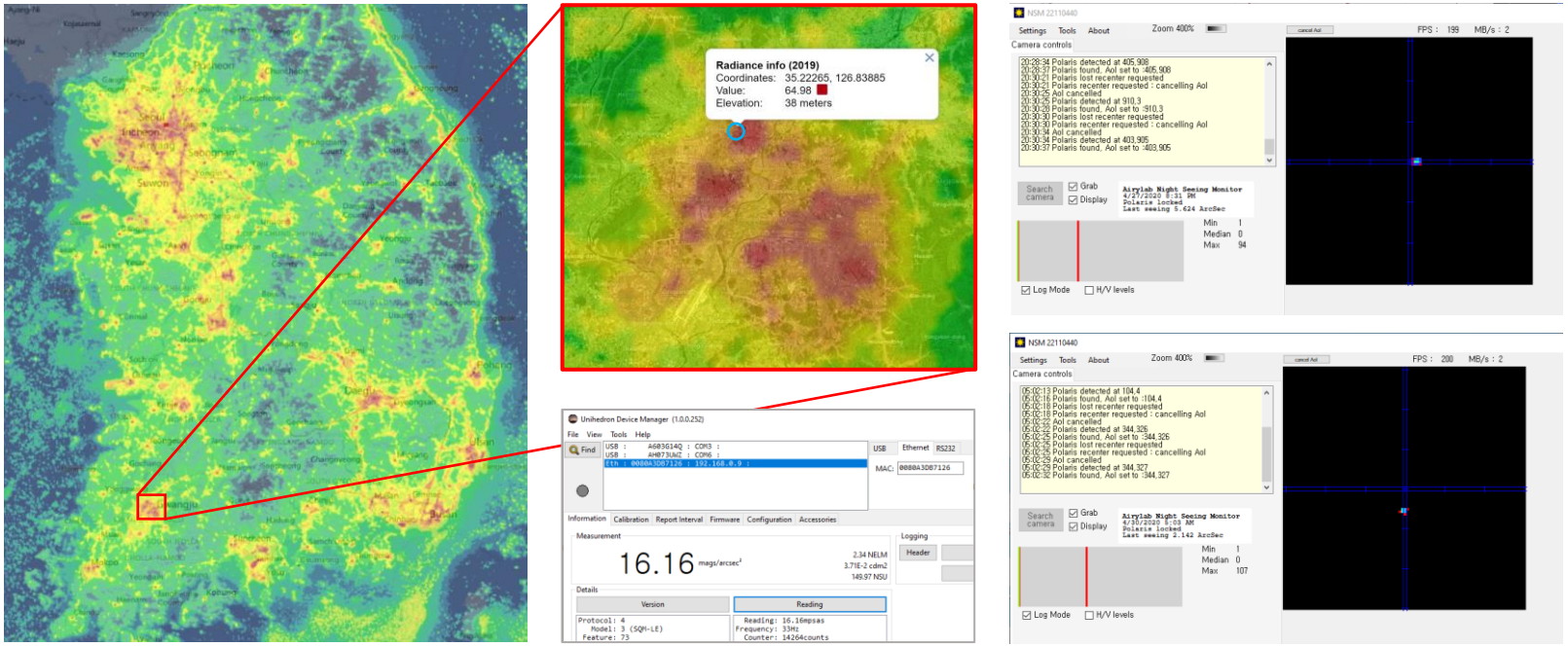
Img. pointing result of 21 stars, taken via PL11000m

Pointing Accuracy of ASTERA1200 is 12.8arcsec.
After performing precise polar alignment, we expect under 4arcsec Pointing Accuracy. (Result will update soon)

Tracking Accuracy is 0.1~0.2 arcsec. You can find result from astronomical photograph on next page.

"This is the best I've seen." - Dan Gray, Sidereal Tech

Installed Place and Sky Quality



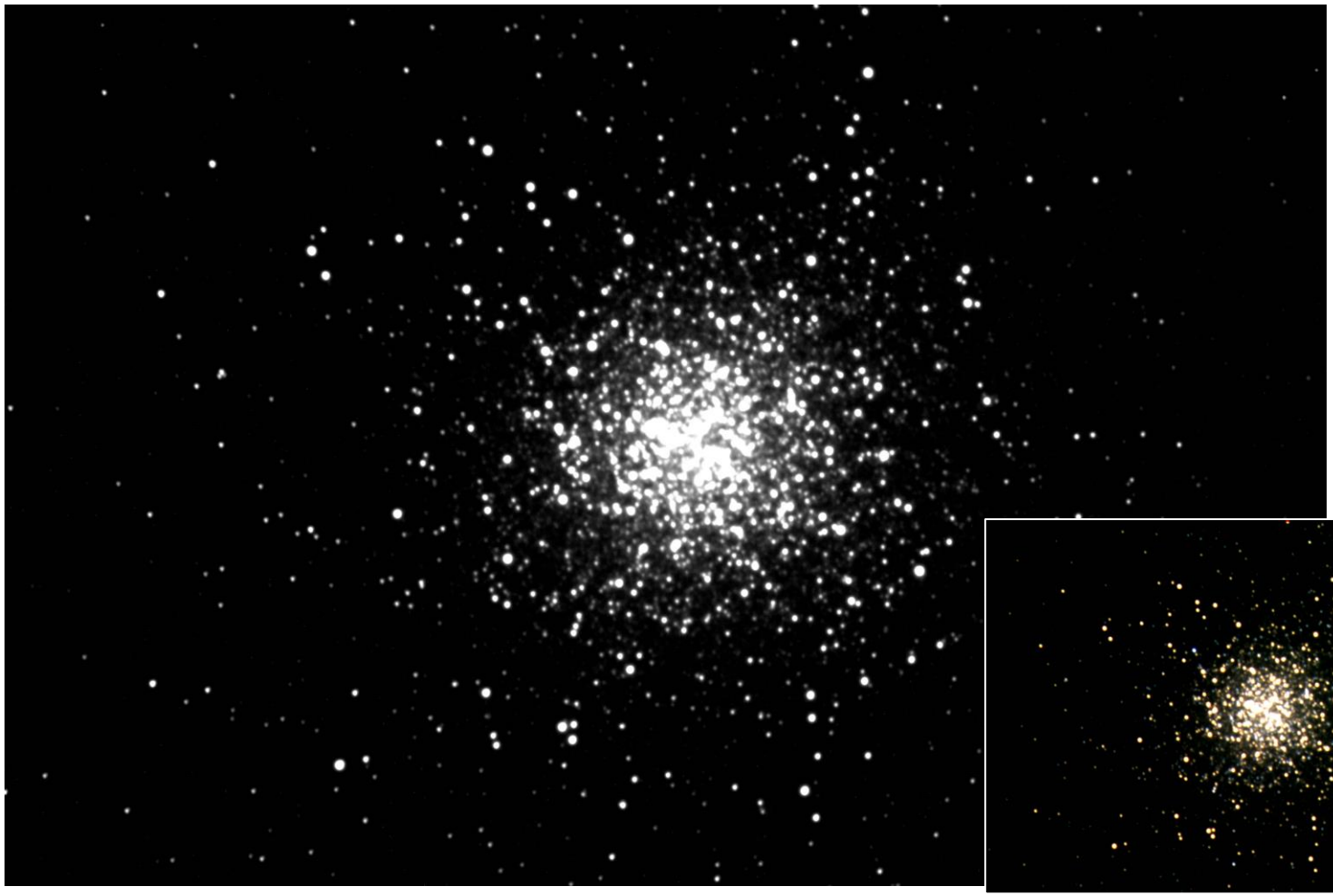
Img. Map Overlay - VIIRS 2019 © www.lightpollutionmap.info

Img. Measured by
SQM(Unihedron) and NSM(AiryLab)

Installed at Gwangju Science Museum
Gwangju is one of the largest city in Korea and observatory is greatly affected by serious light pollution.

SQM : 16.16 mags/arcsec^2
Seeing : 2.142 ~ 5.624
Measured : April 25~30, 2020

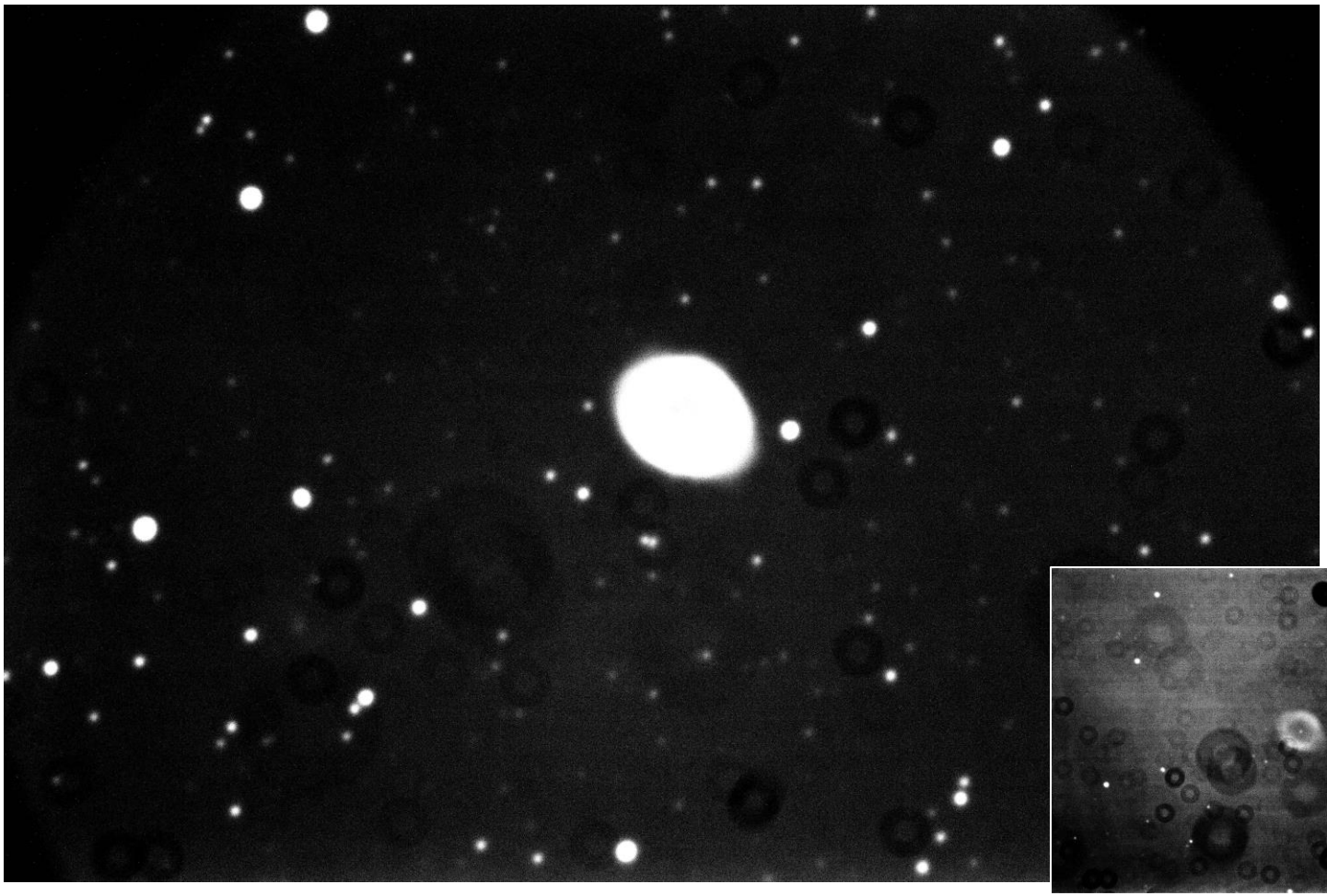
M13 Blind Tracking Image (600sec)



M13, 600 sec, B filter of BVR, Blind Tracking
April 25, 2020 (Moon age 3)
Camera : FLI PL11002M, B filter of UBVRI

M13, BVR combine image,
3 x 600sec Blind Tracking
Same day

M57 Blind Tracking Image (600sec)

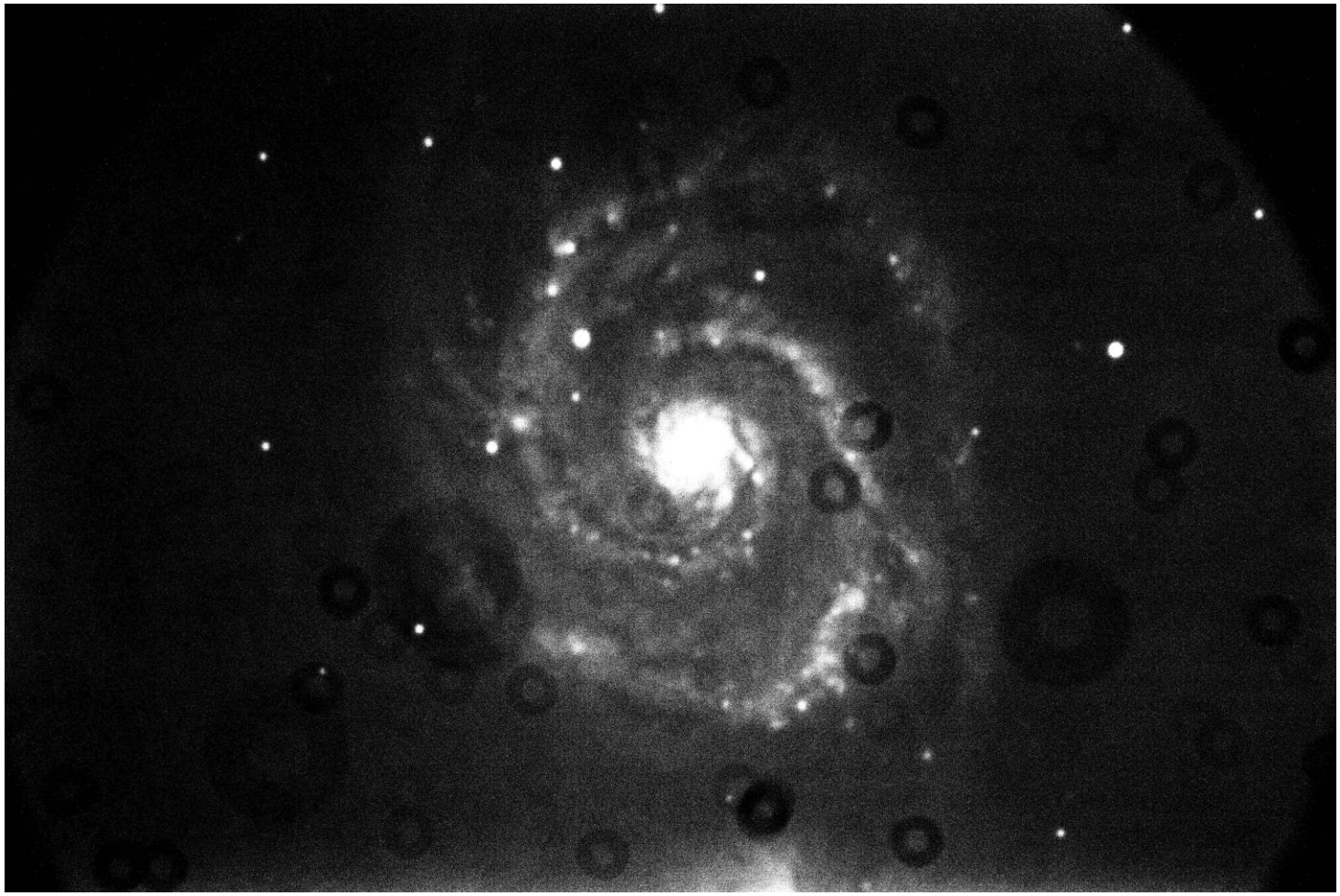


M57, 600 sec, B filter of BVR, Blind Tracking
April 27, 2020 (Moon age 5)
Camera : FLI PL11002M, B filter of UBVRI

Same condition
May 7, 2020 (Full Moon)

* Note. Vignetting happened via using 2inch CCD adapter at first light work, right image doesn't happen it.

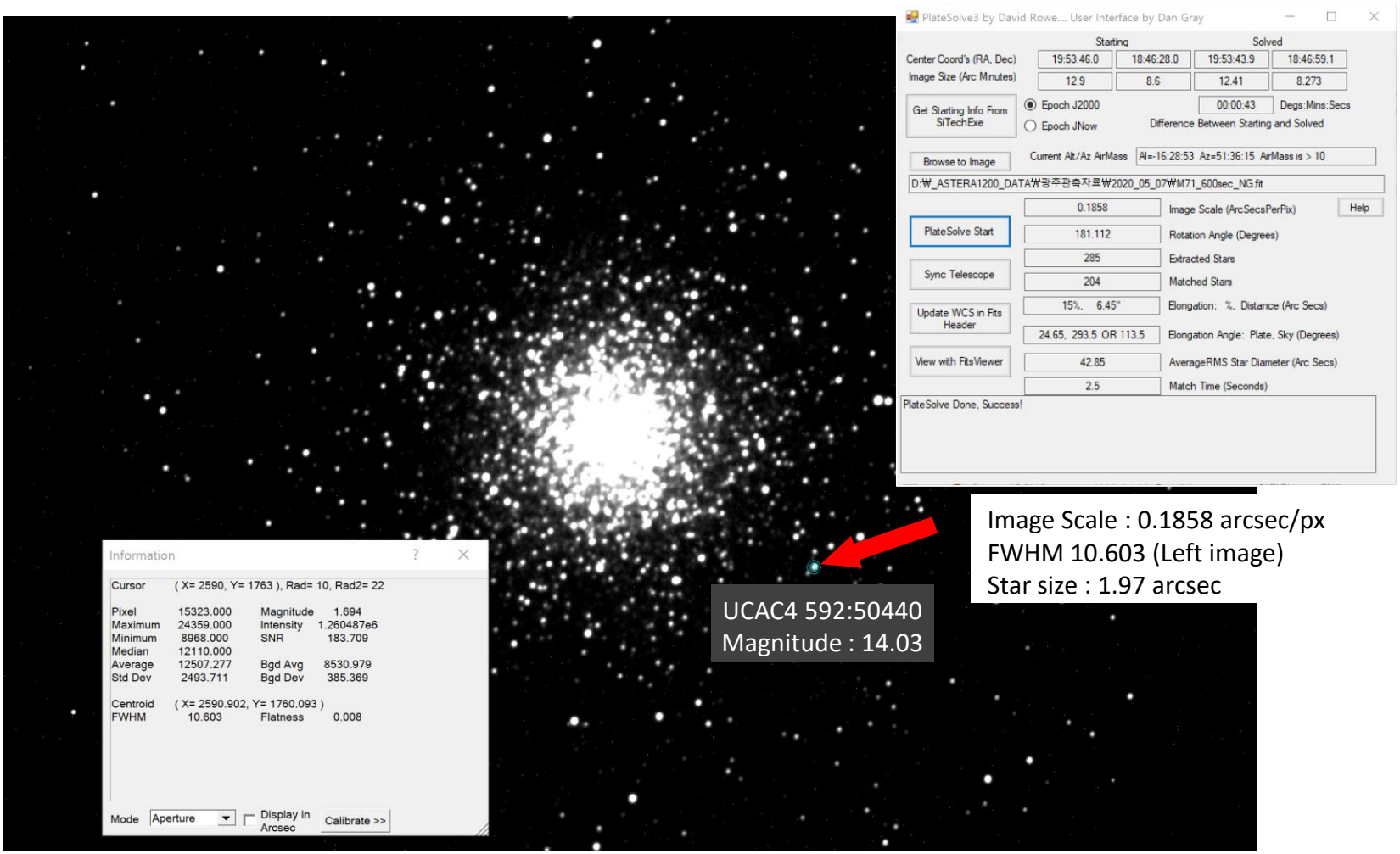
M51 Blind Tracking Image (600sec)



M51, 600 sec, B filter of BVR, Blind Tracking, April 27, 2020 (Moon age 5)
Camera : FLI PL11002M, B filter of UBVRI

* Note. Vignetting happened via using 2inch CCD adapter at first light work.

FWHM by Star Magnitude (mag 14.3)



M3, 600 sec, Blind Tracking
April 23, 2020 (Moon age 1)
Camera : SBIG STX11000M , B filter of RGB

FWHM by Star Magnitude (mag 12.4)

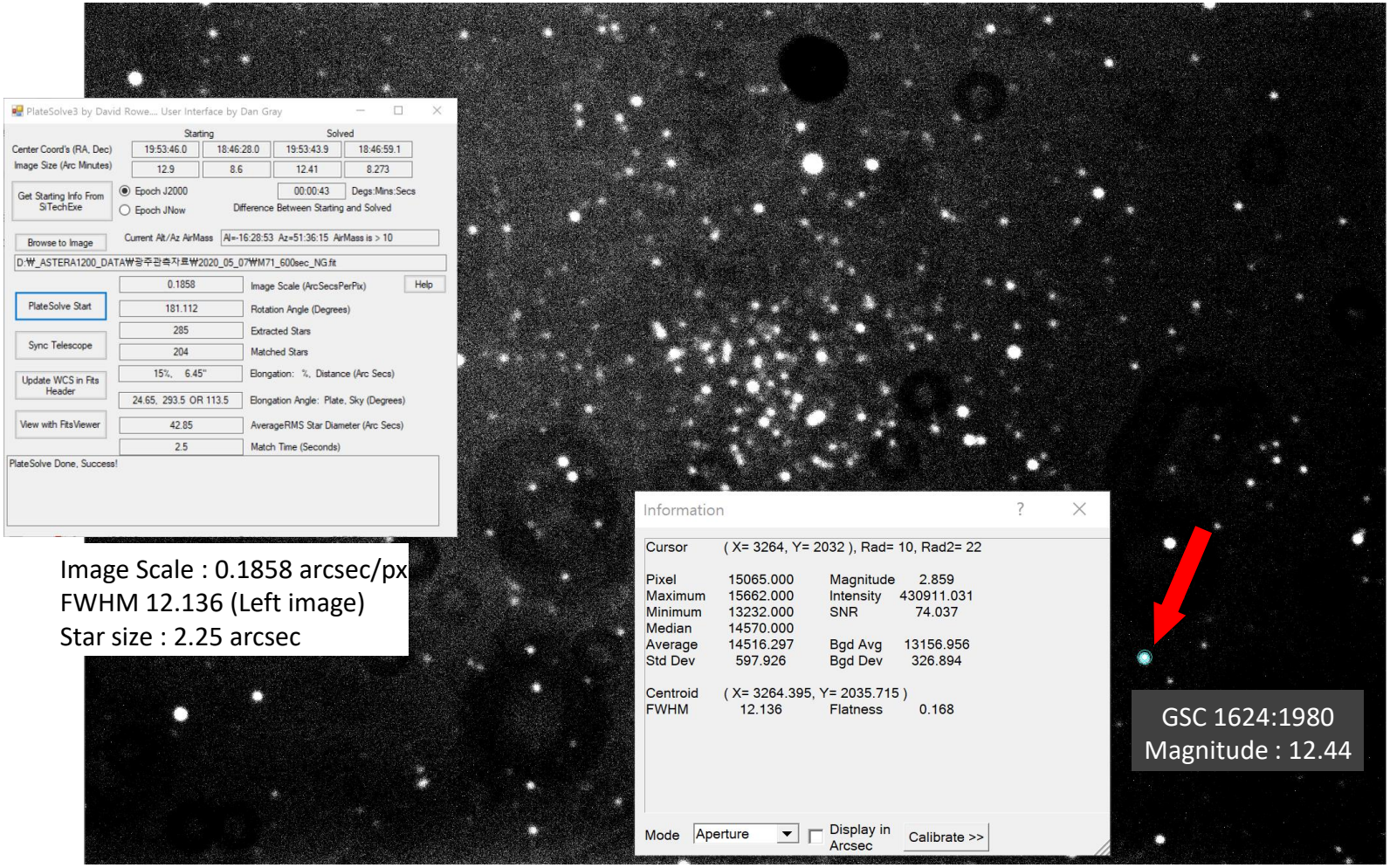


Image Scale : 0.1858 arcsec/px
FWHM 12.136 (Left image)
Star size : 2.25 arcsec

M71, 600 sec, B filter of BVR, Blind Tracking
May 7, 2020 (Full Moon)
Camera : FLI PL11002M, B filter of UBVRI