

VVS ASTROFOTOGRAFIEDAG  
2023



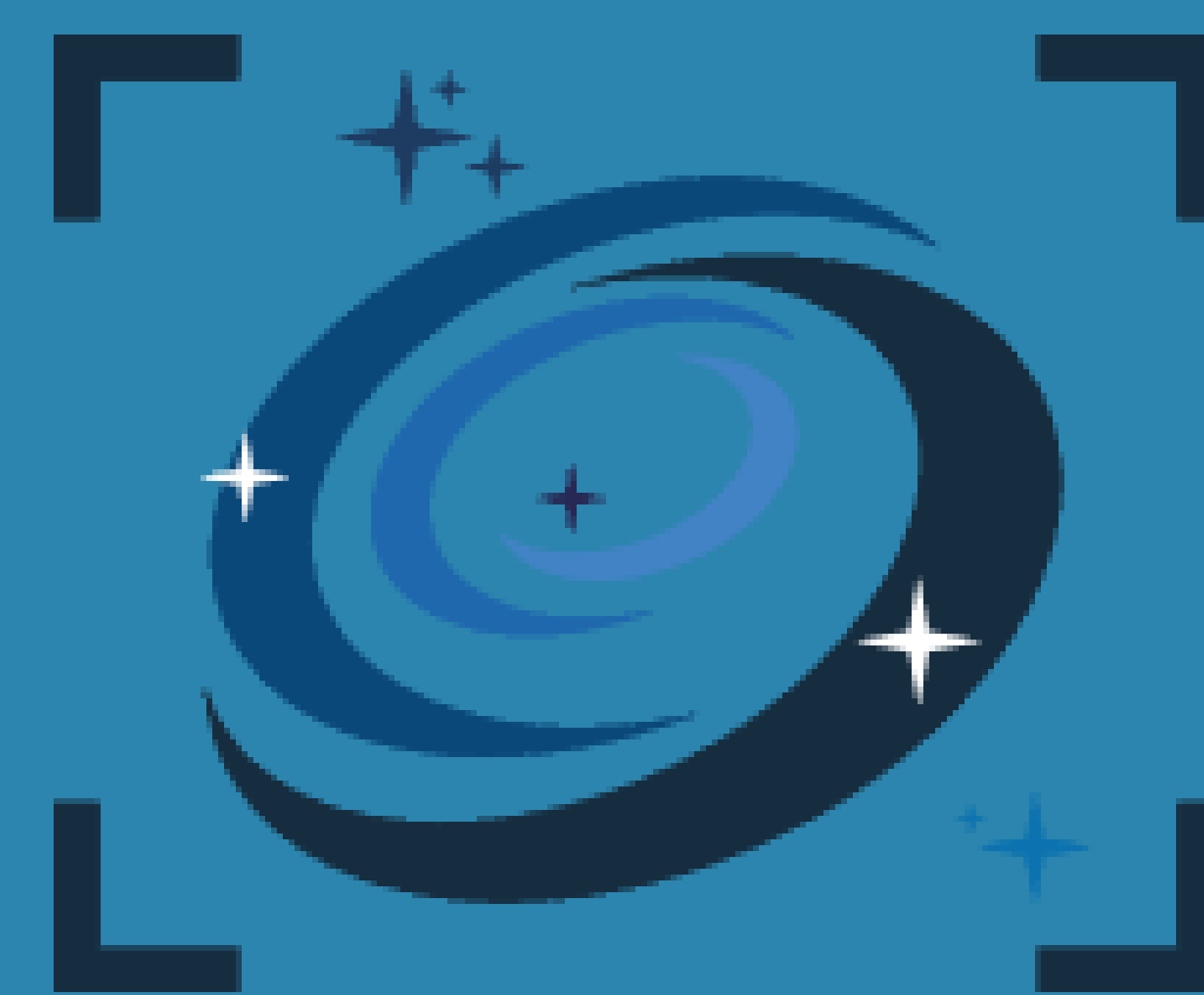
# ALLES ONDER CONTROLE MET N.I.N.A

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# Alles onder controle met



**N.I.N.A.**

# Wat is N.I.N.A. ?

- Nighttime Imaging 'N' Astronomy
- Stefan Berg
- Open Source
- Third party plugins
- Official releases – Beta versions  
– Nightly buids (enkel Windows)
- Deep Sky fotografie tool
- Sequentieel takerschema
- Beeldherkenning
- Beginners en veteranen
- Moduleerbare User Interface

The screenshot displays the N.I.N.A. software interface, which is a comprehensive tool for astronomical imaging. The central window shows a live image of a star field. Surrounding this are several panels:

- Equipment:** Camera settings (Gain: 101, Offset: 40), Cooler (power: 14.00%, temp: -10.00 °C), and Filter Wheel (Active filter: L-Pro).
- Telescope:** Tracking (Custom), Sidereal time (09:23:18), Meridian in (06:03:18), Right Ascension (15:26:37), Declination (52° 22' 06"), Altitude (37° 32' 39"), Azimuth (50° 21' 16"), Side of pier (West), and RA guide rate (6.000).
- Imaging:** Exposure time (5 s), Filter (Current), Binning (1x1), Gain (101), and status for Loop, Save, and Enable subsampling (all OFF).
- Statistics:** Image dimensions (3008x3008), Mean (2547.57SD), Median (2584.00MAD), Min (2000), #Stars (314), Bit depth (16), and Gain (101).
- HFR history:** A line graph showing HFR (green), Autofocus (orange), and Stars (blue) over 5 frames.
- Sequence:** A list of targets including M45, Christmas Tree Cluster, and C/2022 E3 (ZTF), with timing and distance information.
- Altitude Chart:** A graph showing the altitude of the target over time.
- Guiding:** A graph showing RA and Dec corrections over time, with a state of Guiding and a total error of 0.25 (1.21").



# Alles verbinden

- Uitrusting opzetten
- Instellingen – Opties - Parameters

# Uitrustig

Directe connectie  
Ascom  
Manueel

N.I.N.A. - Nighttime

- Equipment
- Camera
- Filter Wheel
- Focuser
- Rotator
- Telescope
- Guidar
- Switch
- Flat Panel
- Weather
- Dome
- Safety Monitor

### Camera

ZWO ASI533MC Pro

Camera state: Idle

Name: ZWO ASI533MC Pro

Description: ZWO ASI533MC Pro

Driver info: ZWO ASI533MC Pro, Driver version: 1.28.0.0

Sensor type: RGGB

Sensor X size: 3008, Sensor Y size: 3008

Min. exposure time: 3.2E-05, Max. exposure time: 2000

Max. binning X: 4, Max. binning Y: 4

Pixel size X: 3.76 µm, Pixel size Y: 3.76 µm

Gain: 101, Offset: 40

### Temperature control

Cooler

Cooler power: 0.00%

Sensor temperature: 23.20 °C / 23.00 °C

Target temperature: -10 °C

Min. Duration: 0 min

Warming

Min. Duration: 0 min

### Settings

Default gain (0-600): 101

Default offset (0-100): 40

USB limit (40-100): 40

### Filter Wheel

Manual filter wheel

Name: Manual filter wheel

Description: Mirrors the filters that are set up inside the options. When a filter change is requested a notification will pop up to manually change the filter.

Driver info: n.A., Driver version: 1.0

Filter name: L-Pro

Change

### Guider

PHD2

Connected

State: Looping

Pixel scale: 4.77 arcsec/px

Guide Graph Show Corrections: ON

Guide Graph RA Color: Blue

Guide Graph Dec Color: Red

Settings

Dither pixels: 5 px, Dither in RA only: OFF

Settle pixel tolerance: 1.5 px, Minimum settle time: 10 s

Settle timeout: 40 s, Guiding start retry: OFF

Guiding start timeout: 60 s, ROI percentage to find guide star: 80 %

PHD2 profile: ASI120 with TS-Optics

### Telescope

POTH Hub

Name: POTH Hub

Description: ES\_PMC8 Telescope

Driver info: POTH->Explore Scientific PMC-Eight ASCOM Driver

Manual coordinates (J2000)

Target RA: 0 h 0 m 0.0 s

Target Dec: 0 d 0 m 0.0 s

Manual control

Set tracking rate

Primary rate: 2.50

Secondary rate: 2.50

Manual control buttons: N, S, E, W, Stop, Park, Set as park, Home

Settings

Primary reversed: OFF

Secondary reversed: OFF

### Focuser

ZWO Focuser (1)

Name: ZWO Focuser (1)

Description: ZWO Focuser (1)

Driver info: ZWO Focuser ASCOM Driver, Driver version: 6.0

Is moving: OFF

Is settling: OFF

Max. increment: 60000

Max. step: 60000

Position: 46924

Temperature compensation: OFF

Temperature: 20.27 °C

Target position: 46924

Move

# Opties

## Algemeen

The image shows a vertical sidebar of options on the left, with a dashed red box highlighting the 'Algemeen' (General) option. Arrows point from callout boxes to specific sections in the main settings window:

- Meerdere profielen** (Multiple profiles) points to the 'Profielen' section.
- Eigen Kleurenschema** (Own color scheme) points to the 'Huidig UI kleurenschema' section.
- Locatie Aangepaste horizon** (Location Custom horizon) points to the 'Astrometry' section.
- Algemene instellingen** (General settings) points to the 'Algemeen' section.
- Software build** (Software build) points to the 'Uitgebreide Instellingen' section.

**Profielen**

Actief	Naam	Beschrijving	ID
<input checked="" type="checkbox"/>	Askar ACL200 ZWO533MC		57c3e1f6-fa60-46f6-9673-9d5185b2e19
<input type="checkbox"/>	Nikon D5600		d8e579ad-76b4-4f01-a7d2-3a7fc69bb4
<input type="checkbox"/>	TS Photon 150/750 ZWO533MC		5891b72e-1a4f-40e7-b8b5-087974b76

**Algemeen**

Naam: Askar ACL200 ZWO533MC  
Beschrijving:   
Taal: Dutch (Netherlands)   
Font: Segoe UI Regular   
Sky Atlas afbeeldingsmap: D:\Data bestanden\Documenten\N.I.N.A\SkyAtlasImageRepos   
Sky Survey cache directory: C:\Users\Bert\AppData\Local\NINA\FramingAssistantCache   
Profile Chooser on Startup:  ON  
Uitgebreide Instellingen: Automatische update bron: Beta

**Huidig UI kleurenschema**

Light

Color	Label
Black	Primair
White	Rand
Dark Blue	Secundaire achtergrond
Dark Blue	Achtergrond knop
White	Knop voorgrond
Brown	Notificatie waarschuwing
White	Waarschuwingstekst
Blue	Secundair
White	Achtergrond
Dark Blue	Tertiaire achtergrond
Blue	Knop accentuering
Light Blue	Knop voorgrond uitgeschakeld
Red	Meldingsfout
White	Fouttekst

**Alternatief UI-kleurenschema**

Navy

Color	Label
Light Blue	Primair
White	Rand
Dark Blue	Secundaire achtergrond
Dark Blue	Achtergrond knop
White	Knop voorgrond
Red	Notificatie waarschuwing
White	Waarschuwingstekst
Blue	Secundair
White	Achtergrond
Dark Blue	Tertiaire achtergrond
Blue	Knop accentuering
Light Blue	Knop voorgrond uitgeschakeld
Red	Meldingsfout
White	Fouttekst

**Astrometry**

Site breedtegraad: 50.23 °   
Site lengtegraad: 4.7 °   
Site-hoogte: 10.0 m   
Custom Horizon: d:\Data bestanden\Documenten\N.I.N.A\Horizon\MiddenGras.h

# Opties

## Uitrusting

**Camera**

Pixelgrootte: 3.76  $\mu\text{m}$     Bit diepte: 16

Bayer Pattern: Auto

▼ Uitgebreide Instellingen

Schakel bit schalen in:  OFF

Bulb modus: Native    Raw converter: Freemage

Camera Timeout: 60 s    ASCOM allow odd pixel:  ON

**Telescoop**

Naam telescoop: Askar ACL200    Automatic Sync:  ON

Brandpuntlengte: 200 mm

Brandpuntverhouding: 4

Rust periode na slew: 5 s

**Weer**

OpenWeatherMap API-sl:

TheWeatherCompany AP:

Weather Underground AI:

Weather Underground St:

**Filterwiel**

Disable guiding during fil:  OFF

Positie	Naam
1	L-Pro
2	L-Ext
3	UV/IR

**Planetarium**

Voorkeurssoftware voor planetarium: Cartes du Ciel

Host: localhost    Poort:

**Filters**

**Planetarium software**

**Uitrusting**

- Uitrusting
- Algemeen
- Uitrusting
- AF Autofocus
- Flat wizard
- Dome
- Sequencer
- Fotograferen
- Fotograferen
- Plate Solving
- Opties**
- Plugins

**Camera**

**Telescoop (brandpunt lengte)**

**Weer**

- Uitrusting
- Algemeen
- Sky Atlas
- Uitrusting
- AF
- Autofocus
- Framing
- Flat wizard
- Dome
- Sequencer
- Fotograferen
- Fotograferen
- Plate Solving
- Opties
- Plugins



### Autofocus

Gebruik filterwiel offsets  OFF

Autofocus initiële offset stappen: 4

AF methode: Star HFR

AF curve fitting: Hyperbolic

AF aantal pogingen: 5

Gebruik de helderste n sterren: 0

AF verhouding buitenste bijsnijding: 1

Binning: 1

R<sup>2</sup> Threshold: 0.7

Autofocus stapgrootte: 100

Standaard autofocus belichtingstijd: 5 s

AF guiding uitschakelen  OFF

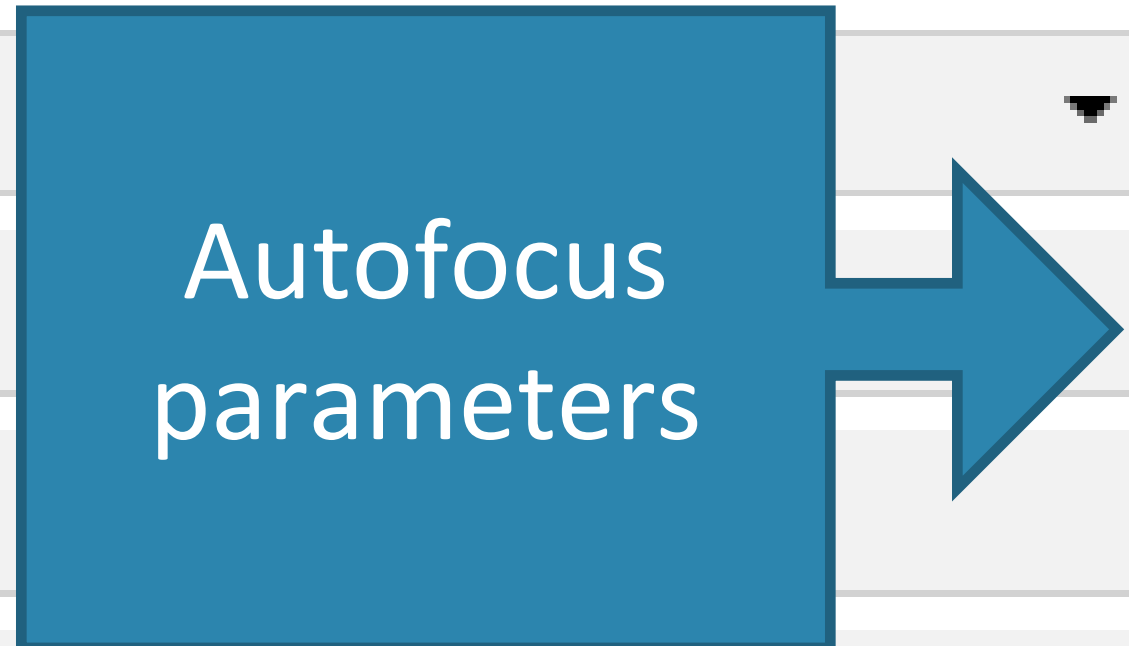
Focuser rusttijd: 1 s

AF aantal frames per punt: 1

AF Inner Crop Ratio: 1

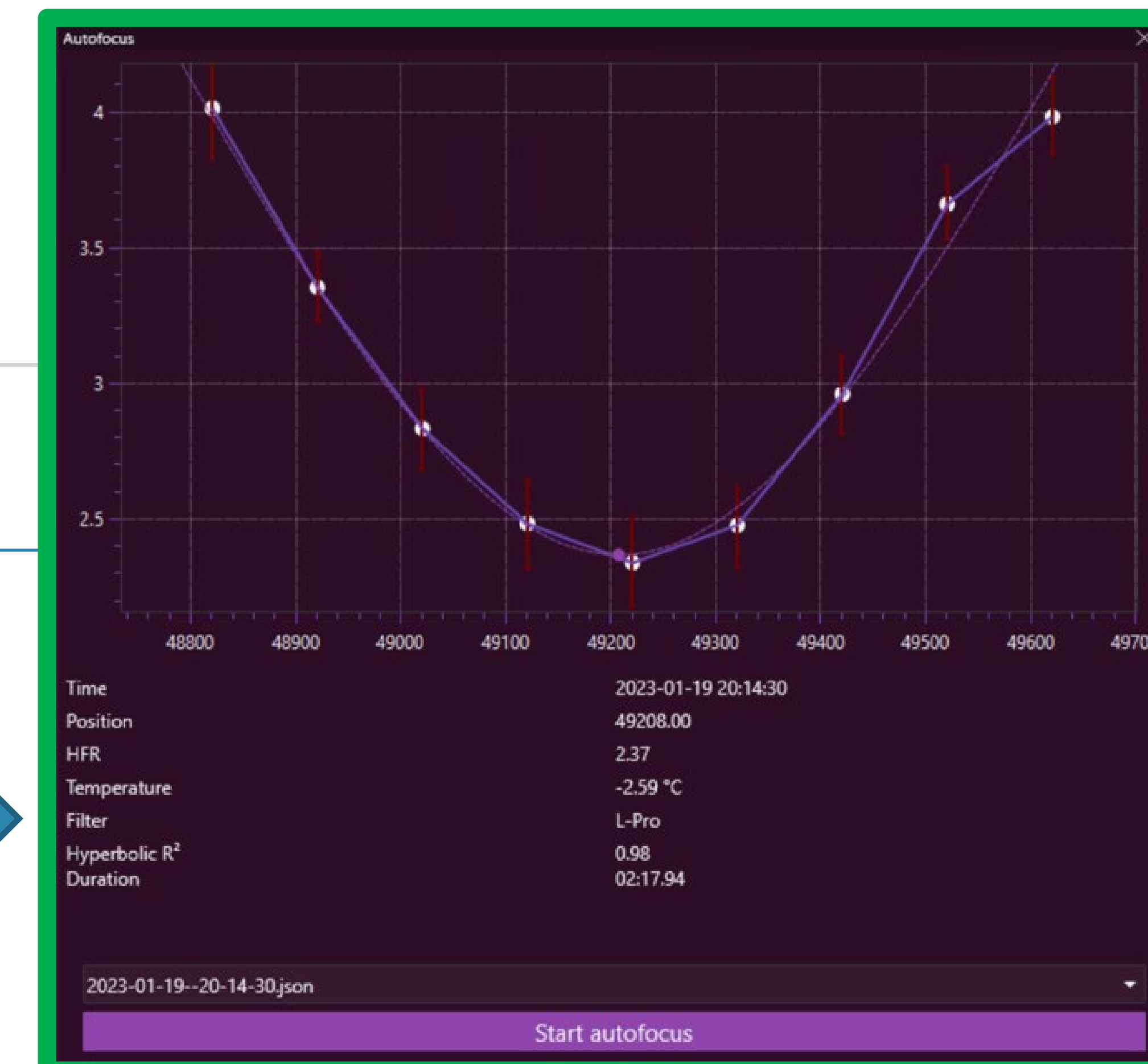
Backlash Compensation Method: Absolute

Backlash IN/UIT: 38 | 38



### Auto Focus Filter Settings

Positie	Naam	Focus offset	Autofocus belichtingstijd	Binning	Gain	Offset
1	L-Pro	0	(5)			(Camera)
2	L-Ext	0	(5)			(Camera)
3	UV/IR	0	(5)			(Camera)







### Dome & mount geometry

Mount Type	Equatorial
Scope Position N/S	0 mm
Scope Position E/W	0 mm
Scope Position +Up/-Down	0 mm
Dome Radius	0 mm
GEM Axis Length	0 mm
Lateral Axis Length	0 mm
Azimuth Tolerance	2 °

### Dome Settings

Synchronization Timeout	120 s
Rust periode na slew	1 s
Allow sync while mount slews	<input type="checkbox"/> OFF
Sync slew dome when scope slews	<input type="checkbox"/> OFF
Find home before parking	<input type="checkbox"/> OFF

### Shutter coordination

NOTICE: These settings relate to the safety of your be set with careful consideration and with the fami your specific setup. They govern only N.I.N.A.'s con and are NOT in effect if N.I.N.A. is not running or is equipment in question. Dome or roof safety mecha have a hardware backup and electrical interlocks to shutter or roof movement. It is your responsibility t settings do not conflict with your dome driver's set

- Close on unsafe conditions  OFF
- Refuse open if a Safety Monitor is not connected  OFF
- Park mount before shutter operation  OFF
- Park dome before shutter operation  OFF
- Refuse open or close if mount is unparked  OFF

# Opties

## Fotograferen

A vertical sidebar menu with various icons and labels. The 'Opties' icon, represented by a gear, is highlighted with a dashed blue border. Other icons include a telescope, a star map, a camera, a dome, a sequence of stars, a camera with a star, a camera with a star, and a puzzle piece.

Bestand instellingen

### Bestandsinstellingen

Afbeelding opslaan als: FITS

Opties bestandsformaat: Er zijn geen opties voor dit bestandsformaat

Afbeelding bestandspa: D:\N.I.N.A Raw data\  
Afdeling bestand: `$$TELESCOPE$$ $$TARGETNAME$$ $$IMAGETYPE$$ $$FILTER$$ $ $EXPOSURETIME$$s gain$$GAIN$$_offset$$OFFSET$$ $$IMAGETYPE$$ $ $TARGETNAME$$_D $$DATE$$_T $$TIME$$_ $$FILTER$$_ $$EXPOSURETIME$$ $ _stars $$STARCOUNT$$_HFR $$HFR$$_RMS $$RMS$$`

Pattern Preview: OptiCo 60mm f-15 > M33 > LIGHT L 10.21s gain1600\_offset10 > LIGHT\_M33\_D2016-01-01\_T12-00-00\_L\_10.21\_stars 3294\_HFR 3.25\_RMS 0.35

Patroonnaam	Beschrijving
\$\$IMAGETYPE\$\$	Light, Flat, Dark, Bias, Snapshot
\$\$SEQUENCETITLE\$\$	Current sequence title
\$\$STARCOUNT\$\$	Star count
\$\$TARGETNAME\$\$	Doelnaam indien beschikbaar
<b>Filterwiel</b>	
\$\$FILTER\$\$	Filternaam
<b>Focuser</b>	
\$\$FOCUSERPOSITION\$\$	Huidige focuserpositie
\$\$FOCUSERTEMP\$\$	Focuser temperatuur
<b>Guider</b>	
\$\$PEAKDEC\$\$	Peak Dec guiding error during exposure in pixels
\$\$PEAKDECARCSEC\$\$	Peak Dec guiding error during exposure in arc seconds
\$\$PEAKRA\$\$	Peak RA guiding error during exposure in pixels
\$\$PEAKRAARCSEC\$\$	Peak RA guiding error during exposure in arc seconds
\$\$RMS\$\$	Wortel van de gemiddelde kwadraatsomfout tijdens de belich

### Automatische meridian flip

Minuten na meridiaan: 5 min  
Max Minutes after Meridian: 10 min  
Gebruik telescoopzijde van pier: ON  
Centreer telescoop na meridian flip: ON  
Scope settle time after flip: 30 s  
Pause before Meridian: 0 min  
Auto Focus after Flip: OFF  
Rotate image after flip: OFF

### Afbeeldingsopties

Annoteer afbeelding: OFF  
Debayer afbeelding: ON  
Debayered HFR: ON  
Niet-gekoppelde stretch: ON

### Volgorde

Standaard map voor reeks bestanden: d:\Data bestanden\Documenten\N.I.N.A\Seque  
Sequence Template Folder: d:\Data bestanden\Documenten\N.I.N.A\Templ  
Sequence Builder Template: d:\Data bestanden\Documenten\N.I.N.A\Simple  
Startup Sequence Template: d:\Data bestanden\Documenten\N.I.N.A\Startu  
Sequencer Targets Folder: d:\Data bestanden\Documenten\N.I.N.A\Target  
Collapse Sequence Templates by default: OFF

Meridian Flip

Opties Voor het tonen van afbeelding

Locatie templates

A screenshot of a file explorer window showing a directory of FITS files. The files are listed with their names and some metadata. The directory path is NINA Raw Data > Askar ACL200 > M 45 > LIGHT None 60.00s 0.00\*.

# Opties

## Plate Solving

Uitrustung  
Sky Atlas  
Framing  
Flat wizard  
Sequencer  
Fotograferen  
Opties  
Plugins

Algemeen  
Uitrustung  
AF Autofocus  
Dome  
Fotograferen  
Plate Solving

Type Plate Solving

### Plate Solving

Plate solver   
Blind Solver   
Use Blind Solver for Failures

Belichtingstijd   
Filter   
Binning   
Gain   
Pointing Tolerance   
Rotatie tolerantie   
Aantal pogingen   
Vertraging tussen pogingen

Parameters

Instellingen

### Plate solver instellingen

Astrometry.Net  
Local plate solver  
Platesolve2  
Platesolve3  
All Sky Plate Solver  
ASTAP

API sleutel   
URL

Platesolve service aangeboden door  
  
[Astrometry.net](http://nova.astrometry.net)

Slew and center

Center RA	3.804
Center RA HMS	03:48:13
Center Dec	24.504
Center Dec DMS	24° 30' 14"
Radius	0.000 deg
Pixel scale	3.82 arcsec/pixel
Orientation	358.97
Epoch	J2000
Error distance	00° 08' 26"
RA error	-00:00:37
RA error (px)	-145.65
Dec error	00° 00' 04"
Dec error (px)	1.05

Telescope not inside tolerance. Syncing scope...

Time	Succ	RA	Dec	Error distance	RA error	Dec error	RA erro	Dec erro	Dec erro
20:18:36	✓	03:48:13	24° 30' 14"	--	--	--	--	--	358.97



# Wat fotograferen?

- Selectie in Sky Atlas
- Framing
- Sequence samenstellen

# Sky Atlas

Diverse selectie criteria

Object Naam

Object foto

Object Altitude

Volgende stap

The screenshot shows the Sky Atlas software interface. On the left is a sidebar with navigation options like Equipment, Sky Atlas, Framing, Flat Wizard, Sequencer, Imaging, Options, and Plugins. The main area displays a list of nebulae with columns for Name, Details, and Altitude. Each row includes a thumbnail image, RA/Dec coordinates, Type, Constellation, and a graph of altitude over time. The right side features a control panel with buttons for 'Add target to sequence', 'Set for framing assistant', and 'Slew'. A blue arrow points to this panel from the right. At the bottom, there are navigation controls and a status bar showing '1 To 15 Of 15'.

Name	Details	Altitude
LBN 756 California Nebula NGC 1499 Sh2 220	RA 04:03:18 Dec 36° 25' 18" Type BRINB Constellation PER 164° 5 99.9 2.67°	90 60 30 0 Transit south 75° 12 15 18 21 00 03 06 09 12
LBN 771 Maia Nebula NGC 1432	RA 03:46:00 Dec 24° 12' 00" Type BRINB Constellation TAU 162° 99.9 99.9 60.00°	90 60 30 0 Transit south 63° 12 15 18 21 00 03 06 09 12
Caldwell 31 IC 405 LBN 795 Flaming Star Nebula	RA 05:17:24 Dec 34° 23' 00" Type BRINB Constellation AUR 171° 10 99.9 50.00°	90 60 30 0 Transit south 73° 12 15 18 21 00 03 06 09 12
Ced 67A Monkey Head Nebula NGC 2174	RA 06:09:42 Dec 20° 30' 00" Type BRINB Constellation ORI 164° 99.9 99.9 40.00°	90 60 30 0 Transit south 60° 12 15 18 21 00 03 06 09 12
Ced 191 Merope Nebula NGC 1435	RA 03:46:00 Dec 23° 54' 00" Type BRINB Constellation TAU 162° 99.9 99.9 30.00°	90 60 30 0 Transit south 63° 12 15 18 21 00 03 06 09 12
IC 2574 Coddington's Nebula UGC 5666	RA 10:28:24 Dec 68° 24' 43" Type GALXY Constellation UMA 118° 10.8 15.5 10.80°	90 60 30 0 Transit north 73° 12 15 18 21 00 03 06 09 12

# Framing

- NASA Sky Survey
- SkyServer Sky Survey
- STScI Sky Survey
- ESO Sky Survey
- HIPS 2 FITS Sky Survey
- Offline Sky Map
- File
- Cache

N.I.N.A. - Nighttime Imaging 'N' Astronomy 2.1 HF1 RC004 - Askar ACL200 ZWO533M ! PREVIEW VERSION !

Image source: HIPS 2 FITS Sky Survey  
This sky survey makes use of [hips2fits](#) a service provided by CDS

Coordinates: California Nebula  
 RA: 4 h 3 m 32.0 s  
 Dec: 35 d 44 m 17.2 s  
 Field of view: 9.00 °

Load Image

Camera parameter

Width	3008
Height	3008
Pixel size	3.76 μm
Focal length	200 mm

Targets

Horizontal panels	2
Vertical panels	1
Panel overlap	20 %
Rotation	320 °
Preserve alignment	OFF

Mosaic Panels

Panel	RA	Dec	Rotation
1	04:08:23	34° 53' 56"	320.00°
2	03:58:35	36° 33' 54"	320.00°

Determine rotation from camera | Slew and center

Add target to sequence

Simple Sequencer  
Sequencer

- Deep Sky Object Sequence
- Basic Sequence Target
- TEMPLATE\_IRUV\_CUT
- TEMPLATE\_LEXTREME
- TEMPLATE\_LPPO
- TEMPLATE\_NoFilter

RA 04:03:32  
Dec 35° 44' 17"

Opacity 0.20

Panelen Rotatie

Volgende stap

# Sequencer

Simple

Timing

Opstart

Autofocus

Opnames

N.I.N.A. - Nighttime Imaging 'N' Astronomy 2.1 HF1 RC004 - Askar ACL200 ZWO533MC ! PREVIEW VERSION !

**Target Set**

Target Set Start Options | Cool Camera | Unpark Mount | Meridian Flip  
 Cool Camera  Unpark Mount  Meridian Flip

Target Set End Options  
 Warm Camera  Park Mount

California Nebula Pan

Delay start: 0 s  
 Sequence mode: One after another  
 Estimated download time: 00:00:00  
 Estimated finish time: From 10:06:23 To 19:26:24 Duration 09h 20m 01s  
 Est. finish time (this target): From 10:06:24 To 19:26:24 Duration 09h 20m 00s

Target Options | Slew to target | Center target | Rotate Target | Start guiding  
 Slew to target  Center target   
 Rotate Target  Start guiding

Autofocus | On start | On filter change | 30 min  
 On start  On filter change   
 After elapsed time  Time: 30 min  
 After # exposures  # exposures: 10  
 After temperature change  Temperature amount: 5 °  
 After HFR increase  HFR amount: 10 %

California Nebula Panel 2  
 RA: 3 h 58 m 35.4 s  
 Dec: 36 d 33 m 53.5 s Rotation: 320 °

Enabled	Progress	Total #	Time	Type	Filter	Binning	Dither	Dither every #	Gain	Offset
<input checked="" type="checkbox"/>	0 / 50	50	300 s	LIGHT	L-Ext	1x1	<input checked="" type="checkbox"/>	10	101	50
<input checked="" type="checkbox"/>	0 / 50	50	180 s	LIGHT	L-Pro	1x1	<input checked="" type="checkbox"/>	10	101	50
<input checked="" type="checkbox"/>	0 / 20	20	300 s	DARK	L-Ext	1x1	<input checked="" type="checkbox"/>	10	101	50
<input checked="" type="checkbox"/>	0 / 20	20	180 s	DARK	L-Pro	1x1	<input checked="" type="checkbox"/>	10	101	50

Coördinaten

Altitude

# Sequencer

Advanced

## Start

The 'Start' configuration screen for 'California Nebula Panel 2' shows a sequence of instructions. The 'Global Triggers' section includes 'Failures to Pushover' (Priority: High, Sound: Siren). The 'Sequence Start' section includes 'Switch Filter' (Filter: L-Ext). The 'Equipment Check' section includes 'Send to Pushover' (Title: NINA, Message: Wait Dusk, Priority: Normal, Sound: Pushover), 'Connect All Equipment', 'Wait for Time' (Source: Nautical Dusk, Time: 18:22:43, Offset: -10m), 'Unpark Scope', and 'Set Tracking' (Tracking rate: Sidereal). A right-hand sidebar lists various instruction sets and actions like 'Camera', 'Connector', and 'Dome'.



## Opnames

The 'Opnames' configuration screen for 'California Nebula Panel 2' shows the 'OSC\_IMAGING' section. It includes triggers for 'Failures to Pushover' (Priority: High, Sound: Siren), 'AF After Time' (Amount: 45 min), and 'Loop Until Time' (Meridian, Time: 20:37:16, Offset: -1m). The 'Instructions' section includes 'Send to Pushover' (Title: NINA, Message: Start imaging, Priority: Normal, Sound: Pushover), 'Robocopy Start' (Src: C:\NINA Raw Data\Askar ACL200\California, Dst: D:\Askar ACL200\California Nebula Panel 2), 'Smart Exposure' (# 500, Time: 300 s, Type: LIGHT, Binning: 1x1, Gain: 101, Offset: 40, Filter: L-Ext, Dither every # 8), and 'Robocopy Stop' (Wait before stop: 120 sec). A 'Stop Guiding' trigger is also present. Below, the 'California Nebula Panel 1' target configuration is shown, including RA (3h 59m 38.6s), Dec (36d 43m 4.3s), and a 'Loop Until Time' (Nautical Dawn, Time: 7:11:18, Offset: -2m).



## Einde

The 'Einde' configuration screen for 'California Nebula Panel 2' shows the 'BASIC\_SEQUENCE\_END' section. It includes a 'Failures to Pushover' trigger (Priority: High, Sound: Siren). The 'Instructions' section includes 'Send to Pushover' (Title: NINA, Message: Dawn - End Session, Priority: Normal, Sound: Pushover), 'Warm Camera' (Min. Duration: 0 min), 'Park Scope', and 'Disconnect All Equipment'. A note states: 'All instructions in this instruction set are run in parallel. This instruction set will not evaluate any conditions or triggers until all instructions are finished.'



# Sequencer

## Advanced

Instructions

<p><b>* Instruction Set *</b></p> <ul style="list-style-type: none"> <li> Deep Sky Object Sequence</li> <li> ExoPlanet object container</li> <li> James-Webb Space Telescope Sequence</li> <li style="background-color: #e91e63; color: white;"> <b>Orbital Object Sequence</b></li> <li> Parallel Instruction Set</li> <li> Sequential Instruction Set</li> <li> Solar System Body Sequence</li> </ul>	<p><b>Dome</b></p> <ul style="list-style-type: none"> <li> Close Dome Shutter</li> <li> Disable Dome Sync</li> <li> Enable dome sync</li> <li> Find Dome Home</li> <li> Open Dome Shutter</li> <li> Park Dome</li> <li> Slew Dome Azimuth</li> <li> Synchronize Dome</li> <li> Synchronize Dome</li> </ul> <p><b>ExoPlanet</b></p> <ul style="list-style-type: none"> <li> Calculate exposure time</li> <li> Loop Until Transit Observation Time</li> <li> Wait for transit observation time</li> </ul> <p><b>Filter Wheel</b></p> <ul style="list-style-type: none"> <li> Switch Filter</li> </ul> <p><b>Flat Device</b></p> <ul style="list-style-type: none"> <li> Close Flat Panel Cover</li> <li> Open Flat Panel Cover</li> <li> Set Brightness</li> <li> Toggle Light</li> <li> Trained Dark Flat Exposure</li> <li> Trained Flat Exposure</li> </ul>	<p><b>Focuser</b></p> <ul style="list-style-type: none"> <li> AF After # Exposures</li> <li> AF After Filter Change</li> <li> AF After HFR Increase</li> <li> AF After Temperature Change</li> <li> AF After Time</li> <li> Move Focuser</li> <li> Move Focuser by Temp.</li> <li> Move Focuser Relative</li> <li> Run Autofocus</li> </ul> <p><b>Ground Station</b></p> <ul style="list-style-type: none"> <li> Failures to Email</li> <li> Failures to IFTTT</li> <li> Failures to MQTT broker</li> <li> Failures to Pushover</li> <li> Failures to Telegram</li> <li> Failures to TTS</li> <li> Publish to MQTT broker</li> <li> Send email</li> <li> Send HTTP Request</li> <li> Send to IFTTT Webhooks</li> <li> Send to Pushover</li> <li> Send to Telegram</li> <li> Send to TTS</li> </ul>	<p><b>Guider</b></p> <ul style="list-style-type: none"> <li> Dither</li> <li> Dither after Exposures</li> <li> Restore Guiding</li> <li> Set Guider Shift Rate</li> <li> Set Guider Shift Rate</li> <li> Start Guiding</li> <li> Stop Guider Track Shift</li> <li> Stop Guiding</li> </ul> <p><b>Loop Condition</b></p> <ul style="list-style-type: none"> <li> Loop For Iterations</li> <li> Loop for Time Span</li> <li> Loop until Altitude Below</li> <li> Loop until Moon Altitude</li> <li> Loop until Sun Altitude</li> <li> Loop Until Time</li> <li> Loop while Altitude Above Horizon</li> <li> Loop while safe</li> <li> Loop while unsafe</li> <li> Moon angle</li> <li> Moon illumination</li> </ul> <p><b>LuckyImaging</b></p> <ul style="list-style-type: none"> <li> Calculate Roi Position</li> <li> Lucky Target Container</li> <li> Take Roi Exposure</li> <li> Take Video Roi Exposures</li> </ul>	<p><b>Orbuculum</b></p> <ul style="list-style-type: none"> <li> Loop While Next Target Is Below Altitude</li> <li> Loop While Next Target Is Below Horizon</li> <li> Loop While Hour Angle</li> <li> Loop While Next Target Hour Angle</li> <li> Wait for Hour Angle</li> <li> Auto Balancing Exposure</li> </ul> <p><b>PixInsight Tools</b></p> <ul style="list-style-type: none"> <li> Stack flats</li> <li> Start live stacking</li> <li> Stop live stacking</li> </ul> <p><b>Polar Alignment</b></p> <ul style="list-style-type: none"> <li> Three Point Polar Alignment</li> </ul> <p><b>Remote Copy</b></p> <ul style="list-style-type: none"> <li> Robocopy Start</li> <li> Robocopy Stop</li> </ul> <p><b>Rotator</b></p> <ul style="list-style-type: none"> <li> Rotate by mechanical angle</li> <li> Solve and rotate</li> </ul> <p><b>Safety Monitor</b></p> <ul style="list-style-type: none"> <li> Wait until safe</li> </ul> <p><b>Switch</b></p> <ul style="list-style-type: none"> <li> Set Switch Value</li> </ul>	<p><b>Telescope</b></p> <ul style="list-style-type: none"> <li> Center After Drift</li> <li> Find home</li> <li> Meridian Flip</li> <li> Park Scope</li> <li> Set Telescope Tracking Rate</li> <li> Set Telescope Tracking Rate</li> <li> Set Tracking</li> <li> Slew and center</li> <li> Slew To Alt/Az</li> <li> Slew To Ra/Dec</li> <li> Slew, center and rotate</li> <li> Smart Meridian Flip</li> <li> Solve and sync</li> <li> Unpark Scope</li> </ul> <p><b>Utility</b></p> <ul style="list-style-type: none"> <li> Annotation</li> <li> External Script</li> <li> Message Box</li> <li> Wait for Altitude</li> <li> Wait for Time</li> <li> Wait for Time Span</li> <li> Wait if Moon Altitude</li> <li> Wait if Sun Altitude</li> <li> Wait until Above horizon</li> </ul>
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# Sequencer

Advanced

Templates

## Templates

### ▼ Default templates › Base

- ▶ Basic Sequence End
- ▶ Basic Sequence Startup
- ▶ Basic Sequence Target

### ▼ User templates › Base

- ▶ TEMPLATE\_IRUV\_CUT
- ▼ TEMPLATE\_LEXTREME
  - ⋮ EQUIPMENT\_CHECK
    - 📄 Send to Pushover
    - 📄 Unpark Scope
    - 📄 Set Tracking
    - 📄 Cool Camera
  - ⋮ PREPARE\_TARGET
    - 📄 Annotation
    - 📄 Send to Pushover
    - 📄 Slew, center and rotate
    - 📄 Slew and center
    - 📄 Run Autofocus
    - 📄 Start Guiding
  - ⋮ OSC\_IMAGING
    - 📄 Annotation
    - 📄 Send to Pushover
    - 📄 Robocopy Start
    - 📄 Smart Exposure
    - 📄 Robocopy Stop
    - 📄 Stop Guiding
- ▶ TEMPLATE\_LPRO
- ▶ TEMPLATE\_NoFilter

Targets

## Targets

By Name

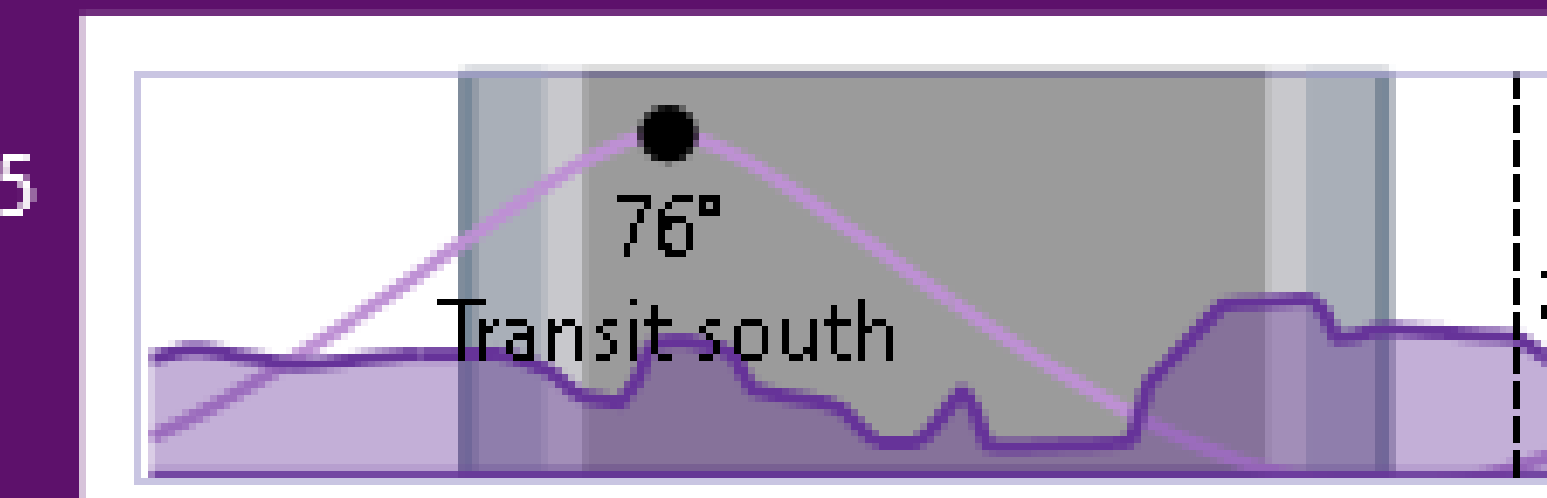
By Relevance

Drop Deep Sky Object Sequences from the Sequence here to save your individual target

### ▼ Base

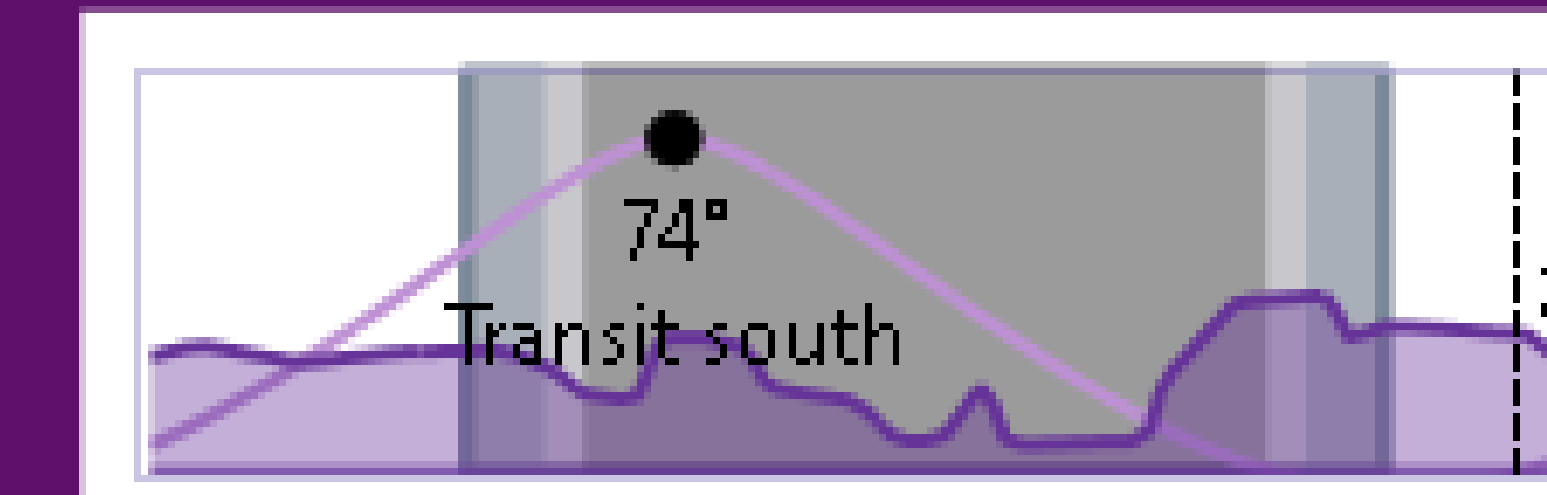
#### California Nebula Panel 1

RA 3:57:49.7  
Dec 36:44:42.5  
Rotation 140°  
 108°



#### California Nebula Panel 2

RA 4:7:38.2  
Dec 35:4:45.4  
Rotation 140°  
 110°



#### M 45

RA 3:47:0.0  
Dec 24:7:0.0  
Rotation 0°  
 103°



#### M 31

RA 0:42:44.0  
Dec 41:16:7.0  
Rotation 0°  
 077°





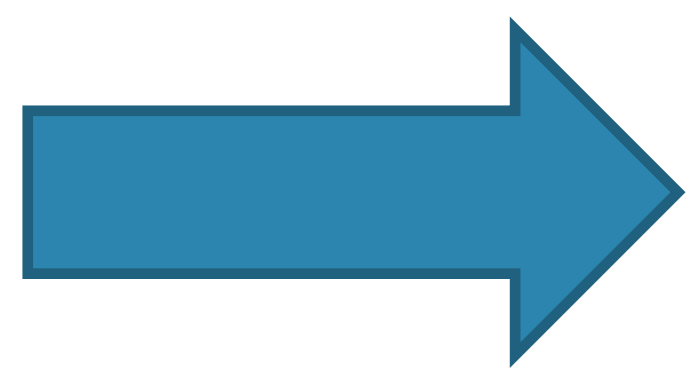
# Alles onder controle

- Start de motoren
- Controlescherm
- Opvolging
- Flat wizard

# Start de motoren

1 druk op de knop

The screenshot shows the N.I.N.A. software interface. On the left is a sidebar with icons for Equipment, Sky Atlas, Framing, Flat Wizard, Sequencer, Imaging, Options, Plugins, Weather, and Dome. The main area is divided into 'Camera' and 'Temperature control' sections. The 'Camera' section shows details for a ZWO ASI533MC Pro camera, including its state (Idle), name, description, driver info, sensor type (RGGB), sensor size (3008), exposure times, binning, pixel size, and gain. The 'Temperature control' section shows cooler power (0.00%), sensor temperature (23.00 °C), and target temperature (-10 °C). A 'Connect all' button is highlighted in a blue callout box at the bottom left. A 'Connect all devices?' dialog box is also visible in the center.



Connect all

Connection Success

... or not

This block shows two error messages from the N.I.N.A. software. The first is an 'Error' message: 'PHD2 Error: PHD2 server connection lost!' dated 2023-01-25 11:36:31. The second is an 'ASCOM Driver Error' message: 'Unable to connect to POTH Hub. Reason: Exception has been thrown by the target of an invocation.' dated 2023-01-25 11:37:29.

The screenshot shows a mobile control interface for a telescope. It features a central image of a planet (Saturn) and a list of coordinates: LST 19:18:35, RA 01:18:34, Dec +90:00:00, Az 359:59:59, and Alt 50:56:26. Below the coordinates are buttons for 'Quiet Scope', 'Track', 'Disconnect Scope', 'Park Scope', 'Traffic', and 'Setup'. At the bottom, there are directional buttons for '30°', 'N', 'W', 'E', 'Flip', and 'S'.

The screenshot shows the PHD2 Guiding software interface. The main window displays a star field with a green crosshair. On the right, there is a 'Star Profile' graph showing a peak in the red line. Below that is a 'Target' window with a 'Reference Circle' and 'Radius' set to 2.0. At the bottom, there is a 'History' table with columns for x, y, and RMS Error. A 'Success' message 'Guider connected' is visible in the bottom right corner.

# Sequencer

Advanced

**OSC\_IMAGING**

Triggers

- Failures to Pushover (Priority: High)
- AF After Time (Amount: 45 min)

Loop Conditions

- Loop Until Time

Instructions

- Annotation: "Slew, Center" OR "Slew, center and rotate"
- Send to Pushover: Title NINA | Message Prepare Target
- Slew, center and rotate
- Slew and center
- Run Autofocus
- Start Guiding

**Solving...**

Time	Succ	RA	Dec	Error distance	RA error	Dec error	RA error	Dec error	Orientation
00:39:22		03:47:31	24° 26' 29"	--	--	--	--	--	180.06
00:39:03		03:47:30	24° 26' 29"	--	--	--	--	--	180.06
00:38:29		03:47:28	24° 26' 44"	--	--	--	--	--	184.21
00:36:34		03:47:33	24° 29' 33"	--	--	--	--	--	171.46

**Autofocus**

Time: 2023-01-21 00:42:27  
Position: 48432.00  
HFR: 2.30  
Temperature: -2.88 °C  
Filter: None  
Hyperbolic R²: 0.97

Elapsed 0 min / 45 min  
Remaining 00:47:29

**OSC\_IMAGING**

Triggers

- Failures to Pushover (Priority: High)
- AF After Time (Amount: 45 min)

Loop Conditions

- Loop Until Time

Instructions

- Annotation: "Slew, Center" OR "Slew, center and rotate"
- Send to Pushover: Title NINA | Message Prepare Target
- Slew, center and rotate
- Slew and center
- Run Autofocus
- Start Guiding

**Instructions**

- Annotation: VALIDATE YOUR LOOPING Hyperbolic R²
- Send to Pushover: Title NINA | Message Start imaging
- Robocopy Start: Src C:\NINA Raw Data\Askar ACL200\M 45 | Dst D:\Askar ACL200\M 45
- Start live stacking
- Smart Exposure: # 500 | Time 60 s | Type LIGHT | Binning 1x1 | Gain 101 | Offset 40 | Filter Progress 55/500
- Stop live stacking
- Robocopy Stop: Wait before stop 120 sec

# De controlekamer

Volledig moduleerbaar

Camera Focuser

Filter Wheel

Telescoop

Positie Horizon

Taakbalk

Recentste subframe

Statistiek

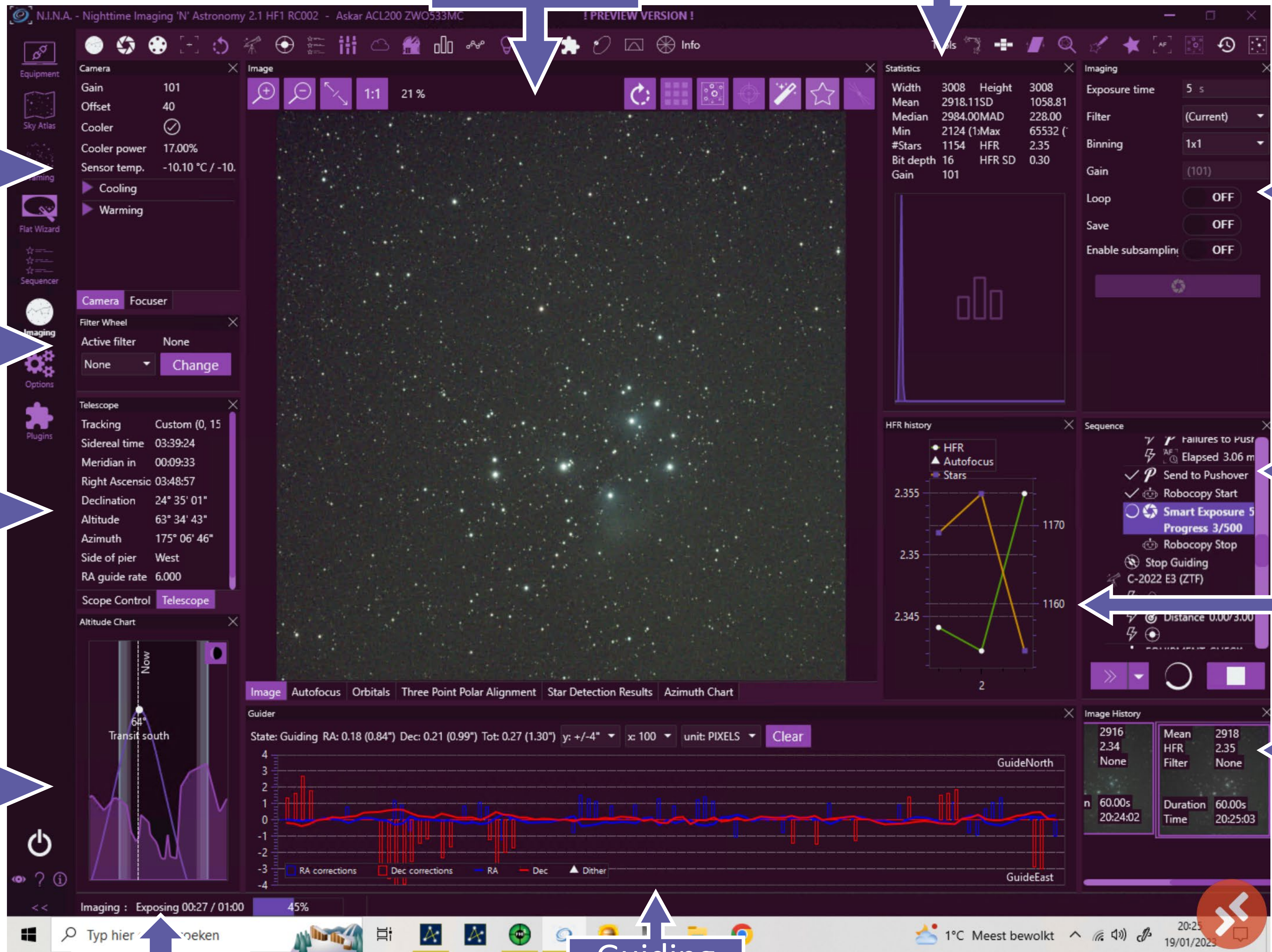
Handmatig

Sequencer

HFR, stars, ...

Beelden historiek

Guiding PH2



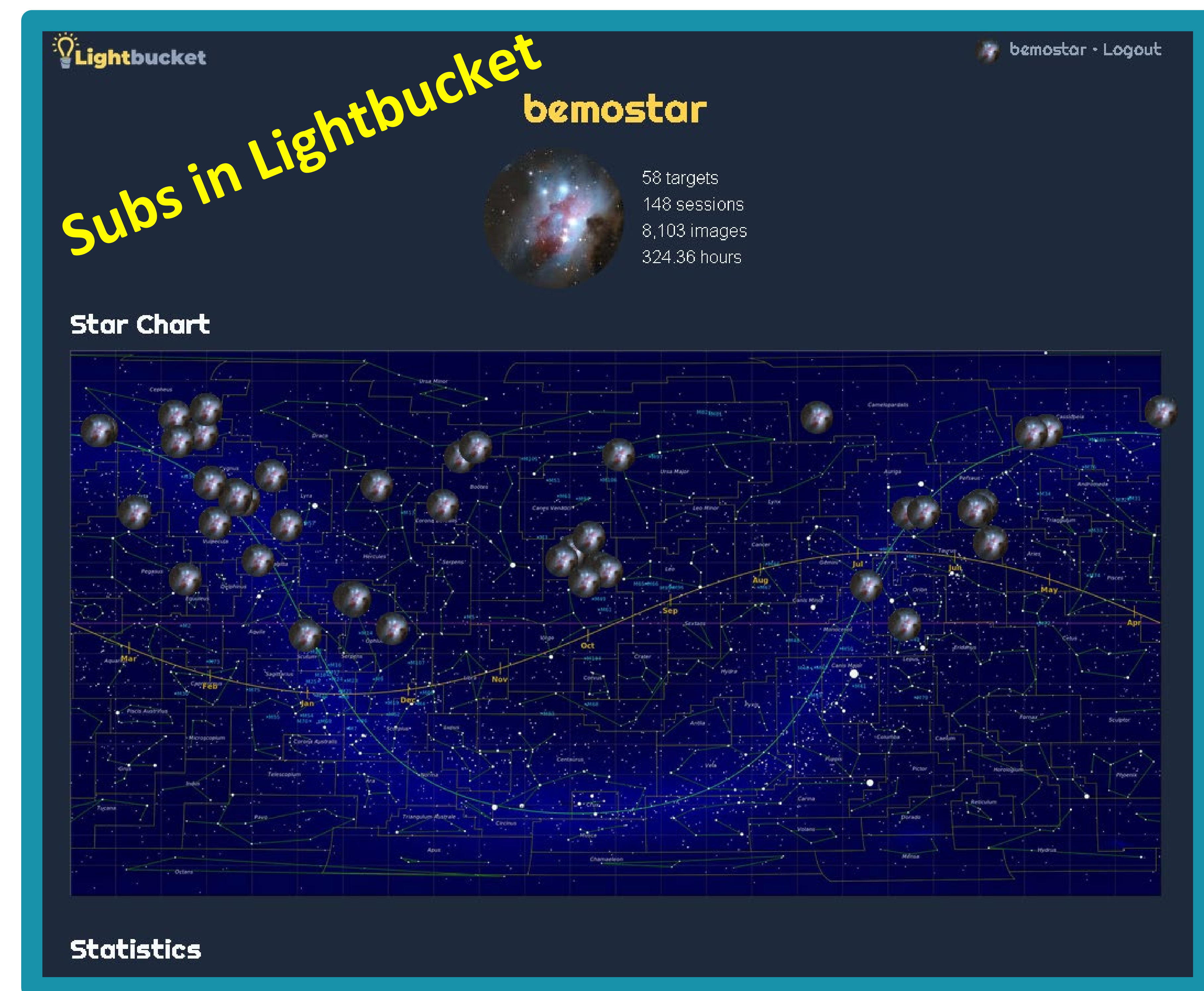
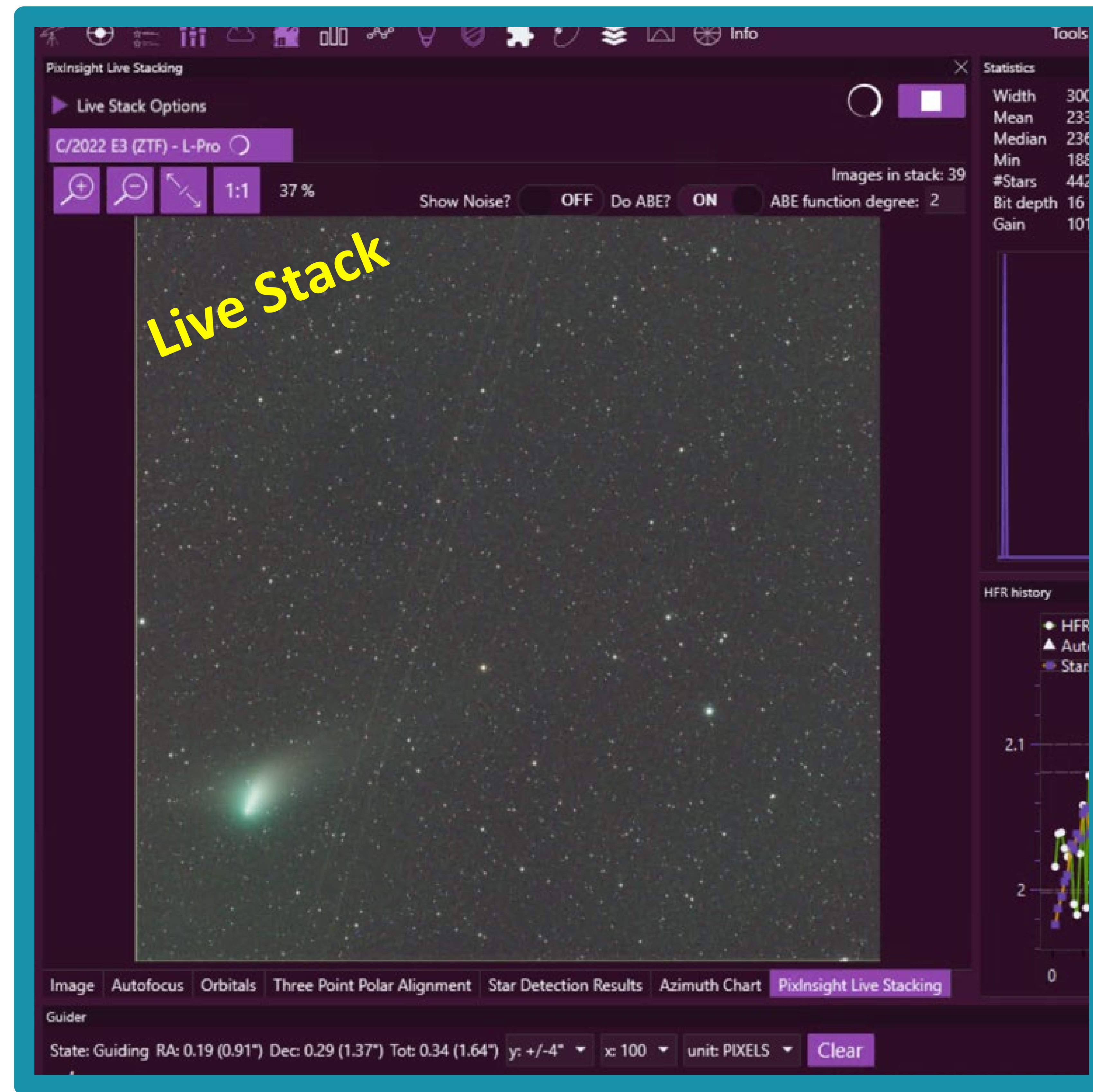
# Opvolging

Pushover  
Bestandsnaam  
Live Stack  
Lightbucket

## Opnamegegevens in csv bestand

AcquisitionDetails.csv	21/01
ImageMetaData.csv	21/01
LIGHT_C-2022 E3 (ZTF)_D2023-01-21_T04-15-17_stars 733_HFR 2.21_RMS 0.29.fits	21/01
LIGHT_C-2022 E3 (ZTF)_D2023-01-21_T04-18-18_stars 719_HFR 2.21_RMS 0.26.fits	21/01

## Opnamegegevens in bestandsnaam



# Flats

## Flat Wizard

Equipment

Sky Atlas

Framing

**Flat Wizard**

Sequencer

Imaging

Options

Plugins

Target name: FlatWizard

Flats to take: 50

Dark flats to take: 25

Binning: 1x1

East | Slew to zenith

Wizard mode: Dynamic exposure

Single Mode | Multi Mode

Filter: (Current)

Flat min. exposure: 0.2 s

Flat max. exposure: 20 s

Flat step size: 0.5 s

Histogram mean target: 19661 | 30 %

Mean tolerance: 17695 - 21627 | 10 %

▶

N.I.N.A. - Nighttime Imaging 'N' Astronomy 2.1 HF1 RC002 - Askar ACL200 ZWO533MC | ! PREVIEW VERSION !

### Flat Wizard

Equipment

Sky Atlas

Framing

**Flat Wizard**

Sequencer

Imaging

Options

Plugins

Target name: FlatWizard

Flats to take: 50

Dark flats to take: 25

Binning: 1x1

Gain: (101)

East | Slew to zenith

Wizard mode: Dynamic exposure

Single Mode | Multi Mode

Filter: None

Flat min. exposure: 0.1 s

Flat max. exposure: 20 s

Flat step size: 0.5 s

Histogram mean target: 22938 | 35 %

Mean tolerance: 20644 - 25231 | 10 %

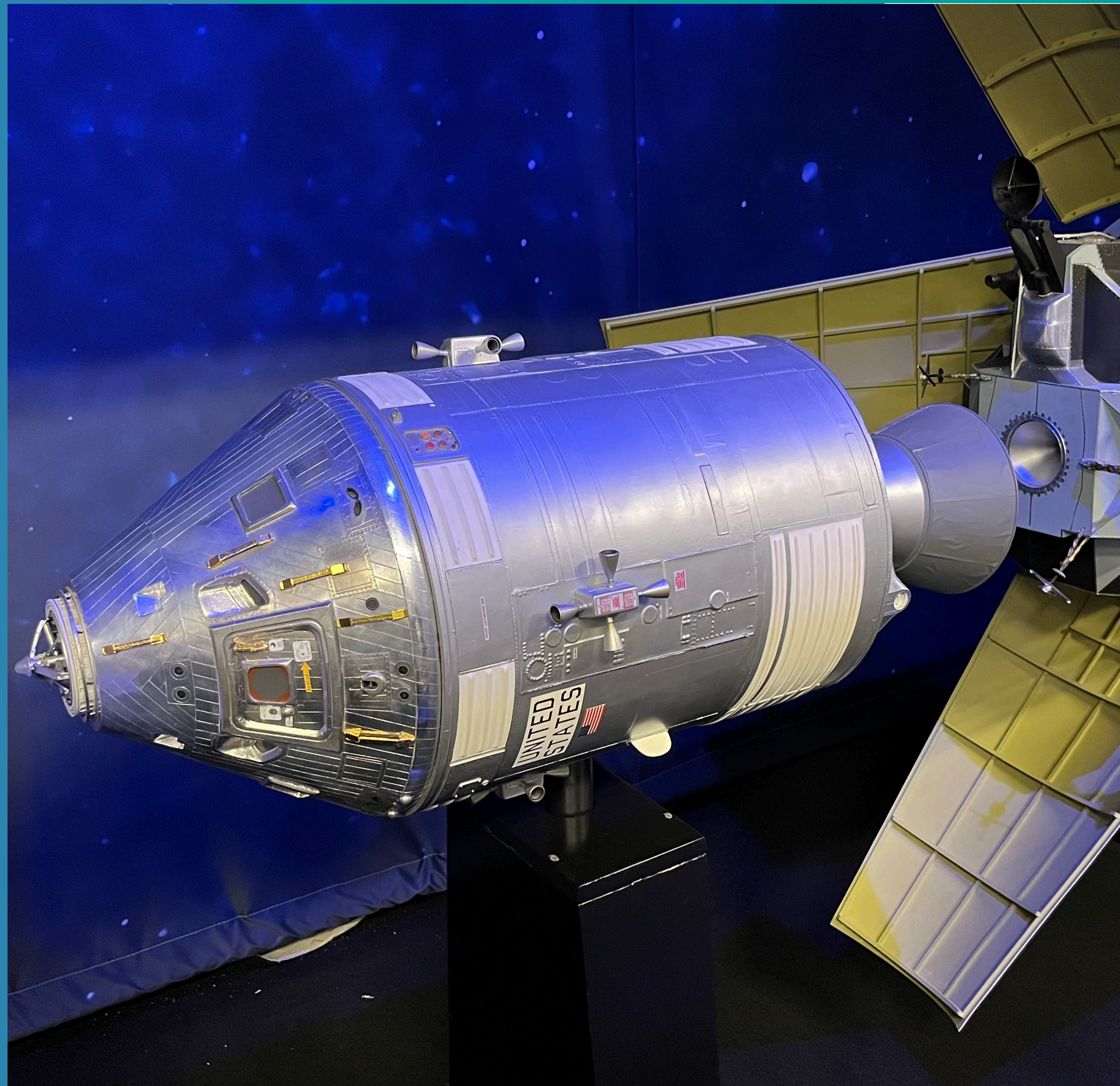
|| ◯ ✕

Calculated target exposure time: 0.20000 s | Calculated target histogram mean: 23,865 ADU

Flat Wizard : Mean ADU is 23865, Target exposure time is 0.2 | Filter None | 1 / 1 | Exposures: 15 / 50 | Image : Debayering image | Save : Saving image | Imaging : Exposing

Typ hier om te zoeken | 0°C Meest bewolkt | 20:33 | 19/01/2023





# Handige plugins

# Plugins

Equipment  
Sky Atlas  
Framing  
Flat Wizard  
Sequencer  
Imaging  
Options  
Plugins

Installed  
Available

### Plugins

- 10 Micron Tools
- Astromechanics Aperture Control
- Astro-Physics Tools
- Constants for Exposures
- Darks Customs
- Device Actions and Commands
- Discord Alert
- DIY Meridian Flip
- DIYTrigger
- Exposure Calculator
- Flexure Correction
- GNS Plugin
- Instruction Math
- Lens AF
- PlaneWave Tools
- RTSP Client
- Shutdown PC
- Speckle Interferometry
- Starting Sequence Number
- Synchronization
- Target Planning
- Web Session History Viewer

	Autofocus Report Analysis	<input checked="" type="checkbox"/>
	Connector	<input checked="" type="checkbox"/>
	ExoPlanets	<input checked="" type="checkbox"/>
	Ground Station	<input checked="" type="checkbox"/>
	Hocus Focus	<input checked="" type="checkbox"/>
	Horizon Creator	<input checked="" type="checkbox"/>
	Lightbucket	<input checked="" type="checkbox"/>
	LuckyImaging	<input checked="" type="checkbox"/>
	Moon Angle	<input checked="" type="checkbox"/>
	Orbitals	<input checked="" type="checkbox"/>
	Orbuculum	<input checked="" type="checkbox"/>
	PixInsight Tools	<input checked="" type="checkbox"/>
	Remote Copy	<input checked="" type="checkbox"/>
	Scope Control	<input checked="" type="checkbox"/>
	Session Metadata	<input checked="" type="checkbox"/>
	Smart Meridian Flip	<input checked="" type="checkbox"/>
	Three Point Polar Alignment	<input checked="" type="checkbox"/>

Check for updates

# Plugins – een selectie

**Live Stack Options**  
 C/2022 E3 (ZTF) - L-Pro  
 Images in stack: 39  
 ABE function degree: 2  
 Show Noise? OFF Do ABE? ON  
 Statistics:  
 Width: 300  
 Mean: 233  
 Median: 236  
 Min: 188  
 #Stars: 442  
 Bit depth: 16  
 Gain: 107

**Three Point Polar Alignment**  
 Adjust Altitude / Azimuth  
 Capturing new image to solve...

<b>Azimuth Error</b> ↔	<b>Altitude Error</b> ↓	<b>Total Error</b>
00° 00' 39"	-00° 00' 23"	00° 00' 45"
← Move left/west	Move up ↑	
-00° 05' 34"	-00° 03' 07"	00° 06' 23"

**ExoPlanet**  
 Select Target: Filter: HAT-P-61 b Excluded: 0  
 Name: HAT-P-61 b  
 Magnitude: 13.1  
 Depth: 11  
 Comment:  
 RA: 5 h 1 m 55.24 s  
 Dec: 50 d 7 m 52.24 s  
 Rotation: 0°

**Triggers**  
 Loop Conditions:  
 Instructions:  
 Switch Filter: Filter (Current)  
 Slew and center  
 Calculate exposure time: Exposures: #1 30 s < #2 60 s < Max 180 s | Binning 2x2 | Gain 56 | Offset 30  
 Wait for transit observation time: Source Start observation | Time 22: 42: 14 Offset 0 m

**Orbitals**  
 Comets (3850) Update Last Updated: 23/01/2023 11:35:49  
 Numbered Asteroids (0) Update Last Updated: Never  
 Un-numbered Asteroids (0) Update Last Updated: Never  
 James-Webb Space Telescope Update Valid Until: Never

Comet: C/2022 E3 (ZTF) Load

**C/2022 E3 (ZTF)**  
 RA: 15:20:26 RA Shift Rate: -0.0717 arcsec/sec  
 Dec: 57° 25' 32" Dec Shift Rate: 0.12 arcsec/sec  
 Distance: 0.418 au

## Connector

- Connect All Equipment
- Connect Equipment: Camera
- Connect Equipment: Filter Wheel
- Connect Equipment: Telescope
- Disconnect Equipment: Focuser
- Disconnect All Equipment

## Remote Copy

- Robocopy Start
- Robocopy Stop

## Rotator

**Horizon Creator**  
 Add Save Clear  
 Azimuth Stepsize: 5  
 Altitude Stepsize: 5

## Triggers

P Failures to Pushover Priority: High | Sound: Siren

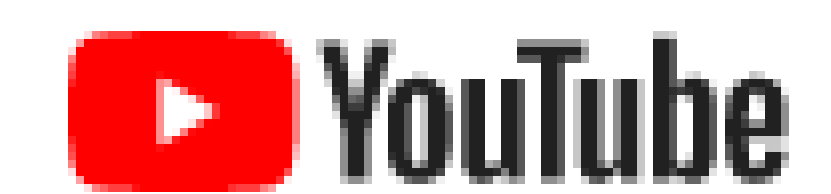


# Referenties



N.I.N.A.

<https://nighttime-imaging.eu/>



<https://www.youtube.com/@PatriotAstro>



<https://www.youtube.com/@VisibleDarkAstro>

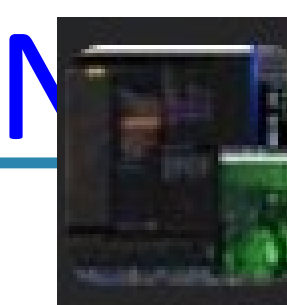


<https://www.youtube.com/@CuivTheLazyGeek>



facebook

[N.I.N.A user to user support](#)



Bedank voor jullie aandacht