

DIY BARN DOOR TRACKER

Mateo Van Damme

Achtergrond

- Mateo Van Damme
- Master Industriële Wetenschappen Informatica Ugent
- Astrofotografie sinds ~2018

Where it all began

- Gestart met komeet Wirtanen
- Powershot SX 500 IS
- Epic fail

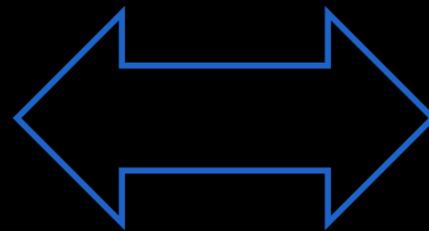


Astrophotography basics



1 s exposure

VS



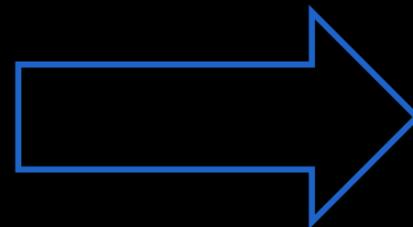
20 s exposure

Astrophotography basics

276 frames
20s each



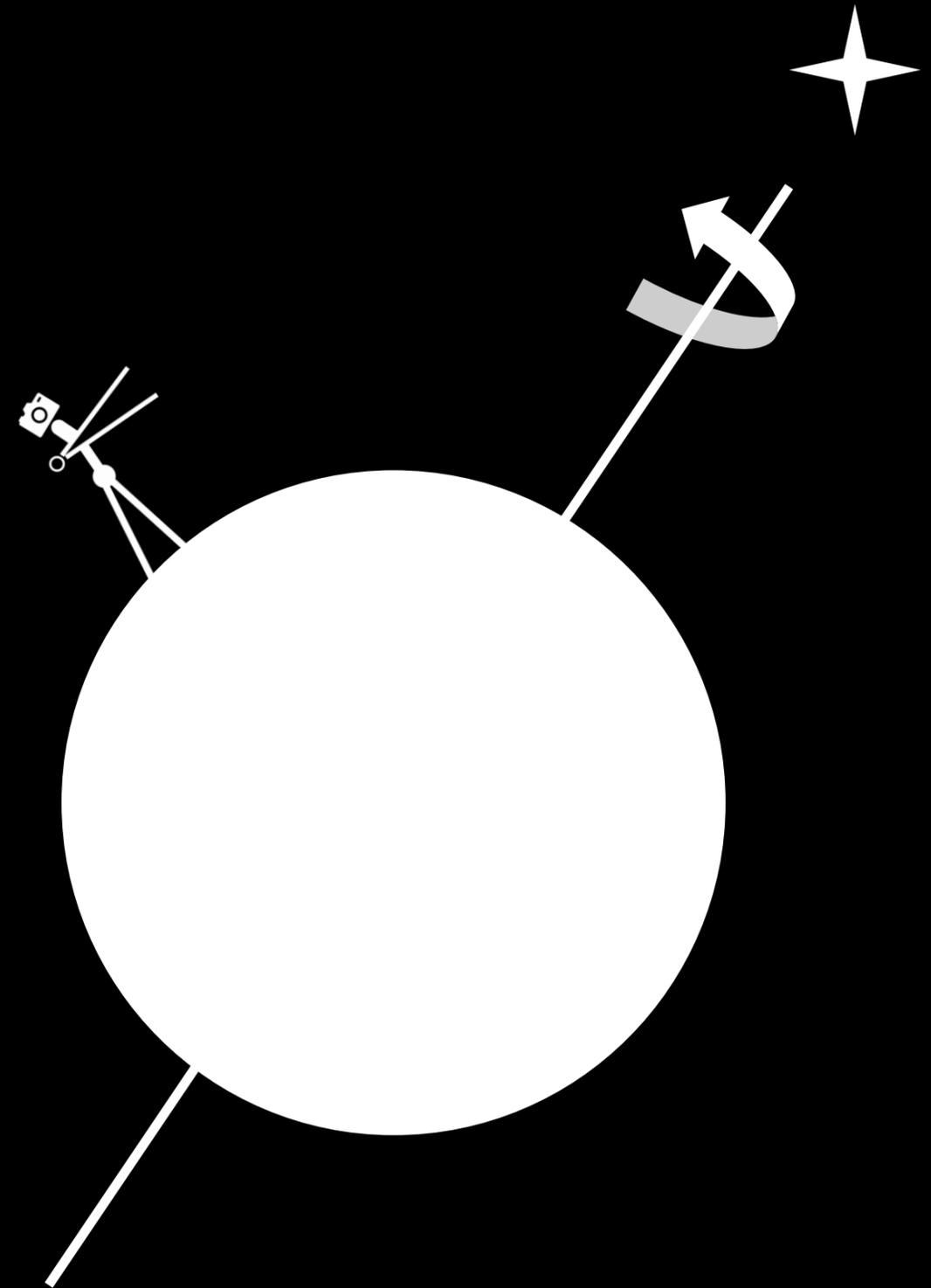
STACKING



Result

Lange exposures

- Noise reduction
- Rotatie aarde
 - Max ~2s
 - EQ Mount?



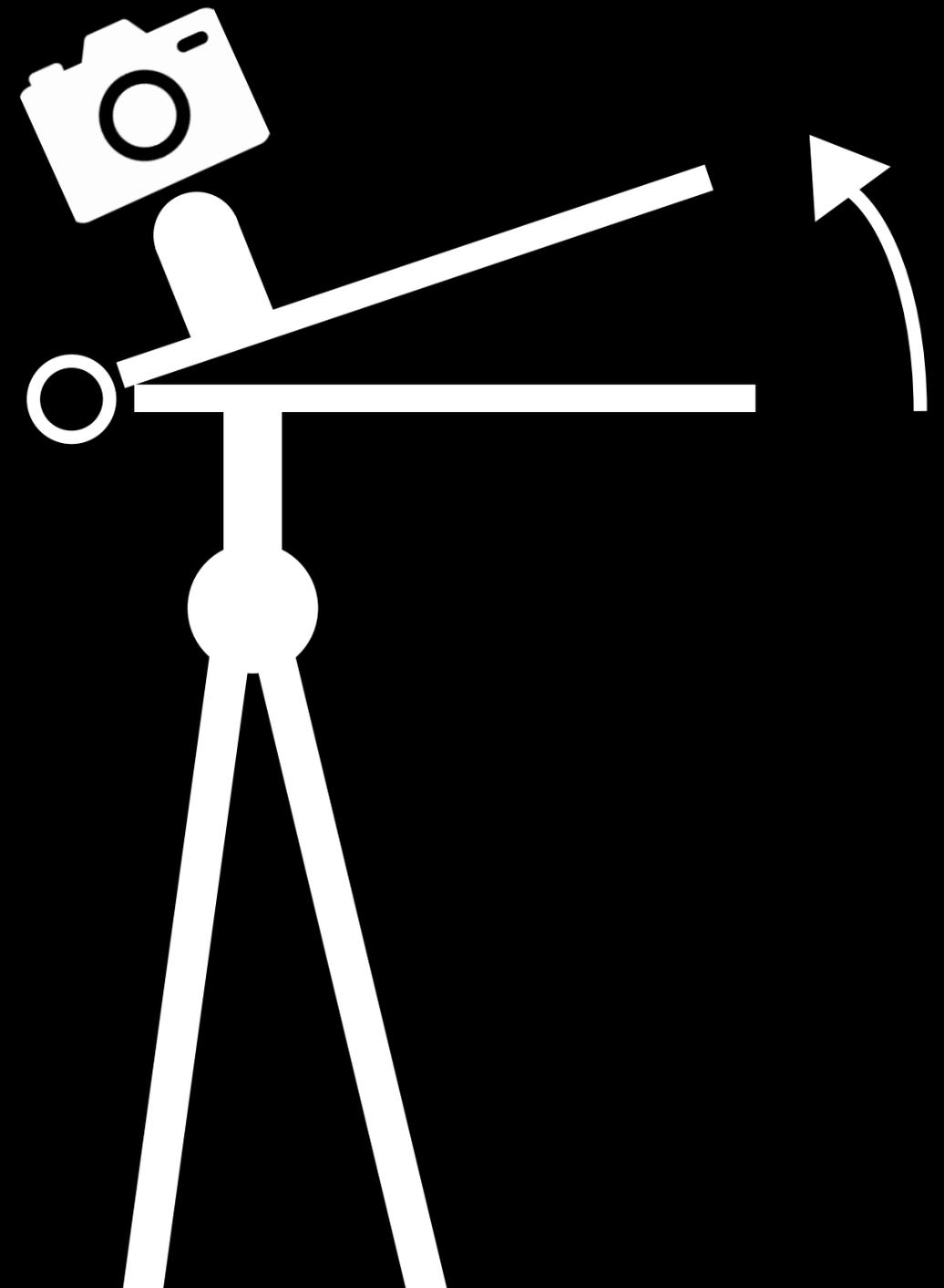
Verminder kosten

- CCD sensor → DSLR camera
- Telescoop → 135mm prime lens
- EQ Mount → **DIY barn door tracker**
- Onderdelen → 3D printen
- Dure software → Open source
- Filters → Nope

Barn door tracker

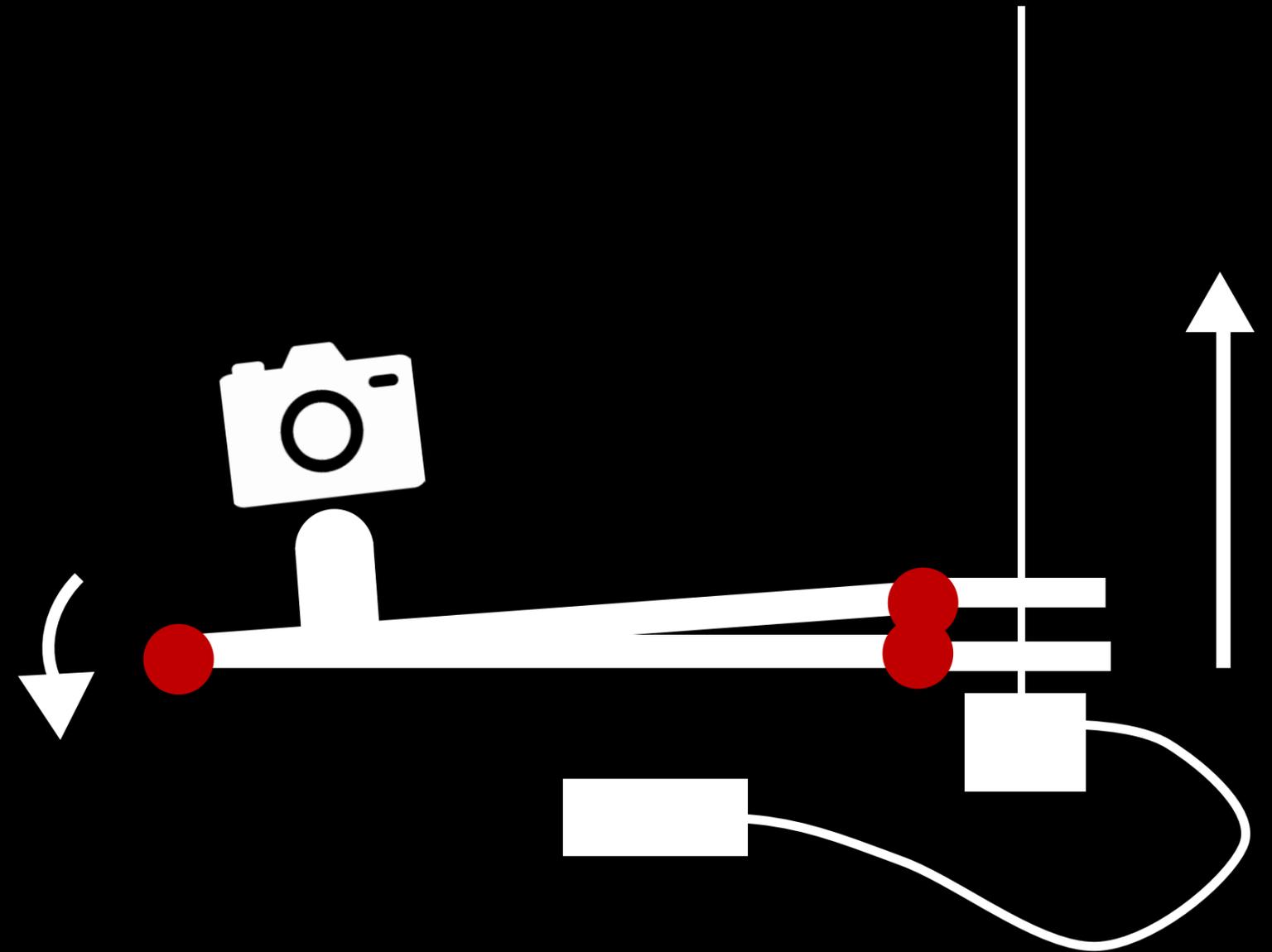
DIY Barn door tracker

- Scharnier draait $\sim 15^\circ/\text{uur}$
- Prestatie: $\sim 1,5$ min met 135mm lens



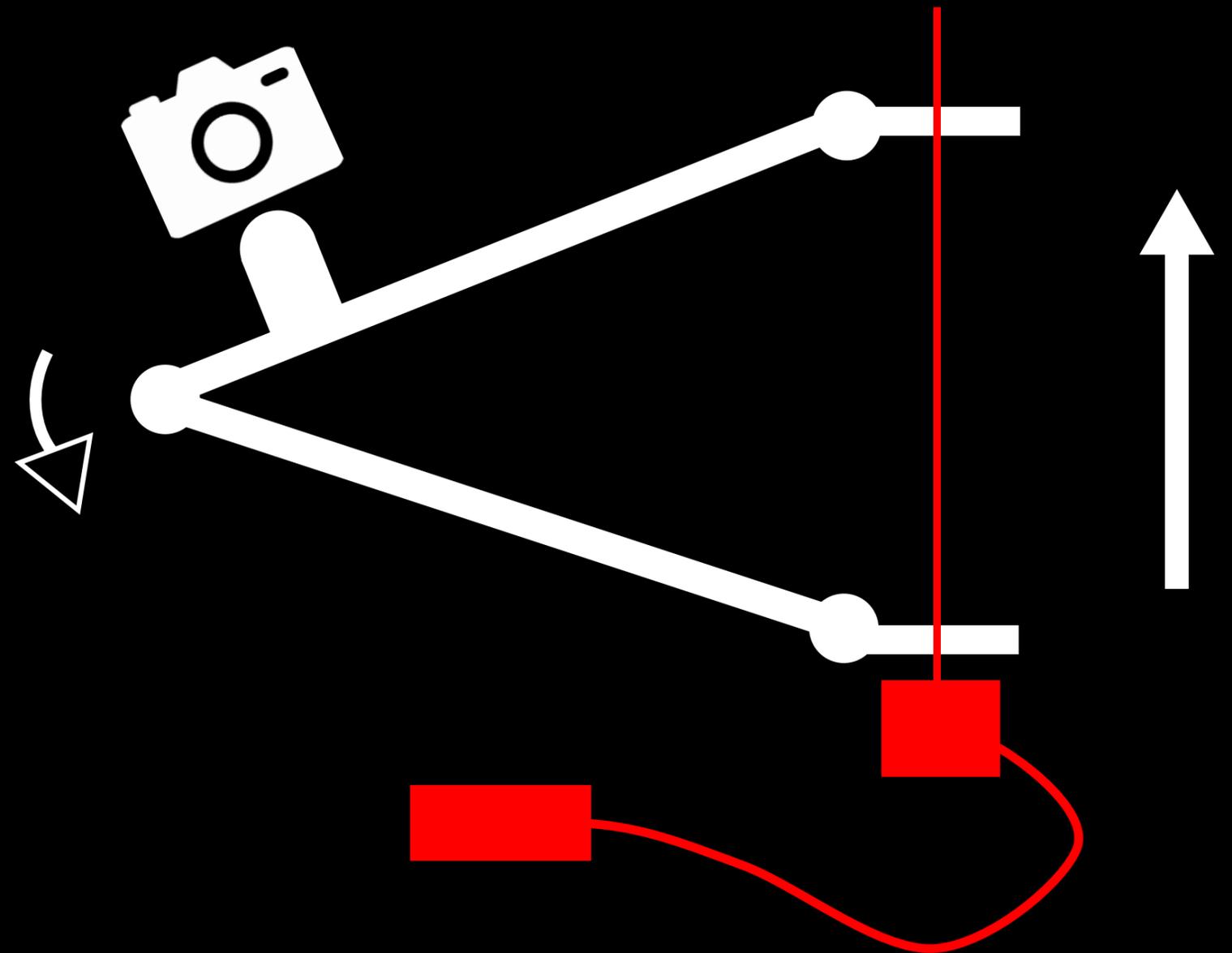
Kinematica

- 3 scharnieren
- Lineair \rightarrow Rotatie
- Materiaal
- Motor



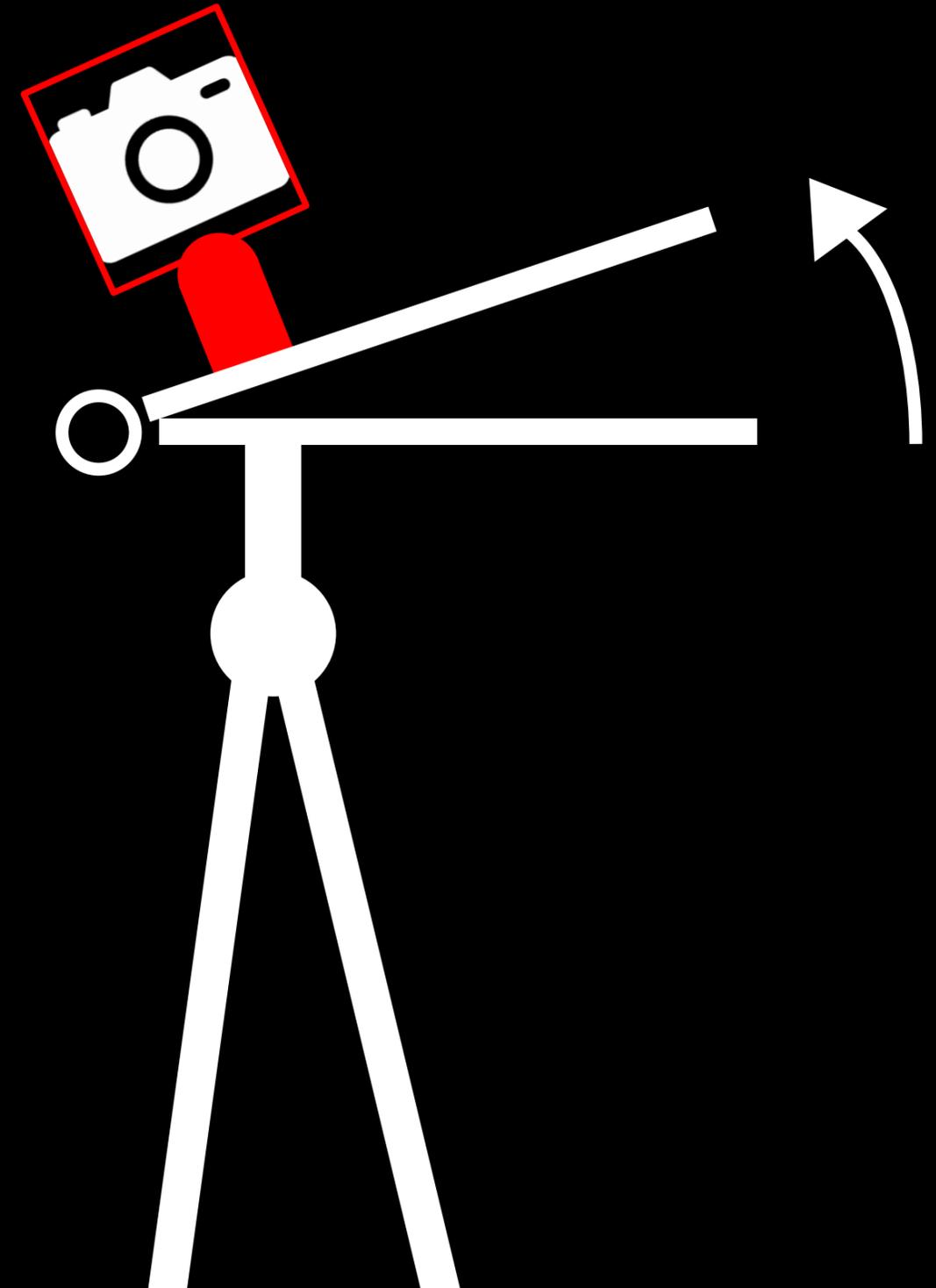
Motor

- Steppermotor:
 - 200 steps = 360°
 - Vibraties
- Sturing:
 - TMC 2208 driver
 - Microcontroller



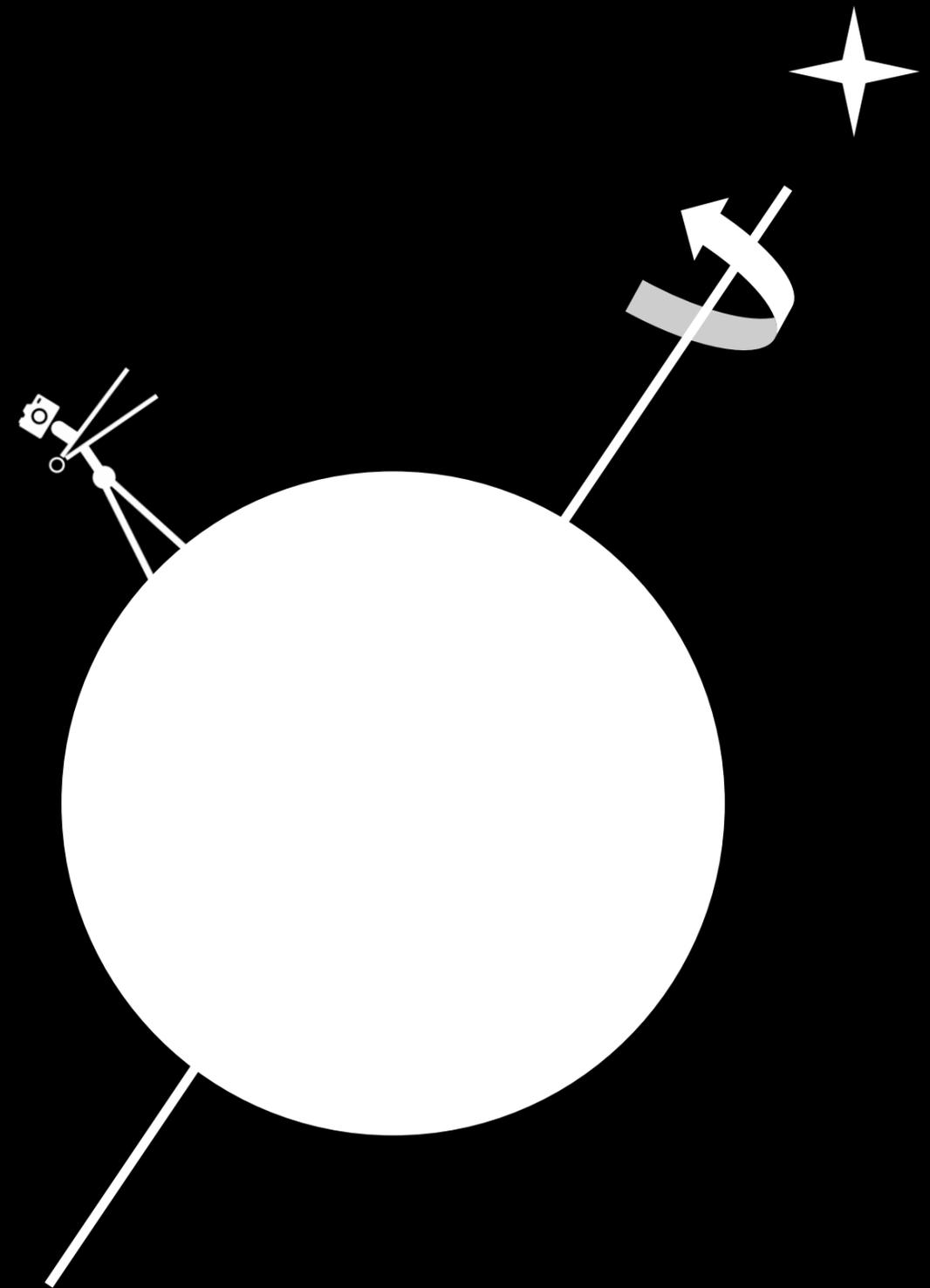
Camera

- Canon 800D
- Samyang 135mm F2.0
 - Prime lens
 - 200mm
- Viewfinder



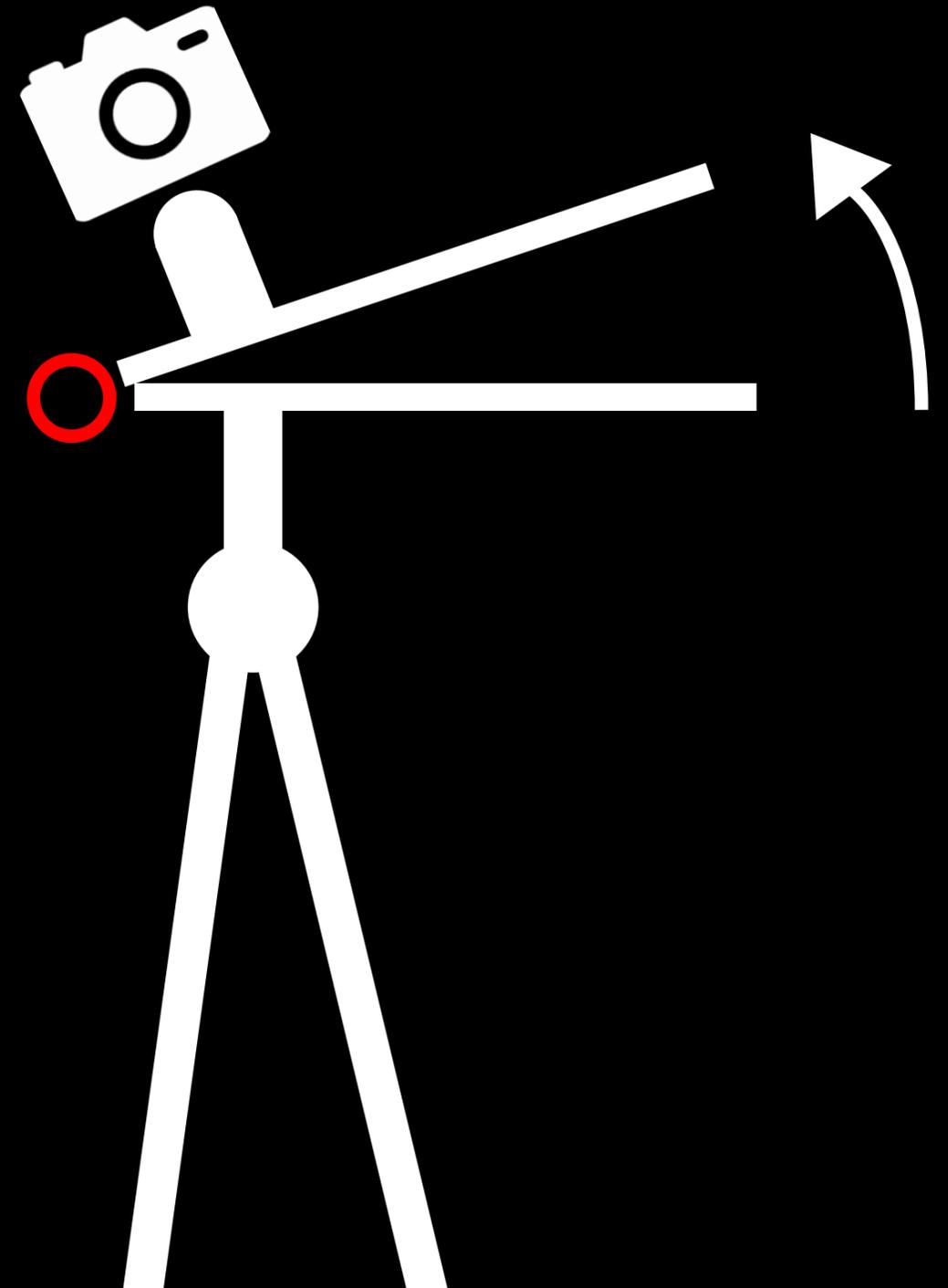
Polar alignment

- As tracker = as aarde
- Celestron Poolzoeker
(niet DIY)



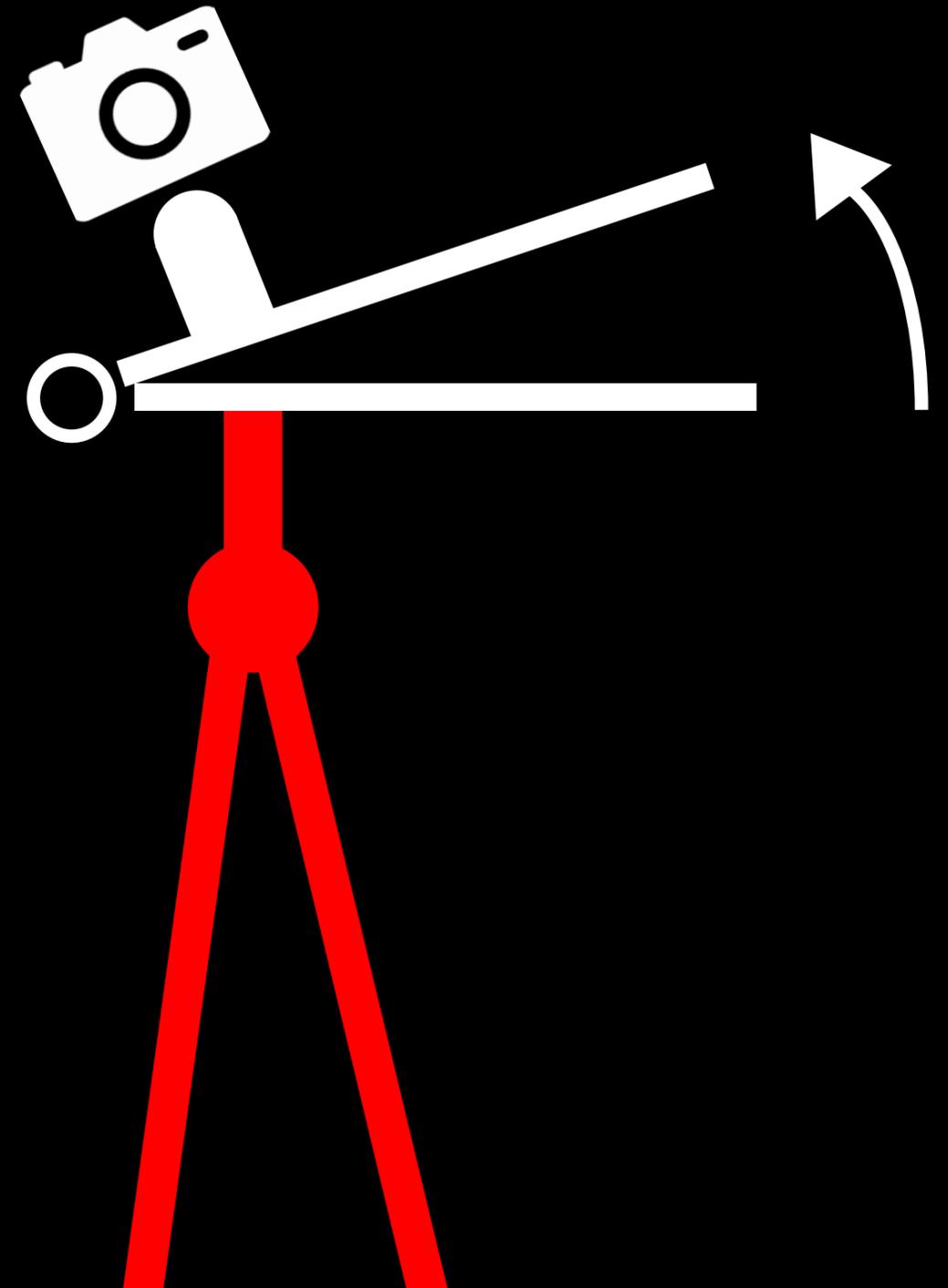
Polar Alignment

- As tracker = as aarde
- Celestron Poolzoeker
(niet DIY)



Tripod

- Tweedehands
- Voor Plate Camera's?
- Stevig en zwaar



Post processing

~~Pixinsight: 250 euro~~

Open source software (gratis)

- Deep Sky Stacker (DSS)
- Gimp

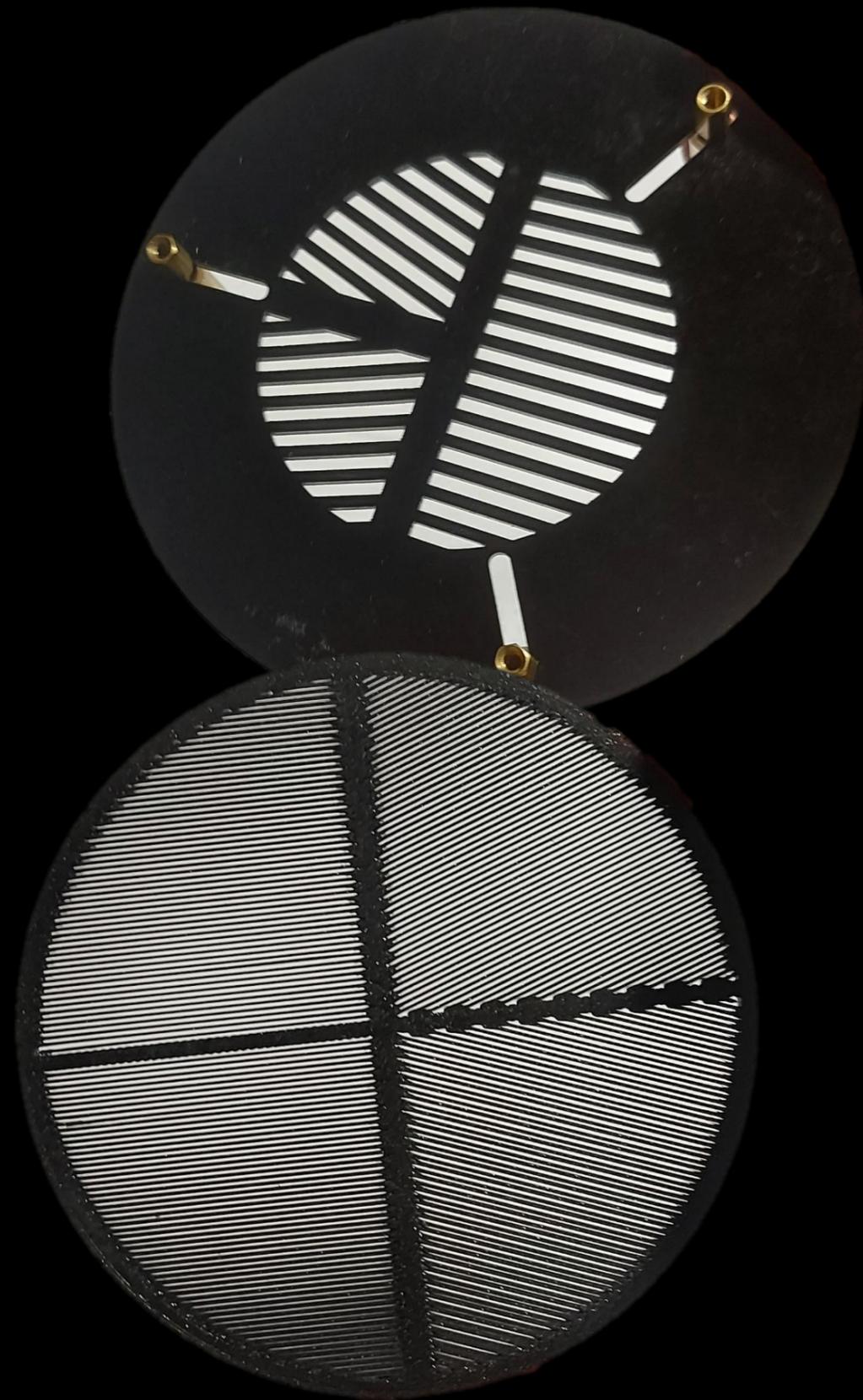
Unsung hero

- 3D printer
- Onderdelen
- Bahtinov masker



Bahtinov masker

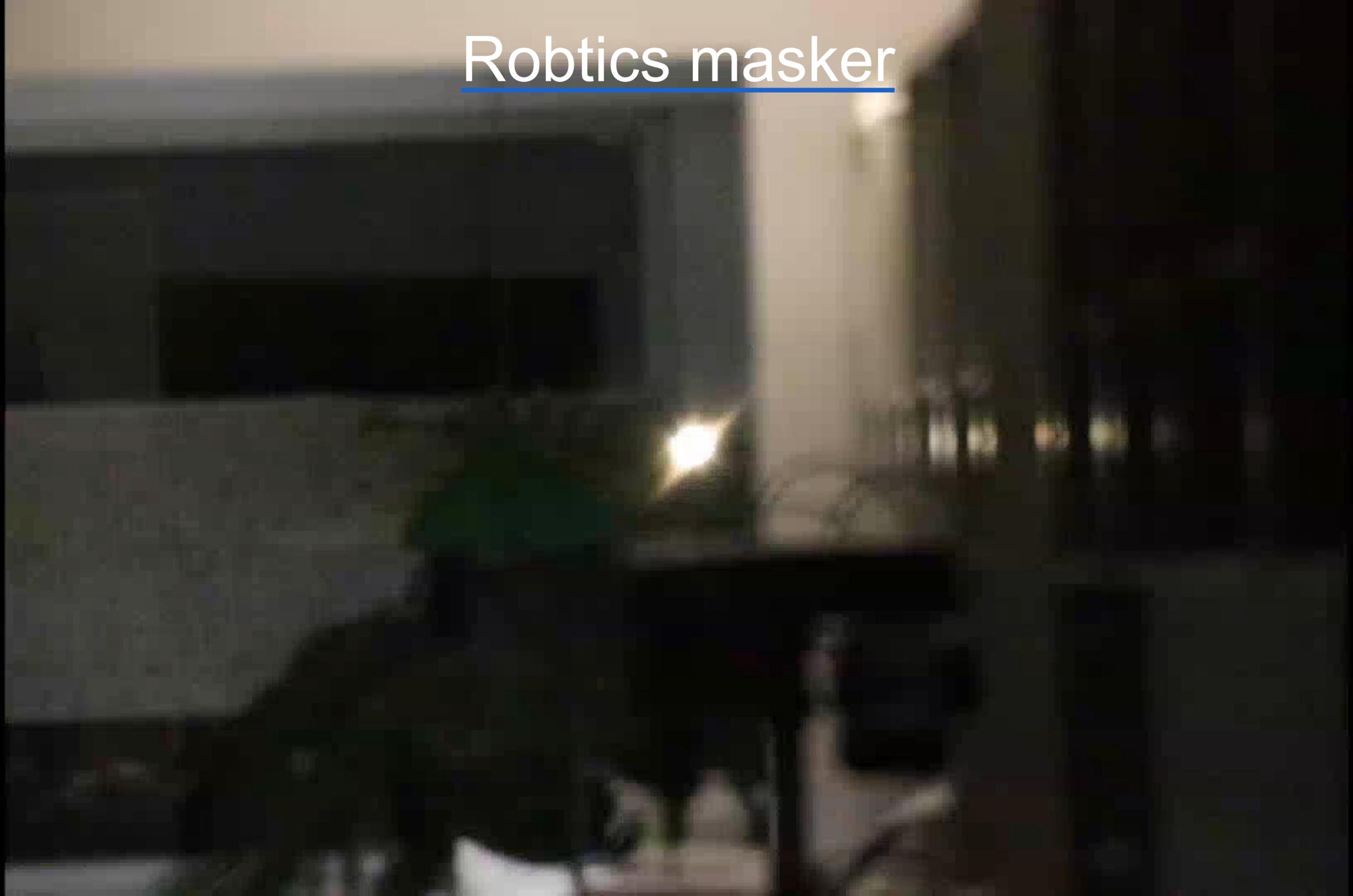
- Scherpstellen lens
- Robotics masker (€20)
- DIY 3D-printed design



DIY Bahtinov masker



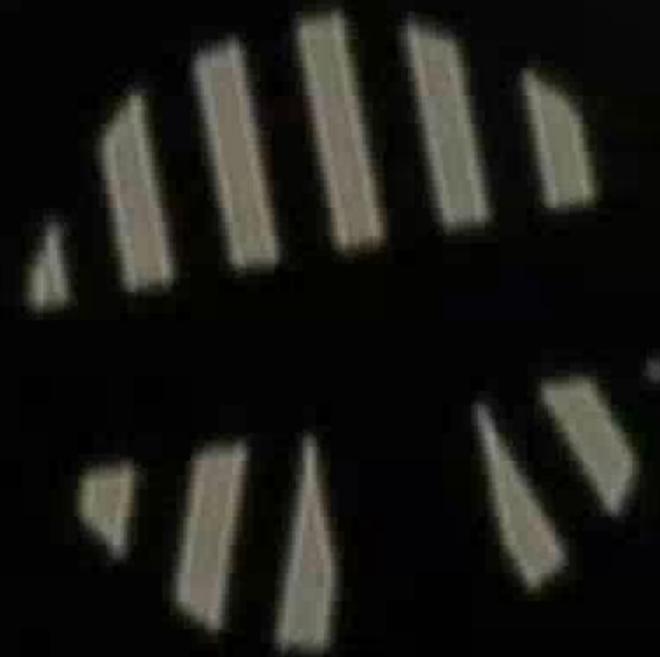
Robotics masker



DIY Bahtinov Masker



Robtics masker



Results

ANDROMEDA
GALAXY

DATE

- 15 sept. 2020

CAMERA

- ISO 800
- F2
- Exposure: 10s

STACKING

- 517 images
- Best 50 %



ORION NEBULA

DATE

- 3 maart 2019

CAMERA

- ISO ?
- F ?
- Exposure ?

STACKING

- 70 images
- Best 50 %



ORION NEBULA

DATE

- 11 februari 2021

CAMERA

- ISO 1600
- F2.0
- Exposure 20s

STACKING

- 276 images
- Best 50 %



T 2017 C2 PANSTARRS

BODE'S GALAXY

CIGAR GALAXY

DATE

- 24 mei 2020

CAMERA

- ISO 1600
- F2.0
- Exposure 45s

STACKING

- 276 images
- Best 50 %



T 2017 C2 PANSTARRS

BODE'S GALAXY

CIGAR GALAXY

DATE

- 25 mei 2020
(1 day later)

CAMERA

- ISO 1600
- F2.0
- Exposure 60s

STACKING

- 140 images
- Manual selection of 76



HERCULES CLUSTER

DATE

- 26 april 2020

CAMERA

- ISO 400
- F2.0
- Exposure 30s

STACKING

- 43 images
- Best 50%



IRIS NEBULA

DATE

- 4 oktober 2020

CAMERA

- ISO 1600
- F2.0
- Exposure 60s

STACKING

- 124 images
- Best 50% manual



PLEIADEN

DATE

- 25 sept 2022

CAMERA

- ISO 800
- F2.0
- Exposure 30s

STACKING

- 61 images
- All images



COMET NEOWISE

DATE

- 11 juli 2020

CAMERA

- ISO 1600
- F2
- Exposure: 2.5s
- No tracker!

STACKING

- 250 images
- Only 12 images!



COMET NEOWISE

DATE

- 21 Juli 2020

CAMERA

- ISO 1600
- F2.0
- Exposure 2.5s
- No tracker!

STACKING

- 1419 images
- Best 50%



COMET NEOWISE

DATE

- 12 juli 2020

CAMERA

- 50mm lens
- ISO 1600
- F2
- Exposure: 10s
- No tracker!

STACKING

- One image!



