Observing with the NOT
(Nordic Optical Telescope)

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ChINOS2

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CHETEC INFRA

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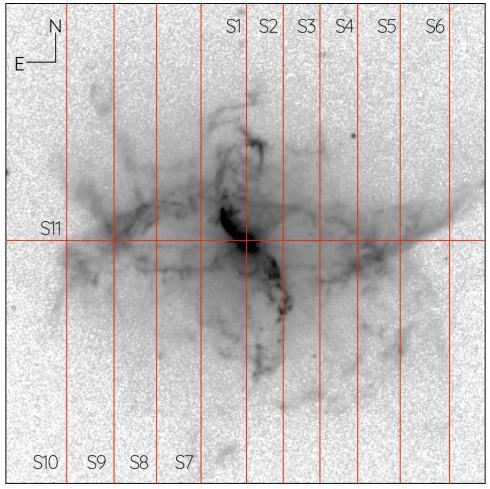
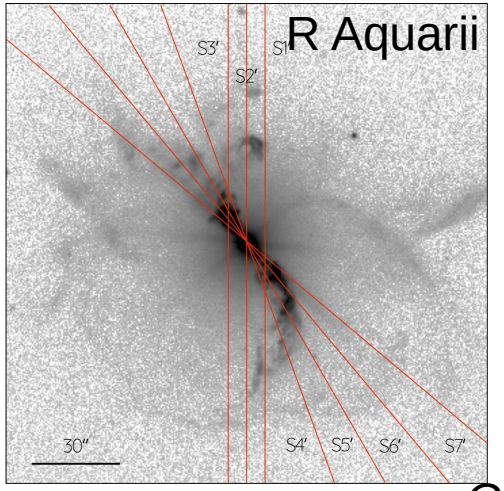
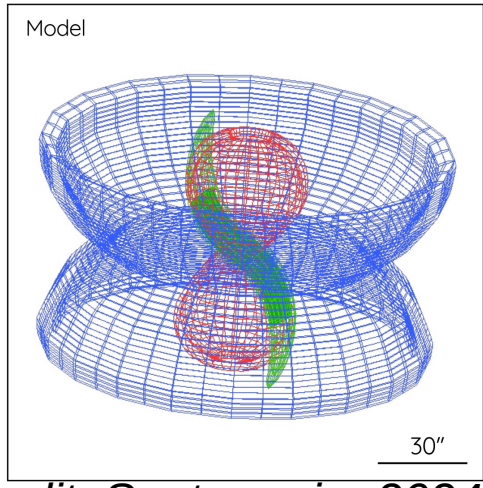
Who am I?



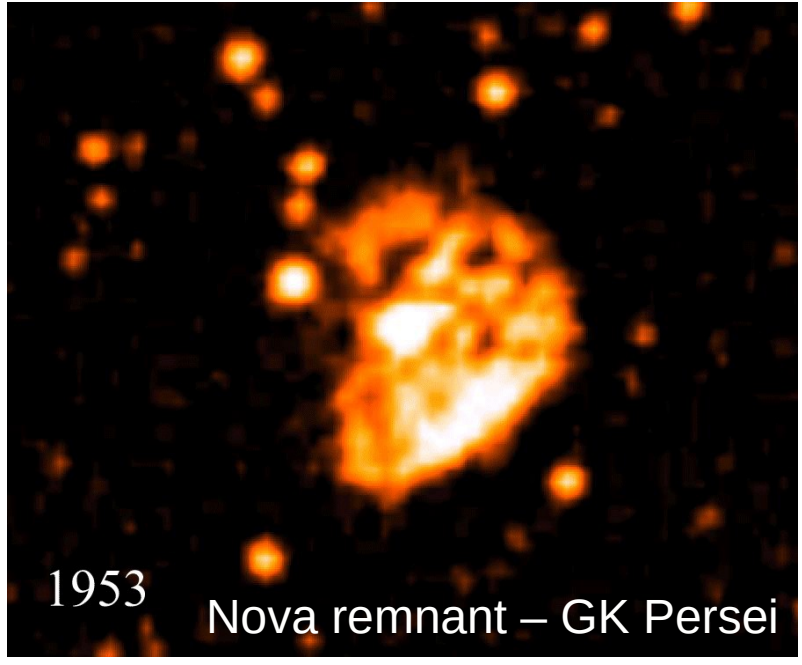




Credit: Santamaria+2024

- Tiina Liimets
- Observational astronomer (> 20 years)
- Tartu Observatory (Estonia)
  La Palma Observatory (Spain)
  Tartu Observatory (Estonia)
  Ondrejov (Czechia)
  University of Tartu (Estonia)
- Structure and kinematics of ejecta around outbursting stars.

Credit: Liimets+2012



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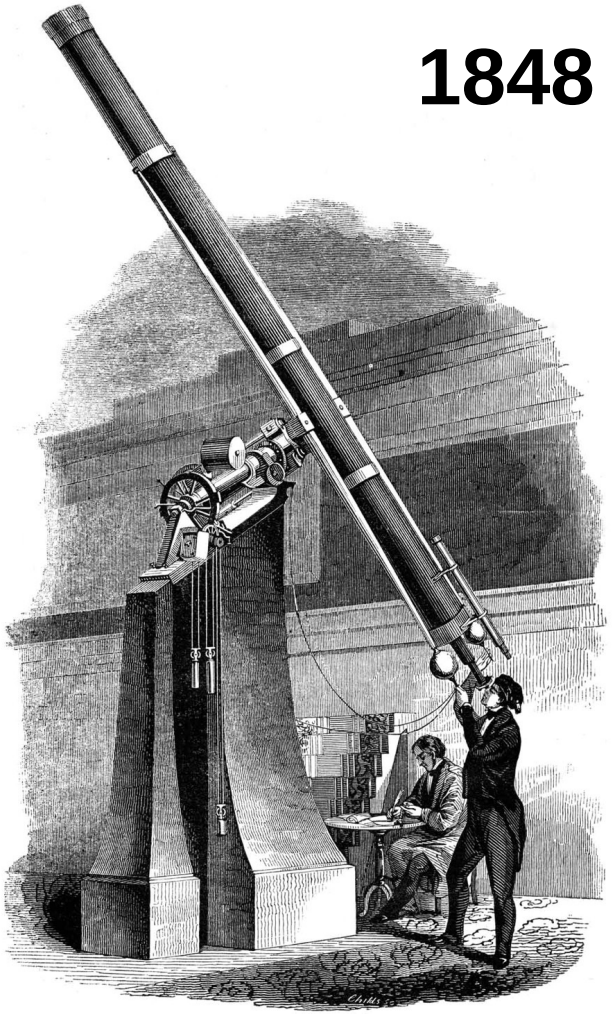


“Smith’s Illustrated Astronomy”
Cincinnati Observatory

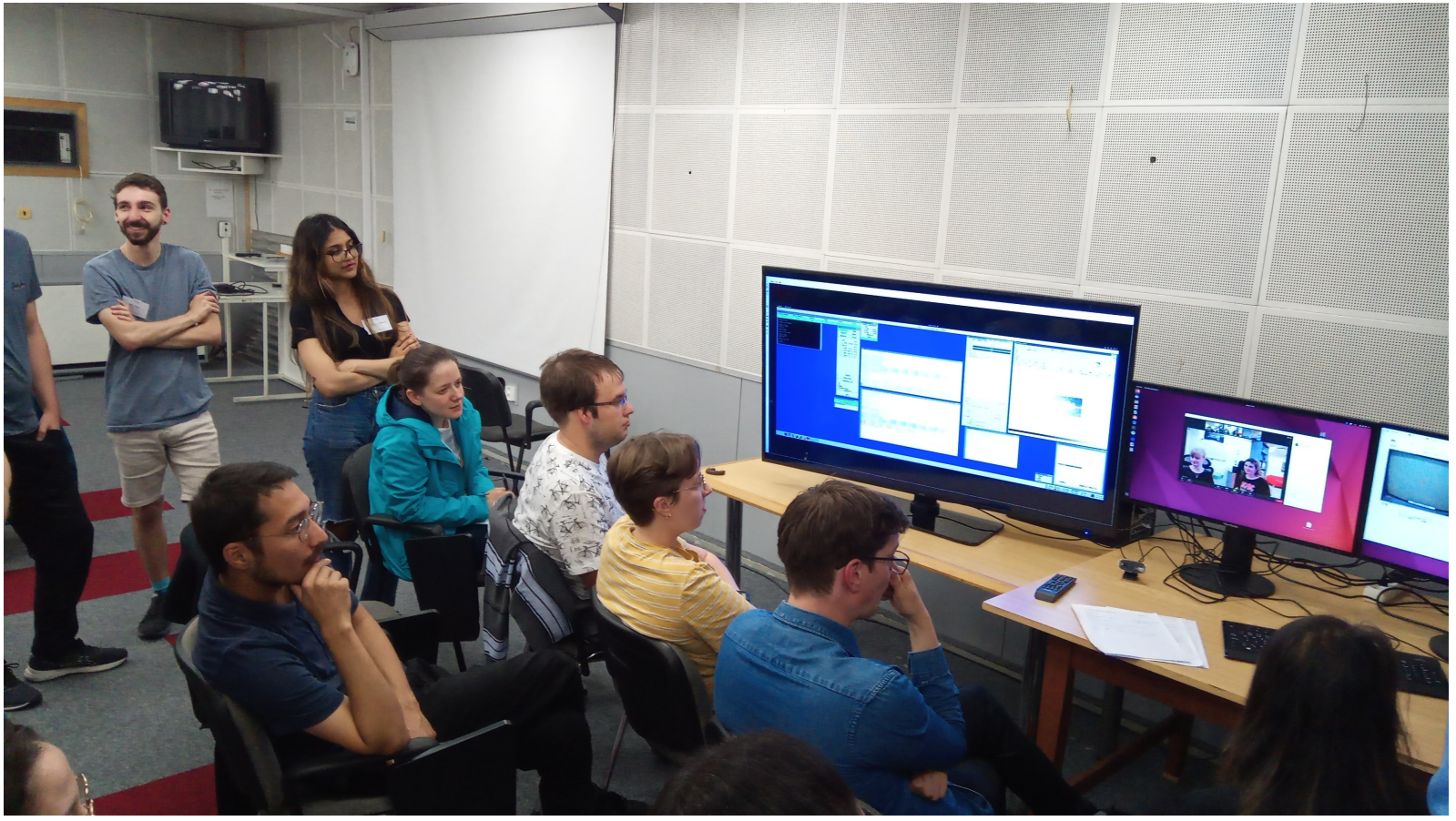
2025

Nordic Optical Telescope - NOT

Credit: NOT ▲
Tiina Liimets ►

Control-room

Remote control-room



1st ChETEC-INFRA Observational School (ChINOS) 2023 - Czechia

Nordic Optical Telescope – NOT

www.not.iac.es

- La Palma (Canary Islands, Spain) – Roque de los Muchachos Observatory

Largest European based observatory.

15 operational telescopes (worlds largest single-aperture optical telescope 10.4 m Gran Telescopio Canarias)

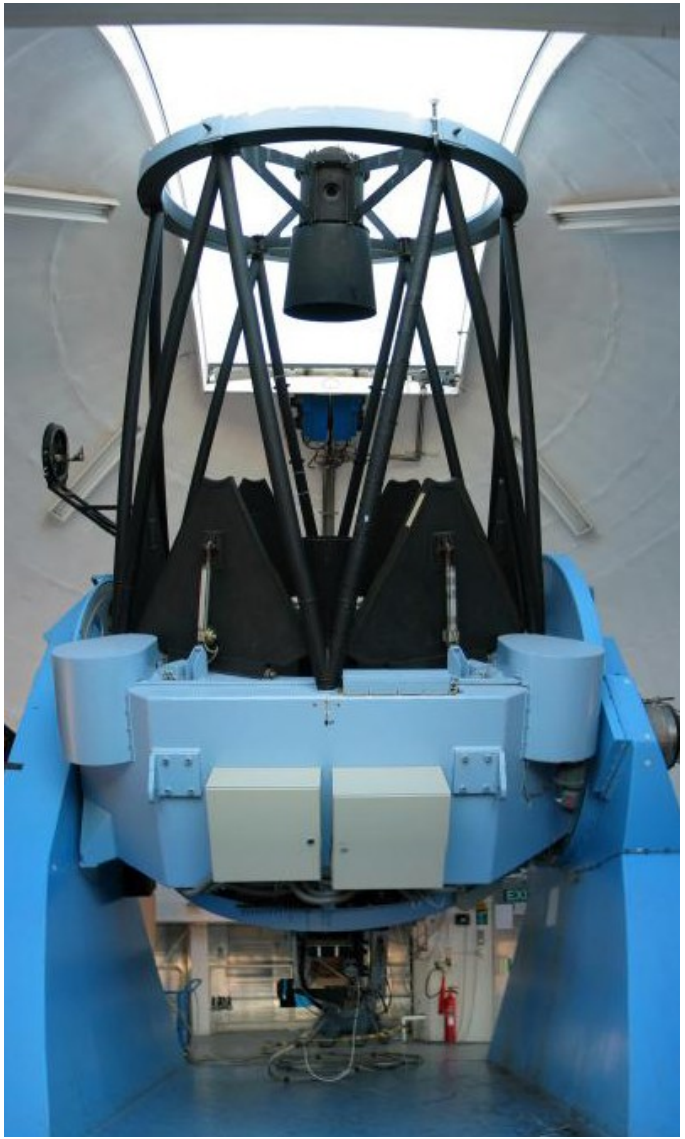
Credit: ESO

Nordic Optical Telescope

- 2.56 m telescope
- Inaugurated 1989
- Aarhus University (Denmark) + University of Turku (Finland)
  Non-Nordic users allowed
- Flexible/state of the art instruments (3 always available) –
  UV to near infrared, low and high resolution spectroscopy,
  imaging, and polarimetry.
  - Your instrument is FIES > see Andreas's lecture on Tuesday

Research Studentships (La Palma)
NOT https://www.not.iac.es/general/studentships/ Deadline 15th of September.
ING https://www.ing.iac.es/astronomy/science/studentship.html and other telescopes


Credit: NOT

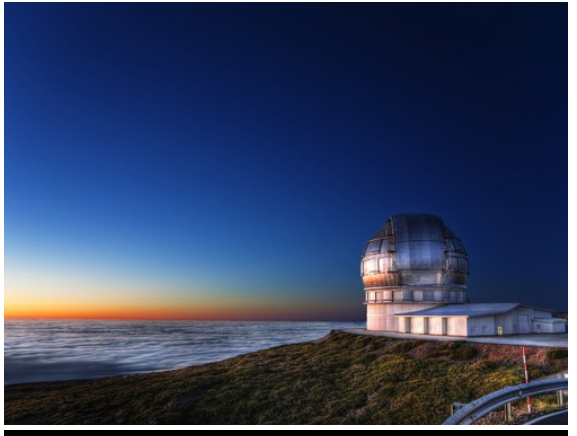


Credit: Tiina Liimets

How to get observations?

- **Are observations already done?**
  Check archives!!
- **Which telescope?**

  - Ground-based or space telescope?
  - Northern or Southern hemisphere?
    Where targets are observable?
  - How big telescope is needed?
  - Instrument?
  - Service mode or in person observations?



Credit: ESA

Applying for observing time

https://www.not.iac.es/observing/proposals/

- **This is not easy! Telescope time is expensive!$**
- **Observing proposal.**
  Depending on the telescope the over-subscription can be 10 times.

- **You are lucky!!**

Preparing for your observations

Observing tools – preparing for the night

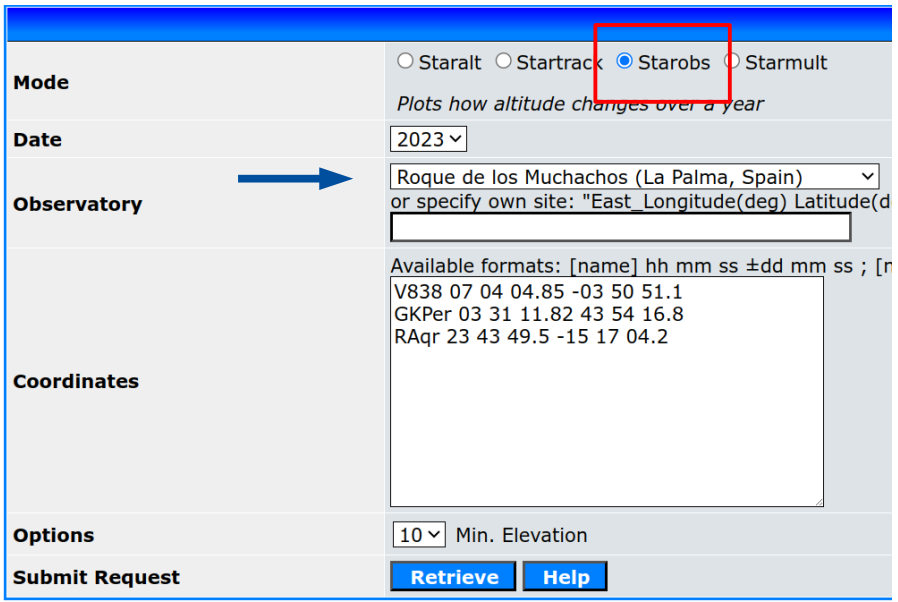
https://www.not.iac.es/observing/tools.php

- Visibility plots - https://www.not.iac.es/observing/forms/visibility/ or https://astro.ing.iac.es/staralt/ (file input)
- Finding Chart Generator – SDSS DR14 https://skyserver.sdss.org/dr14/en/tools/chart/chartinfo.aspx
- Signal-to-noise/exposure time Calculator - https://www.not.iac.es/observing/forms/signal/
- Overheads at the NOT - https://www.not.iac.es/observing/tools/overheads.html
- Observing Block Generator – **OB Generator** https://www.not.iac.es/observing/forms/ob/login.php

Visibility plots (NOT)

https://www.not.iac.es/observing/forms/visibility/

- Starobs – one year
  Date (year), Observatory



Visibility plots (NOT)

https://www.not.iac.es/observing/forms/visibility/

Starobs – one year
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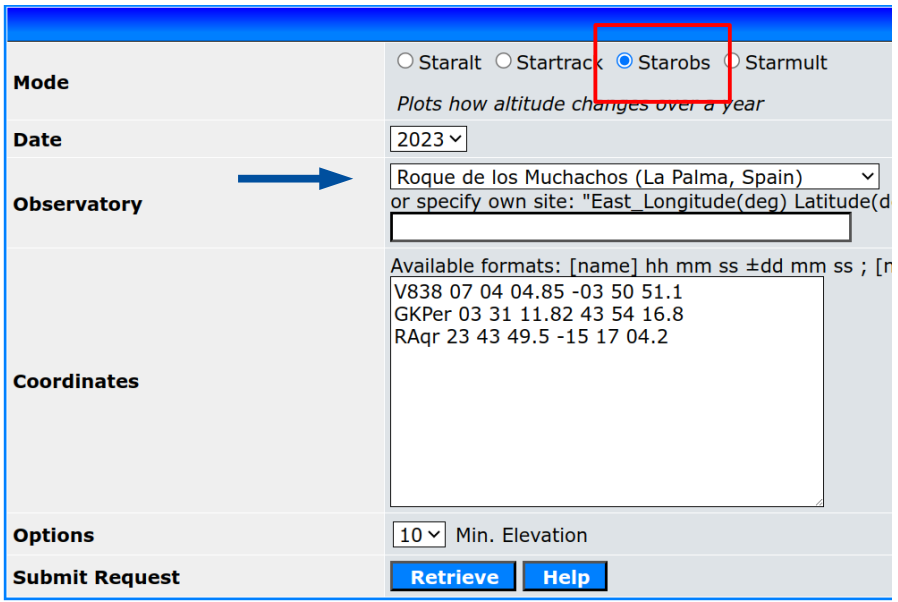
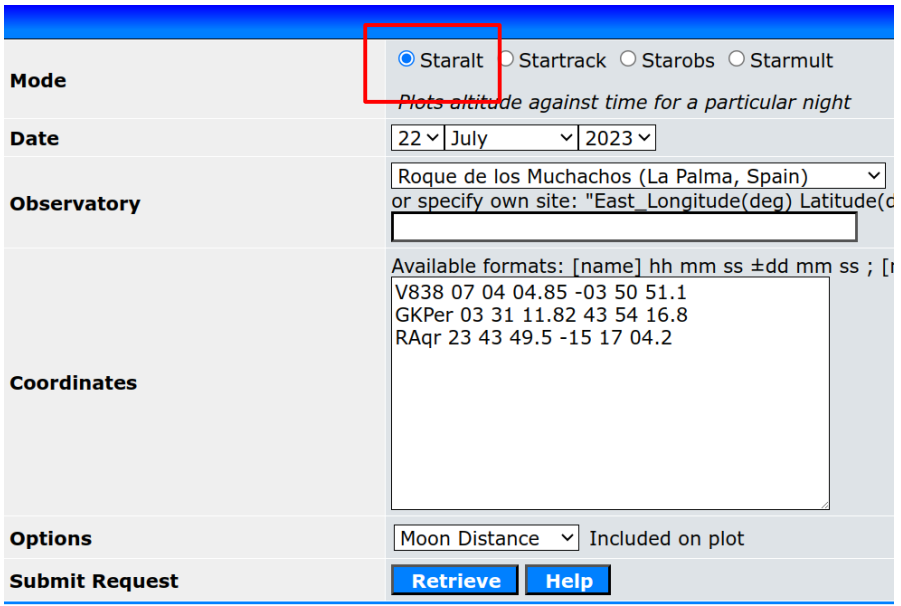
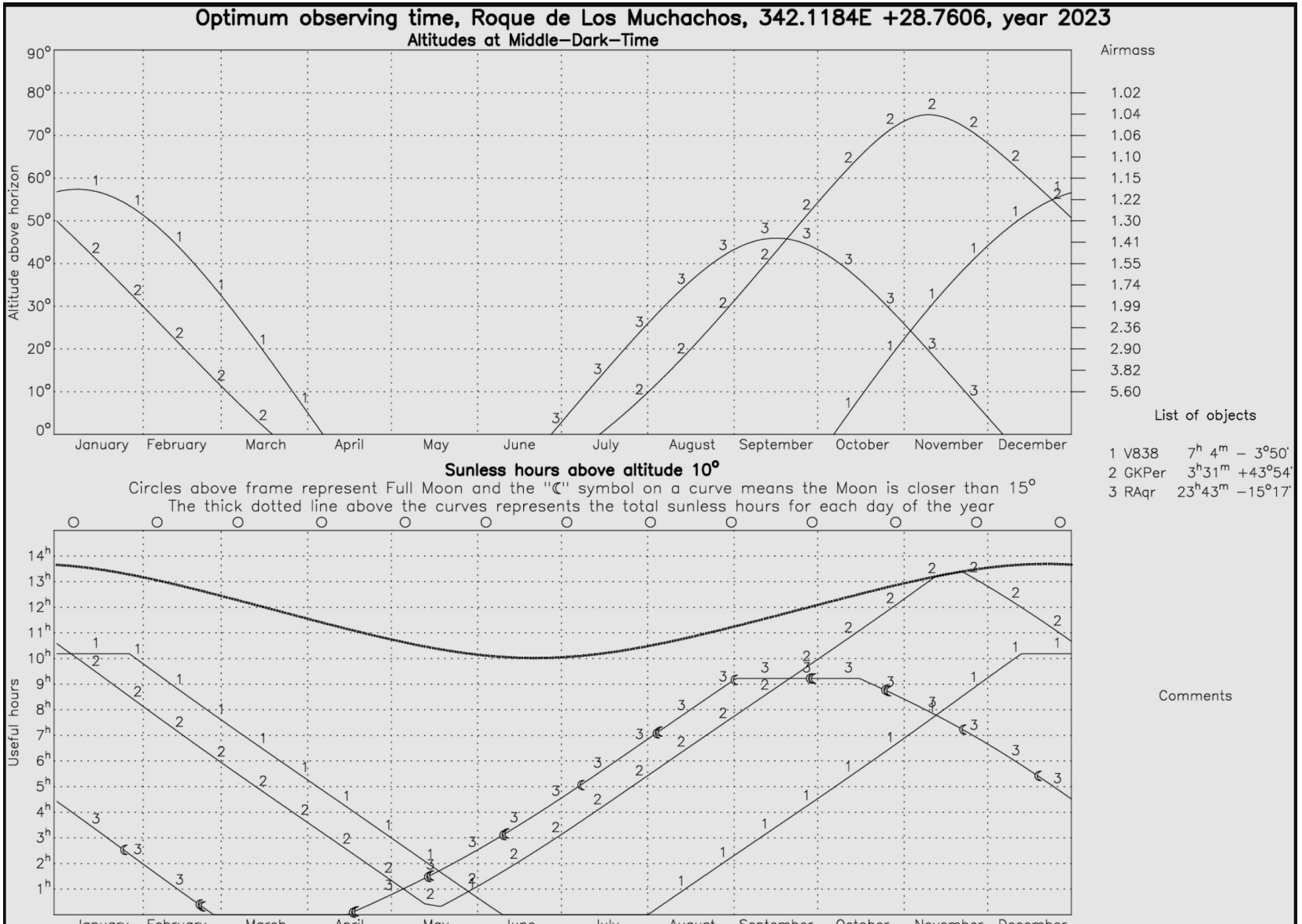


Staralt – one night
Date, Observatory

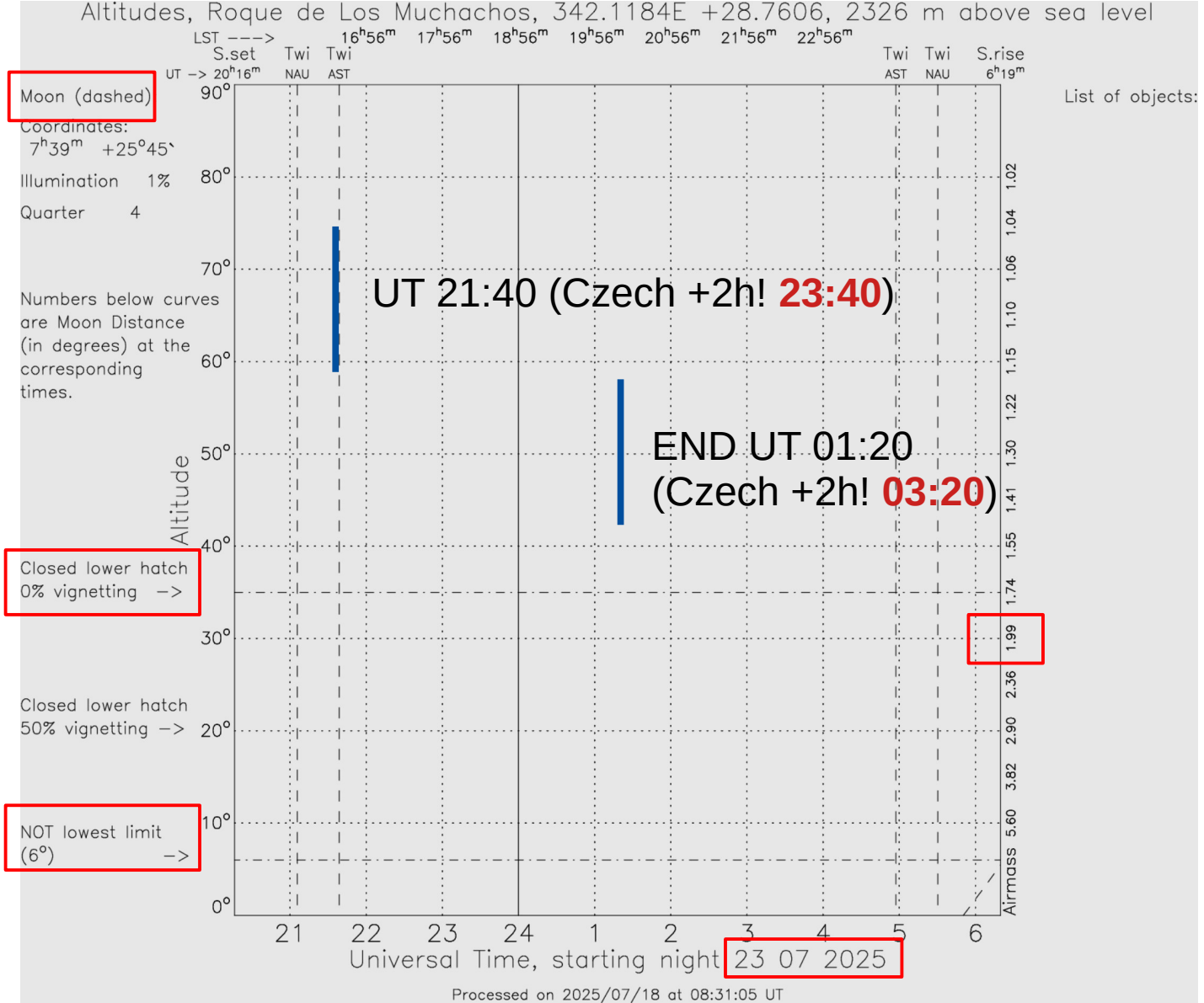




Visibility plots - Starobs

General condition for observing:

Airmass < 2.0
(altitude > 30°)



Visibility plots - Staralt

Airmass < 2.0

Planning the night ($$$):

1) Exposure time per target
2) Overheads
3) Calibrations

Observing **B**lock Generator will help

Visibility plot

https://www.not.iac.es/observing/forms/visibility/

Object Visibili

Mode ◉ Staralt ○ Startrack ○ Starobs ○ Starmult

Plots altitude against time for a particular night

Date 23 July 2025

Observatory Roque de los Muchachos (La Palma, Spain)

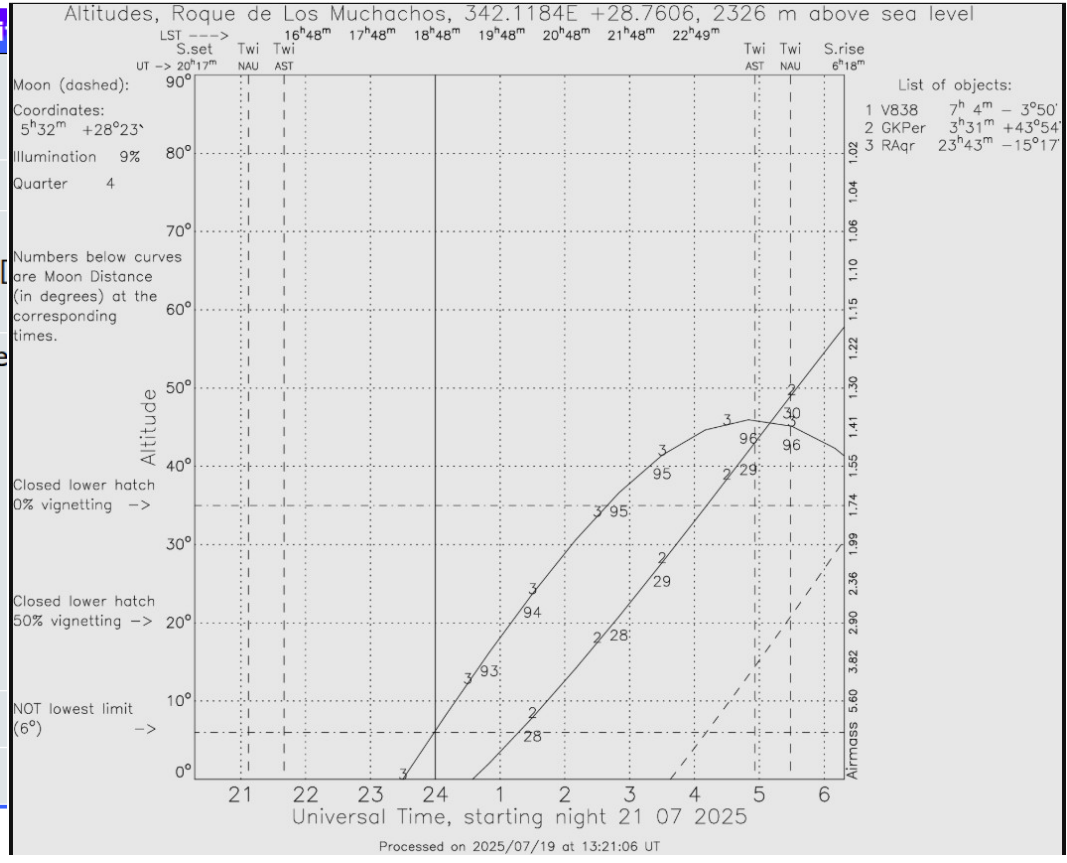
or specify own site: "East_Longitude(deg) Latitude(deg) [

Coordinates

Available formats: [name] hh mm ss ±dd mm ss ; [name

Options Moon Distance Included on plot

Submit Request Retrieve Help



Exposure time calculator

https://www.not.iac.es/observing/forms/signal/index.php

Exposure Time Calculator 2.9

Configuration

Instrument: ALFOSC imaging

High/med-res = 1.3”
Low-res = 2.5”

Setup

Grism / Fiber Band: - - - - - | U#7 (3620A)

Bandwidth: 0

Slitwidth / Fiber diameter ": 1.00

Target

Source: Point

Magnitude: 20 Vega

FWHM ": 1.00

Single Exp. Time (sec): 600

Number of Exposures: 1

Binning: 1x1

Sky Conditions

Airmass: 1.00

Extinction: 0

Sky Brightness: G (D, G or B for typical dark, grey or bright)

Graphical output

(•) None ( ) S/N vs. Exptime ( ) S/N vs. Magnitude ( ) Peak vs. Exptime

Estimate throughput and signal-to-noise

FWHM (Full Width at Half Maximum) in arcseconds ~ 1.0 a good approximation
Sky Brightness – dark time (Moon ~ 0% - 25%)

Overheads at the NOT

https://www.not.iac.es/observing/tools/overheads.html

- **Exposure time ≠ observing time**
  (exposure time + all overheads)
- Most relevant **overheads**: target acquisition and a CCD read-out time

FIES overheads	
Target acquisition	2-5min
CCD probe	20s
Fiber mask: typical	20s

- Read-out time vs. exposure time
- Calibrations (afternoon/night time)

FIES read-out times CCD15

Some approximate readout times are indicated in the table below. For more info on the FIES detector: CCD15

Amplifier	Binning	Read speed	Read-out time (sec)
B	1x1	100	46
B	2x2	100	16

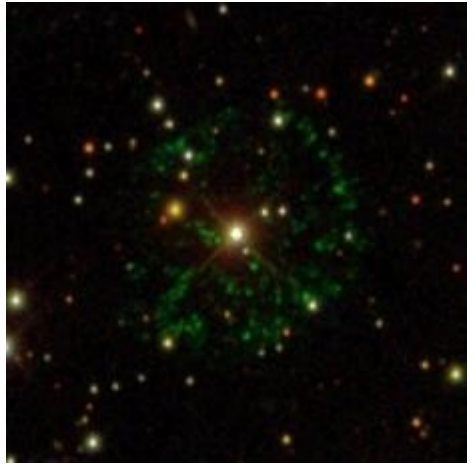
https://www.not.iac.es/instruments/fies/readouttimes.html

Finding Chart Generator - SDSS

https://skyserver.sdss.org/dr14/en/tools/chart/chartinfo.aspx

- The field of view of the finder is 3x3 arcminutes North up, East left.

- Other options:
  https://aladin.cds.unistra.fr/AladinLite/
  ...



Check list

- Choose your targets (~science case).
- Check archive.
- Visibility (~sky coordinates/observing location): 21st-24th of July, Roque de los Muchachos (La Palma, Canary Island), until UT ~01:20 (Czech ~03:20) (in total 3.5h of night time).
- Observing time (exposure time + overheads).
  Each group has one half-night: if needed you can exchange with each other!
- Finding charts of the selected targets (needed for OB generator).
- Creating Observing Blocks (probably one group at the time, together with us):
  - name of the target
  - coordinates (RA, DEC)
  - proper motion (RA/DEC)
  - magnitude
  - finding chart
  - observing mode (~Resolution, low-, med- or high-res fiber)
  - exposure time (~Signal-to-Noise-Ratio)
  - calibrations? (night time spectral calibration)

Overrides

https://www.not.iac.es/observing/proposals/obsmodes.html

- **Someone else will interrupt your observing according to the pre-defined rules.**

  Phenomena whose exact occurrence time cannot be planned but can (mostly) be statistically predicted to happen – GRBs, SN, merger events, etc.

- Rapid Response Mode (**RRM**) **new!**
  immediate and automatic access to the telescope

- hard Target-of-Opportunity (**hard ToO**)
  overriding the observing schedule that was made for that particular night
  This can be triggered during the night. ”SN exploded we need these observations as soon as possible, we are very thankful for your co-operation” = finish your exposure and start observing for us.

- soft Target-of-Opportunity (**soft ToO**)
  Triggers should be sent well before the start of a night.

- **Don’t despair! The amount of time per proposal is limited by time or a number of triggers and there is a payback system.**

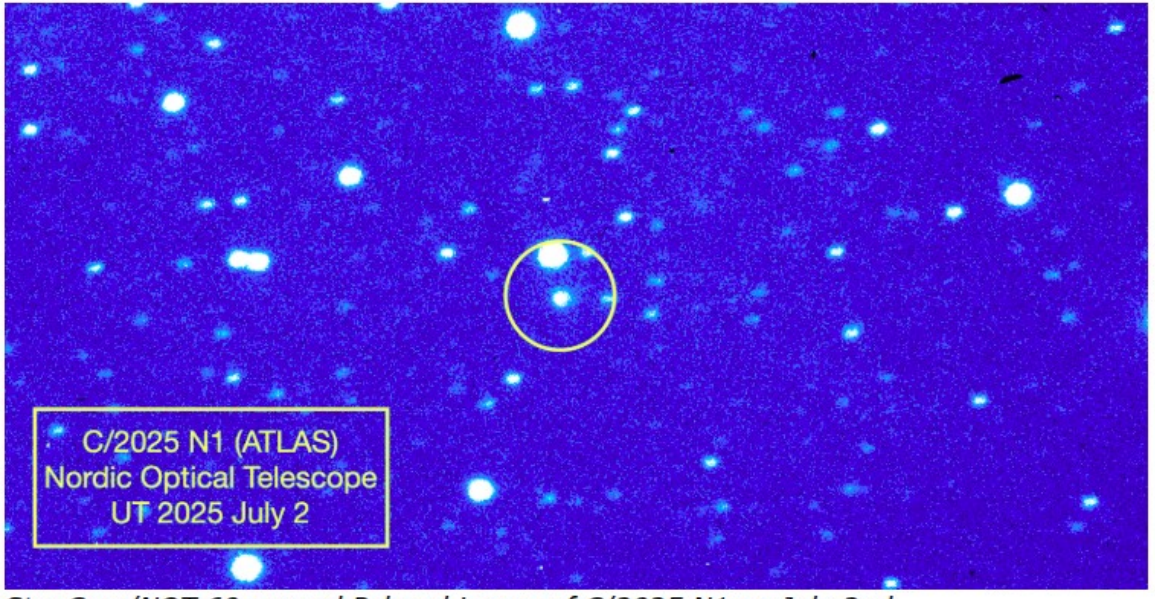
Currently known override

Fast Track proposal:
Every evening 10 minutes
> we get our time back!

Interstellar interloper 3I/ATLAS (C/2025 N1)

This is the third interstellar object ever detected to be passing through our solar system. The object has an extreme hyperbolic orbit with eccentricity ~ 6.15.

Jane Luu early requested observations through her ToO program at the NOT. On July 2nd the observers Andras Haris and Nora Routamo obtained the data, and Jewitt and Luu presented the following StanCam R-band image:



StanCam/NOT 60 second R-band image of C/2025 N1 on July 2nd.

Multiple images of 60s integrations through a Bessel R-filter revealed that the object is clearly active with a diffuse tail, confirming it is a comet.

Published in The Astronomer's Telegram: Jewitt & Luu, ATel 17263.

See Wikipedia entry for more information on this object.