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Project number:

2021-1-IE01-KA220-SCH-000027825

Robotic Telescopes

Age group: 10-14

Topics: stellarium, telescope, astronomy, observation, light polution, hands-on activity

Resource: Gustavo Rojas; CliC-PoLiT summerschool 2022

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Using Robotic Telescope:

A robotic telescope is an automated telescope that can be operated remotely, allowing astronomers to observe celestial objects without being physically present at the telescope site. These telescopes are equipped with advanced technology for automated control, data acquisition, and image processing, making them versatile tools for astronomical research and education.

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1) Introduction:

Welcome to the exciting world of astronomy and exploration through the lens of robotic telescopes! Imagine having the power to peer into the vastness of the cosmos from the comfort of your own computer. Robotic telescopes, equipped with advanced technology and operated remotely, allow budding astronomers like you to observe celestial objects, capture breathtaking images, and delve into the mysteries of the universe without leaving your desk. This student activity will provide you with a hands-on experience, guiding you through the process of accessing and controlling a robotic telescope, unlocking the wonders of the night sky, and fostering a deeper understanding of the cosmos. Get ready to embark on a celestial journey like never before!

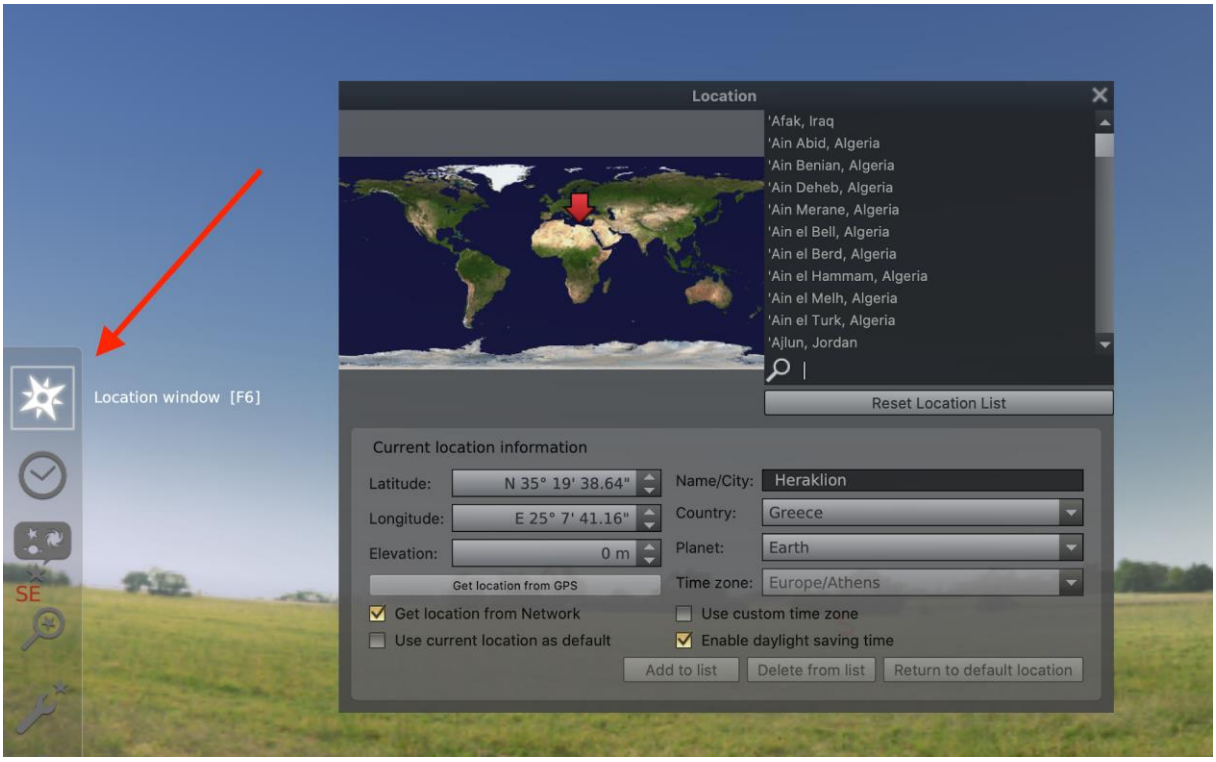
2) Plan your observation with Stellarium:

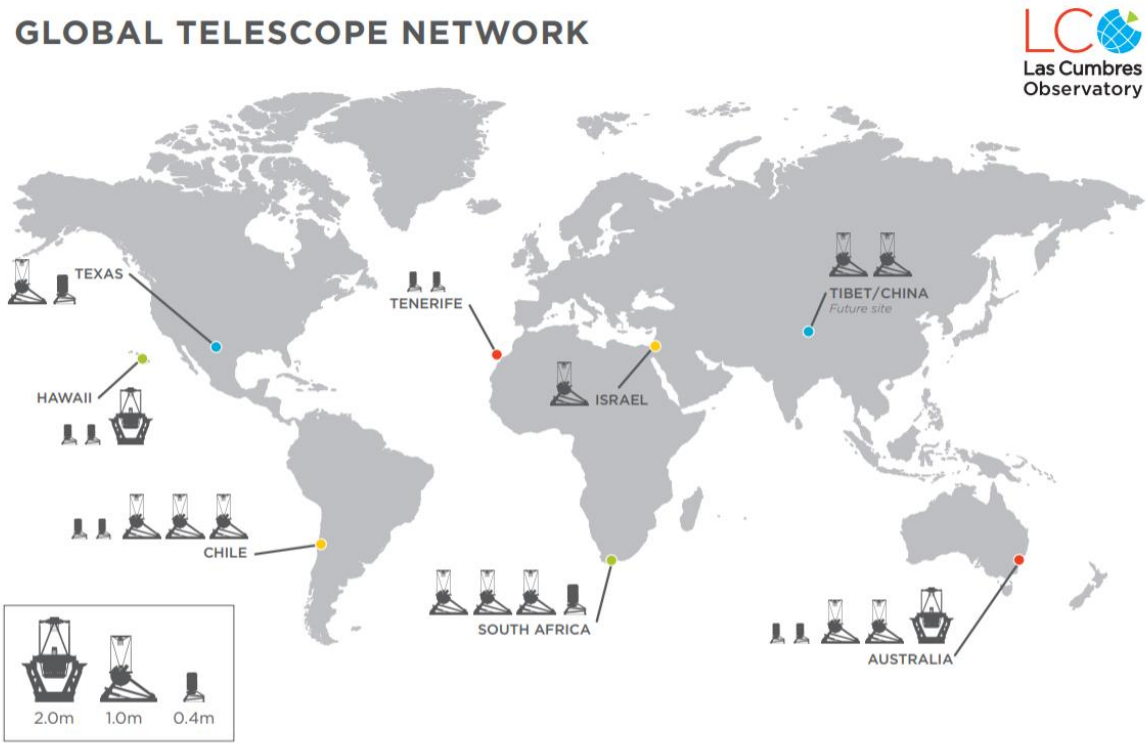
www.stellarium.org

HOW to use the Stellarium?: More information is provided on the Clic-Polit website!

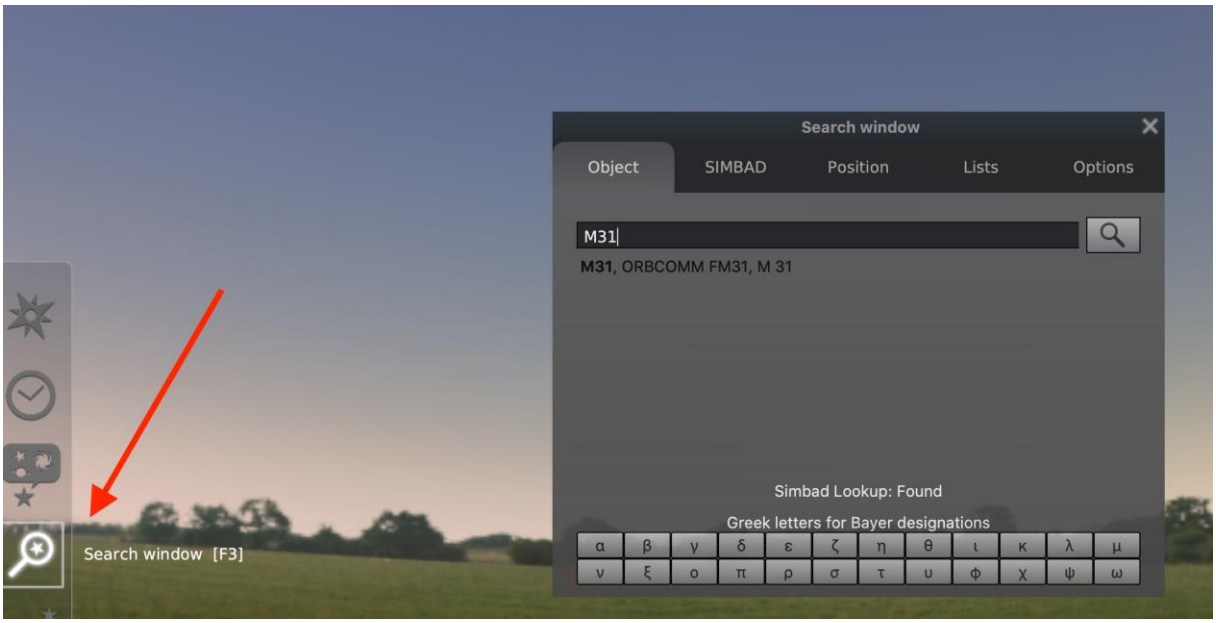
3) Planning steps:

- Set up location

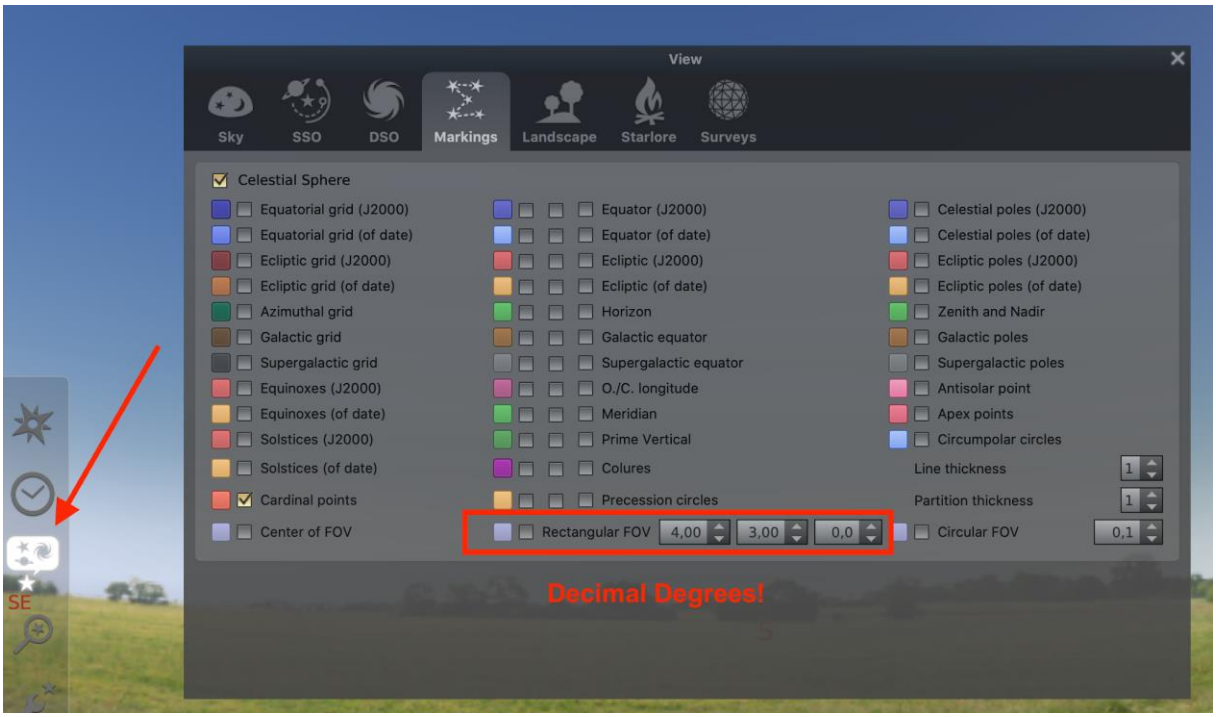




- Search object


Search window
Object
SIMBAD
Position
Lists
Options
M31
M31, ORBCOMM FM31, M 31
Simbad Lookup: Found
Greek letters for Bayer designations
Search window [F3]

- Check FOV


View
Sky
SSO
DSO
Markings
Landscape
Starlore
Surveys
Celestial Sphere
Equatorial grid (J2000)
Equatorial grid (of date)
Ecliptic grid (J2000)
Ecliptic grid (of date)
Azimuthal grid
Galactic grid
Supergalactic grid
Equinoxes (J2000)
Equinoxes (of date)
Solstices (J2000)
Solstices (of date)
Cardinal points
Center of FOV
Equator (J2000)
Equator (of date)
Ecliptic (J2000)
Ecliptic (of date)
Horizon
Galactic equator
Supergalactic equator
O./C. longitude
Meridian
Prime Vertical
Colures
Precession circles
Rectangular FOV
4,00
3,00
0,0
Celestial poles (J2000)
Celestial poles (of date)
Ecliptic poles (J2000)
Ecliptic poles (of date)
Zenith and Nadir
Galactic poles
Supergalactic poles
Antisolar point
Apex points
Circumpolar circles
Line thickness
Partition thickness
Circular FOV
0,1
Decimal Degrees!

FOV

Name	Telescope Class	Pixel scale "/pix (std. binning)	Field of view	Overhead per frame	Filter options
MuSCAT3	2-meter	0.27 (bin 1x1)	9.1'x9.1'	6s or 46s	SDSS g'r'i'zs fixed
Spectral	2-meter	0.300 (bin 2x2)	10'x10'	19s	18
Sinistro	1-meter	0.389 (bin 1x1)	26'x26'	28 s	21
SBIG 6303	0.4-meter	0.571 (bin 1x1)	29'x19'	14 s	9

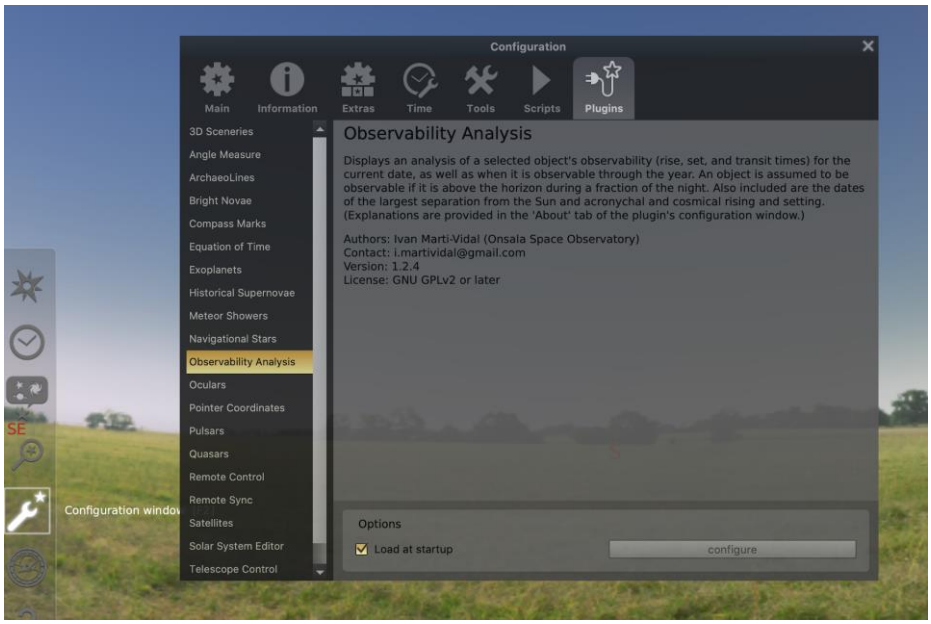
- Estimate exposure time

Estimates for 2-m exposure times

Mag	Exposure time (s)
10	5
11	15
12	40
13	100
14	240
15	600

1 magnitude = 250% more exposure time

- Determine best epoch

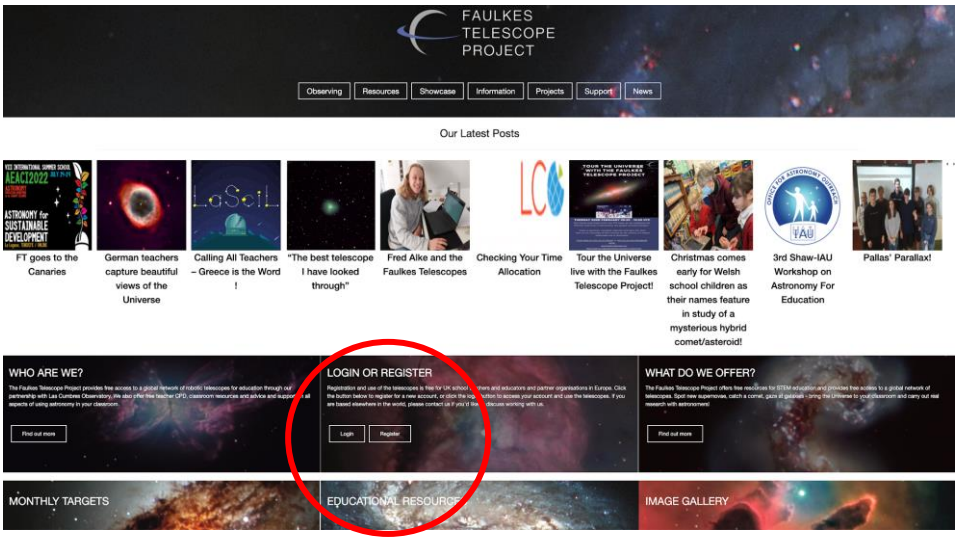


- Be aware of other factors:
  - ❖ Moon
  - ❖ Satellites
  - ❖ Weather
  - ❖ Technical issues

4) Using Faulkes Telescope Project:

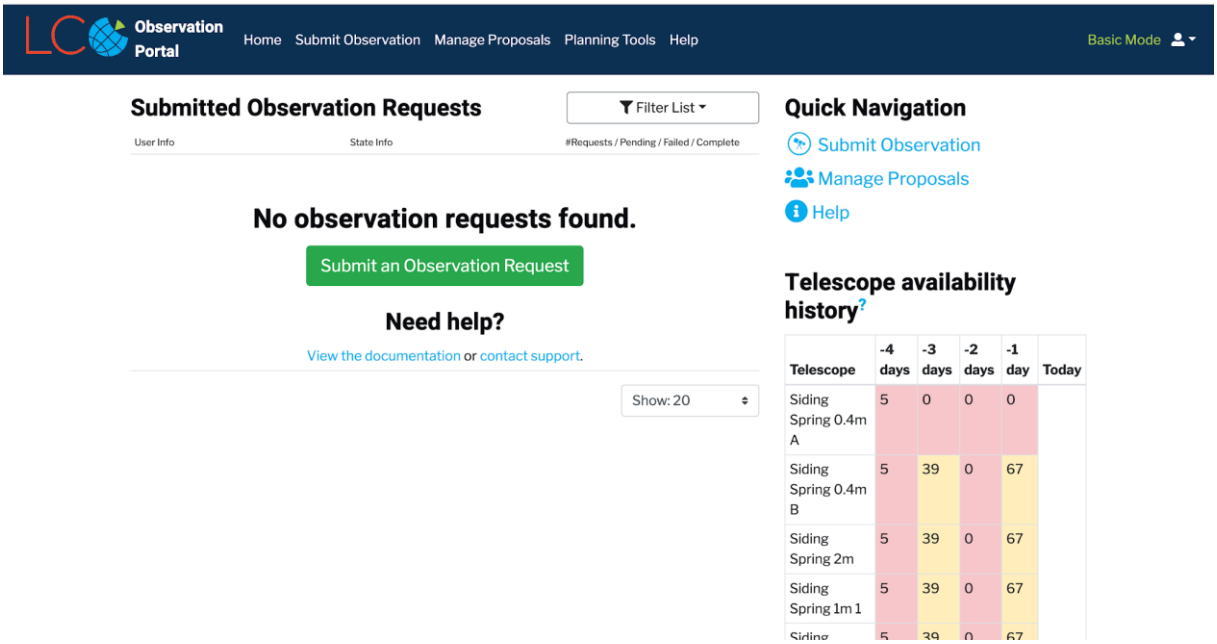
a) Registration to Faulkes Telescope Project:

http://www.faulkes-telescope.com/



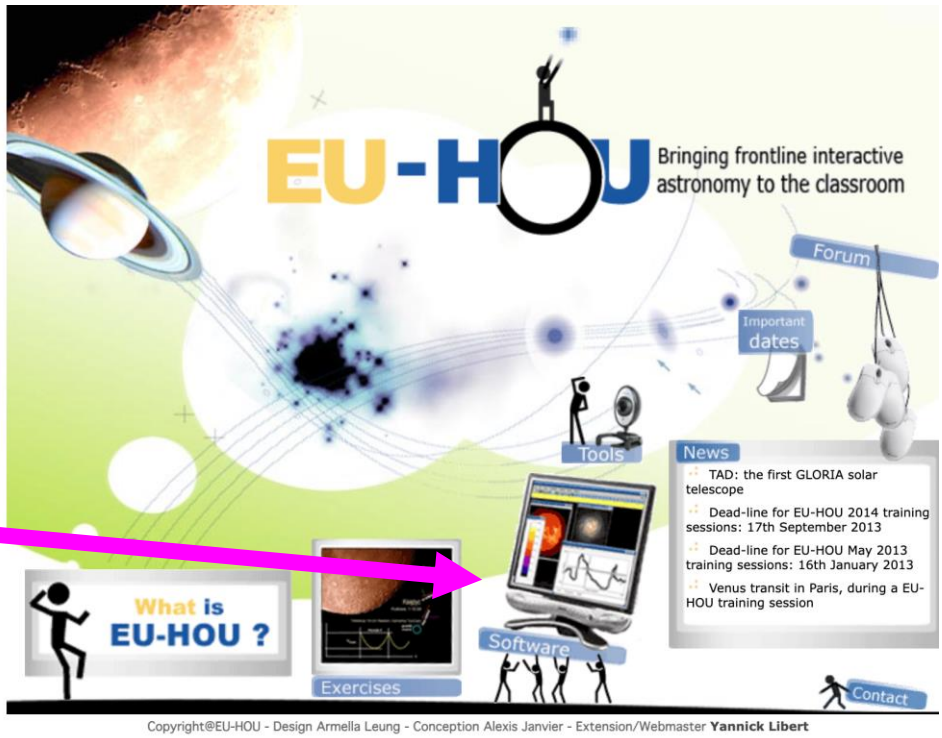
b) Requesting Images using the LCO Interface

https://observe.lco.global/



c) Image processing with SalsaJ

http://www.euhou.net/



HOW to use SalsaJ?: More information is provided on the Clic-Polit website!