SPIRIT

SPICE-PHYSICS-ICRAR
REMOTE INTERNET TELESCOPE

An introduction to Stellarium

Stellarium is an interactive planetarium program that allows you to explore the night sky from any location on Earth, at any time of the year.

Stellarium can be used as an educational tool to learn about the night sky, as well as a tool for planning observations through a telescope. It is ideally suited as a resource for gaining an understanding of the celestial sphere, and the seasonal movement of astronomical objects across the sky

The default installation (current version 0.21.0) contains over 600 000 stars as well as numerous deep sky catalogues and images. Stellarium is also expandable, with a many free plug-ins and educational resources available for download. In addition, Stellarium includes a basic scripting interface that allows custom simulations to be created by the user.

Stellarium is provided as an open-source project. Its source code is available and is freely modifiable and redistributable as per the GNU Public License.

Stellarium can be downloaded at www.stellarium.org

Curtin University

THE UNIVERSITY OF WESTERN AUSTRALIA
Achieve International Excellence

ICRAR
International Centre for Radio Astronomy Research

Stellarium

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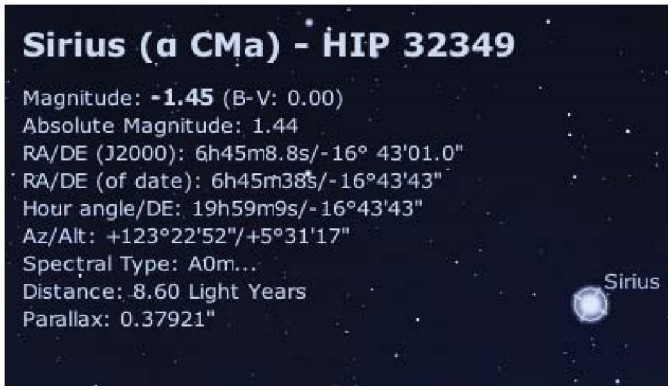
Starting *Stellarium*

On opening a new installation of *Stellarium*, you will be presented with a 60° view of the sky as currently seen from where you are.

At the bottom of the screen you can see additional information describing the location, date and time.

Cardinal indicators located on the horizon show the direction you are facing.



A left mouse click on any object on the screen will display additional information in the top left hand corner of the screen.

Right mouse click to clear the selection.

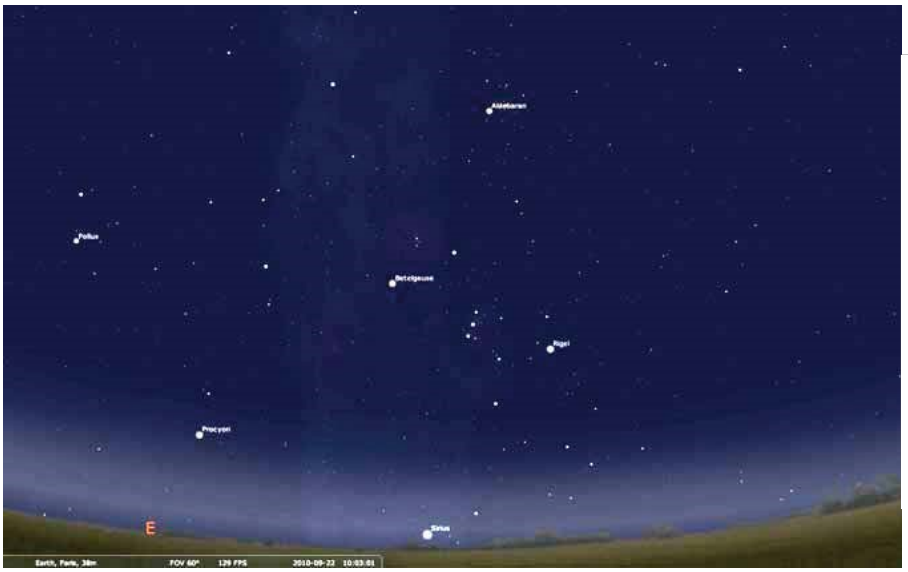
Positioning your mouse at the lower left hand corner of the screen will reveal the main tool bars. They automatically disappear when the mouse is moved away.

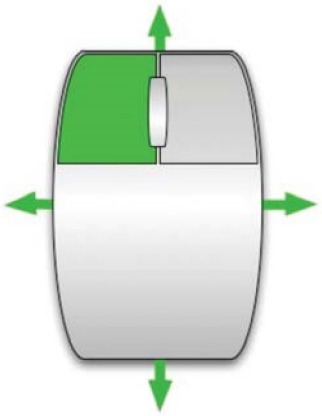
Basic Moves

Moving around Stellarium can be accomplished using mouse and keyboard commands.

Hold the left mouse button down while moving the mouse to change your orientation.

You can also use the **cursor** keys on your keyboard to change your orientation.





Press and hold the keyboard **Page Up** and **Page Down** keys to zoom in and out.

Press the **space bar** to centre a selected object.

Press the **forward slash** key " / " to quickly zoom in on a selected object.

Press the **back slash** key " \ " to return quickly to a 60° field of view.

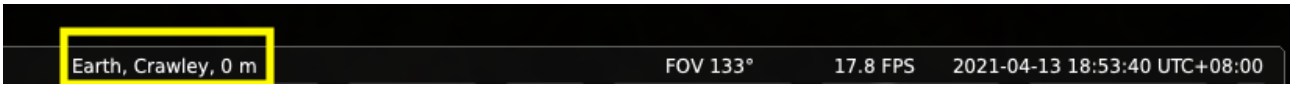
Setting location and time

The correct location and time must be set before *Stellarium* can be used to plan an evening's observations.

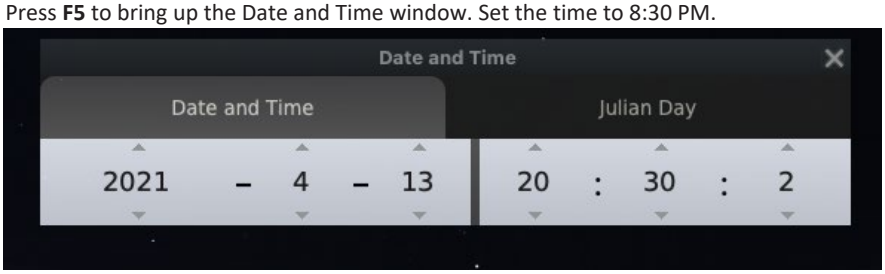
If Stellarium is not showing the correct location, press **F6** to open the *Location Window*. Alternatively, click on the *Location Window* icon in the tool bar.

Type the name of the city in the search box, then select it. Select **use as default** if you wish to retain the setting the next time *Stellarium* starts. Close when finished.

The main display should reflect the new location details.



Press **F5** to bring up the Date and Time window. Set the time to 8:30 PM.



Time

Stellarium also allows us to manipulate time.

Press the "**L**" key to speed up time and see the stars move across the sky.

Press the "**K**" key to return time to normal speed.

Press the "**J**" key repeatedly to make time move backwards.

Press the "**8**" key to reset the date and time to current.

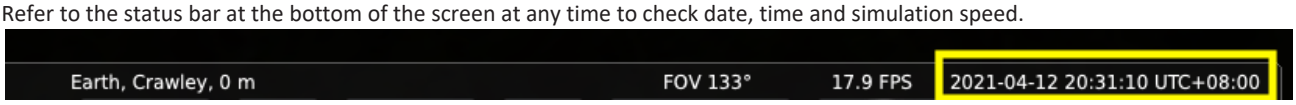
Press the "**7**" key to freeze time.

If you get lost, remember:

the "**8**" key sets date and time to current, and the "**K**"

key sets the simulation to normal speed.

Refer to the status bar at the bottom of the screen at any time to check date, time and simulation speed.

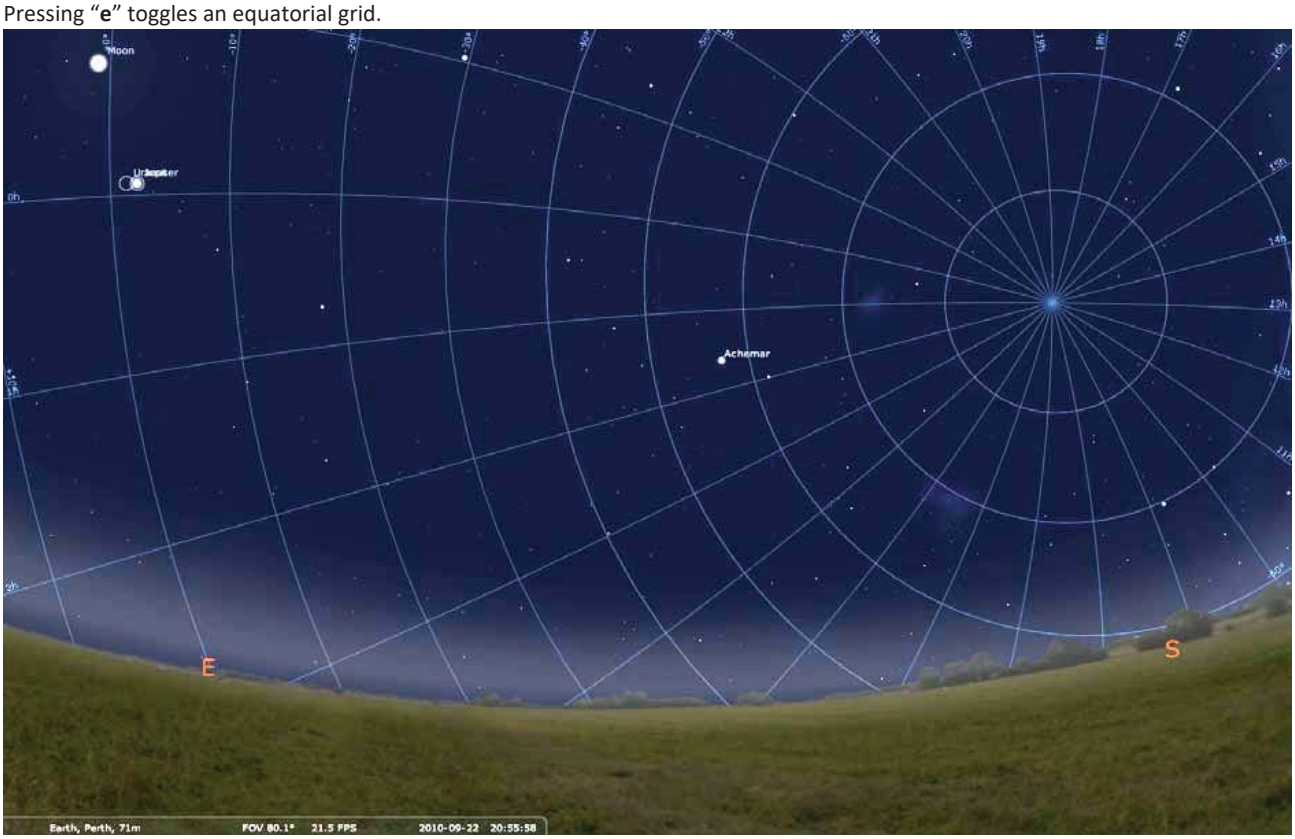


Controls for time can also be found on the lower tool bar.

Markings

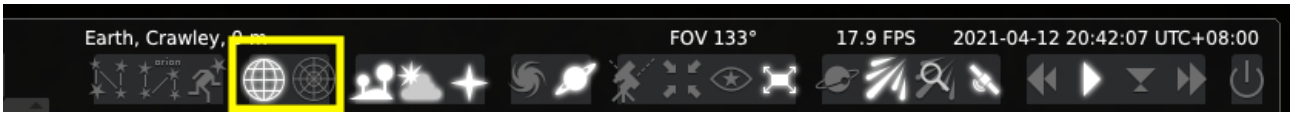
Various grids, lines and markings can be displayed on the celestial sphere.

Pressing "**e**" toggles an equatorial grid.

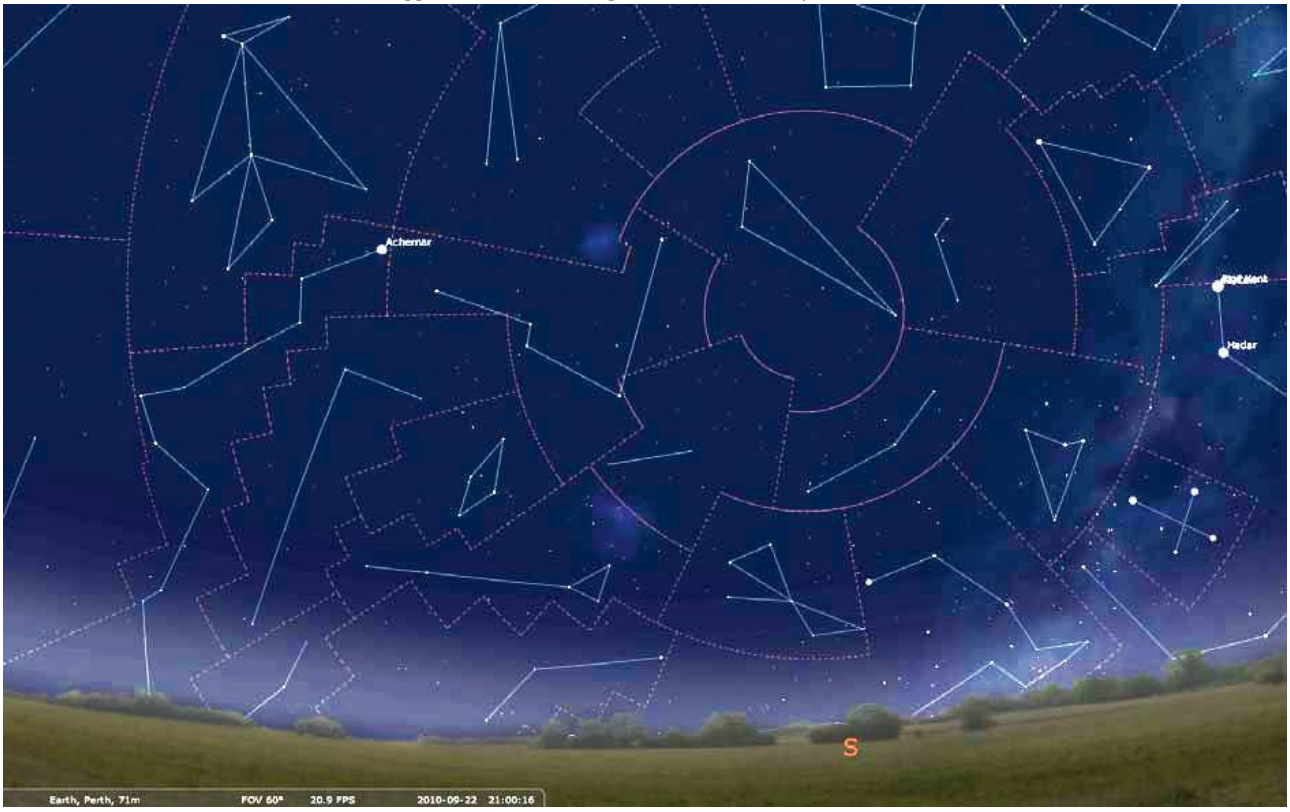


Pressing "**z**" toggles the Altitude / Azimuth grid.

Alternatively you can use this section of the menu options:



Constellation lines and boundaries are toggled on and off using the "**b**" and "**c**" keys.



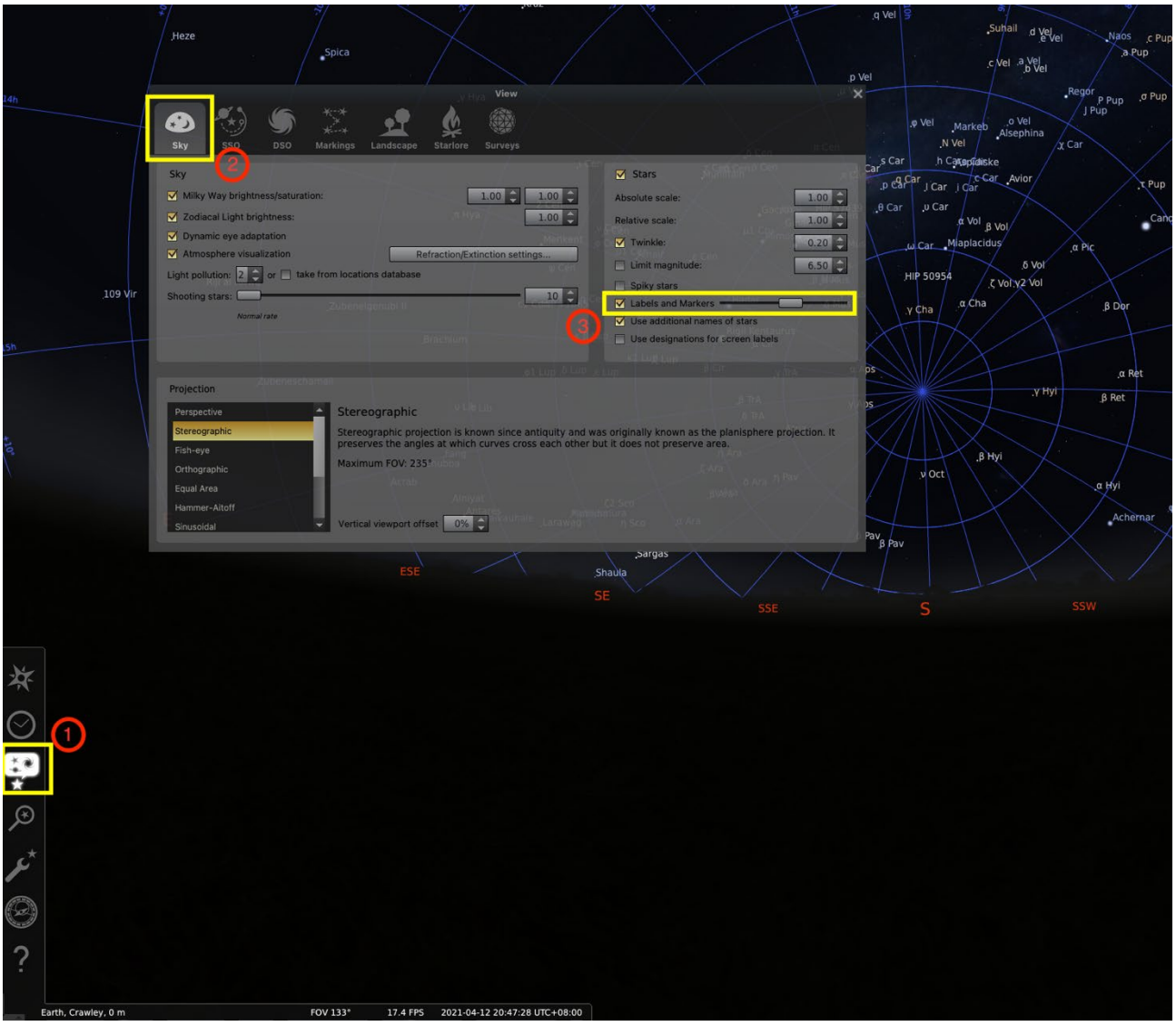
Constellation art can be displayed with the "**r**" key.

Alternatively you can use this section of the menu options:

Labels

Labels can be toggled on and off using the Sky and Viewing Options menu, or by pressing "**F4**".

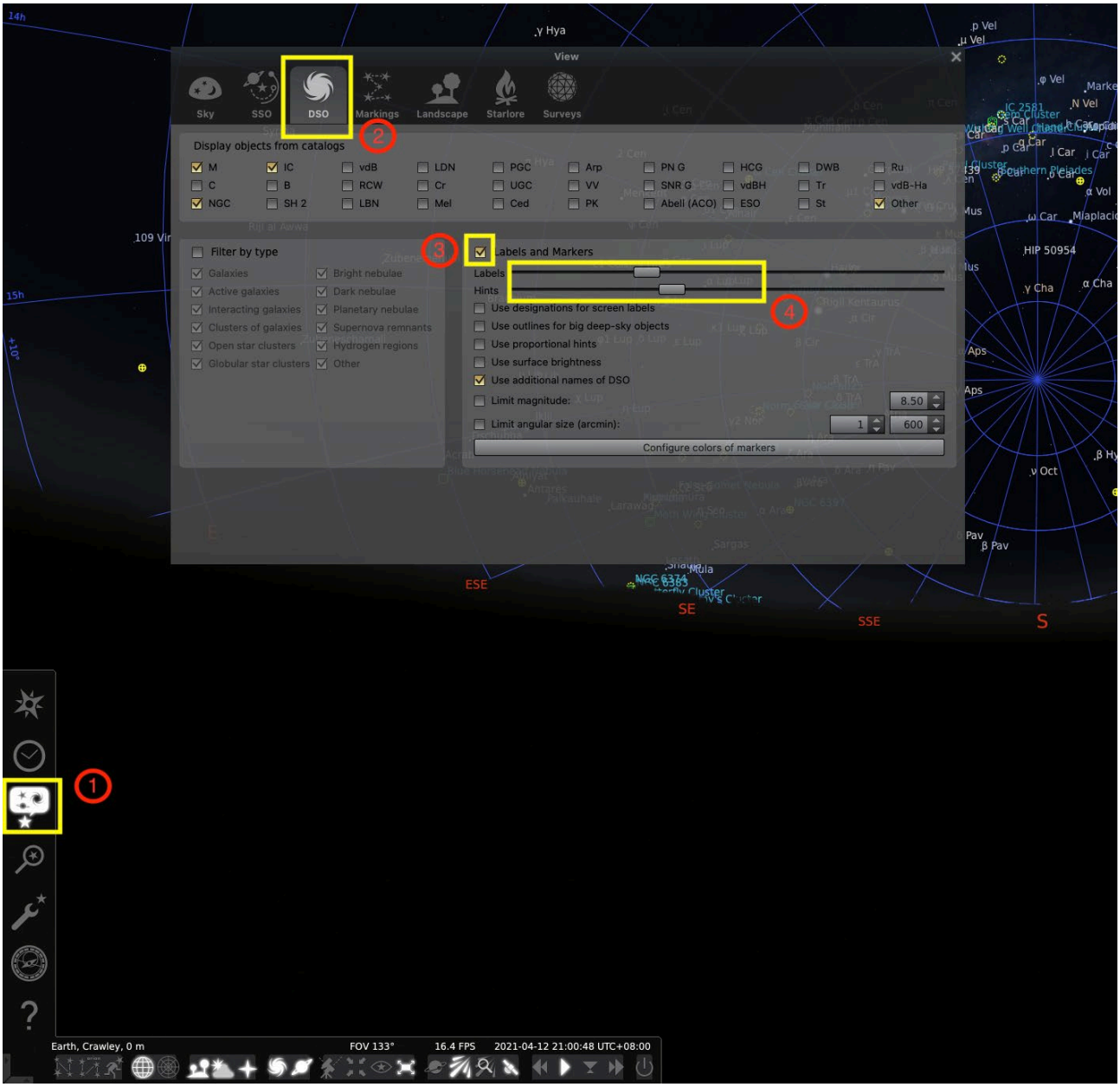
The density of object labels is adjusted with sliders.



Deep sky objects

Deep sky objects, including galaxies and nebulae can be toggled on and off with the "**n**" key.

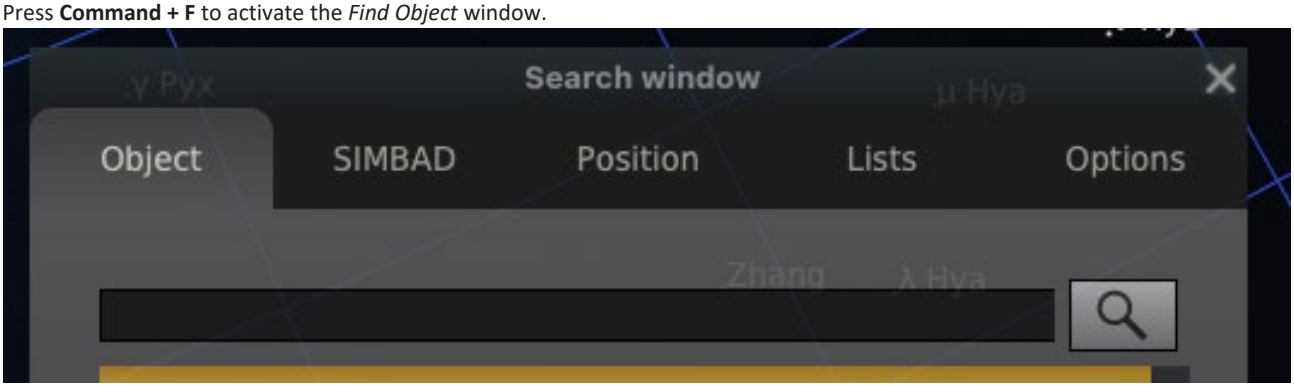
The density of displayed deep sky objects at the default 60° view is controlled by clicking on the **DSO** (deep sky objects) tab in the **Sky and Viewing Options** menu. Click to tick the **Labels and Markers** option and then use the sliders to change the density of the labels and hints.



Under normal use, object density will increase as you "zoom in" and decrease as you "zoom out".

Finding Objects

Press **Command + F** to activate the *Find Object* window.



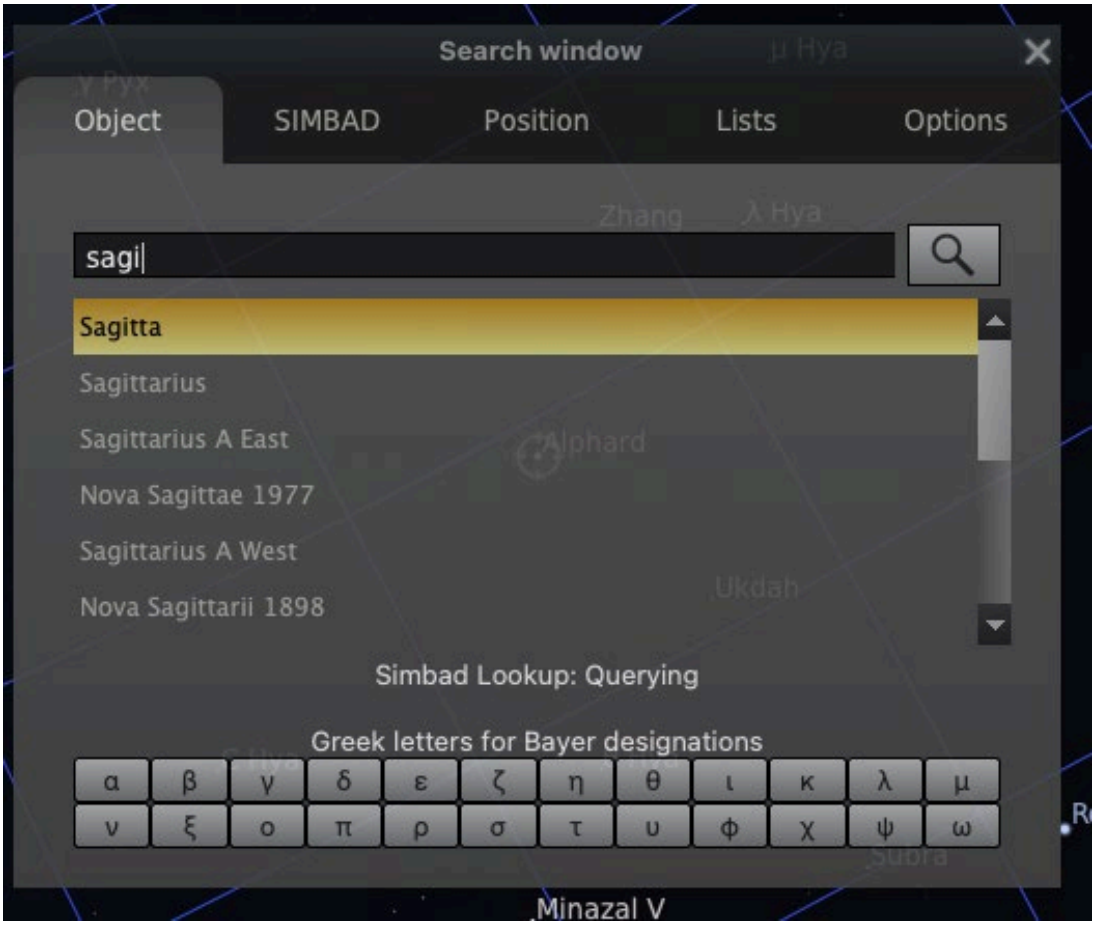
Search functions are extremely powerful in the latest version of Stellarium. Various syntaxes can be used, including:

planet names, eg Jupiter; star names, eg Achernar;

NGC objects, eg NGC 5128; Messier objects, eg M8;

common names, eg Lagoon nebula; and Constellation names,

eg Sagittarius.



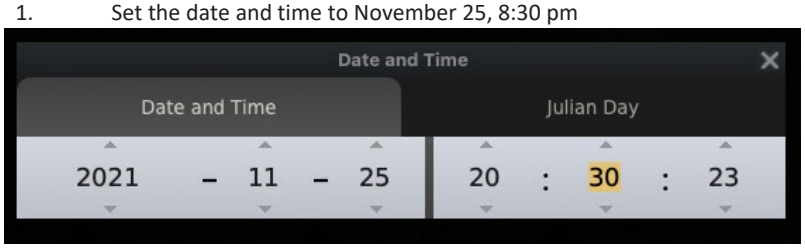
Press enter to immediately centre a 'found' object.

Press the **forward slash** key " / " to quickly zoom in on the object.

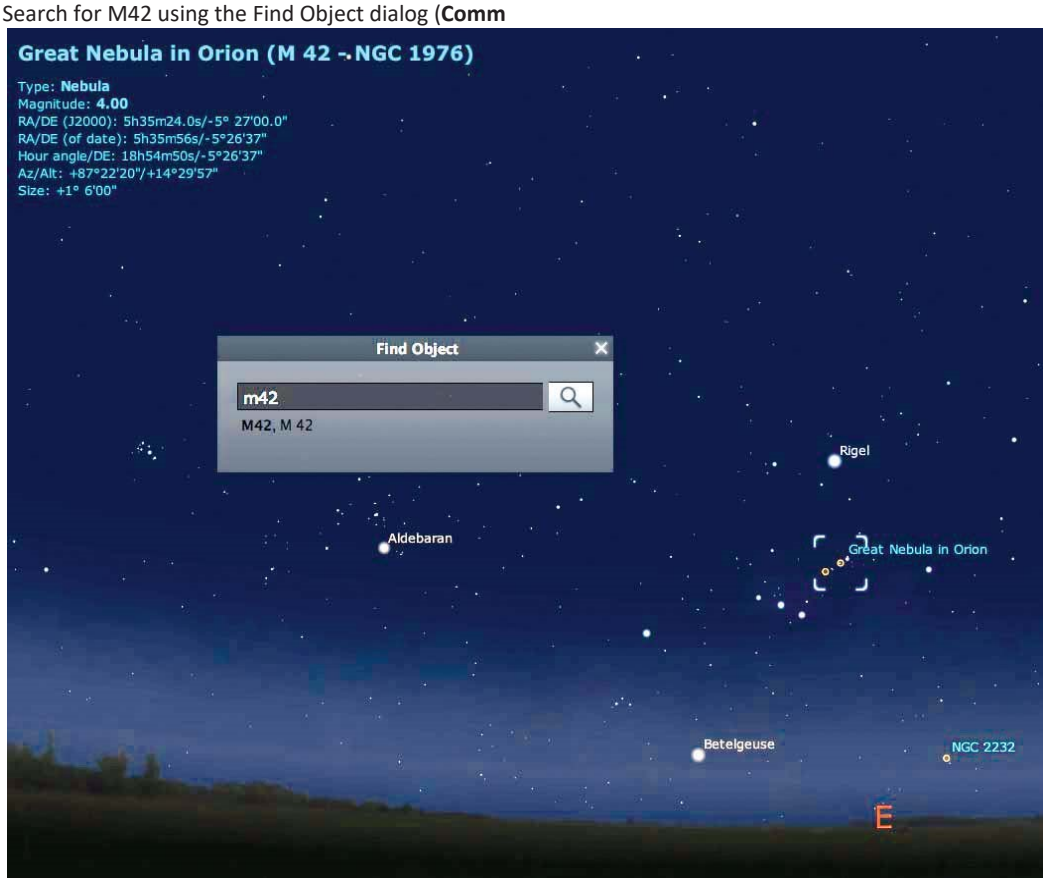
Target planning exercise 1

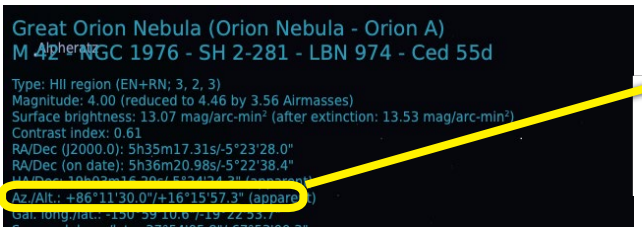
Stellarium can help find the best time to observe particular objects for any time of the year. For this exercise we want to find the best time to image M42 on November 25.

1. Set the date and time to November 25, 8:30 pm



2. Search for M42 using the Find Object dialog (**Comm**



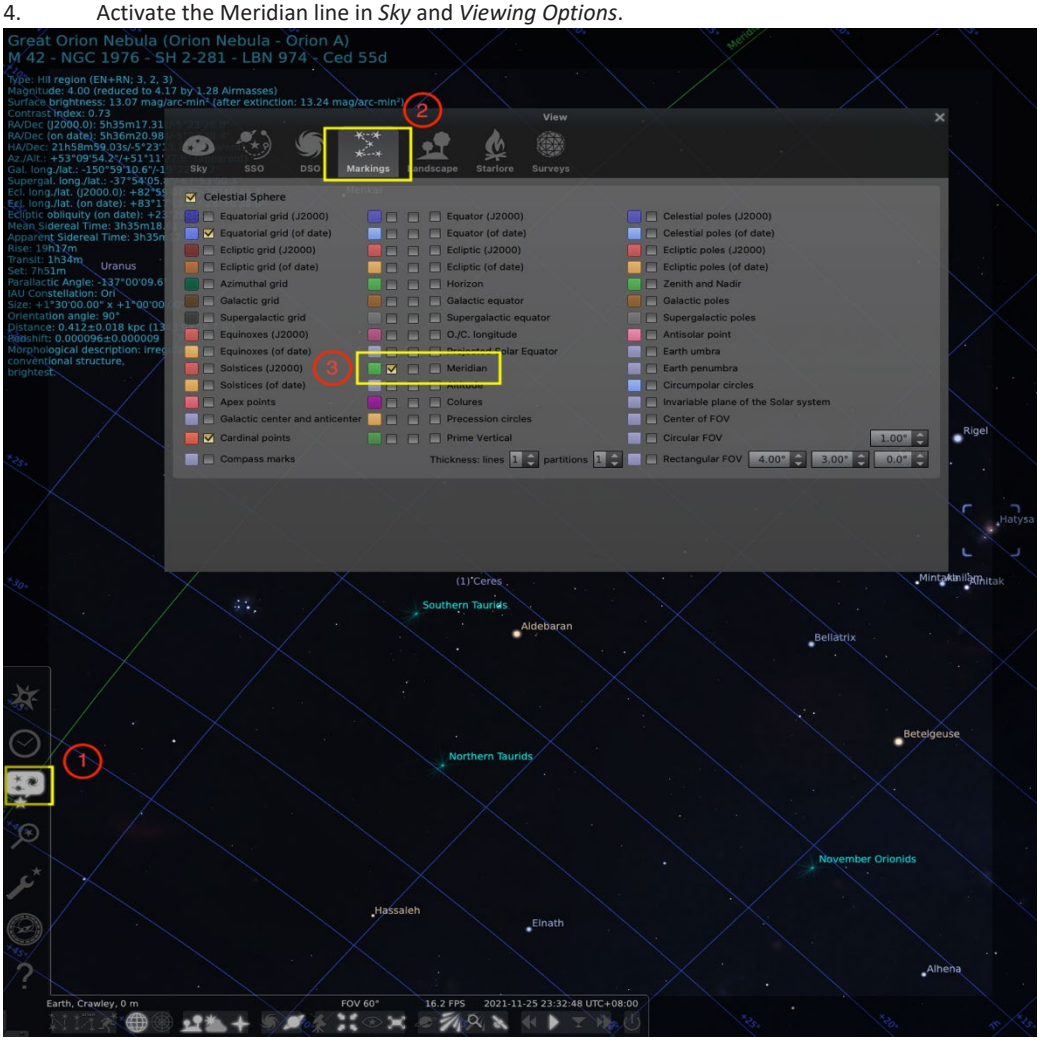


From our view of the sky and from the information at the top of the screen we see that M42 is in the east at an altitude of approximately 14° at 8:30 pm on November 25.

and + F) and press **Enter**.

3. Advancing time by three hours we see that M42 is in a much better position in the sky for viewing and imaging, as it has risen to 50° above the horizon in the north east.

4. Activate the Meridian line in *Sky* and *Viewing Options*.

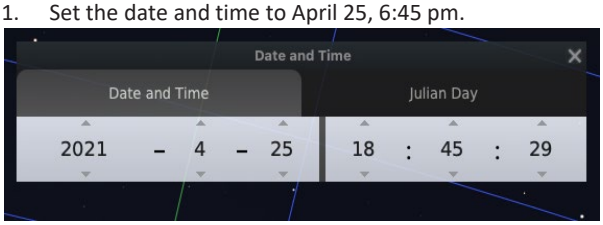


5. Advance time slowly using the “L” key. Note the time that M42 crosses the meridian. At just over 63°, this is the highest that M42 reaches when observed from this location and would be the best time to view this object with the SPIRIT telescopes.

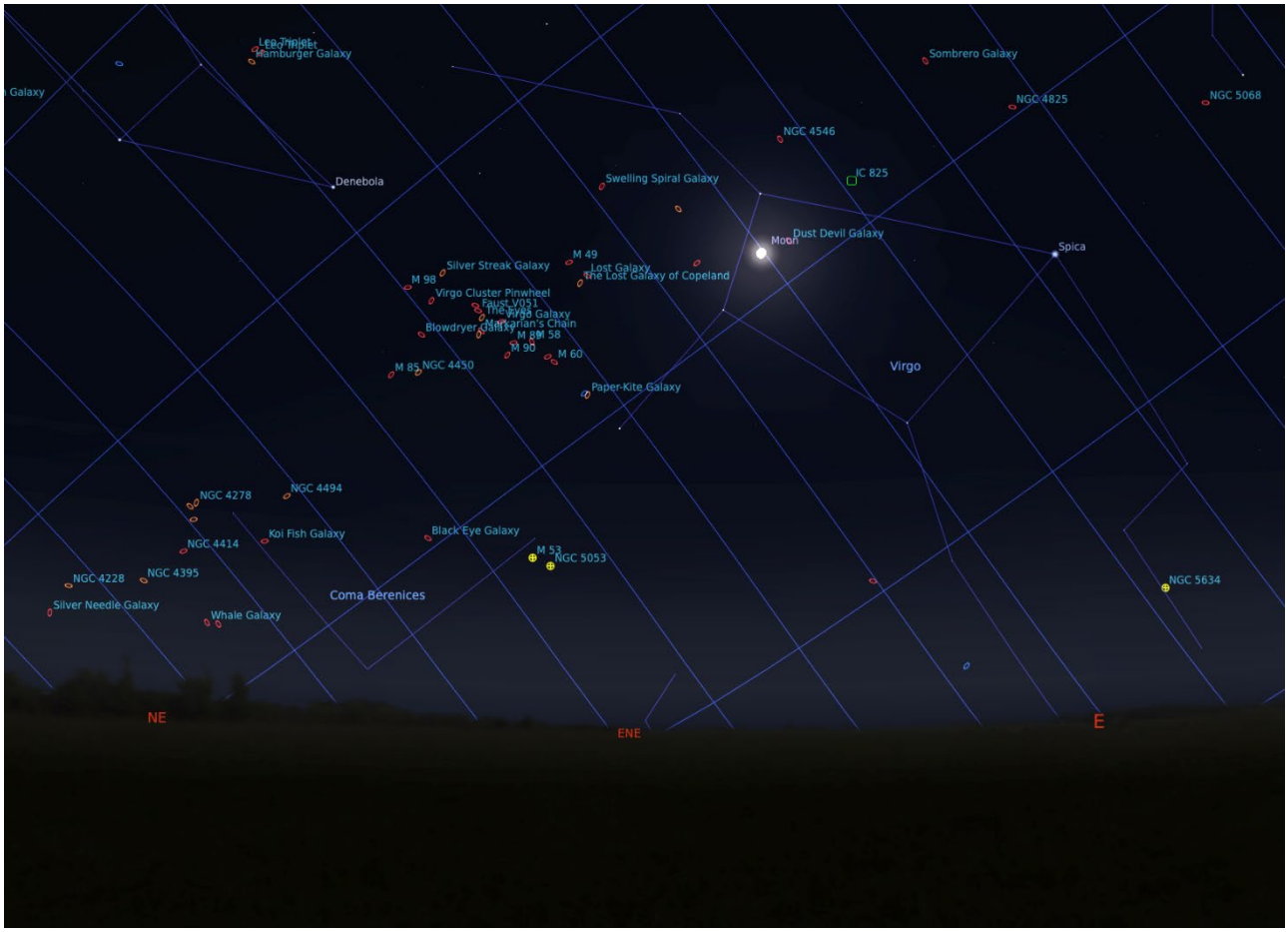
Target planning exercise 2

Stellarium can help you choose the brightest objects to observe and provide object coordinates for telescope use.

1. Set the date and time to April 25, 6:45 pm.

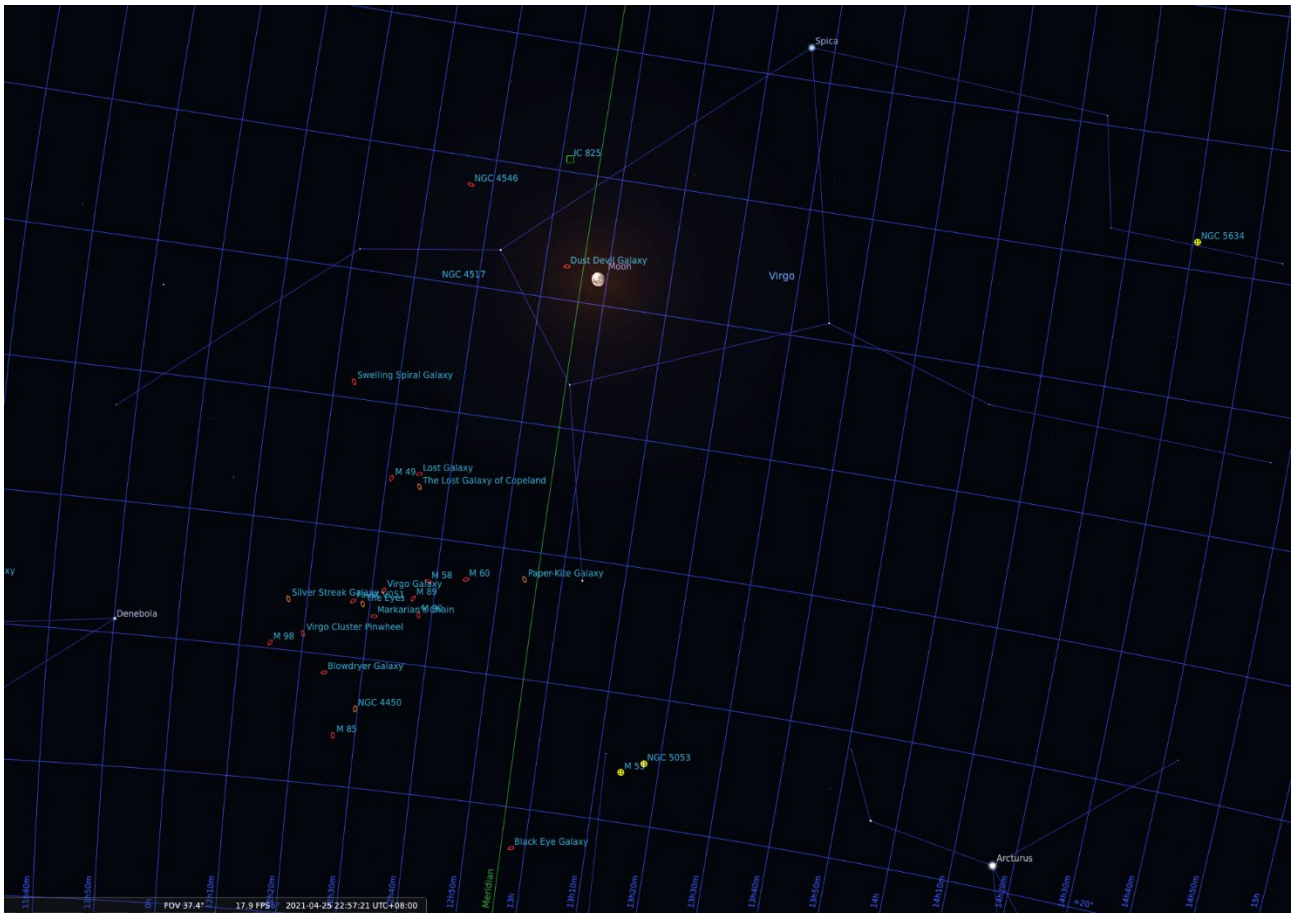


2. At this time we see that the Virgo cluster of galaxies is just under 20° above the eastern horizon.



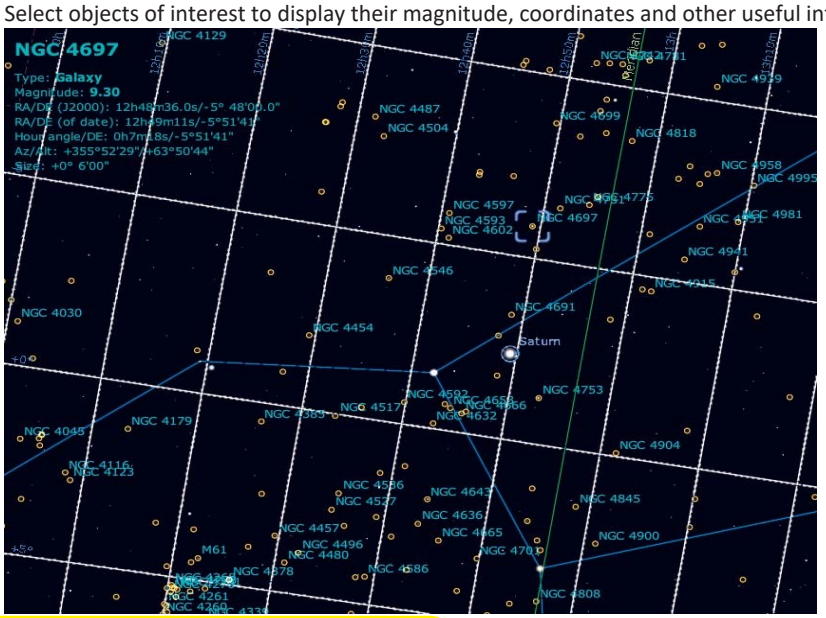
3. Advance time using the "**L**" key and watch the cluster rise higher in the sky.

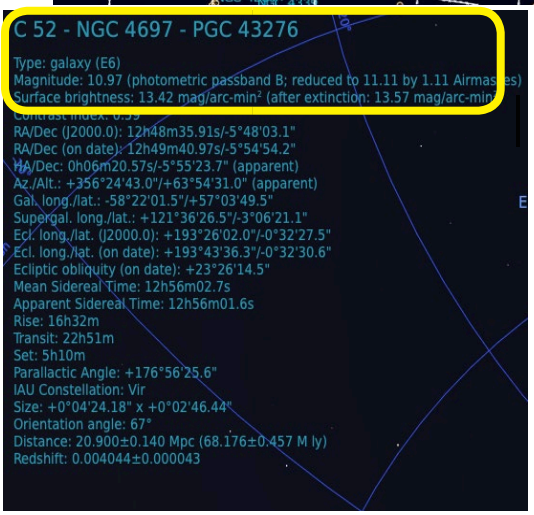
4. A t 11:00 pm there are dozens of galaxies in Virgo that are close to the Meridian. This is the optimum time for imaging.



By adjusting the time and zoom levels, it is possible to examine the motions of thousands of deep space objects moving through this altitude.

5. Select objects of interest to display their magnitude, coordinates and other useful information.





For example, NGC 4697 is a magnitude 10.97 galaxy