Texas Tech University   Department of Physics
Astronomy 2401   Observational Astronomy
Lab 1:- Using "The Sky"

Introduction:

The telescopes in the observatory are controlled by computers using the software program "The Sky". Therefore in order to be able to use the telescopes at the observatory effectively, it is necessary to have an understanding of the various features of the software. That is the purpose of today's laboratory session.

Objectives:

There are three principle objectives for this lab.

(a) To learn the various functions of the software "The Sky" that relate to controlling a telescope with this program.

(b) To become familiar with the startup procedures for operating the telescopes and putting them under the control of the computer.

(c) To become familiar with how to use the software to point a telescope at various objects in the sky.

Procedure:

Computerization of telescopes, as with many things in today's world, has revolutionized observing and enabled much greater productivity in time spent at the telescope. This is as true for the amateur as for the professional. Indeed, it can argued that computerization has played a considerable part in the blurring of the distinction between amateur and professional astronomers, with both groups using similar software and techniques, and many "amateurs" undertaking extensive research projects that 20 years ago could only be undertaken by professionals using large, expensive telescopes.

To open "**The Sky**", go to the "**AS2401**" shortcut that is on the computer desktop. All of the software you will use in the course is accessible from here. Click on "**The Sky 6".**
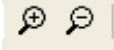
The program will now open up with a map of the sky for the current time. Depending on what is set for display, it should look something like what is shown below.
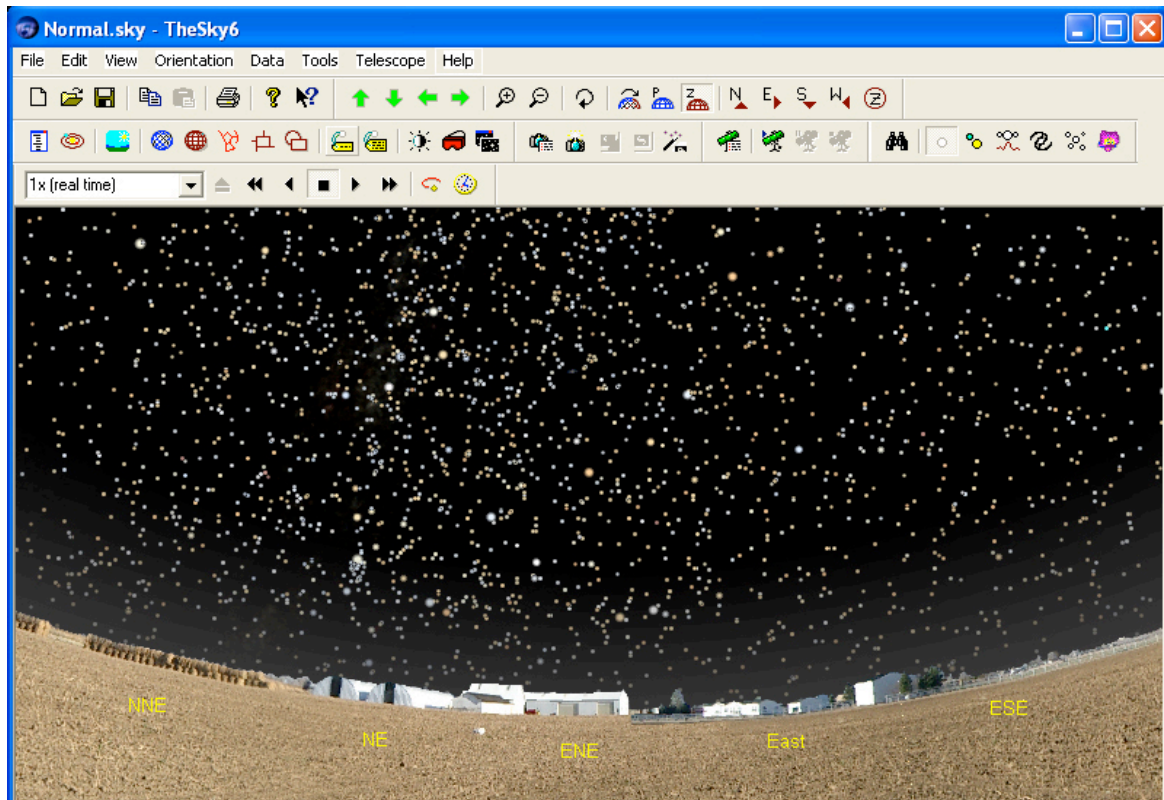
Across the top are several menus while below them are a number of shortcut buttons. For the moment, we will concentrate on the rows of buttons. Holding the cursor over each button for a few moments will result in the program displaying what each one represents.

Look first at the top row. Near the centre are 4 green arrows. These will move the display map a set amount in the direction of the arrow. Generally you will not use these in this course. Next to these to the left, is a black arrow with a question mark. This is the "help" button. You may find this helpful from time to time.

To the right of the arrows are two buttons with magnifying glasses. One has a "+" and one a "-". These are the zoom buttons: "+" for zoom in and "-" for zoom out. As you zoom in, the program will display fainter stars. A wide zoom, only the brighter stars are displayed to avoid saturating the display.

Following the zoom buttons come 4 buttons for setting the display orientation.

 The default is with the zenith being towards the top of the display. This is standard when looking at large areas of the sky such as you would if you were planning some naked eye viewing. However, for telescope viewing, it is more useful to have the celestial pole towards the top of the display. So click on the button with the blue hemisphere and the "P".

The last buttons set the direction of the display. For example "N" will point the display north; "E" will point south; and "Z" will point towards the zenith. Generally, these buttons are only used at very low zoom, when a large area of the sky is displayed.

The buttons on the second row are the ones that you will use most often when preparing for an observing session and when you are at the telescope.

Starting from the left, the first and third buttons you can ignore. The second sets the display to show the solar system. The can be useful for finding out where the planets are at any time, but we will rarely use it in this course.

The next 4 buttons toggle on/off the RA and Declination grid lines, the altitude and azimuth grid lines, the constellation figures and the constellation boundaries. Personally, I prefer to have these off as they can make the screen cluttered, but the choice is yours.

The next button, toggles on/off the any field of view outline that has been set. We will make use of this in a future lab, but for now you can just note where it is.

The next two buttons will toggle on/off object labels. These should be set on. We will discuss later how to set what labels are displayed.

Of the next buttons, only the middle one is needed. This one looks like red glasses. This is the "night-vision" mode and will set the display red. While it is not necessary when indoors, when you are at the telescope, this should **ALWAYS** be on.

The next button looks like a pair of binoculars. This is the "search" button, and you will use it frequently when locating objects. We will return to this later.

The next series of buttons toggle on/off various deep-sky objects from the display.

The final set of buttons on this row look like telescopes. These are for connecting the computer to the telescope. The first one is for setting the telescope setup. **This you should never touch**! The next establishes a link between the computer and the telescope. When this is on, the other two buttons become active. They are for disconnecting the telescope from the computer. These you will use when at the telescope.

The buttons on the third row are for animating the display. Generally you can ignore these for this course.

Now that you have some familiarity with the buttons, set on the deep-sky buttons, and the labels. Then click the "find" button. This will display a menu box with various sub-menus of different types of objects.

Click on the "+" for "Solar System" and highlight "Jupiter". Then click "Find". **Do not click "center and frame"!** This will bring up a new box with information about the planet Jupiter. There are four menus in this box. "General" shows basic information about the planet: how bright it is; where it is in the sky; what time it rises and sets; and so on. From this table, write down the RA and Dec for Jupiter, using the 2000 coordinates and the rise and set times.

RA _____ Dec _____ Rise _____ Set _____
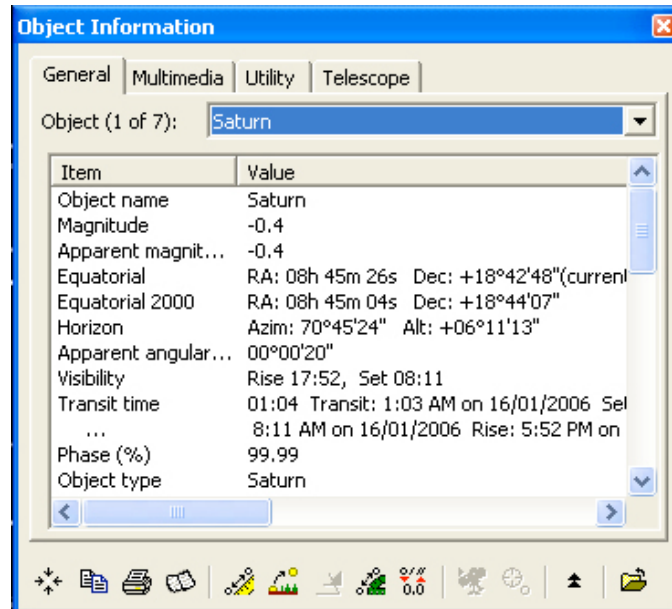
"Multimedia" shows photographs of the planet, while "Utility" is for changing how the planet is displayed and for changing the viewing location. These should not be changed.

"Telescope" is used when the telescope is connected to the computer. The main button on this page is the "sync" button. When the object is visible in the telescope, clicking on this button will update the pointing of the telescope. **Clicking it at any other time will mean that the entire telescope setup procedure will have to be redone. It should therefore be used with care!**

At the bottom of the box are several buttons, two of which are important.
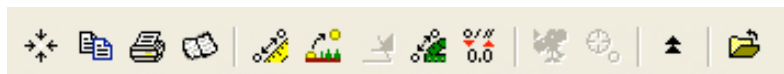
The first is on the left. Clicking on this button will set the object in the centre of the display. Do this so that Jupiter is centered. Zoom in until the display shows the moons of Jupiter in addition to the planet. Clicking on any of them will bring up the relevant information box, such as you had for Jupiter.

The second important button is active when the computer is connected to the telescope. It looks like a small telescope. Clicking on this button will command the telescope to move to the object. You will use this **frequently** at the telescope!

Now go back to the "Find" button and bring up the "Find" box again. This time click on the "+" for "Non-stellar". This will bring up a list of catalogs of non-stellar objects. Choose the one labeled "Messier" and click on the "+" beside it. This will display the list of objects in Messier's catalog.
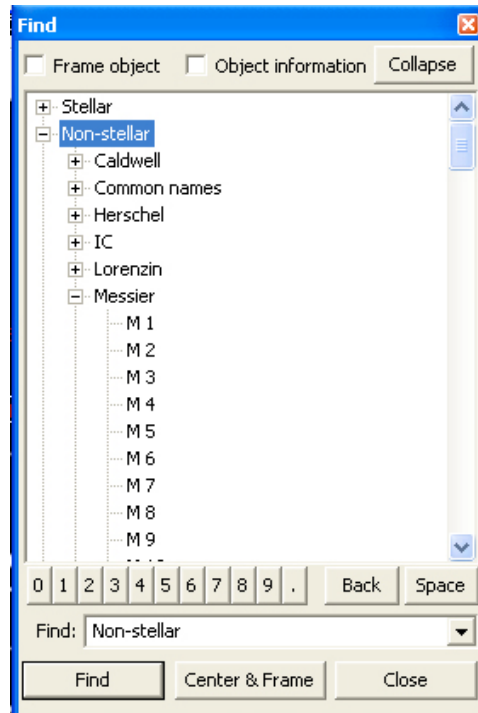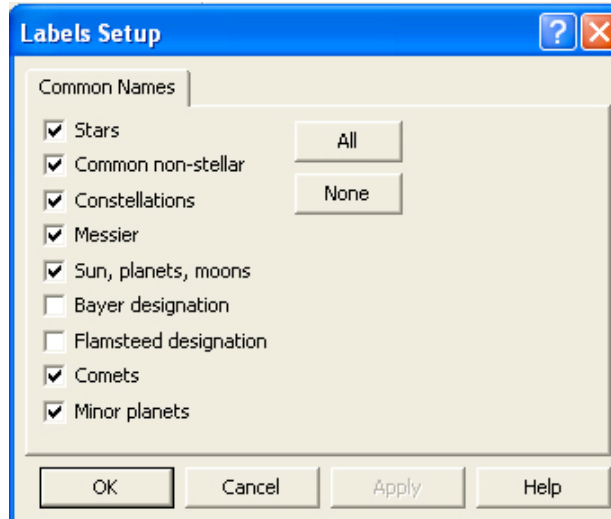
Highlight "M1" and then click on "Find". Now centre the display on this object. From the information box, write down the 2000 position for this object and its NGC number.

RA _____ Dec _____ NGC _____

Once you have done this, go to the drop-down menus at the top of the screen. Go to "View", "Labels", "Setup".
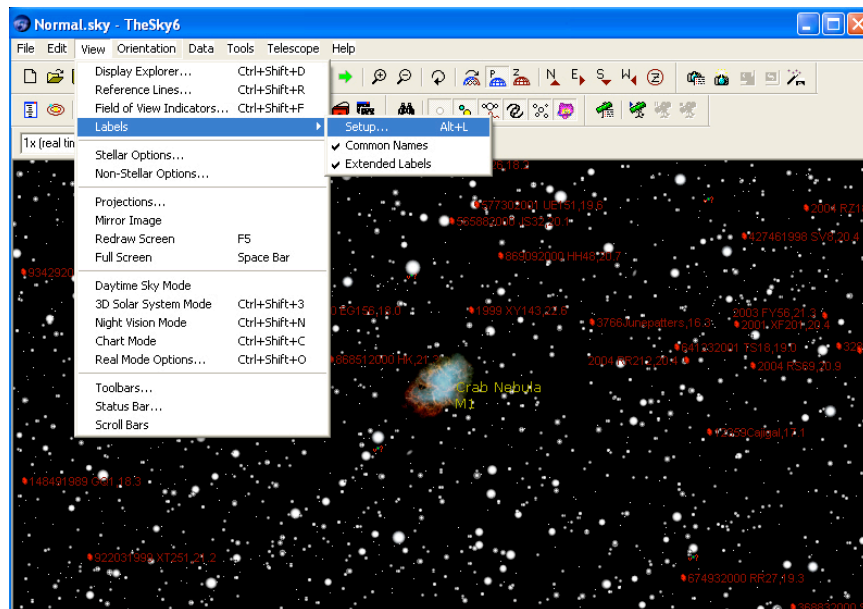
In the box displayed make sure that the following boxes are ticked.

Once you have these boxes ticked, click "Apply". Now go back to the main display, and if you have not already done so, click both "Label" buttons. Now you will see the common name for M1. What is it? _____

Now find and centre M4. What type of object is this? _____

Write down the 2000 position and the rise and set times for M4. Would this be a suitable object to observe this semester? _____

RA _____ Dec _____ Rise _____ Set _____

Now go back to "Find" and this time click on the "+" beside "Common names". Scroll down the list until you find the "**Eskimo Nebula**". (**Not the "Baby Eskimo"!**) Highlight this and then click "Find" and centre the display on this object. From the information given, what is the NGC number of this object? _____

What type of object is it? _____

Now locate and centre NGC 2903. To find it, you can either scroll done the list of NGC numbers, or simply type "NGC 2903" into the box at the bottom of the "Find" box.

What type of object is this? _____

In which constellation is it located? _____

To finish off the lab, locate 2 stars, one from the "**Common names**" list and one from the "**Bayer**" list, four non-stellar objects, one each from the **Messier, NGC, IC,** and "**Common names**" lists, and one solar system object. Centre each of these objects and

write down the name of the object, its position, (2000), its magnitude and the rise and set times. For the non-stellar objects, also include what type of object it is.

Star 1
Name _____   RA _____   Dec _____

Magnitude _____   Rise _____   Set _____

Star 2
Name _____   RA _____   Dec _____

Magnitude _____   Rise _____   Set _____

Non-stellar 1
Name _____   RA _____   Dec _____   Type _____

Magnitude _____   Rise _____   Set _____

Non-stellar 2
Name _____   RA _____   Dec _____   Type _____

Magnitude _____   Rise _____   Set _____

Non-stellar 3
Name _____   RA _____   Dec _____   Type _____

Magnitude _____   Rise _____   Set _____

Non-stellar 4
Name _____   RA _____   Dec _____   Type _____

Magnitude _____   Rise _____   Set _____

Solar system object
Name _____   RA _____   Dec _____

Magnitude _____   Rise _____   Set _____