New Horizon Map (File Menu)

Create a new horizon map window, using the stored default settings. If the "auto redraw" option is turned on, the map will be computed and displayed automatically as soon as the window has been created.

New Area Map (File Menu)

Create a new Area map window, using the stored default values. Selecting this option displays the Area Map View dialog. If the dialog is exited with the OK button, the map will be created at the specified coordinates. If the dialog is exited with the Cancel button, the operation is aborted and a new map will not be created.

Open (File Menu)

Read in and display an image file. Selecting this option invokes a standard file selector, from which the image file can be selected. The image formats supported by the current version of SkyMap are:

GIF	Graphics Interchange Format files, both GIF87a and GIF89a variants.
BMP, DIB, RLE	Windows bitmap files.
IMG, IMQ, IBG	NASA PDS files.

Close (File Menu)

Close the current window.

Save Defaults (File Menu)

Save the current map settings as the default values to be used for creating a new map of the current type. You will be asked to confirm that the settings should be saved.

Preferences (File Menu)

Display the Global Preferences Dialog, to set up global program options.

Zoom In (View Menu)

Zoom in on the map. The map is zoomed around the centre of the image currently visible in the window.

Zoom Out (View Menu)

Zoom out on the map. The map is zoomed around the centre of the image currently visible in the window.

Show (View Menu)

Display the Visible Objects Dialog. This dialog provides a rapid means of controlling the visibility of the different types of object which can be displayed on the map.

Select North View

Set the map view to North, preserving the current altitude and field of view.

Select East View

Set the map view to East, preserving the current altitude and field of view.

Select South View

Set the map view to South, preserving the current altitude and field of view.

Select West View

Set the map view to West, preserving the current altitude and field of view.

Toggle Star Label Display

Switch the display of star labels on or off. Star labels are displayed according to the settings in the Star Labelling Options dialog.

Toggle Constellation Figure Display

Switch the display of constellation figures on or off. Constellation figures are lines connecting the bright stars in a constellation, and can provide a useful way of memorising the constellations.

Toggle Constellation Name Display

Switch the display of constellation names on or off.

Toggle Constellation Boundary Display

Switch the display of official IAU constellation boundary lines on or off.

Toggle Comet Display

Switch the display of comets on or off. The comets to be displayed are selected using the **Comet...** item on the **Options** menu.

Toggle RNGC Object Display

Switch the display of deep sky objects on or off. The type of deep sky objects to be displayed are selected using the **Comets...** item on the **Options** menu.

Toggle Altitude/Azimuth Grid Display

Switch the altitude/azimuth grid on or off. The way the grid is displayed is controlled using the **Alt/Az Labels...** item on the **Options** menu.

Toggle Right Ascension/Declination Grid Display

Switch the RA/Dec grid on or off.

Draw Map (View Menu)

If automatic redraw mode is turned off, this option causes an invalid map to be recalculated using the current settings. The symbol "INV" (Invalid) will be displayed on the status bar when the map needs recalculating.

See also:
Auto Redraw

Flip Map Vertically (View Menu)

Invert the map top-to-bottom. This command can be used to correctly align the map display with the inversions and reflections of the image introduced by the optics of your telescope.

Flip Map Horizontally (View Menu)

Reflect the map left-to-right. This command can be used to correctly align the map display with the inversions and reflections of the image introduced by the optics of your telescope.

Set Map Viewpoint (Options Menu)

Set up the viewpoint of the map. Selecting this option displays the Field of View dialog.

Stars (Options Menu)

Display the Stars Dialog. This determines the magnitude of the faintest star which will appear on the map, and also controls the size of the star images.

Star Labels (Options Menu)

Display the star labels dialog. This controls which stars on the map will be labelled (if star labels are turned on), and also what type of label (proper name, Bayer letter, or Flamsteed number) a star is labelled with.

RNGC Options (Options Menu)

Display the RNGC Options Dialog. This controls what type of deep sky objects will be displayed on the map (if RNGC object display is turned on).

Comets (Options Menu)

Display the Comet Selection Dialog. This determines which comets in the comet catalogue are displayed on the map, and also provides maintenance facilities for the catalogue, allowing the user to add, remove and edit comet details.

Alt/Az Labels (Options Menu)

Display the Altitude/Azimuth Label Options Dialog. This determines the way in which the altitude and azimuth scales of the Horizon map are labelled.

Screen Colours (Options Menu)

Displays the screen colour editing dialog. This allows the user to edit the colour of the various objects appearing on the screen map display. These colour settings are automatically saved between runs of the program.

Printer Colours (Options Menu)

Displays the printer colour editing dialog. This allows the user to edit the colour of the various objects appearing on a colour printed map. These colour settings are automatically saved between runs of the program.

High Precision (Options Menu)

Switches high precision calculation mode on or off. When high precision mode is switched on (ie, when a check mark appears alongside the menu), the positions of all objects displayed on the map are rigorously corrected for precession, proper motion (in the case of stars), aberration, nutation, and refraction. When high precision mode is switched off, positions are only corrected for refraction.

The only situation in which high precision mode becomes important is when displaying maps for the distant past or future, where precession has an important influence. As a rough guide, high precision mode should be switched on for any map drawn for a date more than 50 years either side of 2000AD.

Auto Redraw (Options Menu)

Switches "auto redraw" mode on or off. When switched on (ie, when a check mark appears alongside the menu item), the map is automatically recalculated following any change which necessitates this. If you are running SkyMap on a slow computer - specifically, on a computer without a maths co-processor - you may wish to switch this option off to allow you to make changes to the map settings more rapidly.

If auto redraw mode is switched off and the map settings change in a way that necessitates a recalculation, the letters "INV" (short for "Invalid") will appear on the status bar to inform you of the situation. Once all required changes have been made, the map can then be recalculated using the **Draw** item on the **View** menu, or the equivalent tool bar button or keyboard shortcut.

Search for a Planet (Search Menu)

Search for a planet, or the Sun or Moon. A dialog box containing the names of the planets will be displayed. The action of this command varies slightly with the map type:

On an Area map, the map will be centred on the location of the planet.

On a Horizon map, the map will be centred on the location of the planet if it is currently above the horizon using the current location and time settings. If the planet is not currently visible, a message will be displayed and the current viewpoint left unchanged.

Search for a Constellation (Search Menu)

Search for a constellation. A dialog box containing the names of the constellations will be displayed. The action of this command varies slightly with the map type:

On an Area map, the map will be centred on the location of the constellation name.

On a Horizon map, the map will be centred on the location of the constellation name if it is currently above the horizon using the current location and time settings. If the constellation name is not currently visible, a message will be displayed and the current viewpoint left unchanged.

Search for a Star by Proper Name (Search Menu)

Search for a star by specifying its "proper name". A proper name is a name such as "Polaris", "Betelgeuse", "Aldebaran", etc. Only a few stars on the map will have a proper name; mainly the brighter stars.

On a Horizon map, this command will display a dialog box listing all the proper names of stars that are currently above the horizon. Selecting a name will centre the map on that star.

On an Area map, the command displays a dialog box listing all the proper names in the star database. Selecting a name will centre the map on that star.

Search for a Star by Bayer Letter (Search Menu)

Search for a star by specifying its Bayer letter. Bayer letters are Greek letters which label the brightest stars in a constellation. In the majority of cases, the stars are labelled roughly in decreasing order of brightness; the brightest star being "α", the second brightest "β", and so on, although there are exceptions to this. The stars of Ursa Major, for example, are labelled in sequence along the shape of the "Plough" or "Big Dipper". In some cases, a number is added to the letter. The stars forming Orion's "shield", for example, are labelled "π1", "π2", etc.

When this command is selected, a dialog box is displayed allowing the entry of a Greek letter, a qualifying number, and a constellation. The number zero should always be used where no number is required.

In the case of a Horizon map, the stars currently above the horizon are searched for a match with the specified star. In the case of an Area map, the entire star database is searched. If a match is found, the map is centred on the star; otherwise a message is displayed.

Search for a Star by Flamsteed Number (Search Menu)

Search for a star by specifying its Flamsteed number. Flamsteed numbers are numbers which label the brighter stars in each constellation. Today they are normally used in cases where a fairly star does not have a Bayer letter, since they normally extend to a fainter magnitude limit than that permitted by the 24 letters of the Greek alphabet used in the Bayer labelling scheme.

When this command is selected, a dialog box is displayed allowing the entry of a Flamsteed number and a constellation.

In the case of a Horizon map, the stars currently above the horizon are searched for a match with the specified star. In the case of an Area map, the entire star database is searched. If a match is found, the map is centred on the star; otherwise a message is displayed.

Search for a Star by SAO Catalogue Number (Search Menu)

Search for a star by specifying its SAO catalogue number. This is rarely useful, but is supplied for completeness. When this command is selected, a dialog appears allowing the entry of an SAO catalogue number.

In the case of a Horizon map, the stars currently above the horizon are searched for a match with the specified star. In the case of an Area map, the entire star database is searched. If a match is found, the map is centred on the star; otherwise a message is displayed.

Search for a Deep Sky Object by Popular Name (Search Menu)

Search for a deep sky object by its "popular name". Such names include "Orion Nebula", "Whirlpool Galaxy", "Ring Nebula", etc.

Selecting this option displays a dialog box of names. In the case of a Horizon map, the list contains the names of all objects currently above the horizon; in the case of an Area map, it contains all the names in the database. Selecting a name centres the map on the location of the object.

Note that the object will not necessarily be visible on the map after this command is used. The command simply centres the map on the *location* of the object - it does not automatically display it. You may have to use the **RNGC Options...** item on the **Options** menu, and possibly the **RNGC** tool bar button to actually see the object!

Search for a Deep Sky Object by Messier Number (Search Menu)

Search for an object in the Messier catalogue. When selected, a dialog will appear in which a Messier catalogue number can be entered. In the case of a Horizon map, the list of objects currently above the horizon will be searched for the object; in the case of an Area map, the entire database will be searched. If located, the map will be centred on the location of the object. Note, however, that:

1. The object will not necessarily be visible on the map after this command is used. The command simply centres the map on the *location* of the object - it does not automatically display it. You may have to use the **RNGC Options...** item on the **Options** menu, and possibly the **RNGC** tool bar button to actually see the object!

2. The program uses the RNGC database as its data source, and not all Messier objects are in the RNGC catalogue. The four "missing" Messier objects are:

M24	A local brightening of the Milky Way.
M25	The open cluster IC 4725
M40	The wide double star Winneke 4
M45	The Pleiades

Search for a Deep Sky Object by RNGC Number (Search Menu)

Search for an object by its RNGC catalogue number. When selected, a dialog will appear in which an RNGCr catalogue number can be entered. In the case of a Horizon map, the list of objects currently above the horizon will be searched for the object; in the case of an Area map, the entire database will be searched. If located, the map will be centred on the location of the object.

Note, however, that the object will not necessarily be visible on the map after this command is used. The command simply centres the map on the *location* of the object - it does not automatically display it. You may have to use the **RNGC Options...** item on the **Options** menu, and possibly the **RNGC** tool bar button to actually see the object!

Search for a Comet (Search Menu)

Search for a comet on the map. When this command is selected, a dialog box with a list of comets will be displayed. In the case of an Area map, the list will contain the names of all the currently active comets; for a Horizon map it will contain those active comets which are currently above the horizon.

Selecting a name from the list will centre the map on the comet's location.

Setting the Date and Time of Observation (Options Menu)

To set the time and date for which the map is drawn, select the **Time...** item from the **Options** menu. The Observation Time Dialog will be displayed.

For the horizon map, changing the time of observation obviously alters the map view completely. For the area map, the main effect is to alter the positions of objects in the solar system.

Shortcut: 

Notes:

1. The observation time is taken to be in the observer's local time zone. SkyMap converts the entered time to UTC by applying the corrections for the observer's time zone and (if applicable) for daylight saving time.

2. If the date is on or after 0h on October 15th, 1582, it is assumed to be in the Gregorian calendar. If before this, the Julian calendar is used.

Setting the Location of the Observer (Options Menu)

To set up the position of the observer, together with associated information such as time zone information, weather conditions, etc, select the **Observer...** item from the **Options** menu. The Observation Location Dialog will be displayed.

For the horizon map, changing the observer's location obviously alters the map view completely. For the area map, the only effect is to slightly alter the apparent positions of objects in the solar system, most notably the Moon, due to the effects of parallax.

Shortcut: 

1, 2, 3, 4 command (File menu)

Use the numbers and filenames listed at the bottom of the File menu to open the last four pictures you viewed. Choose the number that corresponds with the picture you want to open.

Exit (File Menu)

Use this command to end your SkyMap session. You can also use the Close command on the application Control menu.

Shortcuts

Mouse: Double-click the application's Control menu button.

Keys: ALT+F4

Toolbar (View menu)

Use this command to display and hide the Toolbar, which includes buttons for some of the most common commands in SkyMap. A check mark appears next to the menu item when the Toolbar is displayed.

See Toolbar for help on using the toolbar.

Toolbar

The toolbar is displayed across the top of the application window, below the menu bar. The toolbar provides quick mouse access to many tools used in SkyMap,

To hide or display the Toolbar, choose Toolbar from the View menu (ALT, V, T).

To obtain information about any button on the Toolbar, select context sensitive help mode by either clicking the help button:

or pressing **SHIFT+F1**, then click the button you require help on.

Status Bar (View Menu)

Use this command to display and hide the Status Bar, which describes the action to be executed by the selected menu item or depressed toolbar button, and keyboard latch state. A check mark appears next to the menu item when the Status Bar is displayed.

See Status Bar for help on using the status bar.

Status Bar

The status bar is displayed at the bottom of the SkyMap window. To display or hide the status bar, use the Status Bar command in the View menu.

The left area of the status bar describes actions of menu items as you use the arrow keys to navigate through menus. This area similarly shows messages that describe the actions of toolbar buttons as you depress them, before releasing them. If after viewing the description of the toolbar button command you wish not to execute the command, then release the mouse button while the pointer is off the toolbar button.

The right areas of the status bar indicate which of the following keys are latched down:

Indicator	Description
CAP	The Caps Lock key is latched down.
NUM	The Num Lock key is latched down.
SCRL	The Scroll Lock key is latched down.

Cascade (Window Menu)

Use this command to arrange multiple opened windows in an overlapped fashion.

Tile (Window Menu)

Use this command to arrange multiple opened windows in a non-overlapped fashion.

Tile Horizontal (Window Menu)

Use this command to vertically arrange multiple opened windows in a non-overlapped fashion.

Tile Vertical (Window Menu)

Use this command to arrange multiple opened windows side by side.

Window Arrange Icons

Use this command to arrange the icons for minimized windows at the bottom of the main window. If there is an open document window at the bottom of the main window, then some or all of the icons may not be visible because they will be underneath this document window.

1, 2, ... command (Window Menu)

SkyMap displays a list of currently open document windows at the bottom of the Window menu. A check mark appears in front of the document name of the active window. Choose a document from this list to make its window active.

Help Index (Help Menu)

Use this command to display the opening screen of Help. From the opening screen, you can jump to step-by-step instructions for using SkyMap and various types of reference information.

Once you open Help, you can click the Contents button whenever you want to return to the opening screen.

Using Help (Help Menu)

Use this command for instructions about using Help.

About SkyMap (Help Menu)

Use this command to display the copyright notice and version number of your copy of SkyMap.

Context Help

Use the Context Help command to obtain help on some portion of SkyMap. When you choose the Toolbar's Context Help button, the mouse pointer will change to an arrow and question mark. Then click somewhere in the SkyMap window, such as another Toolbar button. The Help topic will be shown for the item you clicked.

Shortcut

Keys: SHIFT+F1

Scroll Bars

Displayed at the right and bottom edges of the document window. The scroll boxes inside the scroll bars indicate your vertical and horizontal location in the document. You can use the mouse to scroll to other parts of the document.

Size (System Menu)

Use this command to display a four-headed arrow so you can size the active window with the arrow keys.

After the pointer changes to the four-headed arrow:

1. Press one of the DIRECTION keys (left, right, up, or down arrow key) to move the pointer to the border you want to move.
2. Press a DIRECTION key to move the border.
3. Press ENTER when the window is the size you want.

Note: This command is unavailable if you maximize the window.

Shortcut

Mouse: Drag the size bars at the corners or edges of the window.

Move (Control Menu)

Use this command to display a four-headed arrow so you can move the active window or dialog box with the arrow keys.

Note: This command is unavailable if you maximize the window.

Shortcut

Keys: CTRL+F7

Minimize (Application Control Menu)

Use this command to reduce the SkyMap window to an icon.

Shortcut

Mouse: Click the minimize icon  on the title bar.
Keys: ALT+F9

Maximize (System Menu)

Use this command to enlarge the active window to fill the available space.

Shortcut

Mouse: Click the maximize icon  on the title bar; or double-click the title bar.
Keys: CTRL+F10 enlarges a document window.

Next Window (Document Control Menu)

Use this command to switch to the next open document window. SkyMap determines which window is next according to the order in which you opened the windows.

Shortcut

Keys: CTRL+F6

Previous Window (Document Control Menu)

Use this command to switch to the previous open document window. SkyMap determines which window is previous according to the order in which you opened the windows.

Shortcut

Keys: SHIFT+CTRL+F6

Close (Control Menus)

Use this command to close the active window or dialog box.

Double-clicking a Control-menu box is the same as choosing the Close command.

Note: If you have multiple windows open for a single document, the Close command on the document Control menu closes only one window at a time. You can close all windows at once with the Close command on the File menu.

Shortcuts

Keys:	CTRL+F4 closes a document window
	ALT+F4 closes the <<YourType>> window or dialog box

Restore (Control Menu)

Use this command to return the active window to its size and position before you chose the Maximize or Minimize command.

Switch to (Application Control Menu)

Use this command to display a list of all open applications. Use this "Task List" to switch to or close an application on the list.

Shortcut

Keys: CTRL+ESC

Dialog Box Options

When you choose the Switch To command, you will be presented with a dialog box with the following options:

Task List

Select the application you want to switch to or close.

Switch To

Makes the selected application active.

End Task

Closes the selected application.

Cancel

Closes the Task List box.

Cascade

Arranges open applications so they overlap and you can see each title bar. This option does not affect applications reduced to icons.

Tile

Arranges open applications into windows that do not overlap. This option does not affect applications reduced to icons.

Arrange Icons

Arranges the icons of all minimized applications across the bottom of the screen.

No Help Available

No help is available for this area of the window.

No Help Available

No help is available for this message box.

Print (File Menu)

Use this command to print a document. This command presents a Print dialog box, where you may specify the range of pages to be printed, the number of copies, the destination printer, and other printer setup options.

Shortcuts

Toolbar: 
Keys: CTRL+P

Print Dialog

The following options allow you to specify how the document should be printed:

Printer

This is the active printer and printer connection. Choose the Setup option to change the printer and printer connection.

Setup

Displays a Print Setup dialog box, so you can select a printer and printer connection.

Print Range

Specify the pages you want to print:

All	Prints the entire document.
Selection	Prints the currently selected text.
Pages	Prints the range of pages you specify in the From and To boxes.

Copies

Specify the number of copies you want to print for the above page range.

Collate Copies

Prints copies in page number order, instead of separated multiple copies of each page.

Print Quality

Select the quality of the printing. Generally, lower quality printing takes less time to produce.

Print Progress Dialog

The Printing dialog box is shown during the time that SkyMap is sending output to the printer. The page number indicates the progress of the printing.

To abort printing, choose Cancel.

Print Setup (File Menu)

Use this command to select a printer and a printer connection. This command presents a Print Setup dialog box, where you specify the printer and its connection.

Print Setup Dialog

The following options allow you to select the destination printer and its connection.

Printer

Select the printer you want to use. Choose the Default Printer; or choose the Specific Printer option and select one of the current installed printers shown in the box. You install printers and configure ports using the Windows Control Panel.

Orientation

Choose Portrait or Landscape.

Paper Size

Select the size of paper that the document is to be printed on.

Paper Source

Some printers offer multiple trays for different paper sources. Specify the tray here.

Options

Displays a dialog box where you can make additional choices about printing, specific to the type of printer you have selected.

Network...

Choose this button to connect to a network location, assigning it a new drive letter.

The Horizon Map

A horizon map shows a view of the sky as seen by an observer for a selected place and time. Its main use is simply to see "what's up" at any desired time. Once the map has been calculated, the viewpoint can quickly be moved to display a view of any part of the visible sky.

Although all the information in SkyMap's databases *can* be displayed on a horizon map, it isn't a good idea to display faint stars, deep-sky objects, etc - the map just gets too crowded and takes too long to draw! The recommended way of working is to use the horizon map to get a general picture of what's visible, then to draw a detailed Area map for a specific part of the sky that you wish to observe.

For more information about drawing and using a horizon map, select one of the topics below:

Identifying Objects on a Map

To identify any object on a map:

1. Position the tip of the mouse pointer over the object, then press the *right* mouse button. A "pop-up" menu will appear underneath the mouse pointer. The exact number and wording of the items on the menu will depend on the situation, but there should be a menu item referring to the object you clicked on.

2. Select the item with the *left* mouse button, and a dialog box containing information about the object will be displayed.

For further help on the information displayed in the object description dialog box, press **F1** while the dialog is visible.

Drawing an Area Map from a Horizon Map

To draw an area map showing a detailed view of a part of the sky visible on a horizon map:

1. Position the mouse pointer over the point on the horizon map that you want to appear in the centre of the area map.

2. Press the *right* mouse button. A "pop-up" menu will appear underneath the mouse pointer.

3. Select the **Area Map...** item from the pop-up menu with the *left* mouse button. A dialog box will appear showing the right ascension and declination of the point you clicked on, with the caret in the "Field of View" box. Enter the required field of view for the area map, and click the **OK** button (or just press **Enter**). The map will be drawn.

Changing the Horizon Map Viewpoint

Once the horizon map has been displayed for the first time, the viewpoint can easily be changed to view any part of the visible sky. There are several ways to do this:

1. Use the buttons on the tool bar to change the view to North, East, South, or West. This leaves the central altitude and field of view unchanged.

2. Position the mouse pointer over the location you wish to be the centre of the new map. Press the *right* mouse button. Select **Centre** from the pop-up menu which appears.

3. From the **Options** menu select **Field of View**. Enter the central altitude and azimuth and the required field of view into the dialog box which appears.

Shortcut: 

Creating and Setting Up a Horizon Map

To create a new horizon map, select **New Horizon Map** from the **File** menu. A new map window will appear, and the default map settings will be loaded. The time and date will be read from the computer's clock. Once the map has been created, you will probably wish to configure it. This involves several steps:

Setting the Date and Time of Observation

Setting the Location of the Observer

See also:
Saving the Map Settings

Displaying Objects on the Horizon Map

A wide variety of objects can be displayed on a horizon map. These include:

Stars
Planets
Comets
Deep sky objects (galaxies, star clusters, and nebulae)
Constellation boundaries, figures, and names
A grid of altitude and azimuth lines

The objects which appear on the map are controlled in two ways:

1. The items on the **Options** menu set the display options for each type of object. For example, the **Star Labels...** item controls the way in which stars are labelled; the **Comets...** item allows the user to select which comets will be displayed. To get specific help on these options, select the item and then press **F1**.

2. The **Show...** item on the **View** menu (and the equivalent buttons on the tool bar) allows the user to select *which* items are shown on the map. A huge quantity of information is available, and having it all displayed at once would be very confusing. This menu item provides a rapid way to select exactly the desired items.

   Shortcut: 

Saving the Horizon Map Settings

When all the horizon map options have been set up to your satisfaction they can be saved for use as the default settings for all subsequent horizon maps. To do this:

1. From the **File** menu select **Save Defaults...**. A dialog box will appear asking for confirmation of the operation.
2. Click on the **Yes** button, or just press **Enter**. The current map settings will then be saved.

Searching for Objects on a Horizon Map

To search for specific objects on a horizon map use the items on the **Search** menu. Note that you can only search for objects which are currently above the horizon.

See also:
Searching for a Planet
Searching for a Constellation
Searching for a Star by Proper Name
Searching for a Star by Bayer Letter
Searching for a Star by Flamsteed Number
Searching for a Star by SAO Number
Searching for a Deep Sky Object by Popular Name
Searching for a Deep Sky Object by Messier Number
Searching for a Deep Sky Object by RNGC Number
Searching for a Comet

Observation Location Dialog

This dialog contains information about the observer. The information can be divided into several categories:

Position Information

The latitude and longitude of the observer, in degrees, minutes and seconds. This information can be obtained from a local map.

Time Zone Information

The observer's time zone, and whether or not daylight saving time is currently in effect. Note that the time information is entered in **minutes** (not hours) ahead of or behind UT (Greenwich Mean Time).

Weather Information

The observer's local weather conditions. This information is used to calculate the effects of refraction. Unless you live in a *very* extreme climate, or desire the ultimate in accuracy when calculating the apparent altitude of an object, it is quite acceptable to leave these values at their default settings.

Location List

The listbox at the bottom of the dialog can be used to select a location. If a name is selected from a list, the appropriate latitude, longitude and time zone information are automatically filled in.

You can add your own entries to the location list by editing the ASCII file `LOCATION.SKY` with any convenient editor - the DOS "edit" editor is fine for this purpose. Each line in the file consists of four items, separated with a space. These items are, in order:

Latitude in degrees, + if North, - if South.

Longitude in degrees, + if West, - if East.

Time difference from GMT in hours. + if behind GMT, - if ahead of GMT

Name to appear in the list.

An example line from the file is:

```
47.60 122.33 8 USA: Seattle WA
```

If you add the names of any large towns or cities to the list, please send me the information and I'll incorporate it into the next release of SkyMap.

Observation Time Dialog

This dialog specifies the date and time of observation. Note that the time is taken to be in the observer's local time zone, possibly corrected for the effect of daylight saving time, as specified in the Observation Location Dialog.

The **Now** button sets the date and time from the computer's clock.

The **Midnight** button leaves the date unchanged, but sets the time to 00:00:00.

Note that any date on or after October 15th, 1582, is assumed to be in the Gregorian calendar. Any date before this uses the Julian calendar.

Horizon Map View Dialog

This dialog defines the centre and field of view of the horizon map.

Map Centre

The altitude and azimuth of the centre of the map.

Field of View

The vertical field of view of the map. in degrees.

About SkyMap Dialog

This dialog displays copyright and version information about SkyMap. When requesting help, please always quote the version number shown. The picture is the spiral galaxy M74 in Pisces.

Stars Dialog

This dialog controls both the "limiting magnitude" of stars on the map (ie, the faintest star which is drawn), and also the way in which the stars are drawn.

Limiting Magnitude

The magnitude of the faintest star to be drawn on the map.

Image Display

This section of the dialog allows you to control the sizes of the "dots" used to represent the stars on the map.

The first line shows the size of the *largest* star image which will be drawn, and the magnitude it corresponds to. Any star brighter than the magnitude shown will be displayed using this dot size.

The second line shows the size of the *smallest* star image which will be drawn, and the magnitude it corresponds to. Any star fainter than the magnitude shown will be displayed using this dot size.

A star whose magnitude falls between these two limits (as the majority should do) will be drawn with a dot whose diameter is inversely proportional to the magnitude.

Star Label Options Dialog

This dialog allows you to specify which labels are used when star labelling is switched on.

Label Options

This group of check boxes specifies which label will be drawn for a star. The options are:

Proper Names, eg "Rigel".

Bayer Letters, eg "α".

Flamsteed Numbers, eg "31".

When labelling a star, this list is scanned from top to bottom. The star is labelled using the first existing label which corresponds to a checked option. Eg, if both the "Proper Names" and the "Bayer Letters" options are checked, a star which has both a proper name and a Bayer letter will be labelled with its proper name; a star with only a Bayer letter will be labelled with the letter.

Magnitude Filter

These radio buttons allow you to select whether all stars on the map are labelled, or only those stars above a specified magnitude.

Altitude/Azimuth Label Options Dialog

This dialog controls the way the altitude/azimuth grid is drawn, if it is switched on.

Azimuth Label Options:

Label with:

These radio buttons determine whether azimuth is labelled using compass points (eg, "N", "NE"), or azimuth numbers (eg 180°).

Azimuth Interval:

If the azimuth axis of the map is being labelled with azimuth numbers, these radio buttons allow you to either specify how far apart the lines are drawn, or to allow SkyMap to determine the interval automatically.

Compass Interval:

If the azimuth axis of the map is being labelled with compass points, these radio buttons allow you to either specify how far apart the lines are drawn, or to allow SkyMap to determine the interval automatically.

Draw Azimuth Lines:

Specifies whether the map has lines of azimuth drawn, or simply labelled points along the horizon line.

Altitude Label Options

Label with:

These radio buttons determine whether lines of altitude are drawn across the map, or simply "tick marks" down the centre of the map.

Altitude Interval:

These radio buttons allow you to either enter an altitude labelling interval manually, or allow SkyMap to decide the interval automatically.

Colour Settings Dialog

This dialog allows the colour of each component of the map to be set. There are two ways to edit an item:

1. Double click the mouse on the name of the item.
2. Click on the name of the item, then press the **Edit...** button.

In either case, a colour selector dialog will be displayed, allowing the colour of the item to be set. When all colours are set to your satisfaction, press the **OK** button, and all maps will be redrawn with the new colour scheme.

Notes:

1. Colour settings are *global* and apply to *all* maps. Changing the colour settings from any map alters them for all maps.

2. Colour settings are automatically saved between runs of the program.

Global Preferences Dialog

This dialog sets global application options. The set options are automatically stored when the dialog is exited.

Maximize application window:

If this option is checked, SkyMap will maximize itself - ie use the whole screen - when run on subsequent occasions. If the option is not checked, the program will run as a normal sized window.

Maximize new map window:

If this option is checked, a new map window will be created in a maximized state - ie, using the whole of SkyMap's "workspace".

Image File Location:

The directory in which SkyMap will look for image files. Refer to the images section for more information.

Startup Map Options:

Specifies what type of map, if any, is created automatically when the program is run.

RNGC Options Dialog

This dialog determines which deep sky objects will appear on the map (if display of RNGC objects is currently switched on).

Object Selection

These radio buttons control whether the whole of the RNGC catalogue is used as the data source, or only the Messier objects in the RNGC catalogue.

Object Types

These check boxes allow you to select which types of object are displayed. If the "All Objects" box is checked, all types of object will be displayed. If "All Objects" is not checked, then the remaining boxes in this section of the dialog allow you to control the specific types of object displayed.

Magnitude Limit

These radio buttons allow you to control whether all objects matching the type selection are displayed, or only those objects brighter than a specified magnitude.

Label Objects

If checked, deep sky objects will be labelled with their Messier or RNGC catalogue number. If no checked, only a symbol will be drawn on the map.

Print Options Dialog

This dialog sets the options used when printing a map.

Colour

These radio buttons select whether a colour or black and white map is printed. If the colour option is selected, the printer colour options are used when printing the map; if the black and white option is selected, all objects are printed in black.

Note that the colour option can successfully be used to print a "grey scale" map on a black and white printer. The way that colours are translated to shades of grey will vary with the printer, and some experimentation will be required to produce a good result. This can produce excellent results on a PostScript laser printer; the results on a 9-pin dot matrix printer are not quite so good!

Show Map Key

This check box controls whether or not a key is displayed at the bottom of a printed map.

Find Planet Dialog

This dialog allows you to search for a planet, or the Sun or Moon. Select from the list the name of the object you wish to find, and press **OK**.

Find Constellation Dialog

This dialog allows you to search for a constellation. Select from the list the name of the constellation you wish to find, and press **OK**.

Find Star by SAO Number Dialog

This dialog allows you to search for a star by its number in the SAO Star Catalog. Enter the catalog number in the dialog, and press **OK**.

Find Star by Proper Name Dialog

This dialog allows you to search for a star by its "proper name". Select from the list the name of the star you wish to search for, and press **OK**.

Note that, in the case of a Horizon map, the list only contains the names of stars currently above the horizon.

Find Star by Bayer Letter Dialog

This dialog allows you to search for a star by its Bayer letter. Enter the letter, optionally a qualifying number, and a constellation, then press **OK**.

Find Star by Flamsteed Number Dialog

This dialog allows you to search for a star by its Flamsteed number. Enter a number and a constellation, then press **OK**.

Find Object by Popular Name Dialog

This dialog allows you to locate a deep sky object by its "popular name" (such as "Whirlpool Galaxy", for example). Select from the list the name of the object you wish to find, and press **OK**.

Note that, for a horizon map, only the names of those objects currently above the horizon will be displayed.

Find Comet Dialog

This dialog allows you to search for a comet. Select from the list the name of the comet you wish to locate, and press **OK**.

Note that, for a horizon map, only the names of those comets currently above the horizon will be displayed.

Find Messier Object Dialog

This dialog allows you to search for a Messier object. Enter the number of the Messier object you wish to locate and press **OK**.

Find RNGC Object Dialog

This dialog allows you to search for any object in the RNGC catalogue. Enter the number of the object you wish to locate and press **OK**.

Comet Selection Options Dialog

SkyMap maintains a catalogue of comets in the data file `COMET.SKY`. Since comets are typically only visible for a few months either side of their perihelion passage (the point at which they are closest to the Sun), you will normally only want to display the positions of a few comets at any one time. This dialog allows you to select which comets from the catalogue are "active" - ie, will have their position calculated - and also provides facilities for maintaining the comet catalogue.

Most of the dialog is occupied by two listboxes:

Known Comets

This is the list of all the comets in the catalogue.

Active Comets

This is the list of comets whose positions will be calculated by SkyMap for the current map.

Selecting Comets for Display

To add a comet to the **Active** list, highlight its name in the **Known** list, and click the **Add>>** button. The name of the comet will appear in the **Known** list.

To remove a comet from the **Active** list, highlight its name in the list, and click the **<<Remove** button. The name of the comet will disappear from the **Active** list.

Note that although the name of any comet in the catalogue can be added to the **Active** list, only those comets less than a year either side of perihelion passage will actually be displayed on the map. This is due to problems in computing the position of a comet in a near-parabolic orbit a long way from perihelion.

Maintaining the Comet Catalogue

The buttons in the **Catalogue** section of the dialog allow the user to maintain the catalogue. The available options are:

Add...

Add a new comet to the catalogue. When this button is pressed, the Comet Orbit Dialog is displayed, allowing the user to enter information about the orbit of the new comet.

Edit...

Edit the orbit of the comet whose name is currently highlighted in the **Known** comets list. When this button is pressed, the Comet Orbit Dialog dialog is displayed.

Delete

Delete from the catalogue the comet whose name is currently highlighted in the **Known** comets list. You will be asked for confirmation before the comet is deleted.

Comet Orbit Dialog

This dialog allows information about a comet to be entered or edited. Information contained in the dialog is described below. The orbital elements should all be referred to epoch J2000.0.

Name:

The name of the comet. Up to 31 characters can be entered. A short period comet (one with an orbital period less than 200 years) has a name beginning with "P/".

Image:

The name of a file containing a picture of the comet. Only a file name should be entered here - the file is assumed to be located in the image file directory specified in the Global Preferences Dialog.

T:

The date of perihelion passage of the comet. The time scale used for this is Terrestrial Dynamical Time (TDT).

q:

The distance of the comet from the Sun at the time of perihelion passage, in astronomical units (AU).

e:

The eccentricity of the comet's orbit. An eccentricity of 0.0 means that the orbit is circular, whilst a value of 1.0 indicates a parabola. The majority of comets have an eccentricity between 0 and 1.

ω:

The argument of perihelion, in degrees.

Ω:

The longitude of the ascending node of the orbit, in degrees.

i:

The inclination of the orbit, in degrees.

Magnitude Parameters:

These numbers (H and G) are used to calculate the magnitude of the comet given its distance from the Earth and Sun.

Star Information Dialog

This dialog displays information about a star. The information displayed will differ from star to star, but could include the following:

SAO Catalog Number

The number of the star in the SAO catalog is displayed in the dialog's title bar.

Constellation

The name of the constellation containing the star.

Proper Name

A name, such as "Rigel", by which the star is commonly known.

Bayer Letter

The Bayer identification of the star in the constellation, such as "β Orionis".

Flamsteed Number

The Flamsteed identification of the star in the constellation, such as "19 Orionis".

Magnitude

The visual magnitude of the star.

RA, Dec

The star's right ascension and declination, for the equinox and ecliptic of date. This position includes all position corrections except refraction.

Alt, Az

The star's apparent altitude and azimuth. This position includes the effects of refraction.

Planet Information Dialog

This dialog displays information about a planet. Several "pages" of information are available, and are selected using the group of radio buttons on the right side of the dialog. The information available is described below:

Local Information

This page displays information about the planet which varies according to the observer's location. The information available is:

Altitude

The apparent altitude of the planet, including the effects of refraction.

Azimuth

The apparent azimuth of the planet.

Geocentric Information

This page displays information about the planet which is independent of the location of the observer. The items displayed are:

Right Ascension, Declination

The apparent geocentric right ascension and declination of the planet for the equinox and ecliptic of date.

Constellation

The name of the constellation the planet is currently in.

True Distance

The geometric distance between the planet and the Earth. For all objects except the Moon the figure is expressed to high accuracy in AU, and a rounded figure in Km is also given. For the Moon, the accurate distance in Km is given.

Heliocentric Information

This page displays information about the planet relative to the Sun. The items displayed are:

Ecliptic Longitude

The ecliptic longitude of the planet, for the mean equinox and ecliptic of date.

Ecliptic Latitude

The ecliptic latitude of the planet, for the mean equinox and ecliptic of date.

Radius Vector

The distance of the planet from the Sun. The distance is given to high accuracy in AU, and a rounded figure in Km is also given.

Physical Information

This page displays physical information about the planet. The items available are:

Magnitude

The apparent magnitude of the planet. Note that, in the case of Saturn, this figure does not take any account of the illumination of the ring system, so the planet will be brighter than the displayed figure.

Phase

The phase of the planet. This corresponds to the fraction of the planet's disk which is illuminated by the Sun.

Equatorial Diameter

The equatorial diameter of the planet's apparent disk, in seconds of arc.

Polar Diameter

The polar diameter of the planet's apparent disk, in seconds of arc. If this is not given, the planet's disk is assumed to be circular.

Phase Angle

The angular separation between the Sun and the Earth, as seen from the planet. This is simply an alternative method of expressing the phase of the planet.

Elongation

The angular separation between the planet and the Sun. Obviously, a small elongation indicated that the planet can only be observed shortly before sunrise or after sunset.

Light Time

The length of time it takes for light to travel from the planet to the Earth at the time of observation. This is a measure of how "old" the image of the planet we see actually is. Eg, if the light time of Saturn is 1h 25m, we are actually Saturn as it was 1h 25m ago (and, of course, in the location it occupied at that time).

RNGC Information Dialog

This dialog displays information about an RNGC object. The exact information displayed will vary from object to object, but could include the following:

Name

The dialog title bar will contain the "primary" name of the object. This will either be the Messier catalogue number (if the object is a Messier object), or the RNGC catalogue number.

RNGC Number

If information about a Messier object is being displayed, this field displays the equivalent RNGC number.

Popular Name

The "popular name" of the object, if it has one. This is a name such as "Ring Nebula", or "Whirlpool Galaxy".

Type of Object

A description of the type of object. It should be noted, however, that the RNGC was compiled well over a century ago, and not all the object classifications are accurate. For example, the Crab Nebula is described as a "planetary nebula", although we now know it to be a supernova remnant.

Description

The coded description of the object, as described by Dreyer in the RNGC. This brief description contains a great deal of useful information and, although, cryptic looking, is not hard to decypher with practice.

Constellation

The name of the constellation containing the object.

RA, Dec

The right ascension and declination of the object, for the mean equinox and ecliptic of date.

Comet Information Dialog

This dialog displays information about a comet. The items displayed are as follows:

Name

The name of the comet.

Magnitude

The visual magnitude of the comet. Note that this is only a very approximate figure - the magnitude of a comet is notoriously difficult to predict! Note also that comets are normally diffuse objects, and the magnitude refers to the *total* brightness of the comet - in order to see a 10th magnitude comet it will probably be necessary to be able to see 13th magnitude stars in the same field!

Elongation

The angular separation between the comet and the Sun, in degrees.

Distance

The distance of the comet from the Earth, in both AU and Km.

Radius Vector

The distance of the comet from the Sun, in both AU and Km.

Constellation

The constellation the comet is in.

RA, Dec

The apparent right ascension and declination of the comet for the mean equinox and ecliptic of date.

Alt, Az

The apparent altitude and azimuth of the comet.

Area Map View Dialog

This dialog sets the centre and the field of view of the area map.

Map Centre

The right ascension and declination of the centre of the map.

Field of View

The top-to-bottom field of view of the map, in degrees.

Visible Objects Dialog

This dialog provides a rapid way of selecting the objects to be displayed on the map. Each type of object has a check box on the dialog. Check the boxes corresponding to those objects you wish to display.

SkyMap v2.0 Help Index

General Information

How to use SkyMap

Using the Help System Effectively

This help system contains the complete documentation for SkyMap. The contents page contains items of general interest, which can be reached from any point in the system by pressing the **Contents** button.

Unlike a printed manual, this help system is *not* designed to be read in isolation. It is very much an *interactive* system, and is intended to be used in conjunction with the SkyMap program itself. Several ways of accessing help information are described below:

Help on using a map

To display help information about using a particular type of map, press the **F1** key whilst the map is displayed. A page of general information will be displayed, together with a list of related topics which may be of interest.

Help for a menu item or tool bar button

As you move the mouse pointer over a menu item or tool bar button, a brief description of the item will appear on the status bar at the bottom of the screen. To obtain a more extensive description of the item, press the context sensitive help button (or the keyboard equivalent, which is `SHIFT+F1`):

The mouse pointer will change to an arrow and question mark. Now, simply click the mouse over any menu item or button and a help screen will be displayed describing the use of that command or button.

Help for a dialog box

To display a help screen for a dialog box, press the **F1** key whilst the dialog box is on the screen.

Registering SkyMap

SkyMap is not free software; it is shareware and, as such, you must pay for it if you find it useful after a trial period which is not to exceed 30 days. The shareware concept is based on trust and I trust you to pay for this program if you are using it. In exchange for registering the program you will receive:

1. A registered copy of the latest version of SkyMap.
2. A much larger star database containing 88,000 stars to magnitude 8.5, compared to the 15,925 stars to magnitude 7 that this evaluation version contains. The complete SAO star catalogue of 259,000 stars to magnitude 9.5 may be purchased as an optional extra.
3. A expanded help system containing additional information and sheet shots of all the dialogs.
4. Unlimited lifetime support, and a lifetime guarantee of a full refund of your money if you ever encounter a bug in SkyMap which renders the program unusable, and which we are unable to fix.
5. The right to purchase upgrades to future registered versions of SkyMap for a reduced price.

For complete information about registering SkyMap please see the separate registration form included with the SkyMap package.

See also:

ASP Ombudsman Statement

ASP Ombudsman Statement

This program is produced by a member of the Association of Shareware Professionals (ASP). ASP wants to make sure that the shareware principle works for you. If you are unable to resolve a shareware-related problem with an ASP member by contacting the member directly, ASP may be able to help. The ASP Ombudsman can help you resolve a dispute or problem with an ASP member, but does not provide technical support for members' products. Please write to the ASP Ombudsman at 545 Grover Road, Muskegon, MI 49442 or send a CompuServe message via CompuServe Mail to ASP Ombudsman 70007,3536.

What is Shareware?

Shareware distribution gives users a chance to try software before buying it. If you try a shareware program and continue using it, you are expected to register. Individual programs differ on details -- some request registration while others require it, some specify a maximum trial period. With registration, you get anything from the simple right to continue using the software to an updated program with printed manual.

Copyright laws apply to both Shareware and commercial software, and the copyright holder retains all rights, with a few specific exceptions as stated below. Shareware authors are accomplished programmers, just like commercial authors, and the programs are of comparable quality. (In both cases, there are good programs and bad ones!) The main difference is in the method of distribution. The author specifically grants the right to copy and distribute the software, either to all and sundry or to a specific group. For example, some authors require written permission before a commercial disk vendor may copy their Shareware.

Shareware is a distribution method, not a type of software. You should find software that suits your needs and pocketbook, whether it's commercial or Shareware. The Shareware system makes fitting your needs easier, because you can try before you buy. And because the overhead is low, prices are low also. Shareware has the ultimate money-back guarantee -- if you don't use the product, you don't pay for it!

Contacting the Author

If you have any suggestions about ways in which SkyMap could be improved (and I'm sure there are many!), or you have and questions you'd like answered, feel free to contact the author by any of the following methods:

Electronic mail

I can be contacted at either of the following addresses:

CompuServe: 100113,1140
Internet: chris@chrism.demon.co.uk

Post

You can send me a letter at the following address:

Chris Marriott
9, Severn Road
Culcheth
Cheshire WA3 5ED
UK

Support in the USA and Canada

SkyMap is exclusively distributed in the United States and Canada by:

Shareable Software International Inc
PO Box 240357
Apple Valley MN 55124
USA

If you have any questions about the software, you may contact SSI at this address or by phone, fax or e-mail at:

Phone: 612-322 5868
FAX: 612-322 5871
Orderline 800-622 2793
CompuServe: 76226,2652
Internet: 76226.2652@compuserve.com

Introduction

SkyMap is a "Planetarium" program for Microsoft Windows version 3.1 or later. It will display a map of the sky as seen from any point on Earth for any date between 4000BC and 8000AD. Two different types of map can be drawn - a "Horizon" map showing the observer's local horizon, and a "Sky Area" map showing a detailed view of a small area of the sky. You can get information about any object displayed on the map by simply pointing at the object with the mouse and clicking the button. The display of additional information, such as constellation figures or star labels can be switched on and off with a click of the mouse button, making it easy to see exactly what you want without being overwhelmed by unwanted information. When you have the map exactly as you want it, you can print it on any printer supported by Windows, in either black and white or colour.

SkyMap can also display photographic images, supplied in the form of GIF or Windows bitmap files. Thousands of such images are freely available on bulletin boards and commercial information systems such as CompuServe. This allows you to build up your own personal library of astronomical photographs which, coupled with the map displays, really helps to bring the sky to life!

There are a number of planetarium programs available today. Unlike some of these, SkyMap makes no claims of blinding calculation speeds. Instead, what SkyMap concentrates on is *accuracy*. When writing SkyMap I've used the most accurate methods available to me for all the calculations. This accuracy makes SkyMap equally suited for both the novice astronomer who just wants to know "what's that bright object up there?" and the serious amateur or professional astronomer who wants a detailed "finder chart" for a faint galaxy.

SkyMap carries out its calculations in as efficient as manner as possible, but it *never* compromises accuracy for the sake of speed. An increase in speed can always be achieved by using a faster computer! Having said all that, the speed is still reasonable; on the author's 33MHz 486-based PC for example, the horizon map, with default settings, is computed and drawn in about 5 seconds.

Whilst developing SkyMap I've received the help and encouragement of a number of people. I'd especially like to thank David Webber for many useful suggestions and help with the mathematical problems I encountered, and Steve Moshier for generously consenting to allow me to use many of his coding ideas for various astronomical calculations. I'd also like to thank my "beta testers" - Lenny Abbey, Scott Miller and especially Andy Steere for making many helpful suggestions without which SkyMap would not be nearly as good as program as it currently is, Finally, I'd like to thank Jean Meeus for writing the book "Astronomical Algorithms" (Willman-Bell, 1991), without which this program could never have existed.

Chris Marriott
27th December 1993

Data Sources and Precision

The sources of the data used by SkyMap are as follows:

Stars
Planets and Sun
Moon
RNGC Objects
Time Corrections

Stars

Smithsonian Astrophysical Observatory (SAO) star catalog, (SAO Staff, 1966), 1990 machine readable version, as supplied on NASA's National Space Science Data Center's "Selected Astronomical Catalogs, Volume 1" CD-ROM.

The SAO star catalog is a catalog of 258,997 stars to epoch J2000.0, and is reasonably complete down to magnitude 9.5 or so. The star database supplied with the shareware version of SkyMap contains all the stars from the SAO catalog down to magnitude 7 - a total of 15,925 stars. Larger databases, up to and including the full SAO catalog, are supplied to registered users of SkyMap - refer to the separate registration form for details.

SkyMap rigorously reduces star positions from mean to apparent place. The following corrections are applied:

- Precession
- Proper Motion
- Nutation
- Aberration

In the case of the Horizon Map, the apparent place is used to compute the local altitude and azimuth of the star, and the altitude is then corrected for the effects of refraction.

Planets and Sun

The positions of the Sun, and the planets Mercury to Neptune are computed using a subset of Bretagnon and Francou's VSOP87 planetary theory, as described in the book "Astronomical Algorithms", by Jean Meeus (Willman-Bell, 1991).

Spot checks against recent editions of the "Astronomical Almanac" indicate that the mean error in the computed positions of the planets is under half a second of arc, with peak errors of about one arc second. For comparison, the apparent diameter of the planet Neptune is about 2", whilst that of Jupiter is typically 35".

Moon

The position of the moon is computed from the ELP 2000-85 lunar theory (Chapront-Touzé and Chapront, 1988), which in turn is fitted to the DE200/LE200 numerical integration of the Jet Propulsion Laboratory (Standish, 1981).

Spot checks against the "Astronomical Almanac" again indicate that the mean error in the computed position of the Moon is about half an arc second, with peak errors around one arc second.

RNGC Objects

For non-stellar objects, SkyMap uses the machine-readable version of the "Revised New General Catalog of Non-stellar Astronomical Objects" (Sulentic and Tifft, 1973), or RNGC. This is a modern, revised and expanded version of the "New General Catalogue of Nebulae and Clusters of Stars" (Dreyer 1888).

Time Corrections

Because of the irregularities in the Earth's rotation, the theories of motion of astronomical bodies do not use Universal Time (GMT), but a uniform timescale called Terrestrial Dynamical Time (TDT). SkyMap uses TDT internally for all its calculation of planetary positions, etc, but obviously the user specifies the time for which a map is required in UTC (or rather, in local time, which is converted to UTC).

The difference between TDT and UT is called "delta T", and currently has a value of approximately 1 minute. It is currently increasing at a rate of somewhat less than 1 second per year. The problem is that the value of delta T can only be determined historically (typically by analyzing the motion of the Moon), and current and future values can only be estimated, whilst values for the distant past (before the advent of modern astronomy) are uncertain to the order of many minutes.

What this means in practice is that although the time of a total solar eclipse in the year 1500BC could be computed to a precision of a fraction of a second in TDT, the actual time in UT that the eclipse occurs (hence the places on Earth from which it is visible) will be uncertain to within several minutes.

The "Astronomical Almanac" lists the values of delta T for every year from 1620 onwards (currently up to 1993), and provides estimates of its value for the current time. SkyMap has all this data stored, and interpolates or extrapolates in this table to find values of delta T for dates between 1620 and 2000.

For dates beyond the year 2000, an estimate of delta T is made using the method of L V Morrison and F R Stephenson, "Sun and Planetary System" vol 96,73 eds. W Fricke, G Teleki, Reidel, Dordrecht (1982).

For dates prior to 1620, an estimate is made using the method of F R Stephenson and M A Houlden, "Atlas of Historical Eclipse Maps", Cambridge University Press (1986). They estimate the uncertainty to be 15 minutes at 1500BC.

Dedication

Respectfully dedicated to the memory of:

Francis R Scobee
Michael J Smith
Ellison S Onizuka
Judith A Resnick
Ronald E McNair
Gregory Jarvis
S Christa McAuliffe

the crew of Challenger flight STS 51-L, 28th January 1986
and to all who have lived - and died - for The Dream.

"Oh, I have slipped the surly bonds of earth,
And danced the skies on laughter-silvered wings;
Sunward I've climbed and joined the tumbling mirth
Of sun-split clouds -- and done a hundred things
You have not dreamed of -- wheeled and soared and swung
High in the sunlit silence. Hov'ring there,
I've chased the shouting wind along and flung
My eager craft through footless halls of air.
Up, up the long, delirious, burning blue
I've topped the wind-swept heights with easy grace,
Where never lark, or even eagle, flew;
And, while with silent, lifting mind I've trod
The high, untrespassed sanctity of space,
Put out my hand, and touched the face of God."

"High Flight" John G Magee Jr

The Area Map

The area map displays a detailed view of a small area of the sky on a grid of right ascension and declination. Its main use is as a "finder chart" for observing a specific part of the sky.

For more information about drawing and using an area map, select one of the topics below:

Creating and Setting Up an Area Map

An area map can be created in one of two ways:

1. Select **New Area Map** from the **File** menu. A dialog will appear allowing you to set the position of the map centre and the field of view. Press **OK** to create the map - a new window will appear and the default map settings will be loaded. The time and date will be read from the computer's clock.

2. Click the *right* mouse button over the point on a horizon map that you wish to appear at the centre of the area map, and select **Area Map...** from the menu which appears. A dialog will appear allowing you to alter the position of the map centre and to set the desired field of view. Press **OK** to create the map. A new area map window will appear and the default map settings will be loaded. The time, date, and observation location details will be copied from the horizon map.

Once the map has been created you may wish to alter the location of the observer, or the date and time for which the map is drawn:

Setting the Date and Time of Observation

Setting the Location of the Observer

See also:
Saving the Map Settings

Displaying Objects on the Area Map

A wide variety of objects can be displayed on an area map. These include:

Stars
Planets
Comets
Deep sky objects (galaxies, star clusters, and nebulae)
Constellation boundaries, figures, and names
A grid of right ascension and declination lines

The objects which appear on the map are controlled in two ways:

1. The items on the **Options** menu set the display options for each type of object. For example, the **Star Labels...** item controls the way in which stars are labelled; the **Comets...** item allows the user to select which comets will be displayed. To get specific help on these options, select the item and then press **F1**.
2. The **Show...** item on the **View** menu (and the equivalent buttons on the tool bar) allows the user to select *which* items are shown on the map. A huge quantity of information is available, and having it all displayed at once would be very confusing. This menu item provides a rapid way to select exactly the desired items.

Shortcut: 

Saving the Area Map Settings

When all the area map options have been set up to your satisfaction they can be saved for use as the default settings for all subsequent area maps. To do this:

1. From the **File** menu select **Save Defaults...**. A dialog box will appear asking for confirmation of the operation.
2. Click on the **Yes** button, or just press **Enter**. The current map settings will then be saved.

Searching for Objects on an Area Map

To search for specific objects on an area map use the items on the **Search** menu.

See also:
Searching for a Planet
Searching for a Constellation
Searching for a Star by Proper Name
Searching for a Star by Bayer Letter
Searching for a Star by Flamsteed Number
Searching for a Star by SAO Number
Searching for a Deep Sky Object by Popular Name
Searching for a Deep Sky Object by Messier Number
Searching for a Deep Sky Object by RNGC Number
Searching for a Comet

Displaying Pictures

One of the most exciting features of SkyMap is its ability to display photographic images. You can build up your own collection of pictures which, together with the maps, can really bring the sky to "life". A picture collection is also a good way to spend a cloudy night - here in England there are a *lot* of cloudy nights...

In order to display pictures, you really need a "SuperVGA" display capable of displaying 256 or more colours at once. You *can* display pictures on a standard 16-colour VGA display, but the results will probably be pretty horrible!

For more information, refer to the following topics:

Picture Formats
Displaying Pictures Manually
Displaying Pictures Automatically
Obtaining Picture Files

Picture Formats

SkyMap can currently display picture files in the following formats:

1. GIF files. GIF is probably the most popular of all image formats currently in use. The format was specifically devised to enable pictures to be easily transferred between different types of computer, and there are literally tens of thousands on pictures in GIF format available. SkyMap will display files in either GIF87a or GIF89a format, and can handle both interlaced and non-interlaced images. The only restriction is that only the first image in a file can currently be displayed. GIF files for the PC normally have an extension of "`.GIF`".

2. Windows "Bitmap" files. These are "device independent bitmap" files created for use with Microsoft Windows. They normally have an extension of "`.BMP`" (for uncompressed images) or "`.RLE`" (for compressed images).

3. NASA Planetary Data Systems (PDS) format. This is the file format used by NASA for pictures from spacecraft such as Voyager and Viking. The images normally have a resolution of 800x800 pixels, in 256 grey scales. Due to the large size of the files, CD-ROM is the primary distribution medium for these images. There are three variants of the image format in common use:

   Uncompressed full-resolution images, which normally have an extension of "`.IMG`".

   Compressed full-resolution images, with an extension of "`.IMQ`".

   Uncompressed "browse" images. These are uncompressed images containing only 1/16th of the pixels of the full images, and are intended for rapid viewing. They normally have an extension of "`.IBG`".

Displaying Pictures Manually

From the **File** menu, choose the **Open...** item. A standard file selector will be displayed, letting you select a file from any available drive or directory. Pressing the **OK** button will create a new window in which the image will be displayed.

Displaying Pictures Automatically

SkyMap has the ability to load and display pictures of certain object automatically. This can be done for all RNGC objects, as well as the planets, Moon, and Sun, and comets. In order to use this feature of the program, carry out the following steps:

1. Find a nice picture of the required object in any supported image format. You can use the "manual" method described above to look through pictures until you find one you would like to have as a "standard" picture for that particular object.
2. Copy the picture to the image directory specified in the Global Preferences Dialog , and rename the file to "`OBJECT.EXT`", where "`OBJECT`" is the name of the object, and "`.EXT`" is the "standard" extension for the image format - "`.GIF`" for GIF files and "`.BMP`" for bitmap files.

   For planets, the name used should be one of the following:

   SUN
   MOON
   MERCURY
   VENUS
   MARS
   JUPITER
   SATURN
   URANUS
   NEPTUNE
   PLUTO

   For Messier objects, the name should be "M" followed by the Messier number; "`M32`", for example.

   For other RNGC objects, the name should be "NGC" followed by the RNGC catalogue number; "`NGC1530A`", for example.

   For a comet, the file can be called anything you wish, but it must still be in the image file directory. Edit the details of the comet using the Comet Selection Dialog and enter the file name in the Comet Orbit Dialog.

3. Now, if you draw a map and click the right mouse button over an object for which a picture has been stored, you should find that a **Picture of <object>...** item appears on the resulting pop-up menu. Selecting this item will display the picture in a new window.

Notes:

When you click on a object, SkyMap will first of all look for a file with a "`.GIF`" extension, and then for a file with a "`.BMP`" extension. If files with both extensions are present, the GIF file will be displayed.

Obtaining Picture Files

There are many sources from which picture files (particularly GIF images) suitable for use with SkyMap can be obtained. Some of these are:

1. Commercial information services such as CompuServe. An especially good source are the CompuServe "Astronomy" and "Space" forums (type "GO ASTROFORUM" or "GO SPACE" from any prompt), which currently has more than 1000 astronomy and space-related GIF files available.
2. Bulletin board systems, of which there are a vast and ever-changing number. Some of these specialise in astronomy and carry a large number of GIF images.
3. Public domain and shareware software libraries.
4. If you have access to it, perhaps the best source of all are the vast resources of the Internet - a world-wide computer network. Take a look, for example at the machine "explorer.arc.nasa.gov" via anonymous FTP.
5. Finally, if you get really stuck, a collection of GIF images is available as an option for registered used of SkyMap. Refer to the registration form for details.