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To learn how to use Help, press F1.

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Commands

File Menu

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File Menu Commands

The File menu offers the following commands.

Print

Prints the sky display.

Print Preview

Allows you to see how the printed sky display will look.

Print Setup

Selects a printer and printer connection.

Exit

Exits the SkyView application.

Options Menu Commands

The Options menu offers the following commands.

Location

Allows you to set the observer's location on the earth.

Limiting Magnitude

Allows you to set the limiting magnitude of stars in the sky display.

Orientation

Allows you to set the orientation of the sky display.

Lines

Allows you to specify which lines--ecliptic, celestial equator, galactic equator, or equatorial coordinate system--should be included in the sky display.

Time Menu Commands

The Time menu offers the following commands.

Date and Time

Allows you to set the date and time, and to specify whether daylight-saving time is in effect.

Subtract 1 Hour

Subtracts one hour from the time.

Add 1 Hour

Adds one hour to the time.

Subtract 1 Day

Subtracts one day from the date.

Add 1 Day

Adds one day to the date.

Subtract 1 Week

Subtracts one week from the date.

Add 1 Week

Adds one week to the date.

Colors Menu Commands

The Colors menu offers the following commands.

Background

Allows you to set the color of the window background.

Mercury

Allows you to set the color used for the symbol that represents Mercury in the sky display.

Venus

Allows you to set the color used for the symbol that represents Venus in the sky display.

Mars

Allows you to set the color used for the symbol that represents Mars in the sky display.

Jupiter

Allows you to set the color used for the symbol that represents Jupiter in the sky display.

Saturn

Allows you to set the color used for the symbol that represents Saturn in the sky display.

Ecliptic

Allows you to set the color used for the ecliptic in the sky display.

Celestial Equator

Allows you to set the color used for the celestial equator in the sky display.

Galactic Equator

Allows you to set the color used for the galactic equator in the sky display.

Equatorial Coordinate System

Allows you to set the color used for the equatorial coordinate system lines in the sky display.

Default Colors

Restores the colors to the values that SkyView started up with.

View Menu Commands

The View menu offers the following commands.

Toolbar

Shows or hides the toolbar.

Status Bar

Shows or hides the status bar.

Help Menu Commands

The Help menu offers the following commands, which provide you assistance with this application.

Contents

Displays the help contents for SkyView.

Procedures

Displays help for SkyView procedures.

Commands

Displays help for SkyView commands.

Search for Help On

Allows you to search for a keyword in SkyView help.

Using Help

Provides general instructions on using help.

About SkyView

Displays program information, version number, and copyright.

Exit Command (File Menu)

Use this command to end your SkyView 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

Location Command (Options Menu)

Use this command to set the observer's location on the earth. This command displays the Location dialog box.

Limiting Magnitude Command (Options Menu)

Use this command to set the limiting magnitude of stars in the sky display. This command displays the Limiting Magnitude dialog box.

Orientation Command (Options Menu)

Use this command to set the orientation of the sky display. This command displays the Orientation dialog box.

Lines Command (Options Menu)

Use this command to specify which lines--ecliptic, celestial equator, galactic equator, or equatorial coordinate system--should be included in the sky display. This command displays the Lines dialog box.

Date and Time Command (Time Menu)

Use this command to set the date and time, and to specify whether daylight-saving time is in effect. This command displays the Date and Time dialog box.

Subtract 1 Hour Command (Time Menu)

Use this command to subtract one hour from the time.

Add 1 Hour Command (Time Menu)

Use this command to add one hour to the time.

Subtract 1 Day Command (Time Menu)

Use this command to subtract one day from the date.

Add 1 Day Command (Time Menu)

Use this command to add one day to the date.

Subtract 1 Week Command (Time Menu)

Use this command to subtract one week from the date.

Add 1 Week Command (Time Menu)

Use this command to add one week to the date.

Background Command (Colors Menu)

Use this command to change the color of the window background. This command displays the Colors dialog box.

Mercury Command (Colors Menu)

Use this command to change the color of the symbol used to represent Mercury in the sky display. This command displays the Colors dialog box.

Venus Command (Colors Menu)

Use this command to change the color of the symbol used to represent Venus in the sky display. This command displays the Colors dialog box.

Mars Command (Colors Menu)

Use this command to change the color of the symbol used to represent Mars in the sky display. This command displays the Colors dialog box.

Jupiter Command (Colors Menu)

Use this command to change the color of the symbol used to represent Jupiter in the sky display. This command displays the Colors dialog box.

Saturn Command (Colors Menu)

Use this command to change the color of the symbol used to represent Saturn in the sky display. This command displays the Colors dialog box.

Ecliptic Command (Colors Menu)

Use this command to change the color used for the ecliptic in the sky display. This command displays the Colors dialog box.

Celestial Equator Command (Colors Menu)

Use this command to change the color used for the celestial equator in the sky display. This command displays the Colors dialog box.

Galactic Equator Command (Colors Menu)

Use this command to change the color used for the galactic equator in the sky display. This command displays the Colors dialog box.

Equatorial Coordinate System Command (Colors Menu)

Use this command to change the color used for the equatorial coordinate system lines in the sky display. This command displays the Colors dialog box.

Default Colors Command (Colors Menu)

Use this command to restore the colors that SkyView started up with.

Toolbar Command (View Menu)

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

See [Toolbar](#) for help on using the toolbar.

Decrement the Limiting Magnitude by 0.5 Magnitudes

This toolbar button allows you to quickly decrement the limiting magnitude of stars in the sky display by 0.5 magnitudes.

Increment the Limiting Magnitude by 0.5 Magnitudes

This toolbar button allows you to quickly increment the limiting magnitude of stars in the sky display by 0.5 magnitudes.

Toggle the Ecliptic, Celestial Equator, and Galactic Equator

This toolbar button allows you to quickly toggle the display of the ecliptic, celestial equator, and galactic equator.

Toggle the Equatorial Coordinate System Lines

This toolbar button allows you to quickly toggle the display of the equatorial coordinate system lines.













Toolbar



The toolbar is displayed across the top of the application window, below the menu bar. The toolbar provides quick mouse access to some of the commands used in SkyView.

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

Click To


-  Decrement the limiting magnitude of stars in the sky display by 0.5 magnitudes.
-  Increment the limiting magnitude of stars in the sky display by 0.5 magnitudes.
-  Toggle the ecliptic, celestial equator, and galactic equator.
-  Toggle the equatorial coordinate system lines.
-  Subtract one hour from the time.
-  Add one hour to the time.
-  Subtract one day from the date.
-  Add one day to the date.
-  Subtract one week from the date.
-  Add one week to the date.
-  Display program information, version number, and copyright.
-  Display help for clicked on buttons, menus, and windows.

Status Bar Command (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



For Help, press F1

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

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.

Contents Command (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 SkyView 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.

Procedures Command (Help Menu)

Use this command to display help for SkyView procedures.

Commands Command (Help Menu)

Use this command to display help for SkyView commands

Search for Help On Command (Help Menu)

Use this command to search for a keyword in SkyView help.

Using Help Command (Help Menu)

Use this command for instructions about using Help.

About SkyView Command (Help Menu)



Use this command to display program information, the version number, and the copyright notice of your copy of SkyView.

Context Help Command



Use the Context Help command to obtain help on some portion of SkyView. 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 SkyView window, such as another toolbar button. The Help topic will be shown for the item you clicked.

Shortcut

Keys: SHIFT+F1

Title Bar

The title bar is located along the top of a window. It contains the name of the application window.

To move the window, drag the title bar. Note: You can also move dialog boxes by dragging their title bars.

A title bar may contain the following elements:

- Application Control-menu button
- Document Control-menu button
- Maximize button
- Minimize button
- Name of the application
- Name of the document
- Restore button

Size Command (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 Command (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 Command (Application Control Menu)

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

Shortcut

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

Maximize Command (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.

Close Command (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.



Shortcuts

Keys: CTRL+F4 closes a document window
 ALT+F4 closes a SkyView window or dialog box

Restore Command (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 Command (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 Command (File Menu)

Use this command to print the sky display. 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 Box

The following options allow you to specify how the sky display 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 SkyView is sending output to the printer. The page number indicates the progress of the printing.

To abort printing, choose Cancel.

Print Preview Command (File Menu)

Use this command to display the sky display as it would appear when printed. When you choose this command, the main window will be replaced with a print preview window in which one or two pages will be displayed in their printed format. The print preview toolbar offers you options to view either one or two pages at a time; move back and forth through the pages; zoom in and out of pages; and initiate a print job.

Print Preview Toolbar

The print preview toolbar offers you the following options.

Print

Bring up the print dialog box, to start a print job.

Next Page

Preview the next printed page.

Prev Page

Preview the previous printed page.

One Page / Two Page

Preview one or two printed pages at a time.

Zoom In

Take a closer look at the printed page.

Zoom Out

Take a larger look at the printed page.

Close

Return from print preview to the sky display window.

Print Setup Command (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 Box

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 sky display 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.

Description of SkyView

SkyView is one of a growing number of astronomy applications for Microsoft Windows. The program is designed to perform many of the functions of a planetarium. As the name suggests, SkyView shows you a view of the sky. The whole sky. It shows everything that you can see in the sky from one location at one time.

SkyView displays



The positions of the sun, moon, and all planets visible with the naked eye.



All stars down to a limiting magnitude you select.



The positions of the ecliptic, celestial equator, galactic equator, and equatorial coordinate system lines in any combination.

SkyView allows you to



See the sky as it looked or will look at any date and time between the years 1900 and 2100, inclusive.



See the sky as it looks from any location on the earth.



Orient the sky display so that the North, South, East, or West horizon is positioned at the bottom of the window.



Print and print preview the sky display.



Select the colors used for the window background and many of the objects in the sky display.

SkyView was developed with a limited goal in mind. It does not try to do everything and display everything related to astronomy. SkyView is not the fastest program, and it is not the most accurate. SkyView does not display small sections of the sky filled with dim stars that you can only see through binoculars or a telescope. It does not display deep sky objects such as nebulae, star clusters, or galaxies. It does not label constellations or individual stars.

SkyView is free. If you enjoy playing around with it, that's great. If not, let me know why.

Software and Hardware Requirements

Software Requirements

SkyView requires Microsoft Windows 3.1, running in 386 Enhanced Mode.

Hardware Requirements

For the best performance, SkyView should be run on a computer equipped with at least a 486 CPU. Not only are such computers fast, they are all equipped with a math coprocessor. Computers equipped with 486SX and 386 CPUs may contain an optional math coprocessor chip, but many do not. SkyView performs very many trigonometric calculations to generate the sky display, and these calculations take significantly longer to perform without a math coprocessor. A sky display that takes seconds to generate on a 486 system will take minutes on a 386 system without a math coprocessor.

SkyView requires that you run Windows in a video mode that can display 256 colors. It will run in a 16-color video mode, but the sky display won't look very good. I've made no attempt to write the program for or test it in a 16-color video mode. Hey, this is 1993. Decent hardware is pretty cheap.

SkyView requires 800KB of hard disk space.

Installation

SkyView Distribution

SkyView is distributed as a compressed file called skyview.zip. This archive was created using the utility pkzip 2.04g. The file skyview.zip contains the following files.

readme.1st	Description of SkyView and installation instructions
skyview.exe	Executable
skyview.hlp	Help file
location.dat	Location database
pelement.dat	Orbital elements and other data for the planets
ybsc64b.dat	Star database
spin.vbx	Spin buttons for the dialog boxes
threed.vbx	Three-dimensional controls for the dialog boxes

Installation Instructions

Use the following steps to install SkyView.

1. Create a directory to contain the SkyView files.

File Manager

- a. Choose the command Create Directory from the File menu.
- b. Type skyview as the directory name.

Norton Desktop for Windows

- a. Choose the command Make Directory from the File menu.
- b. Type skyview as the directory name.

DOS Command Line

- a. Type md skyview on the command line.

2. Copy skyview.zip to the directory you just created.

File Manager or Norton Desktop for Windows

- a. Drag the file skyview.zip to the directory you just created.

DOS Command Line

- a. Type copy skyview.zip c:\skyview on the command line.

3. Uncompress the distribution file.

File Manager or Norton Desktop for Windows

- a. Use your favorite Windows compression/decompression utility to uncompress the file skyview.zip. You have probably associated the .zip extension with this utility, so you should be able to just double-click on the name to uncompress the file.

DOS Command Line

- a. Type pkunzip skyview on the command line.

4. Create a new group to contain SkyView. If you wish to put the SkyView icon in an existing group, skip to step 5.

Program Manager

- a. Choose the New command from the File menu.
- b. Select the Program Group radio button.
- c. Type SkyView in the Description field.

Norton Desktop for Windows

- a. Choose the New command from the File menu.
- b. Select the Group radio button.
- c. Type SkyView in the Title field.

5. Add the SkyView icon to a group.

Program Manager

- a. Choose the New command from the File menu.
- b. Select the Program Item radio button.
- c. Type SkyView in the Description field.
- d. Type c:\skyview\skyview.exe in the Command Line field.

Norton Desktop for Windows

- a. Choose the New command from the File menu.
- b. Select the Item radio button.
- c. Type SkyView in the Title field.
- d. Type c:\skyview\skyview.exe in the Program/Document/Script field.

or, simply drag the file skyview.exe into the group or onto the desktop.

How to Register

Register? Yeah, right. SkyView is free!

Even though SkyView is free, it is not public domain software. See [Copyright](#) for my legal copyright notice and a list of rights I grant to users of SkyView.

Copyright

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Contents of the SkyView Window

Sky Display

The sky display shows the entire sky visible to an observer at a given location at a given date and time. Imagine lying on your back far away from buildings, mountains, or trees, and looking straight up at a cloudless sky. The four cardinal directions (North, South, East, and West) are at the top, bottom, right, and left sides of the display, but their positions depend on the sky display orientation you choose. See [Changing the Sky Display Orientation](#) for step-by-step instructions on how to set the sky display orientation.

The circle around the edge of the sky is the horizon, and the center of the sky display is the [zenith](#).

You can position and size the SkyView window to your liking. When you exit SkyView, the window size and position is saved and will be restored when you start the program again.

Sun and Moon

The sky display may contain the sun and the moon. The sun is always displayed as a yellow circle. Even though you can't really see stars and planets when the sun is above the horizon, SkyView shows them as if you could.

The moon is displayed using the colors white for the side illuminated by the sun, and dark gray for the dark side.

Planets

The sky display may contain one, some, or all of the planets visible by the naked eye. The positions of the planets are indicated by their traditional symbols. The colors of these symbols can be changed. See [Changing the Sky Display Colors](#) for step-by-step instructions on how to change the colors of these symbols.

The positions of the planets Uranus, Neptune, and Pluto are never shown as these planets cannot be seen without the aid of binoculars or a telescope.

Stars

The number of stars in the sky display depends on the selected limiting [magnitude](#). The greater the limiting magnitude, the more stars will be displayed and the longer it will take to generate the display. See [Changing the Number of Stars Displayed](#) for step-by-step instructions on how to change the limiting magnitude.

The stars are represented in the display by symbols of different sizes and colors. Naturally, larger symbols represent brighter stars and smaller symbols represent dimmer stars. Although the star database used by SkyView contains information about the colors of all the stars, only stars in the top three brightness levels are displayed in color. Only the brightest stars in the real sky appear to be colored. The colors of the stars are subtle. In addition to white, bright stars may appear to have a touch of blue, yellow, or red in them. Dimmer stars are displayed using only white and a few levels of gray.

Lines

You can choose to display lines on the [celestial sphere](#) representing the [ecliptic](#), [celestial equator](#), [galactic equator](#), and [equatorial coordinate system](#) lines. See [Adding Lines to the Sky Display](#) for step-by-step instructions on how to add these lines to the sky display.

Legend

The upper right corner of the SkyView window contains a legend of symbols used in the sky display. These symbols include those for the sun, moon, all planets visible with the naked eye, the ecliptic,

celestial equator, galactic equator, and equatorial coordinate system lines.

A symbol for a given object appears in the legend only if that object is currently visible in the sky display. If the object is not visible because it is below the horizon, no symbol appears.

Date and Time Information

The lower right corner of the SkyView window contains date and time information. This information includes the local time, universal time, local sidereal time, and the Julian date.

Adding Lines to the Sky Display

SkyView can display the ecliptic, celestial equator, galactic equator, and equatorial coordinate system lines.

To add these lines to the sky display

1. Choose the Lines command from the Options menu. This will display the Lines dialog box.
2. Specify the lines you want or don't want in the sky display by checking or unchecking the check boxes labeled Ecliptic, Celestial Equator, Galactic Equator, and Equatorial Coordinates.
3. Choose the OK button or press the Enter key to return to the sky display.

Another way to add these lines to the sky display is to use some of the buttons on the toolbar.

Adding a Location to the Location Database

SkyView allows you to add locations to the location database.

To add a location to the location database

1. Choose the Location command from the Options menu. This will display the Location dialog box.
2. Choose the Add button in the Location dialog box. This will display the Edit Location dialog box.
3. Type the name of the location into the edit control in the Location group. The name should be no more than 24 characters long.
4. Type the latitude in decimal degrees into the edit control in the Latitude group. Select the North or South radio button for this latitude. Do not use a minus sign to indicate South latitude.
5. Type the longitude in decimal degrees into the edit control in the Longitude group. Select the East or West radio button for this longitude. Do not use a minus sign to indicate West longitude.
6. Type the time zone in decimal hours into the edit control in the Time Zone group. The time zone is the difference between local time and Universal time for that time zone. Select the Ahead or Behind radio button for this time zone. Do not use a minus sign to indicate time zones that are behind Universal Time.
7. Choose the OK button or press the Enter key to return to the Location dialog box.

Changing the Date and Time

SkyView can display the sky for any date and time between the years 1900 and 2100, inclusive.

To change the date and time

1. Choose the Date and Time command from the Time menu. This will display the Date and Time dialog box.
2. Specify the date by typing the year, month number, and day into the edit controls labeled Year, Month, and Day or by using the spin buttons next to those edit controls.
3. Specify the time by typing the hour, minute, and second into the edit controls labeled Hour, Minute, and Second or by using the spin buttons next to those edit controls.
4. Specify whether daylight-saving time is or is not in effect by checking or unchecking the check box labeled Daylight-Saving Time.
5. Choose the OK button or press the Enter key to return to the sky display.

To decrement or increment the date or time

Use the other commands on the Time menu. These commands--Subtract 1 Hour, Add 1 Hour, and so on--allow you to quickly subtract or add one hour, day, or week to the date and time.

Another way to increment or decrement the date and time is to use some of the buttons on the toolbar.

Changing the Number of Stars Displayed

SkyView can show all the stars in the sky down to a limiting magnitude of 6.4.

To change the limiting magnitude

1. Choose the Limiting Magnitude command from the Options menu. This will display the Limiting Magnitude dialog box.
2. Specify the limiting magnitude by moving the scroll bar back and forth until the number displayed above it is the limiting magnitude you want.
3. Choose the OK button or press the Enter key to return to the sky display.

Another way to change the number of stars displayed is to use some of the buttons on the toolbar.

Changing the Observer's Location

SkyView can display the sky as seen by an observer from any location on the earth.

To change the observer's location

1. Choose the Location command from the Options menu. This will display the Location dialog box.
2. Select a location from the Location combo box.
3. Choose the OK button or press the Enter key to return to the sky display.

The Location dialog box can also be used to edit, add, or delete locations. See Location Dialog Box for instructions.

Changing the Sky Display Colors

SkyView allows you to select the colors used to display some of the objects in the sky display, and the color of the window background.

To change any color

1. Choose one of the commands on the Colors menu except Default Colors. This will display the Colors dialog box.
2. Select a color from the Colors radio group.
3. Choose the OK button or press the Enter key to return to the sky display.

To restore the default colors

The Default Colors command on the Colors menu returns all the sky display colors to the values the program started up with.

Changing the Sky Display Orientation

SkyView can display the sky with any of the four cardinal directions oriented at the bottom of the window.

To change the sky display orientation

1. Choose the Orientation command on the Options menu. This will display the Orientation dialog box.
2. Select which horizon should be positioned at the bottom of the window from the Horizons radio group.
3. Choose the OK button or press the Enter key to return to the sky display.

Deleting a Location From the Location Database

SkyView allows you to delete locations from the location database.

To delete a location from the location database

1. Choose the Location command from the Options menu. This will display the Location dialog box.
2. Select a location from the Location combo box.
3. Choose the Delete button. A Confirmation dialog box will appear asking you to confirm that you want to delete the location. Choose the OK button in the Confirmation dialog box.
4. Choose the OK button or press the Enter key to return to the sky display.

Editing the Data for a Location

SkyView allows you to edit the data associated with a location in the location database.






To edit the data for a location in the location database

1. Choose the Location command from the Options menu. This will display the Location dialog box.
2. Choose the Edit button in the Location dialog box. This will display the Edit Location dialog box.
3. Modify the name of the location in the edit control in the Location group. The name should be no more than 24 characters long.
4. Modify the latitude in the edit control in the Latitude group. Select the North or South radio button for this latitude. Do not use a minus sign to indicate South latitude.
5. Modify the longitude in the edit control in the Longitude group. Select the East or West radio button for this longitude. Do not use a minus sign to indicate West longitude.
6. Modify the time zone in the edit control in the Time Zone group. The time zone is the difference between local time and Universal time for that time zone. Select the Ahead or Behind radio button for this time zone. Do not use a minus sign to indicate time zones that are behind Universal Time.
7. Choose the OK button or press the Enter key to return to the Location dialog box.

Tools Used

Hardware

In case you're interested, SkyView was developed using the following hardware.


-  Tri-Star Computer Corporation 486/33 EISA system
-  16MB of RAM
-  Maxtor LXT-340S 340MB SCSI hard drive
-  UltraStor 24F-10 EISA SCSI controller
-  Diamond SpeedStar HiColor video card
-  NEC MultiSync 5FG monitor
-  Hewlett-Packard LaserJet IIIp laser printer

I don't have access to a wide variety of PC systems, so I can't try SkyView out on a wide variety of hardware and software combinations. SkyView has been tested on other 486 systems manufactured by Tri-Star Computer Corporation and Gateway 2000. These systems were equipped with Diamond SpeedStar HiColor, SpeedStar 24, and ATI Graphics Ultra Pro video boards running in 1024x768x256 and 800x600x256 modes. No 386 systems were tested.

SkyView should run just fine on any hardware that runs Windows, but you never know. If you have trouble running SkyView, let me know. If it doesn't appear to like a certain video mode or printer, let me know.




Software

The computer used to develop SkyView ran the following operating system.

-  Microsoft MS-DOS 6.0
-  Microsoft Windows 3.1
-  Norton Desktop for Windows 2.2

You don't need MS-DOS 6.0 or the Norton Desktop for Windows to run SkyView, but it wouldn't hurt. You definitely need Window 3.1 to run SkyView. Also, you need to be running Windows in 386 Enhanced Mode. Hey, if you are still using Windows 3.0, now you have a great reason to upgrade!

This version of SkyView was written entirely in C++ using the Microsoft Foundation Class Library 2.00. The following development tools were used.

-  Microsoft Visual C++ Professional Edition 1.00
-  Microsoft Visual Control Pack 1.00
-  Microsoft Word for Windows 2.0b

Visual C++, the Visual Control Pack, and the new version of the Microsoft Foundation Class Library are **fantastic!** Way to go, Microsoft!

Note About the Projection Used by SkyView

I have seen a number of astronomy programs for Windows, DOS, and the Macintosh. Some of these programs have an option to display the entire sky at once. These sky displays all use a very misleading projection of the sky on the computer screen.

It is common to think of the sky as a large sphere, the celestial sphere, and the stars being fixed on the inner surface of this sphere. We think of ourselves viewing the inside of this sphere from the center. Other programs incorrectly display the sky as if we were looking at the inside of one hemisphere from a great distance away. Stars seem to be concentrated around the edge of the sky display rather than be distributed evenly across the sky. Constellations are foreshortened, as if you were viewing them at a shallow angle. Ask yourself this: does the real sky ever look like this? The answer is clearly no!

Look at a continent on a globe of the earth. If the continent is right in front of you it looks the way you expect it to look. Spin the globe so that the continent is moving away from you. The closer it gets to the edge of the globe the more distorted it looks. Spin the globe a little more and the continent disappears to the back side. This is all very normal if you are viewing the globe from a few feet away. But what if you were inside the globe--at the very center--and could look out and see the continents. They would always look the same; there would be no distortion.

The same idea applies to the stars in the sky. You are viewing a hemisphere of the celestial sphere from the inside, not from a great distance away. Objects near the horizon do appear larger than those that are higher up in the sky. This is just an optical illusion, but it is important to keep in mind when thinking about how the sky really looks. A constellation near the horizon will look *larger* than it does when it is high in the sky, not smaller as many other programs will display it.

You cannot display a three-dimensional surface like the celestial sphere on a two-dimension surface like a computer screen without distortion. But there are different ways to project the 3D surface onto the 2D surface, and some ways are clearly better than others. I think the projection used by this program displays the sky in a much more realistic fashion than do other programs. Constellations are somewhat distorted, but they are distorted in a way that more accurately simulates the appearance of the sky.

Bibliography

Windows Programming

This application could not have been written without the help of the following book.

Charles Petzold. 1992, *Programming Windows 3.1, Third Edition*. (Redmond, Washington: Microsoft Press). ISBN 1-55615-395-3.

I must admit that this book was a lot more useful to me when I was still programming Windows using C and the Software Development Kit. It's been over a year since I switched completely to C++ and the Microsoft Foundation Class Library. Even if you're using C++, it's a very good idea to not only know of but also *understand* the Windows API, and for this I certainly recommend reading Petzold.

Astronomical Calculations

For more information about the astronomical calculations performed in SkyView, refer to the following books.

Duffett-Smith, P. 1990, *Astronomy with Your Personal Computer, Second Edition*, (Cambridge: Cambridge University Press). ISBN 0-521-38995-X.

A useful book if you can stand the sight of BASIC code. I kept my sanity by telling myself that by performing the act of translating the code to C++ the gods of programming would smile upon me.

Green, R.M. 1985, *Spherical Astronomy*, (Cambridge: Cambridge University Press).

Ugh. Spherical astronomy. Enough said.

Meeus, J. 1991, *Astronomical Algorithms*. (Richmond: Willmann-Bell). ISBN 0-943396-35-2.

This is *the* book to get for astronomical calculations.

Acknowledgments

I wish to thank the following people who reported bugs (bugs? In SkyView? NO! I DON'T BELIEVE IT!) and provided suggestions for improvements to previous versions of SkyView.

Calvin Cliff
Geoffrey Hoyer
Peter Kron
Allan Milgate
G.C. Sodhy
Reiner Suikat

Contacting the Author

If you have any problem running SkyView, please contact me. Hey, I may even be able to figure out what's wrong and to find a way to fix it. If you have any comments about SkyView--negative as well as positive--I'd also like to hear those. Bug reports are very welcome (bugs? In SkyView? NO! I DON'T BELIEVE IT!), but please be sure to tell me--step by step--what I have to do to reproduce the bug.

Now that I've finished this version of SkyView, I'm going to lock myself in my room and play guitar for a long, long time, but one day I'll emerge and give working on another version of SkyView a passing thought. So, if you have any suggestions for features you'd like to see in a future version of SkyView, please let me know.

Ways to contact me

1. The easiest and fastest way to contact me--provided you have Internet access--is to send email to my account at work.

stephen@eggneb.astro.ucla.edu

I check my mail frequently during every workday. If you send mail to this address on the weekend it may be a day or two before I read it and reply.

2. If you can't send email, you can send a letter to my home address. If, for some reason, only hearing the sound of my voice will do, you can use my home phone number to reach me at a reasonable hour. Don't worry, I'll let you know very quickly if you call at an unreasonable hour.

Stephen Michael Schimpf
2444 West 230th Street
Torrance, CA 90501-5242
(310) 530-6766

3. Finally, you can send a letter to my work address, or can call me at work.

Stephen Michael Schimpf, Programmer/Analyst II
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Version History

Version 2.00 (Wednesday, 11 August 1993)



Created with Microsoft Visual C++ Professional Edition 1.00.



Combined the sky display, legend, and time information into one window. Version 1.00 used two windows.



Added support for printing and print preview of the sky display.



Added the toolbar.



Added the status bar.



Added context-sensitive help.



The symbols for the sun, moon, and planets in the legend are now displayed only if the corresponding objects appear in the sky display. Similarly, the symbols for the ecliptic, celestial equator, galactic equator, and equatorial coordinate system lines are only displayed if the corresponding lines appear in the sky display.



Improved some of the dialog boxes by adding spin buttons where appropriate.



Changed the Location dialog box. This dialog box now displays only a list of locations. You can easily add and delete locations from the database, and can edit the information for any location. You will be asked for confirmation before any location is deleted from the database. Adding and editing location data now takes place in the new Edit Location dialog box.



Moved the Limiting Magnitude, Orientation, and Lines commands from the Display menu to the Options menu. The Display menu was removed.



Added buttons to the toolbar to increment and decrement the limiting magnitude of stars in the sky display by 0.5 magnitudes.



Moved the Date and Time command to the new Time menu. Added items to that menu to make it easy to increment and decrement the time by one hour, one day, and one week. Buttons on the toolbar duplicate these six menu commands.



Added buttons to the toolbar to make it easier to add lines to and remove lines from the sky display. One button toggles the ecliptic, celestial equator, and galactic equator. The other button toggles the equatorial coordinate system lines.



Selecting the Default Colors item on the Colors menu previously restored the colors used for items in the sky display to factory values. This command now restores the colors to the default values you selected, the ones in effect when you last exited SkyView. This allows you to experiment with the colors and easily restore them to the values you had previously decided upon.



Improved the display of the moon.



Practically rewrote the entire help file.

Version 1.00 (Monday, 8 February 1993)



First release for Windows 3.10 or higher. Created with Microsoft C/C++ 7.00.

Date and Time Dialog Box

The Date and Time dialog box allows you to specify the local date and time for which you want to see the sky. See [Changing the Date and Time](#) for step-by-step instructions.

Year

Year in the range 1900 to 2100, inclusive.

Month

Month number, in the range 1 to 12.

Day

Day of the month, in the range 1 to 31.

Hour

Hours in the range 0 to 23.

Minute

Minutes in the range 0 to 59.

Second





Seconds in the range 0 to 59.

You will be warned by a message box if you enter a value that is out of range.

Daylight-Saving Time

Check this check box if daylight-saving time is in effect. This will cause one hour to be subtracted from the time zone value used to convert from local time to universal time.

The state of this check box is saved when you exit SkyView and restored when you start the application again.

Click	To
	Accept the date, time, and daylight-saving time state you entered and return to the sky display.
	Cancel any changes you made and return to the sky display.
	Set the date and time values to your computer's current system date and time.
	Display help for the dialog box.







Location Dialog Box

The Location dialog box allows you to specify the location from which the sky is being viewed. See [Changing the Observer's Location](#) for step-by-step instructions.

You can also edit location data, add locations, and delete locations from the location database. See [Adding a Location to the Database](#), [Deleting a Location from the Database](#), and [Editing Data for a Location](#) for step-by-step instructions.

Location

Combo box that display the names of locations in the SkyView location database.

Click	To
	Accept the selected location and return to the sky display.
	Cancel the selection you made and return to the sky display.
	Edit the data for the currently selected location.
	Add a new location to the location database.
	Delete the currently selected location from the location database.
	Display help for the dialog box.

Edit Location Dialog Box

The Edit Location dialog box allows you to edit a previously defined location, or to define a new location. See [Adding a Location to the Database](#) and [Editing Data for a Location](#) for step-by-step instructions.

Location

Name of the location. The name can be up to 24 characters in length.

Latitude

Latitude in decimal degrees.

North/South

Radio buttons used to specify whether the latitude is north or south latitude. Do not use a minus sign.

Longitude

Longitude in decimal degrees.

East/West

Radio buttons used to specify whether the longitude is east or west longitude. Do not use a minus sign.

Time Zone

Difference in decimal hours between the location's local time and [universal time](#).

Ahead/Behind

Radio buttons used to specify whether the time zone is ahead of or behind universal time.

Click To



Accept the location name, latitude, longitude, and time zone values you entered and return to the sky display.



Cancel any changes you made and return to the sky display.



Display help for the dialog box.

Limiting Magnitude Dialog Box

The Limiting Magnitude dialog box allows you to select the limiting magnitude of stars in the sky display. See [Changing the Number of Stars Displayed](#) for step-by-step instructions.

Remember that the more stars that are displayed, the longer it will take to generate the sky display. For those of you without a math coprocessor, this can make a *big* difference.

Selecting 6.4 as a limiting magnitude will display all 7788 stars in the SkyView database. You only see about half this many stars at one time because you only see half of the sky at one time. Also, you will only be able to see down to magnitude 6 under very good seeing conditions far away from city lights. Therefore, under such conditions you will see about 3000 stars in the entire sky, even though you think you are seeing a million stars.

When you exit SkyView the currently selected limiting magnitude becomes the default.

Click	To
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Accept the selected limiting magnitude and return to the sky display.



Cancel any changes you made and return to the sky display.



Display help for the dialog box.

Orientation Dialog Box

The Orientation dialog box allows you to select which horizon is positioned at the bottom of the sky display. See [Changing the Sky Display Orientation](#) for step-by-step instructions.

When you exit SkyView the currently selected sky-display orientation is saved and is the default when you start SkyView again.

Click	To
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Accept your orientation selection and return to the sky display.



Cancel any changes you made and return to the sky display.



Display help for the dialog box.

Lines Dialog Box

The Lines dialog box allows you to display or hide the ecliptic, celestial equator, galactic equator, and equatorial coordinate system lines. See [Adding Certain Lines to the Sky Display](#) for step-by-step instruction.

When you exit SkyView the changes you make in the Lines dialog box are saved. If you always want certain lines included in the sky display, simply select them in the dialog box. When you leave SkyView your preferences become the default.

Click	To
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Accept your selections and return to the sky display.



Cancel any changes you made and return to the sky display.



Display help for the dialog box.

Colors Dialog Box

The Colors dialog box allows you to specify the color for the window background or one of the objects in the sky display. See [Changing the Sky Display Colors](#) for step-by-step instructions.

Colors

Radio buttons for 27 pure colors listed by name.

When you exit SkyView the current color preferences are saved and are the default colors when you start SkyView again.

Click	To
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Accept your color selection and return to the sky display.



Cancel any changes you made and return to the sky display.



Display help for the dialog box.

Confirmation Dialog Box

The Confirmation dialog box is used to confirm whether you want a location deleted from the SkyView location database.

Click	To
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Confirm the deletion.



Cancel the deletion.

Glossary

Celestial Equator

Celestial Meridian

Celestial Poles

Celestial Sphere

Ecliptic

Equatorial Coordinate System

Galactic Equator

Great Circle

Julian Date

Local Sidereal Time

Magnitude

Precession

Sidereal Time

Terrestrial Meridian

Universal Time

Zenith

Celestial Equator

The celestial equator is the great circle formed by projecting the earth's equatorial plane onto the celestial sphere. The celestial equator is 90 degrees from both the north and south celestial poles.

The axis of the earth's daily rotation is tilted with respect to its orbital plane, and therefore the ecliptic and celestial equator are tilted with respect to each other. This angle, known as the obliquity of the ecliptic, is currently roughly 23.5 degrees. The precession of the earth's axis causes this angle to slowly change over time.

Celestial Meridian

The celestial meridian is the projection of the observer's terrestrial meridian on the celestial sphere.

The observer's celestial meridian passes through both celestial poles, and passes through the observer's zenith. Think of the celestial meridian as an imaginary line dividing the entire visible sky in half.

The celestial meridian divides the sky into a east half and a west half. When an object in the sky is in the east half, it is rising, and when it is in the west half it is setting. When the object is on the celestial meridian, it has reached its highest point in the sky.

Celestial Poles

The celestial poles are the projection of the north and south poles of the earth's rotation onto the celestial sphere. The precession of the earth's axis causes the celestial poles to trace out circles on the celestial sphere in a period of about 25,800 years.

The north celestial pole currently lies in the constellation Ursa Minor, near the star Alpha Ursae Minoris, better known as Polaris or simply the North Star. The south celestial pole is currently in the constellation Octans.

Celestial Sphere

The celestial sphere is an imaginary sphere of immense radius centered on the earth. It provides a convenient surface on which to draw and study the motions of points in the sky as seen from an observation point on the earth.

Ecliptic

The ecliptic is the plane of the earth's orbit, and the projection of that plane onto the celestial sphere. It is the line in the sky along which the sun appears to move during the course of a year. The sun moves roughly one degree along this line every day.

Because the orbits of the naked-eye planets have inclinations of seven degrees or less with respect to the ecliptic, you will always find these planets on or very close to this line.

Equatorial Coordinate System

The equatorial coordinate system is a coordinate system for the celestial sphere similar to the system used on the surface of the earth. Rather than latitude and longitude, the coordinates are right ascension (α) and declination (δ). The lines that run from celestial pole to celestial pole are lines of right ascension, and those that run parallel to the celestial equator are lines of declination.

Galactic Equator

The galactic equator is the plane of the Milky Way galaxy projected onto the celestial sphere. The galactic equator and the celestial equator are inclined at an angle of about 62 degrees.

If you set the limiting magnitude of the sky display as high as it will go, you will notice that the number of stars in the sky display is larger around the galactic equator than in other areas of the sky. You are seeing the concentration of stars along the plane of our galaxy.

Great Circle

A great circle is any circle on the surface of a sphere generated by a plane passing through the center of the sphere. Therefore, such a circle has the same radius as the sphere.

Julian Date

The Julian date is the number of days that have passed since 1200 hours universal time on 1 January, 4713 BC. The Julian day is the number of integral days that have passed, whereas the Julian date includes the decimal fraction of the day that has elapsed since the preceding noon.

The Julian date system was invented in 1582 by the French scholar Joseph Scalinger. The Julian date is very useful because the consecutive numbering of days makes the system independent of the varying lengths of months and years. To find the number of days between two events, simply determine the Julian dates of those events and subtract one date from the other.

Local Sidereal Time

Local sidereal time is the sidereal time at an observer's location. It is equal to the right ascension currently on the observer's celestial meridian.

Magnitude

The magnitude system is a logarithmic scale used to describe the brightness of an object. The larger the magnitude, the dimmer the object.

Magnitudes are used in astronomy for historical reasons. In ancient times the stars were ranked in six classes of magnitude. The brightest stars were first magnitude and the faintest stars just visible to the naked eye were sixth magnitude.

More recently, this system had to be expanded to cover stars brighter than first magnitude and fainter than sixth magnitude. In 1856 the English astronomer N.R. Pogson proposed that a difference of five magnitudes correspond *exactly* to a brightness ratio of 100 to 1. The brightness ratio of two stars that differ by one magnitude is the fifth-root of 100, or 2.512, a quantity known as the Pogson ratio. A star that is two magnitudes brighter than another star is 2.512 squared, or about 6.3, times brighter than the other star.

Precession

Precession is the periodic change in the direction of the earth's axis of rotation. Currently the north pole of the axis of rotation points toward the star Alpha Ursae Minoris, better known as Polaris or simply the North Star. But the positions of the celestial poles actually move across the sky, tracing out a circle on the celestial sphere every 25,800 years. So, the pole star observed thousands of years ago was not the North Star we see today. For example, in Egypt when the pyramids were being built, the north star was Alpha Draconis, also known as Thuban, the brightest star in the constellation Draco.

The earth is not a perfect sphere, but has an equatorial diameter that is slightly larger than its polar diameter. The sun, moon, and other planets of the solar system exert a gravitational attraction on the equatorial bulge of the earth. It is this force that is responsible for precession.

Sidereal Time

Sidereal time is time measured by reference to the rotation of the earth with respect to the stars. Our common solar time is measured by reference to the rotation of the earth with respect to the sun. With respect to the stars, the earth takes 23 hours, 56 minutes, and 4.091 seconds to spin once on its axis. This quantity is known as a sidereal day. During this period the earth moves along in its orbit around the sun. Because of this motion, it takes roughly another four minutes before the earth has spun once on its axis with respect to the sun. This 24-hour period is known as a solar day.

Terrestrial Meridian

A terrestrial meridian is a great circle on the surface of the earth that passes through both poles of the earth's rotation. In other words, an observer's terrestrial meridian is the line of longitude he or she is standing on.

Universal Time

Universal time (UT) is the mean solar time in the time zone centered on Greenwich, England. It is the same thing as Greenwich Mean Time (GMT).

Zenith

The zenith is the point on the celestial sphere that lies directly above an observer.

