MyStars! v2.3

This software is shareware, it is not free software. Please read the <u>registration information</u> ($12) for more details.

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Program Description:

WHAT THIS PROGRAM DOES:

MyStars! is a windows program that shows the position of the stars, the sun, the planets, comets and the Messier objects as they would be seen from any position on earth. It also allows you to vary the time of view (What did the stars look like the day that I was born?). Various options allow you to view the planet names, constellation names, and several celestial coordinate grids as well. Actual images are shown to scale for the planets. An animation option generates a series of views separated by fixed intervals of time. Zooming allows you to see items in further detail. A unique full screen option allows you to work with the maximum viewing area.

View From Location:

This dialog box allows you to select the position on earth from where you want to view the sky.

This dialog box is accessible at program startup, from the View menu or by left clicking on the Lat/Lng data area.

You can select one of the cities from the list provided, select any latitude or longitude, or you can click on the map of the earth.

Latitude may be entered in degrees minutes seconds (i.e. 45 30 00 N), or as decimal degrees (i.e. 45.5 N, or 45,5 N). Convenience buttons are provided to set the view from the north pole (Lat 90 N), the equator (Lat 0), or the south pole (Lat 90 S), and convenience scrollers are provided to increase and decrease the latitude by five degree increments.

Longitude may be entered in degrees minutes seconds (i.e. 45 30 00 W), or as decimal degrees (i.e. 45.5 W, or 45,5 W). A convenience button is provided to set the view from the Greenwich meridian (Lng 0), and convenience scrollers are provided to increase and decrease the longitude by five degrees increments.

With a new viewing location selected, the local time is adjusted if necessary, and the sky updated to reflect the new location.

To add new locations to the locations list, see the Datasets menu.

Hot Keys:
(New for v2.3)

Several of the menu commands are also available as hot keys. In many cases it may be much quicker to use the keyboard to perform functions than using the mouse and menus, especially form Full Screen mode where the menus are not easily accessible.

The following hot keys are defined:

Program Control

Esc	View Full Screen	toggles full screen mode
F1	Help Contents	brings up help
F2	View Status Bar	toggles status bar
Alt+F4	System Close	shuts down the program

Gridline Control

F5	Gridlines Alt lines	toggles altitude lines
Shft+F5	Gridlines Azi lines	toggles azimuth lines
Ctrl+F5	Gridlines Headings	toggles heading
F6	Gridlines Dec lines	toggles declination lines
Shft+F6	Gridlines Rta lines	toggles right ascension lines
F7	Gridlines Ecliptic	toggles ecliptic
Shft+f7	Gridlines ELng lines	toggles ecliptic longitude lines
F8	Gridlines Crosshair	toggles crosshair

Zoom Control

Ctrl+PageUp	View Zoom Max	Maximum zoom in
PageUp	View Zoom In	zoom In
PageDown	View Zoom Out	zoom Out
Home	View Zoom Restore	restores screen to unzoomed

Others

Ctrl+O	View Ahead Only	limits view ahead of viewpoint
Ctrl+H	View Above Horizon	limits view above horizon only
Alt +	View Font Increase	increase font size
Alt -	View Font Decrease	decrease font size

Registration Information:

$12 Gets You The Moon!

This is a shareware product. Feel free to experiment with it and find whether it is of interest to you. Freely distribute as many copies of this product to friends and associates as you wish. The only restriction on copying is that you include all the files, without modification, that were originally included in your copy of this software.

BUT THIS IS NOT FREE SOFTWARE, even if you received it on a CD-ROM, downloaded it from a bulletin board or the Internet, or got it on diskette. Until you become a registered user, you are entiled only to evaluate it for a period of 15 days, then it must be registered or use discontinued.

BENEFITS OF REGISTRATION:
When you register you will be sent (by mail or E-Mail) a personal registration number which enables the moon (with phases and eclipses). You are also registered for 2 years of free upgrades as they are released, which will be shipped to you for no extra cost. Finally, you also receive free internet E-Mail user support. Input from registered users is used to determine which new features are added to subsequent versions. Registered users occasionally receive special releases not distributed to the general public.

HOW TO REGISTER:
You can register by personal cheque, postal money order, or VISA.

To register by cheque, send by mail a cheque payable to 'Relative Data Products' for US$12
(drawn on an American Bank) or CDN$12 (drawn on a Canadian bank). Note: Cheques must be
drawn on an American or Canadian bank, only.

To register by postal money order, send by mail a postal money order for US$12 or CDN$12.

To register by VISA, send your VISA number and expiry date by mail, E-Mail or Fax. Your card will be billed in your local currancy the equivalent of CDN$15 (CDN$12 plus a CDN$3 handling charge), or approximately US$12.

If you send cash, you do so at your own risk.

Prices include all taxes.

Please include the following with your order:

- your name
- postal address
- current version number of MyStars!

- your Internet E-Mail address (if any)

Special site licence pricing for network installations are possible. For more information contact the author.

REGISTRATION BY MAIL:
You can send your registration fee and other required information to:

      Relative Data Products
      365 Sherwood Drive,
      Ottawa, Ontario,
      CANADA   K1Y 3X3

US/International customers, please use correct international postage!

REGISTRATION BY INTERNET (FOR VISA REGISTRATIONS):
You can send the required info by Internet E-MAIL to: dpatte@synapse.net
It is recommended that you send your VISA number and information in one message, and your expiry date in a subsequent message.

REGISTRATION BY FAX (FOR VISA REGISTRATIONS):
You can send the required information by fax to: (613) 728-4240

TO CONTACT THE AUTHOR:
If you have questions or comments, feel free to contact Relative Data Products by any of the above methods; mail, E-Mail, or Fax. Or check our web page at
http://www.synapse.net/~dpatte/

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Disclaimer:

THIS SOFTWARE IS SUPPLIED WITHOUT WARRANTY, EXPRESSED OR IMPLIED, AND THE AUTHOR IS NOT LIABLE FOR ANY DIRECT OR INDIRECT LOSS ARISING OUT OF THE USE OF THIS SOFTWARE.

This software has been extensively tested for bugs. If any bugs are found the author would be more than pleased to hear of them so that they may be removed from subsequent releases.

System Requirements:

Minimum requirements: 386SX with 3 Megs of memory. Windows 3.1, 95 or NT.

Installation:

If you acquired this as a zip file:

You can use a product like WinZip to install the program.
1) Open the zip file using WinZip.
2) Select Install, and follow the instructions.

Or, you can use pkunzip:
1) Unzip the files to a temporary directory.
2) In Windows 3.1 or NT 3.5, from within the program manager, File/Run the INSTALL.EXE program that you just unzipped into the temporary directory.
Or, From Window 95 or NT 4.0, from the taskbar, Start/Run the INSTALL.EXE program that you just unzipped from the temporary directory.
3) Follow the instructions during the install, but insure that you specify a MyStars! directory other than the temporary directory you just unzipped into.
4) When install completes, delete the temporary files from the temporary directory.

If you acquired this as separate files on a diskette, simply Run the INSTALL.EXE program included on the diskette.

If you are upgrading from an older version of MyStars!, we suggest that the new files be placed in a new sub-directory (folder). Note that you cannot run two copies of this program at the same time.

If your copy does not contain an INSTALL.EXE program, you have an incomplete set of files. You can always download the latest version of this shareware from our web site at:

http://www.synapse.net/~dpatte/

Program Startup:

After installing, double-click on the icon for MyStars! Or, from Windows 95 or NT 4.0, you can simply select it from the START/PROGRAMS menu.

When MyStars! is started, if the product is not yet registered, an About MyStars! dialog box appears showing version, copyright and registration information. After the product is registered, this dialog box will not appear at startup.

Then the View From dialog box appears. Enter the location from which you wish to view the stars, then press OK. Pressing cancel will use the last default location or 45N, 75W (Upstate N.Y.).

Then the View At dialog box appears. Adjust the date and time to specify the date required, then press OK. Pressing cancel will use the system date and time.

A rotating earth indicates that calculations are being performed. You can then use the pull down menus, mouse or hotkeys. When the rotating earth stops, the sky is displayed.

Menu Commands:

The following menus are available:

File
Used for application control.

View
To select viewing parameters.

Objects
To select which objects are to be computed and shown.

Gridlines
To select which coordinate lines to add to the display.

Animate
Pops up a dialog to specify an animation frame rate.

Datasets
To edit the data used during calculations.

Help
To get help on MyStars!

File:

The only command here is File Exit, which, when selected causes the program to <u>shut down</u>.

Objects:

This menu allows you to select which astronomical objects will be computed and displayed, and options for those objects. Selected objects are shown with a check mark beside the object type in the menu. Reducing the number of selected objects will reduce the time required to complete computations.

Stars and Constellations:
Compute and display the stars, and positions of constellations. Stars are shown in white.

Sun, Planets & Moon:
Compute and display the sun, planets, and moon. They are shown as scaled images.

Comets:
Compute and display the positions of comets. They are shown as images,

Deep Sky Objects:
Compute and display the positions of the Messier (M) objects. Their positions are shown as scaled circles in magenta.

View:

This menu allows you to select viewing parameters.

Full Screen
Toggles full screen mode.

From Location
Pops up a dialog to select the position on earth from where you want to view the sky.

At Date/Time
Pops up a dialog to select the date and time when the view of the sky is wanted.

Towards
Pops up a dialog to specify the direction, coordinate or object to view towards.

Upto Magnitude
Pops up a dialog to specify the limit magnitude of objects to be shown.

Zoom
Adjusts the magnification factor.

Ahead Only
Limits the field of view ahead (in front of) the viewer only.

Above Horizon Only
Limits the field of view to items above the horizon only.

Status Bar
Enables/Disables the status bar.

Font
Adjust the font used in the projection.

Gridlines:

This menu allows you to enable and disable various coordinate gridlines on the display. Adding options to the display may slow down some calculations.

Altitude Lines   Add/Remove altitude lines, zenith and nadir.
Azimuth Lines   Add/Remove azimuth lines.
Headings   Add/Remove compass heading markers.

Declination Lines   Add/Remove declination lines and celestial poles.
Right Ascension Lines   Add/Remove right ascension lines.

Ecliptic Line   Add/Remove ecliptic line and ecliptic poles.
Ecliptic Longitude Lines   Add/Remove ecliptic longitude lines.

CrossHair   Add/Remove crosshair at centre.

Animate:

This dialog box allows you to set a frame rate.

This dialog box is accessible from the menu bar or by clicking on the rotating earth area.

During Animation, the specified frame rate is added to the view-at time, calculations are redone, and the display is automatically refreshed. This allows the display to quickly show the changes that occur on a day by day, or hour by hour basis. This repeats until Animation is stopped. NOTE: During animations, all other options and menu commands ARE STILL permitted. It is even possible to reset the View-At-Time if necessary.

NOTE: Monthly and Annular animations are best seen from the poles, viewing towards the object in question.

Stop Animation:
Select this from the dialog when you wish to stop animation mode.

In Real Time:
Auto recalculate in real time so that the display remains a constant reflection of the current sky.

By Minute:
Useful for viewing eclipses, or whatching stars "come out".

By Hour:
It is useful for observing the effect of the rotation of the earth.

By Civil Day:
A civil day is 24 hours, and is the mean time it takes for the earth to do one rotation relative to the sun. This option is most useful for viewing the daily movement of stars and planets, or watching the seasonal motion of the sun.

By Sidereal Day:
A sidereal day is the time it takes for the earth to do one rotation relative to the position of the stars, approximately 23 hrs, 56 minutes. If this option is selected and you view towards a fixed direction, the stars will not seem to move. It is most useful in viewing the relative motion of the sun compared to the background of stars.

By Civil Month:
This simply adds 1 to the month number for each refresh.

By Sidereal Month:
The average time it takes the moon to return to the same position relative to the background of stars. 27.3217 days.

By Anomalistic Month:
The average time between the moon's closest approaches to the sun. 27.5546 days.

By Nodal Month:
The average time between the moon's crossings of the ecliptic. 27.2122 days.

By Synodic Month:
The average time of the moon's phase cycle. 29.5306 days. The time between full moons, for example.

By Civil Year:
This simply adds 1 to the year number for each refresh. Useful for watching the effect of leap years.

By Sidereal Year:
The time it takes the sun to return to the same position relative to the background of stars. 365.2564 days.

By Anomalistic Year:
The average time between the earth's closest approaches to the sun. 365.2596 days.

By Tropical Year:
The time it takes between successive first days of spring. 365.2422 days. This is the length of the year that our civil calendar tries to simulate. Useful for viewing the slow moving planets, and precession.

Help:

You can get help by pressing F1, from the menu, or from various dialogs.

<u>Contents</u>:
Displays the main MyStars! help page.

<u>Menu Commands</u>:
Displays the available Menu commands for MyStars!

Using Help
Displays help on how to use help.

<u>About MyStars!</u>:
This display version information about MyStars!, and asks you to register if you have not already done so.

Mouse Effects:

The mouse can be used as a quick way of entering information as opposed to using the pull down menus.

PROJECTION AREA

Clicking the **right** mouse button toggles between full screen and normal viewing mode. (New for v2.3)

Clicking the **left** button on the projection area will allow you to re-center the display towards the selected direction/coordinate. A dialog will appear allowing you to confirm the request.

If a fixed direction was last specified, the new direction at the selected mouse position will be remembered and the software maintains this new fixed viewing direction.

If a celestial coordinate <u>or an object</u> were last specified, the new celestial coordinate at the selected mouse position is remembered, and the software locks onto this new celestial coordinate for further viewing, constantly adjusting the direction as required.

DATA DISPLAY AREA

Clicking the **left** button on the data display area will pop up an appropriate dialog allowing you to modify viewing parameters:

Lat/Lng: pops up the <u>View From Location</u> Dialog
Date/Time: pops up the <u>View At Date/Time</u> Dialog
Alt/Azi: pops up the <u>View Towards Fixed Direction</u> Dialog
Rta/Dec: pops up the <u>View Towards Equatorial Coordinate</u> Dialog
ELat/Lng: pops up the <u>View Towards Ecliptic Coordinate</u> Dialog
Mag/Brt: pops up the <u>View Upto Magnitude</u> Dialog
Image: pops up the <u>View Towards Object</u> Dialog

Logo: pops up the <u>About</u> Dialog
Rot. Earth: pops up the <u>Animate</u> Dialog.

Program Shutdown:

You can shut the program down from the File or System menus, or by pressing the Alt+F4 keys.

When the program is shut down all options (except for the date/time, and the zoom factor) are remembered for the next time it is run.

Update Log:

Version 2.3   May 96
- added Full-Screen view mode
- added comet computation and comet editing (add/update/delete)
- added atmospheric extinction option
- added location editing (add/update/delete)
- added hot-keys
- add zoom maximum
- added min images size for solar system objects
- added magnitude/all option for planets
- added bold font option
- improved crosshair now indicates distance from centerpoint
- 100-1000X higher accuracy in calculations
- added new animation rates and helper dialogs
- save all options (except date/time and zoom)
- gridlines adjust to scale
- fixed fonts/colors to match Win95
- dialogs for objects
- modified menus
- replaced bwcc.dll by ctl3dv2.dll
- fixed bug when started minimized
- fixed bug: azi lines misplaced when view to zenith
- better scale for planet images
- better scale for galaxy markers

Version 2.2   September 95
- switched setup for 3.x/95/NT install and uninstall
- modified cities file

Version 2.1   July 95
- actual scaled and layered images of the planets are integrated within the display
- dso positions are now shown to scale
- improved star drawing and brightness adjustment method
- added view towards (brightest star in) constellation
- added constellation "common name" labels
- added help
- parallax calculated for moon planets and sun
- added ecliptic coordinates to data display area
- more-improved cities list
- synchronized earth rotation and removed hourglass while drawing
- improved yielding to other applications
- improved menu greying
- added confirmation dialogs when clicking on projection
- clicking on data, or world brings up appropriate dialog
- accept ',' or '.' in dialogs, i.e.: 5,5 or 5.5 = 5 deg 30 min
- added file exit

- moved about to help menu
- objs don't disappear prematurely at edges
- improved meridian labels at poles
- improved parallel drawing
- zoomin now adds 1 mag
- constellations names now gold
- removed dsomag: now only one magnitude selector
- references to "deep space" changed to "deep sky"
- fixed bug: LST before 545 A.D.
- fixed bug: lockup when mag set to minimum value
- fixed bug: positions of uranus/neptune
- package includes README.WRI instead of README.TXT
- dialogs are now based on BWCC.DLL

Version 2.0a   Jan 95
- updated city list (Jan 95)
- improved precession algorithm (Jun 94)

Version 2.0   June 94
- reduced registration fee!! (now you have no reasonable excuse not to register!)
- improved line drawing technique
- added coordinate labels to lines
- added more stars (database now has over 9000 instead of just 1600)
- added star names, bayer & flamsteed ids and YBS #s
- modified star2.dat star file
- added deep sky objects (all Messier objects)
- added dso names, messier #s & NGC #
- added dso mag to display
- added dso2.dat dso file
- enlarged window start size
- added variable font size in projection
- improved bitmap draw method
- added low memory warning dialog
- improved magnitude adjustment technique
- improved label placements (names of some types no longer OVERLAP each other)
- added greying of menus for disabled items
- fixed mag/bright bug
- optimized ahead only option to do less computations
- improved view towards menu
- added view towards object (object tracking)
- added view towards ecliptic coordinate
- fixed to rotate earth the other way, oops
- modified, faster scrolling in dialog boxes
- added fixed point math library
- added interpolated sintbl resource
- added moon phases

- improved stat change checking
- modified crosshair now points N
- added optional status bar
- added below horizon warning
- added Local Sidereal Time (LST) to display
- modified colours

Version 1.1a, September 93
- Enhanced drawing speed

Version 1.1, September 93
- file formats changed (again)
- shutdown data increased to maintain new options.
- map added to view from menu.
- screen layout modified to add new data.
- scale factor added to caption line.

Version 1.0c, February 93
- At shutdown, the list of objects selected and the view parameters selected (except the time) are automatically saved for the next run.
- View from selection is improved to detect the location name.
- Calculation speeds are increased for machines without coprocessors.
- The data file formats are changed.
- The screen layout is modified to have region titles and is better centred.

Version 1.0b, September 92
- Bug fixes.

Version 1.0a, July 92
- Optimized sidereal animation in order to reduce calculations.
- Modified coprocessor and 486 checking to use winflgs

Version 1.0, 1st Q, 92
- converted to C++ for Windows

Rewritten in C for QNX, 1988

Originally written in C for CP/M on the Apple II+, 1985

View At Date/Time:

This dialog box allows you to select the date and time of your selected view.

This dialog box is accessible at program startup, from the View menu or by left clicking on the Lat/Lng data area.

The date is specified as year/month/day (i.e. 1997 1 1) and convenience buttons are provided to move the date ahead or back one day.

The time is specified as hour:minute:second in 24 hour format (i.e. 6 30 0, or midnight is 0 0 0) and convenience buttons are provided to move the time ahead or back 20 minutes.

You can also choose whether the displayed time is Local time, or Greenwich Mean time. When Local time is selected, you can specify whether Daylight Savings Time or Standard Time is selected.

To reset the time to that of the current system clock press Reset/Now.

View Towards:

This menu allows you to specify the direction, celestial coordinate or object to view towards. The selected direction or coordinate is then maintained in the centre of the display, and a checkbox remains in this pulldown menu to indicate the item chosen:

Fixed Direction
Pops up a dialog to set a fixed viewing direction by horizontal coordinates.

Equatorial Coordinate
Pops up a dialog to lock onto a celestial coordinate specified by equatorial coordinates.

Ecliptic Coordinate
Pops up a dialog to lock onto a celestial coordinate specified by ecliptic coordinates.

Object
Pops up a dialog to lock onto a specified celestial object.

View Ahead Only:

You can toggle 'Ahead Only' using Ctrl+O, or from the <u>View</u> menu.

This limits the view to only those objects in the field of view ahead (in front of) the viewer, the hemisphere directly in front of the viewed position. When disabled, the view is allowed to wrap around and fill the display area, showing more than a hemisphere.

View Above Horizon Only:

You can toggle the horizon using Ctrl+H, or from the <u>View</u> menu.

This limits the view to only those objects above the viewers horizon. Normally this option is on, and the earth, in dark green, prevents viewing objects below the horizon. When disabled, the earth horizon disappears and objects below the horizon become visible.

View Zoom:

You can adjust the zoom factor from the <u>View</u> menu, or by using various key combinations.
Try using the key combinations which are easier and faster than using the menus.

Zoom In / Zoom Out: (PageUp key / PageDown key)

These allow you to zoom into the objects at the centerpoint of the display. Note that zooming in will also automatically increase the limiting <u>magnitude</u> of displayed objects by 1.0 making more objects visible. The caption line will indicate the current zoom factor, and the data display area will show the effective increase in magnitude.

Zoom Maximum: (New for v2.3) (Ctl+PageUp key)

Zooms in to the maximum scale (256 times original scale)

Zoom Restore: (Home key)

This restores the display to normal view (unzoomed).

View Upto Magnitude:

This dialog box allows you to specify the limiting magnitude of objects to be shown.

This dialog is accessible from the <u>View</u> menu or by left clicking on the Mag/Brt data area.

Increasing the limiting magnitude will increasing THE NUMBER of celestial objects to be computed and shown. Objects inherantly too dim (with magnitudes beyond the selected limit) will not be calculated. Increasing the limit magnitude will increase the amount of time required to perform calculations. The default value of 4.00 is recommended. Note that <u>zooming</u> will temporarily augment this value.

Atmospheric Extinction (New for v2.3) simulates the effect of the atmosphere on the visibility of objects. Objects normally of magnitude 4 (when there is no extinction) will be magnitude 4.2 (somewhat dimmer) at the zenith, and magnitude 6 (much dimmer) when near the horizon. This option slows down calculations, but gives a much more accurate representation of what the sky really looks like at any particular time. A novel side-effect of this feature is that during slow animations, stars "come-out" as they get closer to the zenith.

After selecting the limiting magnitude options, the general brightness of stars can be adjusted from the <u>stars dialog</u>. There you can use the brightness control if the displayed stars are not bright enough for your monitor.

Locations List:
(New for v2.3)

This dialog shows the current list of locations available. You can add, edit or delete new locations from the list.

Press Add New, or select a city from the list and select Edit, or Delete. This will pop up an <u>edit location data</u> dialog.

When you have finished editing the locations list, press Done.

Altitude Lines:

You can toggle altitude lines from the <u>Gridlines</u> menu, or by using the F5 key.

This will draw labeled blue <u>altitude</u> lines parallel to the horizon. The horizon is shown with a dashed line. Altitude indicates the angular distance above/below the horizon. The zenith (Z) and nadir (N) are shown as well (in blue).

Azimuth Lines:

You can toggle azimuth lines from the <u>Gridlines</u> menu, or by using the Shift+F5 key.

This will draw labeled blue <u>azimuth</u> lines perpendicular to the horizon. Azimuth lines indicate the compass directions (i.e.: North, South, East, West). North is 0 degrees, East is 90, South 180, and West 270.

Headings:

You can toggle heading markers from the Gridlines menu, or by using the Alt+F5 key.

This will draw the compass headings (the azimuths) in blue at the horizon (N/S/E/W).

Declination Lines:

You can toggle declination lines from the <u>Gridlines</u> menu, or by using the F6 key.

This will draw labeled cyan <u>declination</u> lines indicating the angular distance North or South of the celestial equator. The Celestial Equator is shown with a dashed line. The north (N) and south (S) celestial poles are shown as well (in cyan).

Right Ascension Lines:

You can toggle right ascension lines from the Gridlines menu, or by using the Shift+F6 key.

This will draw labeled cyan right ascension lines perpendicular to the celestial equator. The Equinoxes are shown using a dashed line. Right ascension indicates the angular distance along the celestial equator.

Ecliptic Line:

You can toggle the ecliptic line from the <u>Gridlines</u> menu, or by using the F7 key.

This will draw the <u>ecliptic</u> dashed in yellow. This corresponds to the path of the orbit of the sun during the year and it crosses the celestial equator at the vernal(spring) equinox and the autumnal(fall) equinox.

Ecliptic Longitude Lines:

You can toggle ecliptic longitude lines from the Gridlines menu, or by using the Shift+F7 key.

This will draw labeled yellow ecliptic longitude lines indicating the angular distance along the ecliptic, and therefore the position of the sun on the first day of spring - equinox (0 degrees), mid-spring(45), first day of summer - solstice (90), mid-summer(135), first day of autumn - equinox(180), mid-autumn(225), first day of winter - solstice (270) and mid-winter(315). The north (N) and south (S) ecliptic poles are shown as well (in yellow).

CrossHair:

You can toggle the crosshair from the <u>Gridlines</u> menu, or by using the F8 key.

This will draw a red crosshair through the centre of the screen as an aid in identifying the centrepoint of the current view and for determining directions. The arrow points to the North Celestial Pole, and circles indicate the angular distance from the centrepoint.

Zooming is done towards this centrepoint.

View Font:

You can adjust the font size from the <u>View</u> menu, or by using various key combinations.

This allows the user to increase or decrease the size of labels used on the display, or make them bold.

You can also use they keys Alt+ or Alt- to adjust the font size.

View Towards Fixed Direction:

This dialog box allows you to set your view towards a fixed viewing direction using underline horizontal coordinates.

This dialog box is accessible from the View Towards menu or by left clicking on the Alt/Azi data area.

Altitude may be entered in degrees minutes seconds (i.e. 45 30 0), or as decimal degrees (i.e. 45.5, or 45,5). Convenience buttons are provided to set the direction towards the zenith (straight up, Alt 90), the horizon (normal, Alt 0), or the nadir (straight down, Alt -90), and convenience scrollers are provided to increase and decrease the altitude by five degree increments.

Azimuth may be entered in degrees minutes seconds (i.e. 45 30 0), or as decimal degrees (i.e. 45.5, or 45,5). Convenience buttons are provided to set the direction towards north (Azi 0), east (Azi 90), south (Azi 180), or west (Azi 270), and convenience scrollers are provided to increase and decrease the azimuth by five degree increments.

The chosen fixed direction will be locked in the centre of the display.

- If viewing towards the horizon, the horizon appears as a straight horizontal line with the stars above it.

- If viewing towards the zenith (straight up), the stars appear in the centre of the display, and the horizon appears as a circle around them. You can imagine that your feet are pointing in the direction of your chosen azimuth.

- Inversely, if viewing towards the nadir (straight down, if you could see through the earth) the earth appears in the centre and the stars appear around the horizon.

View Towards Equatorial Coordinate:

This dialog box allows you to set your view towards and lock onto a specific celestial coordinate using equatorial coordinates.

This dialog box is accessible from the View Towards menu or by left clicking on the Rta/Dec data area.

Declination may be entered in degrees minutes seconds (i.e. 45 30 0), or as decimal degrees (i.e. 45.5, or 45,5). Convenience buttons are provided to set the view towards the north celestial pole (Dec 90), the celestial equator (Dec 0), or the south celestial pole (Dec -90) and convenience scrollers are provided to increase and decrease the declination by five degree increments.

Right ascension may be entered in hours minutes seconds (i.e. 5 30 0), or as decimal hours(i.e. 5.5, or 5,5). Convenience buttons are provided to set the view towards the vernal equinox (Rta 0h), the summer solstice (Rta 6h), the autumnal equinox (Rta 12h), or the winter solstice (Rta 18h), and convenience scrollers are provided to increase and decrease the right ascension by 20 minute (five degree) increments.

The chosen celestial coordinate will be locked in the centre of the display. This means that the same stars will remain in the center of the display, and the viewing direction will be constantly adjusted if required.

View Towards Ecliptic Coordinate:

This dialog box allows you to set your view towards and lock onto a specific celestial coordinate using ecliptic coordinates.

This dialog box is accessible from the View Towards menu or by left clicking on the ELat/ELng data area.

Ecliptic latitude may be entered in degrees minutes seconds (i.e. 45 30 0), or as decimal degrees (i.e. 45.5, or 45,5). Convenience buttons are provided to set the view towards the ecliptic north pole (ELat 90), the ecliptic (ELat 0), or the ecliptic south pole (ELat -90) and convenience scrollers are provided to increase and decrease the ecliptic latitude by five degree increments.

Ecliptic longitude may be entered in degrees minutes seconds (i.e. 45 30 0), or as decimal degrees (i.e. 45.5, or 45,5). Convenience buttons are provided to set the view towards the vernal equinox (ELng 0), the summer solstice (ELng 90), the autumnal equinox (ELng 180), or the winter solstice (ELng 270), and convenience scrollers are provided to to increase and decrease the ecliptic longitude by five degree increments.

The chosen celestial coordinate will be locked in the centre of the display. This means that the same stars will remain in the center of the display, and the viewing direction will be constantly adjusted if required.

View Towards Object:

This dialog allows you to chose an object to view towards and lock onto. For the solar system objects, or comets a static image of the object will also be displayed in the data area.

This dialog is accessible from the <u>View Towards</u> menu or by left clicking the image portion of the data display area.

1) First select the type of object to view toward:

a Star:
by common name, by Bayer Id number, by Flamsteed Id number, or by Bright Star Catalogue (BSC) number.

(The brightest star in) a Constellation:
by name or common name.

a Solar System object:
by common name.

a Comet:
by name

a Deep Sky Object:
by common name, by Messier Catalogue (M) number, or by New General Catalogue (NGC) Number.

2) Then select the required object from the popdown list:

The popdown list contains the brightest objects of that type. Objects currently disabled, or that cannot be seen at the current specified magnitude limits are greyed, but may still be selected. Click on an object, select OK and the view will turn towards and lock onto the chosen object. You may need to enable the object, or zoom in to see it in the projection.

The solar system objects and comets have integrated images associated with them. If the object you select has an image available, it is shown in the data area as well.

Once an object is selected, the view altitude and azimuth, and celestial coordinates, will be modified in order to keep the projection facing the specified object.

Terrestrial Coordinates:

Positions on earth are measured in latitude and longitude (Lat & Lng).

Latitude indicates how far north or south a position is from the equator, Lat 0. The geographic north pole is 90 degrees north and the south pole is 90 degrees south.

Longitude indicates how far east or west a position is from the prime meridian, Lng 0, which runs through Greenwich, London, England. Positions east of Greenwich are in the eastern hemisphere and have east longitudes. Positions west of Greenwich (the Americas, for example) are in the western hemisphere, and have west longitudes.

Ecliptic Coordinates:

Celestial coordinates are sometimes specified in ecliptic latitude and longitude (ELat & ELng), especially for the planets and objects near the sun.

Ecliptic latitude 0 (the ecliptic) corresponds to the path of the sun against the background of stars in it yearly motion as seen from earth. Ecliptic latitude is measured north and south from the ecliptic.

Ecliptic longitude corresponds to the position of the sun on this path. ELng 0 is the position on the first day of spring, the vernal equinox; ELng 90 is its position at the summer solstice; ELng 180, the autumnal equinox; and ELng 270, the winter solstice.

The ecliptic poles indicate the rotational axis of the earth's yearly orbit around the sun.

About MyStars!

This dialog shows the copyright and version information for MyStars!

This dialog is accessible at <u>startup</u> (until the program is registered), from the <u>help</u> menu, or by clicking on the MyStars! logo in the data display area.

If the application is not registered, you can press the REGISTER button which allows you to <u>register</u> the product, or you can press EVALUATE, which allows you to run the program unregistered in order to evaluate it.

Once the application is registered the REGISTER, and EVALUATE buttons do not show.

Edit Location Data:
(New for v2.3)

This dialog is accessible from the Datasets menu.

This dialog allows you to enter a new location or modify an existing location.

Enter a new location name if required. The recommended format is Country, City name.

Then select any latitude or longitude, or you can click on the map of the earth.

Latitude may be entered in degrees minutes seconds (i.e. 45 30 00 N), or as decimal degrees (i.e. 45.5 N, or 45,5 N). Convenience buttons are provided to set the view from the north pole (Lat 90 N), the equator (Lat 0), or the south pole (Lat 90 S), and convenience scrollers are provided to increase and decrease the latitude by five degree increments.

Longitude may be entered in degrees minutes seconds (i.e. 45 30 00 W), or as decimal degrees (i.e. 45.5 W, or 45,5 W). A convenience button is provided to set the view from the Greenwich meridian (Lng 0), and convenience scrollers are provided to increase and decrease the longitude by five degrees increments.

Finally, enter the appropriate standard time zone for the location. You can press Estimate to allow the system to guess the time zone based on the longitude, or you can enter a time zone directly.

With editing is complete, press the OK button, and the locations list is permanently updated.

View Status Bar:

You can toggle the status bar using F2, or from the <u>View</u> menu.

Selecting this option adds a status bar to the bottom of the screen, describing in more detail the menu items as they are selected, and indicating the state of calculation. Don't forget that you may access menu items even when computations are underway (WORKING...). It is not necessary to wait until it says WAITING... .

The mouse unfortunately is inoperative while the system is temporarily BUSY PAINTING.

Horizontal Coordinates:

Fixed directions towards the sky, from the point of view of an individual on earth, are often measured in altitude and azimuth (Alt & Azi).

Altitude indicates how far something is above or below the horizon. Straight up (towards the zenith) is Alt 90 degrees. Towards the horizon is Alt 0 degrees. Straight down (towards the nadir) is Alt -90 degrees.

Azimuth indicates the compass direction. North is Azi 0 degrees; East, Azi 90 degrees; South, Azi 180 degrees; and West, Azi 270 degrees.

Generally, as objects appear to move through the sky, their altitude and azimuth change, rising from the east and setting in the west.

Register

This dialog allows you to enter your registration number.

This dialog is accessible from the <u>About MyStars!</u> dialog until the product is registered.

If you have been sent a registration number, type it in the registration number box and press OK.

If you don't have a registration number, please read the <u>registration information</u>. You can press the CANCEL in order to continue evaluating this product.

Credits:

Where the images came from:

Venus:	JPL, NASA P-45186 Magellan
Mars:	HST Photo STScI-PRC95-17B
	Philip James (Univ. of Toledo)
	Steven Lee (Univ. of Colorado)
	NASA, STScI
Jupiter:	JPL, NASA P-20957C Voyager
Saturn:	JPL, NASA P-23883C Voyager
Uranus:	JPL, NASA P-29478 Voyager
Neptune:	HST Photo
	David Crisp (JPL)
	Heidi Hammel(MIT)
	STScI
Pluto	HST Photo STScI-PRC96-09 (1996/03)
	Alan Stern (Southwest Research Institute)
	Marc Buie (Lowell Observatory)
	NASA & ESA

Where the data came from:

Star data:	Bright Star Catalog, BSC5, Catalog 5050
	Astronomical Data Center,
	NASA Goddard Space flight Center,

Other data:

Astronomical Algorithms
Jean Meeus
Willman-Bell, Inc, Richmond, Virginia

Practical Astronomy with your Calculator
Cambridge University Press

D.K. Yeomans
JPL NASA

Equatorial Coordinates:

Celestial coordinates are usually specified in right ascension and declination (Rta & Dec). They are an extension of <u>terrestrial coordinates</u> into the sky.

Declination corresponds to terrestrial latitude. The point in the sky straight up from Lat X is always Dec X.

Right ascension corresponds to terrestrial longitude, except that Rta 0, is a fixed position in the stars and corresponds to the position of the sun on the first day of spring, the vernal equinox. As the earth rotates, the right ascension straight up from any longitude on earth increases as we move under the stars at that right ascension. Rta is measured in 'hours' as opposed to degrees.

The celestial poles indicate the axis of the earth's daily rotation.

View Full Screen:
(New for v2.3)

Full screen mode expands the projection area to fill the complete screen. In full screen mode all commands function exactly as they do in normal viewing mode, and animation (if it is running) proceeds as normal.

You can toggle in and out of full screen mode by pressing the ESC key, or by right clicking on the projection area. Full screen mode is also accessible from the <u>View</u> menu.

In full screen mode, even though the menus cannot be pulled down by using the mouse, they remain available using the keyboard hot keys. Alt-F (for example) will open the File menu; Alt-V, the View menu. ESC will close down any active menu.

Datasets:

(New for v2.3)

This menu allows you to modify data that is used by the application. From here you choose to edit the <u>locations list</u> or the <u>comets list</u>.

Stars and Constellations:

This dialog box allows you to specify if and how stars are to be shown.

This dialog is accessible from the Objects menu.

Stars can be totally enabled/disabled using the Display Stars box.

If stars are enabled:

Stars are shown in white. The number of stars shown is determined by the View Upto Magnitude dialog.

The general brightness of stars can be increased/decreased by adjusting the brightness value. Use this if your monitor does not show the stars bright enough on your display.

Labels can be added to the shown stars and are displayed in gray. These will be displayed only above the brightest stars if the stars are enabled and visible in the current view. If two stars are close together, only the brightest will be labeled; so as to prevent overlapping.   During animations labels may flicker on and off depending on the position and the number of brightest stars shown.

Possible labels include standard star names, Bayer&Flamsteed Ids [the Flamsteed Id (i.e.: Tau 37) is only shown if no Bayer Id exists for the star], or Bright Star Catalog (BSC) numbers.

Constellation labels can be added and are displayed in gold. These will be displayed centered within the visible stars of each constellation. If no stars of a particular constellation are being displayed, the constellation label will not be displayed.

Since the constellation names can easily clutter the display, Constellation Codes enables the abbreviated constellation code name to be displayed instead of the full constellation name. As above, if no stars of a particular constellation are displayed, the constellation code will not be displayed.

Common Names can optionally be displayed, which are English equivalent names for the constellations.

Constellation labels may overlap.

Sun, Planets & Moon:

This dialog box allows you to specify if and how the sun, planets, and the moon are to be shown.

This dialog is accessible from the Objects menu.

The Planets and Sun and/or the Moon can be totally enabled/disabled using the Display boxes.

Until the product is registered the Moon display cannot be enabled. For more information about registering the product see the registration information.

If Solar System Objects are enabled, the objects are shown as actual scaled images that are correctly scaled and correctly layered depending upon their distance. The moon also shows the correct phase.

You can choose whether:
- the number of objects shown is determined by the limit magnitude on the View Upto Magnitude dialog, or
- all the selected solar system objects are always shown, ignoring the limit magnitude.

You can also choose the minimum image size for the objects. Unless you have zoomed in, most objects would in general be less than a pixel in size. This minimum image size is used to allow the object to be recognizable even when sufficient zooming in has not yet been done.

Names can be added to the shown objects and are displayed in red. These will be displayed above the objects shown, and may overlap if objects are close to each other.

Comets:
(New for v2.3)

This dialog box allows you to specify if and how comets are to be shown.

This dialog is accessible from the <u>Objects</u> menu.

Comets can be totally enabled/disabled using the Display Comets box.

If Comets are enabled, they are shown as an image. The number of comets shown is determined by the View Upto Magnitude dialog.

You can choose the minimum image size for comets. The visual size of comets is not computed by this software, and is therefore arbitrary. Use the minimum image size to select an appropriate size for the images.

Comet names can be added to the shown comets and are displayed in cyan. These will be displayed above the comets shown, and may overlap if shown comets are too close to each other.

To edit the data about comets, or add new comets to be displayed, see the section about <u>Datasets</u>.

Deep Sky Objects:

This dialog box allows you to specify if and how the Messier objects (galaxies, nebula and clusters, etc.) are to be shown.

This dialog is accessible from the Objects menu.

These can be totally enabled/disabled using the Display Deep Sky Objects box.

If Deep Sky Objects are enabled, they are shown as appropriately scaled circles in magenta. The number of objects shown is determined by the View Upto Magnitude dialog.

Labels can be added to the shown objects and are displayed in magenta. If labels are selected, the name is shown, or the Messier number is shown if no name is common. Or you can select to show the names only, the Messier numbers only, or the NGC (New General Catalog) numbers only.

Comets List:
(New for v2.3)

This dialog shows the current list of comets. You can add, edit or delete comets from the list.

Press Add New, or select a comet from the list and select Edit, or Delete. This will pop up an edit comet data dialog.

When you have finished editing the comets list, press Done.

PLEASE NOTE: The data about comets changes from orbit to orbit. Therefore if you wish to compute accurate locations and magnitudes for the comets being displayed, it is important that you update these tables with new data yourself. A small sample of data has been included in these tables when installed, but it is far from complete, accurate, or up-to-date. Occasionally comet orbital elements are available on the internet. but the greatest source of new and historical comet orbital information remains the "Central Bureau of Astronomical Telegrams". They regularly publish new comet orbital elements which you can have sent to you by subscription. Information about CBAT subscriptions can be acquired at:

IAUSUBS@CFA.HARVARD.EDU or FAX 617-495-7231

Edit Comet Data:
(New for v2.3)

This dialog is accessible from the Datasets menu.

This dialog allows you to enter a new comet or modify data about an existing comet.

PLEASE NOTE: The data about comets changes from orbit to orbit. Therefore if you wish to compute accurate locations and magnitudes for the comets being displayed, it is important that you update these tables with new data yourself. A small sample of data has been included in these tables when installed, but it is far from complete, accurate, or up-to-date. Occasionally comet orbital elements are available on the internet. but the greatest source of new and historical comet orbital information remains the "Central Bureau of Astronomical Telegrams". They regularly publish new comet orbital elements which you can have sent to you by subscription. Information about CBAT subscriptions can be acquired at:

IAUSUBS@CFA.HARVARD.EDU or FAX 617-495-7231

Accurate orbital elements can then be entered as follows:

Enter the comet name
Enter the time of perihelion. (T). The format is yyyy/mm/dd.fffff
Enter the perihelion distance (q) in astronomical units
Enter the eccentricity of the orbit (e). For parabolic orbits use 1.0
Enter the inclination of the orbit (i) in degrees
Enter the argument of the perihelion (small omega) in degrees
Enter the longitude of the ascending node (capital omega) in degrees

All these values must be non-blank or the orbit will not be calculated.

Then you can enter the magnitude factors:
- the absolute magnitude (H)
- the slope of the magnitude (n)

If you leave out the magnitude factors default values of 6 and 4 will be used.

When editing is complete, press the OK button, and the comets list is permanently updated.