

Welcome to **Astro Meeus**, an implementation of selected algorithms from *Astronomical Formulae for Calculators* by Jean Meeus. This book is available from

Willmann-Bell, Inc.  
P.O. Box 35025  
Richmond, VA 23235  
phone 804-320-7016

and is highly recommended! The 1989 Willman-Bell catalog lists it at a very reasonable \$14.95. The topics covered in this HELP are as follows:

File - Save to file, About and Exit

Configuration - set the time, location and format

Sun and Moon - compute sun and moon positions and times

Planets - computes the position and times of the planets

## **File**

**Clear Screen** - This will clear the screen contents. Normally, the screen consists of 511 lines and will keep the most recent ones. However, if you are about to copy the screen to file via the Save menu item, you may want to clear the screen first.

**Save** - Allows you to save the current screen contents to file. A Windows style file selection box will appear where you may specify the filename.

**Exit** - Exits the program. Same as ALT-F4.

**About AstroMeeus** - Displays the cool looking AstroMeeus icon and gives you a short blurb about the program.

## Configuration

**Location** - Displays a list box with 150 cities in the U.S. You may choose one of these by clicking on them or you may type directly into the Geographic Description boxes for cities that do not appear on the list.

The file LONGLAT.TXT contains the info on these cities, sorted in alphabetical order by city name. You can edit this file using a regular ASCII editor to add more cities, up to 300. If you want to only add one city, it may be best to simply type the city information in the dialog box and then save it by selecting Save Configuration. If you are really determined to edit LONGLAT.TXT, I recommend saving the original file. You must use the following file layout when adding entries:

city name - 21 characters exactly  
latitude - in decimal degrees (north is positive)  
longitude - in decimal degrees (west is positive)  
time zone correction - in integer hours from Greenwich  
altitude - in integer feet

**Time Format** - Specify 24 hour or AM/PM clock, the number of digits in a time, the smallest unit (hours, minutes or seconds) and time zone. This will affect most time displays globally throughout the ephemeris. This dialog box may be iconized and kept on the icon bar at the top of the screen for quickly reformatting time displays.

**Angle Format** - Specify the resolution (degrees, minutes, seconds) and range of the degree quantities throughout the ephemeris. This dialog box may be iconized and kept on the icon bar at the bottom of the screen for quickly reformatting time displays.

**Twilight Type** - The twilight times that appear under the Sun and Moon menu entry may refer to either Civil, Nautical or Astronomical twilight. The difference between these three is how much lower the sun is below the horizon: each category marks when the sun is 6 degree lower in the sky than the previous. Civil twilight is when the sun is 6 degrees lower than sunset.

**Sun Position Type** - The position of the sun calculations under the Sun and Moon menu entry may be for the apparent position of the sun (as viewed from the earth) or the actual, or geometric position.

**Save Configuration** - Save the location, time format, date format, twilight type and sun position type to a file to be used next time. The file name is ASTROWIN.CFG.

**Julian Date and Time** - Sets the date and time for most ephemeris calculations. You may convert from Julian date to calendar date or from calendar to Julian dates for any year from 4713 B.C. Although B.C. dates are entered as negative, since the calendar goes from 1 A.D. to 1 B.C., 1 B.C. must be entered as zero, 2 B.C. as -1 and so on.

Depending on which way your conversion is going, you may enter either the

calendar date and time or Julian date and, after clicking on OK (or CR), the other date will be displayed. This will set the date that will be used in all other calculations. This dialog box may be iconized and kept at the bottom of the screen for quickly changing the calculation date.

## **Sun and Moon**

**Position of the Sun** - Calculates the position of the Sun for the global date and time.

**Sunrise** - Calculates the time of sunrise for the day set in the global date.

**Equation of Time** - The difference in minutes and seconds between the position of the sun and the position of the fictional mean sun. This may be used for sundial corrections.

**Equinox/Solstice** - Calculates the two equinoxes and solstices for the year of the global date.

**Position of the Moon** - Calculates the position of the Moon for the global date and time.

**Moonrise** - Calculates the time of moonrise for the day set in the global date. It will also print the phase of the moon for the beginning of the day.

**Angle of Limb** - Computes the angle of the moons bright limb which is measured in a counter-clockwise direction from the 12 o'clock position. It also shows the percent illuminated and draws a picture of the moon for the the global julian date.

**Phases of the Moon** - Calculates the four (or five) phases of the moon for the month of the global date.

**Sun/Moon Chart** - Produces a chart of twilight times, sunrise, sunset, moonrise, moonset and phases of the moon for the month of the global date. It will also print the phases of the moon for that month, and equinoxes or solstices, or eclipses.

**Eclipses** - Lists all the solar and lunar eclipses for the current year.

**Print Calendar Chart** - Draws the monthly calendar for the selected month in a new window. You can customize this calendar, fill it with the monthly astronomical data, and print it to your default printer. Since only scaleable fonts are used, your calendar will be much more attractive if you use Facelift, Adobe's Type Manager, or True Type (when available!))

## Planets

**Select Planets** - Select which planets to perform calculations for. Note that although there are 9 planets, only eight are listed here. The earth is excluded. Because of the nature of their orbits, the calculations for inner planets are more accurate than the outer planets. In general, the farther from the sun's influence, the greater the number of perturbations there are and consequently, the more difficult they are to predict. Pluto, the farthest out, will only give good results only for the years 1885 to 2099.

**Position** - The heliocentric and geocentric positions of each planet selected are printed with their distance to the sun in astronomical units.

**Rise/Transit/Set** - Computes the times of rise, transit and setting for each planet selected.

**Illuminated Fraction** - Computes the illuminated fraction of each of the planets. This applies mostly to Mercury, Venus and Mars as most of the other planets are always fully illuminated.