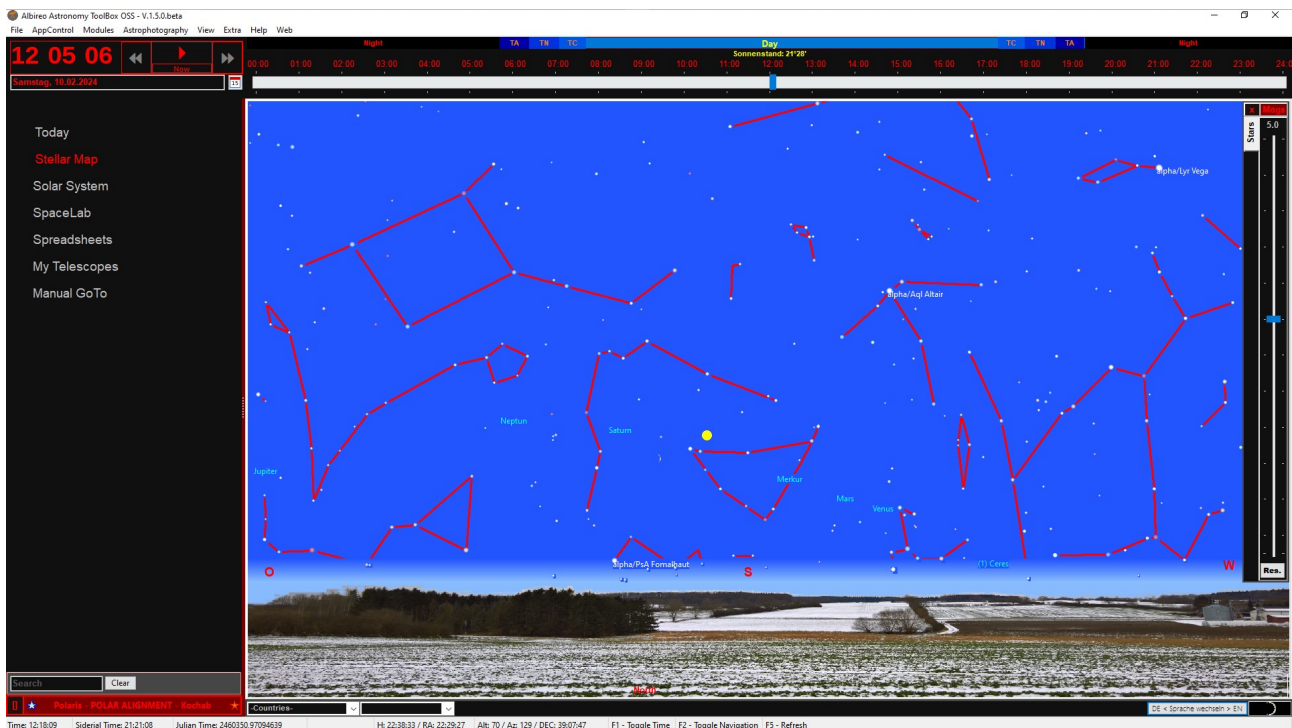


Albireo

Astronomy Toolbox

Version 1.5

Manual



by
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Author

Introduction

Do you need a software that puts the starry night sky on your computer's screen or smartphone? A lot of astronomical software products and apps currently exist in a daily growing market. The hobby-astronomer has the choice. Some of astronomical software tools are free of charge, other are commercial and you have to pay a license fee. Astronomical software tools can be equipped with impressive functional amount. Some of the best commercial software products have powerful visualisation capabilities implemented, which take the user to an impressive trip through a virtual universe.

The *Albireo Astronomy Toolbox* is an astronomical software for hobby & amateur astronomer. It embraces a wide range of astronomical features. It provides technical information as well as astrophysical background knowledge.

Albireo Astronomy Toolbox

Albireo is based on my experience, which I made during a VHS education course.

Most important part (so-called „module“) of the *Albireo Astronomy Toolbox* is the integrated star map. Many options are available to display different views of the starry sky on your computer. The starmap is able to display any kind of astronomical objects: Stars, Galaxies, Quasars, Galaktical and Planetary Nebula, Open Clusters, Planets, Asteroids und Comets.

An integrated search option for a wide range of astronomical objects allows the identification of an object and provides support to set-up the manual alignment of astronomers telescope.

Additionally the program provides management and evaluation capabilities for telescopes and other optical devices used by hobby astronomers. Based on aperture, focal length and other properties Albireo calculates the quality coefficients of the telescope like minimal and maximum usable magnification, limosity a.s.o.

Introduced in version 0.9.7 is the visualisation of our solar system including all planets, planetoids, asteroids and some comets.

Introduced in version 1.2 Albireo provides advanced aperture computation based on the image processor: Nyquist criteria, SNR optimization, dark current calculation or background limitation.

Albireo is also designed to be used in parallel with other astronomical programs (e.g. 3rd-party-guiding software). *Albireo Astronomy Toolbox* is able to run on any MS Windows 8, 8.1 and 10.

In August 2021 Albireo 1.4.0 becomes open source, GPLv3 License.

For more details about Albireo's features please take a look on the corresponding sections of this manual.

Albireo V.1.5.x continues the inclusion of visualisation capabilities for physical properties of astronomical objects.

Integrated Astronomical Database

Albireo does not need an internet access to get data from a remote server. It operates completely without a network connection. All astronomical data are stored in a local database which can easily extended and backed up by a experienced user.

With respect to lower resource computers a memory-reduced variant can be selected. In this mode only a part of the astronomical data are used by the system.

	Open Source Version
Number of Stars	1.000.000
Number of Galaxies	360.000
Other DSO(*)	1600
Solar system objects(**)	66

(*): DSO (DeepSky-Objects: Planetary Nebula, Galactic Nebula, Open Clusters and Quasars)

(**) Solar system objects: Planets (ohne without moons) , Asteroids und Comets

System Requirements

The *Albireo Astronomy Toolbox* is available for MS-Windows operating systems like Win 8, 8.2, and 10 and Linux (Mint). Other operating systems, e.g. Android, iOS, MacOS, are currently not supported.

Minimal display resolution size is 1024x768 square pixels, a 2 GHz CPU, 2GB RAM (the more the better). Albireo needs approximately 350 MB installation disk space. There are no special graphic hardware, software packages or other drivers needed to run Albireo.

Is the resource liited operation activated lower CPU speeds (< 2.1 GHz) are possible.

Installation

Download Albireo from stecknitz-astronomy.de

Run setup file *AlbireoSetupVXY.exe*

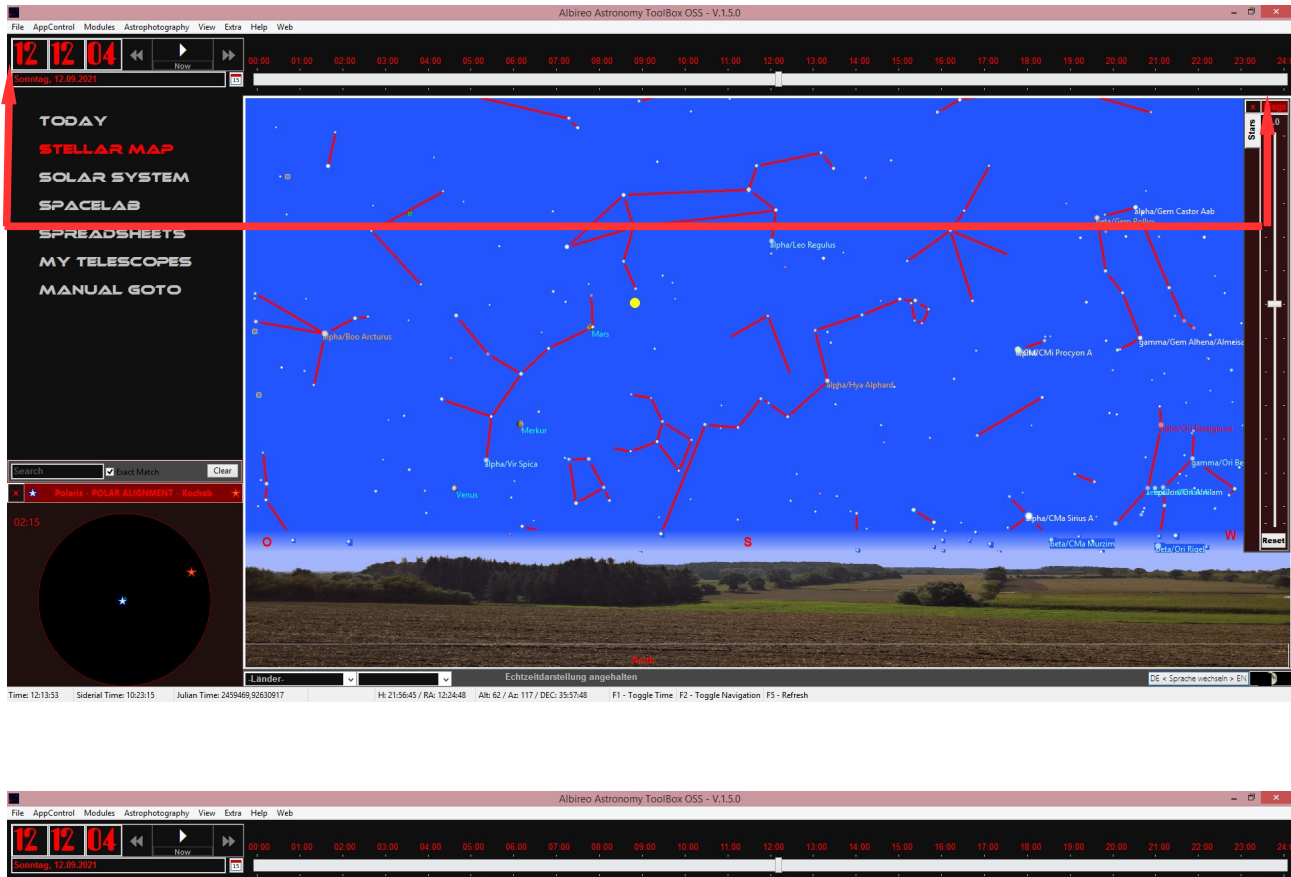
You can choose between a local installation and a system-wide installation for all users.

For the last case administrator privileges are required, furthermore a system warning is displayed (unknown manufacturer). Please allow to continue the installation.

The local installation does not require administrator privileges. This is the recommended option.

User Interface

Real-Time control panel



The real-time control panel is located in the left top range of the graphical user interface (GUI). It allows the definition of the observing date and time (via date picker selection box and three time input fields). To select a special time, please press on the || button to stop the real-time mode. Now you can change time via the slider element and the date via the date picker component. To return to the current date and time, please press the 'Now'-button, which is visible when the real-time mode is stopped.

An additional slider is located on the right side of the input fields of the time panel that also allows the time settings of the selected day. The leftmost slider position denotes midnight of the previous day (00:00), the middle position corresponds to 12:00 and the rightmost position is assigned to midnight of the selected day, 24:00.

Above the slider you can see a blue/black colorised area, which visualises the intervals of civil twilight, nautical twilight and astronomical twilight. That area becomes visible, if the mouse pointer is moved on the time slider (versions 1.3.3 and later). The daylight interval is painted in blue color, the night-intervals (2nd part of the night of the previous night on the left, 1st part of the night on the right side) in black color. Double-click with the mouse pointer opens the Moon & Sun-dialog.

Setting up Date & Time manually

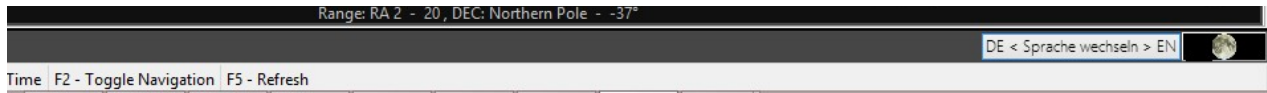
When the user presses button || the real-time mode is stopped. Now the symbol of the button is changed to > . Furthermore, the entry fields for time & date are ready for user input.

If the > button is pressed again the real-time mode is active and the symbol is changed back to || .

During the real-time mode the user can accelerate the time simulation via keys >> (forward) and << (rewind).

If the real-time mode is stopped the keys are labelled with + and – symbols in order to increase or decrease the hour, minute or second depending what was selected lastly. Alternatively the user can use the shift-key+mouse wheel for V.1.3.1 (mouse wheel only for V.1.3.0) - if available - or the up- and down arrow keys to change the time values.

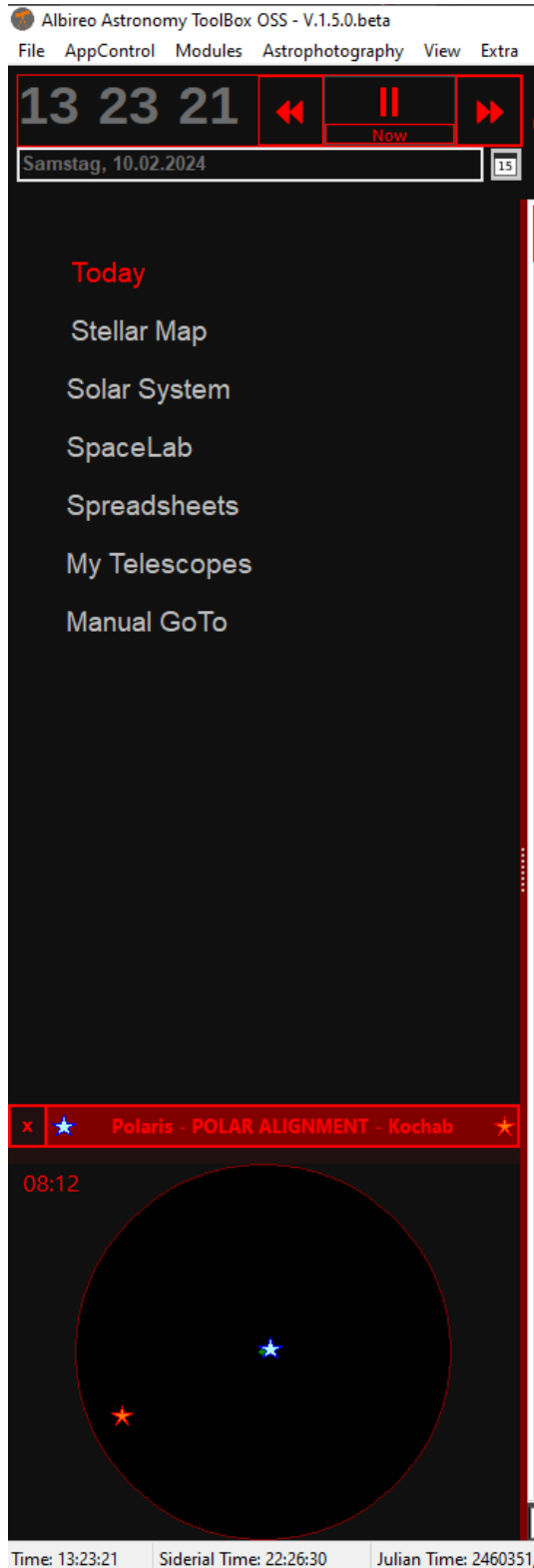
Moon Phases



The moon icon is displayed on the right bottom corner that represents the corresponding moon phase with respect to the selected time. Double-Click on the moon item opens the Moon & Sun dialog.

Navigation Area

The left hand side of the Albireo graphical user interface contains the navigation area. This is the starting point to all main modules of *Albireo Astronomy Toolbox*. Each button is assigned to a specific software module.



Today: Home screen that displays recommended astronomical objects

Stellar Map: Displays the stellar map visualisation (360° night sky view and horizon views) with many visualisation options.

Solar System: Visualisation of our Solar System including planets, dwarf planets, asteroids and some comets

SpaceLab: Calculation area for astronomical distances, angles, and comprehensive astrophotography sensor calculus (PRO-Version).

Spreadsheets:: Display all objects of a star constellation in a table view of a specific type (Stars, Galaxies, Nebula a.s.o.).

My Telescopes: Entry point of the astronomical device database, which provides functions for telescope management, valuation and visualisation

Manual Goto:: Calculates the coordinates for a selected astronomical object for equatorial or yaw mounts

Polaris – POLAR ALIGNMENT – Kochab:

Absolute Position of star *Kochab* in relation to the north star *Polaris*. This constellation is needed for precise northing alignment of parallactic telescopes (so-called *Kochab Method*). Can be minimized by pressing the [x] -button.

Main Menu

File/Close: Closes *Albireo Astronomy Toolbox*.

AppControl: Contains *Start/Stop* submenu for time control and *Refresh*-Submenu for refreshing the current displayed module und *Now* to set the current time.

Modules: Alternative way to select a main module

Astrophotography: Submenus which navigate to the corresponding astrophotography item of the SpaceLab module

View: Switches the time control panel, the navigation panel and the Kochab method northing panel

Extra/Sun and Moon: Opens the dialog to display sun's and moon's rise- and set-times.

Extra/Preferences: Opens the preferences dialog. Here is the place to set e.g. the geographical coordinates of user's position. The preferences should be configured properly before the first usage of other program modules.

Extra/Streaming: Opens the submenus for livestreaming (PRO only)

Extra/Horizon Designer: Opens the dialog for customer horizons creation

Extra/Orbital Parameter: Opens the dialog for orbital parameter calculation and conversion.

View/Time Control: Menu items to open or close the time control area, the navigation panel, the Kochab alignment panel and a menu item to switch into the fullscreen mode of the current view.

View/Navigation: Opens or closes the navigation area on the left hand side of the application

Help / Info: Links to Albireo resources and release information.

Help/Privacy Statement: Displays the privacy declaration of the Albireo Astronomy Toolbox

Web: Submenus for related websites (www.stecknitz-astronomie.de, www.twitch.tv/StecknitzAstro and the Download Portal of Albireo Astronomy Toolbox). Also, you can find here a menu *Donate* which forwards to the donation page of the Albireo Project and StecknitzAstro streaming.

Footer

The footer area shows – independently from the active program module – the current time, siderial time and Julian date. If the star map is active the current position of the mouse pointer in right ascension, hour angle and declination is displayed.

Preferences

When you start the *Albireo Astronomy Tollbox* for the first time it is recommended to navigate at first to dialog 'Preferences' to define your geographical location (latitude and longitude). Based on the user coordinates the Albireo program calculates the night sky simulation that shows the correct positions of stars and other astronomical objects due to the selected time and place.

The screenshot shows the 'Preferences' dialog box with a dark theme. It is organized into several sections, each with a red header. The 'Observation Location' section contains fields for Latitude (53° 52'), Longitude Greenwich E (10° 42'), City or Place (Lübeck), and State or Province (Deutschland). A dropdown menu for 'State or Province' is open, showing a list of countries and regions including Afghanistan, Alabama (USA), Alaska (USA), Albania, Algeria, Andorra, and Angola. The 'Daylight Saving Time' section has a checked 'Saving Time' checkbox, a 'MESZ' text field, and 'DST Delay in Hours' and 'Time Zone' both set to 1. The 'Language' section shows 'German' selected with a German flag and 'English' unselected with an American flag. The 'Personal Data' section has a 'Year of Birth' field set to 1964. The 'GoTo Control' section has an 'Output Directory' field set to 'C:\'. The 'Visualisation' section has two tabs: 'General' and 'Color Management'. Under 'General', there are 'Refreshrate [Minutes]' (5) and 'Line Thickness' (3) spinners, and checkboxes for 'Horizon Vapor' (checked) and 'Low PC Resources' (unchecked). Below these is a 'Horizon View' section with three radio buttons: 'Green (dynamic)' (selected), 'Desert', and 'Urban'. To the left of these radio buttons are three small landscape images corresponding to each option. At the bottom of the dialog are 'Reset', 'Cancel', and 'OK' buttons.

File

Observation Location

Degree Minutes

Latitude 53 52

Longitude Greenwich E 10 42

City or Place Lübeck

State or Province Deutschland

State or Province

Afghanistan
Alabama (USA)
Alaska (USA)
Albania
Algeria
Andorra
Angola

Daylight Saving Time



☒ Saving Time

MESZ

DST Delay in Hours 1

Time Zone 1

Language

☒ German  ☐ English 

Personal Data

Year of Birth 1964

GoTo Control

Output Directory C:\

Visualisation

General Color Management

Refreshrate [Minutes] 5

Line Thickness 3

☒ Horizon Vapor ☐ Low PC Resources

Horizon View

☒ Green (dynamic)

☐ Desert

☐ Urban

Reset Cancel OK

Dialog '*Preferences*' allows the user to put all the basic data needed to the correct real-time simulation of the night sky. Under area *Geographical User Location* the most important items like geographical latitude and longitude which can be figured out by you cell phone via GPS request or other smartphone apps. Or you simply take a look into an atlas. As an alternative you can select the country in listbox 'State or province' and activate the entry by double-click. After that the second listbox *city or places* shows a list of cities and other towns of the selected state. When you double-click on a selected city which should be located in your neighbourhood, the preferences dialog shows the appropriate latitude, longitude, time zone, language and daylight saving time. The precision should be sufficient to display correctly the night sky.

It is important that you put your location name, state and longitude and latitude into the corresponding fields *Longitude*, *Latitude*, *City or Place* a.s.o. Otherwise Albireo shows a warning message on the main screen *Albireo* to remember to configure Albireo correctly.

The preferences dialog contains input field regarding the daylight saving time and the language (English, German). You can edit the fields manually or it can be done automatically by selecting a state and city nearby your place from the listboxes in the top of the dialog which has been explained above.

Personal data

Please enter in *field birth year* your year of birth; this is required for some quality values of your telescope that depend on your age.

Visualisation

Under area *Visualisation, Tab General* you can set the time interval used for refreshing the real-time star map visualisation. Also you can simulate the horizon vapor and the line thickness used in the stellar map.

Furthermore, you can select the foreground landscape for horizontal views of the star map. Landscape options *Green (dynamic)*, *Desert* and *Urban* are currently available.

Option extension *dynamic* is used for seasonally adapted horizon pictures.

Section *Goto Control* contains the directory name used for Albireo-generated target files used for external telescope communication.

Check Checkbox *Low PC Resources* if Albireo is installed on a PC with low RAM (< 4 GB). When Albireo is started, only a part of the stars and galaxies are loaded.

Tab *Color Management* allows to set pre-defined or user-defined colors used to display star constellations, constellation boundaries of the stellar map, coordinate grids and auxiliary lines.

Press button *OK*, to save changed preferences else *Cancel*.

To reset the standard values you have to press button *Reset*. Please note that all personal and individual data are lost and replaced by default values.
All functionalities of these buttons are available via menu *File*, too.

Albireo displays always a warning message if you didn't set-up you preferences.

Menu *Extra/Sun and Moon*

The Sun and Moon dialog indicates the days, which are suitable for astronomical observations with respect to the darkness of the night sky. It can also be used for calculation of the optimal time for moon and sun studies.

The screenshot shows a software window titled "Sun and Moon" with a close button (X) in the top right corner. The window features a header bar with a date "17.03.2024" and a navigation menu with tabs: "March 2024", "Diagram", "Solar Eclipses", and "Lunar Eclipses". The main content area is divided into two sections. The top section, labeled "Sun", displays a large image of the sun rising over a dark horizon. Below this, there are two columns of time data for the sun. The left column lists "Start astronomical twilight" (04:26), "Start nautical twilight" (05:09), "Start civil twilight" (05:51), and "Sunrise" (06:26). The right column lists "End of astronomical twilight" (20:23), "End of nautical twilight" (19:40), "End of civil twilight" (18:59), and "Sunset" (18:24). The bottom section, labeled "Moon", displays a large image of the moon. Above the moon is the label "Culmination" with the time "18:55". Below the moon are the labels "Rise" (09:45) and "Set" (03:15). The moon phase is indicated as "1. Quarter".

Sun	
Start astronomical twilight	04 : 26
Start nautical twilight	05 : 09
Start civil twilight	05 : 51
Sunrise	06 : 26

Sun	
End of astronomical twilight	20 : 23
End of nautical twilight	19 : 40
End of civil twilight	18 : 59
Sunset	18 : 24

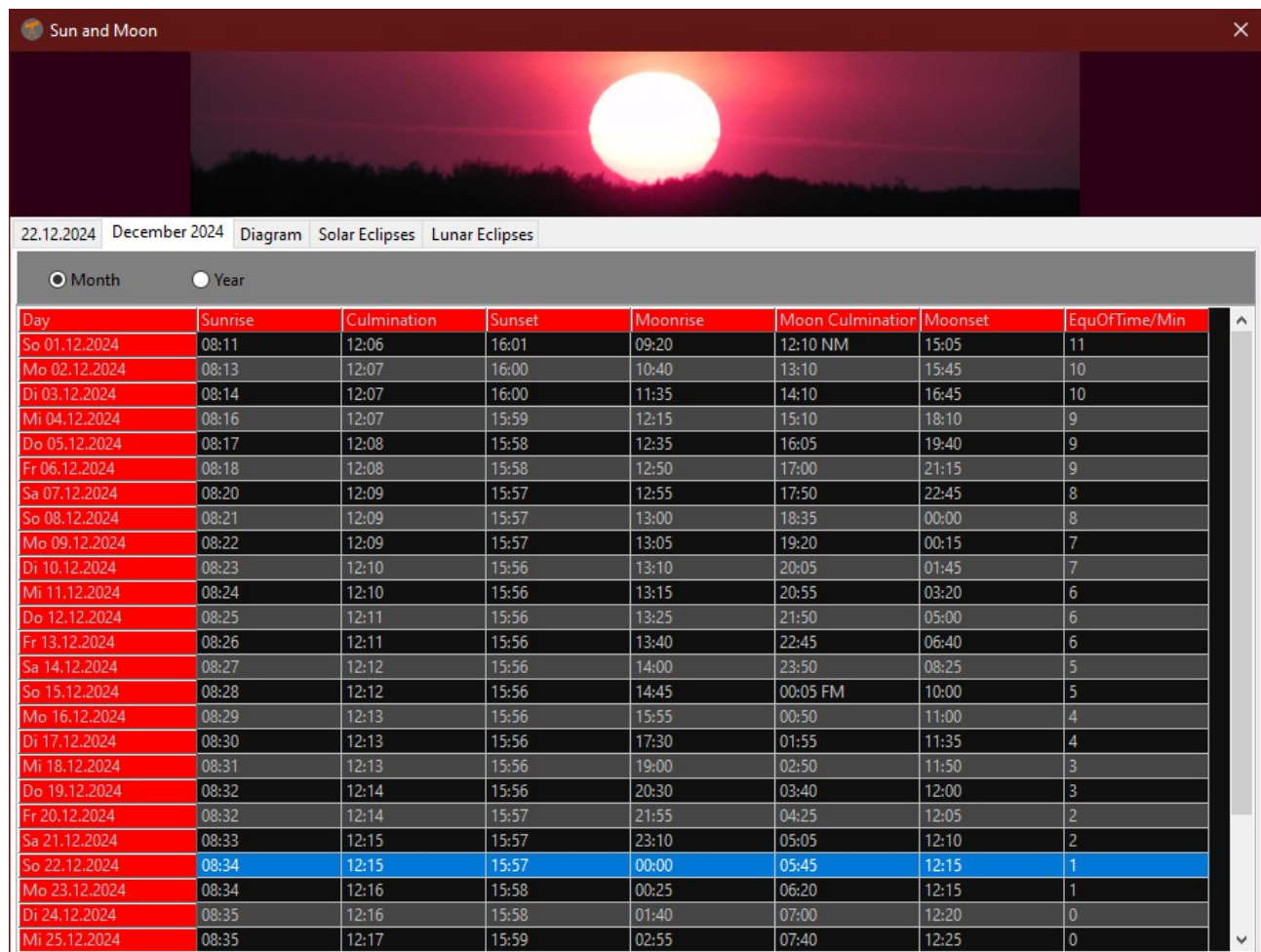
Moon	
Culmination	18 : 55
Rise	09 : 45
Set	03 : 15

1. Quarter

Menu *Extra/Sun and Moon* opens a form, which displays the rising and setting times for sun and moon; also the culmination times (the time of the highest position in the sky, the meridian passage). The data displayed are dependent of the time settings by the user via the main time control panel. Furthermore the moon phase is visualised and distinct time intervals regarding the civil, nautical and astronomical twilight.

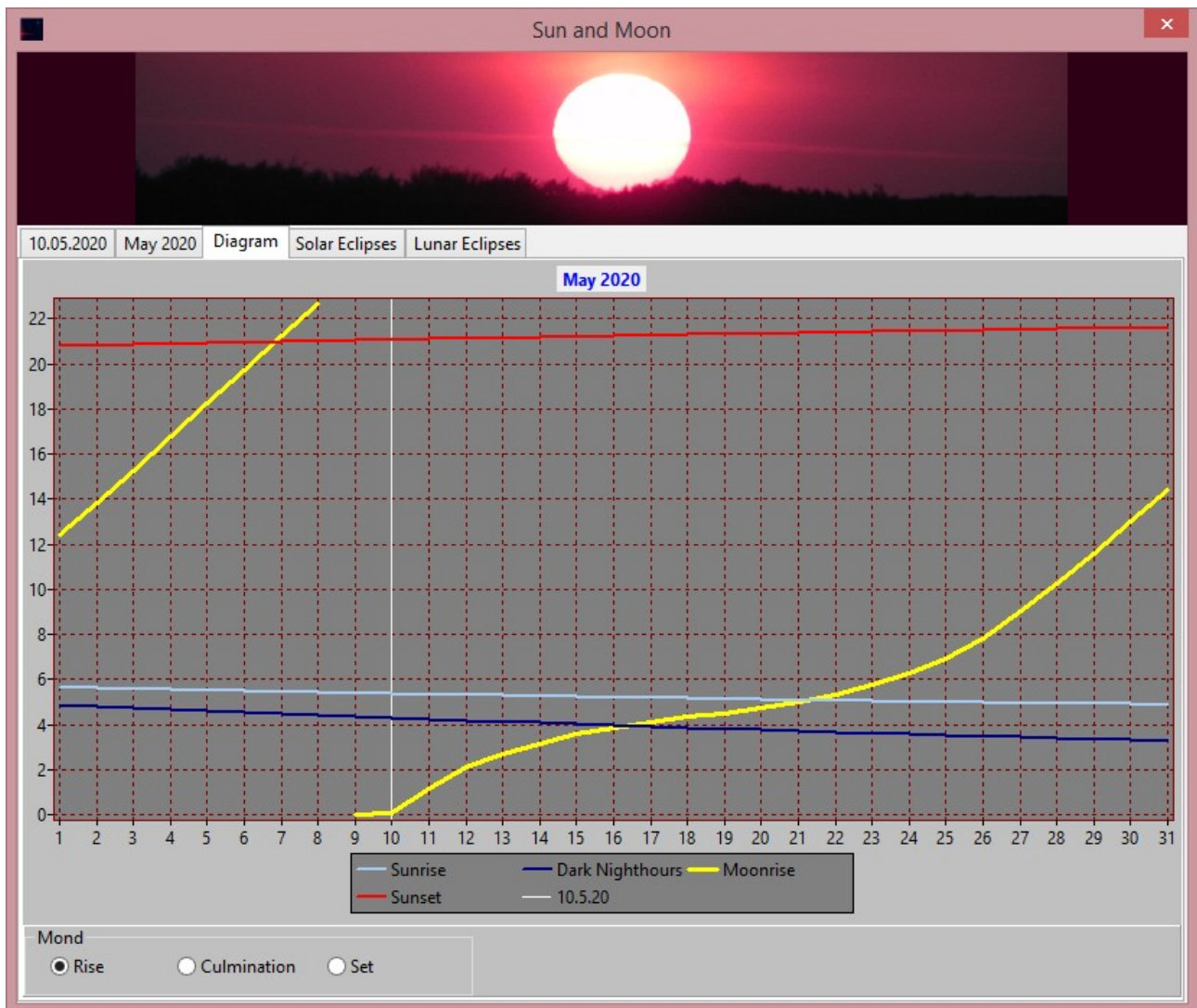
The second index card shows the rise and set of sun and moon and the culmination time for each day of the selected month and year. Last column contains the corresponding value of the equation of time.

The listed data depends strongly on the geographical latitude of your watching location.



Day	Sunrise	Culmination	Sunset	Moonrise	Moon Culmination	Moonset	EquOfTime/Min
So 01.12.2024	08:11	12:06	16:01	09:20	12:10 NM	15:05	11
Mo 02.12.2024	08:13	12:07	16:00	10:40	13:10	15:45	10
Di 03.12.2024	08:14	12:07	16:00	11:35	14:10	16:45	10
Mi 04.12.2024	08:16	12:07	15:59	12:15	15:10	18:10	9
Do 05.12.2024	08:17	12:08	15:58	12:35	16:05	19:40	9
Fr 06.12.2024	08:18	12:08	15:58	12:50	17:00	21:15	9
Sa 07.12.2024	08:20	12:09	15:57	12:55	17:50	22:45	8
So 08.12.2024	08:21	12:09	15:57	13:00	18:35	00:00	8
Mo 09.12.2024	08:22	12:09	15:57	13:05	19:20	00:15	7
Di 10.12.2024	08:23	12:10	15:56	13:10	20:05	01:45	7
Mi 11.12.2024	08:24	12:10	15:56	13:15	20:55	03:20	6
Do 12.12.2024	08:25	12:11	15:56	13:25	21:50	05:00	6
Fr 13.12.2024	08:26	12:11	15:56	13:40	22:45	06:40	6
Sa 14.12.2024	08:27	12:12	15:56	14:00	23:50	08:25	5
So 15.12.2024	08:28	12:12	15:56	14:45	00:05 FM	10:00	5
Mo 16.12.2024	08:29	12:13	15:56	15:55	00:50	11:00	4
Di 17.12.2024	08:30	12:13	15:56	17:30	01:55	11:35	4
Mi 18.12.2024	08:31	12:13	15:56	19:00	02:50	11:50	3
Do 19.12.2024	08:32	12:14	15:56	20:30	03:40	12:00	3
Fr 20.12.2024	08:32	12:14	15:57	21:55	04:25	12:05	2
Sa 21.12.2024	08:33	12:15	15:57	23:10	05:05	12:10	2
So 22.12.2024	08:34	12:15	15:57	00:00	05:45	12:15	1
Mo 23.12.2024	08:34	12:16	15:58	00:25	06:20	12:15	1
Di 24.12.2024	08:35	12:16	15:58	01:40	07:00	12:20	0
Mi 25.12.2024	08:35	12:17	15:59	02:55	07:40	12:25	0

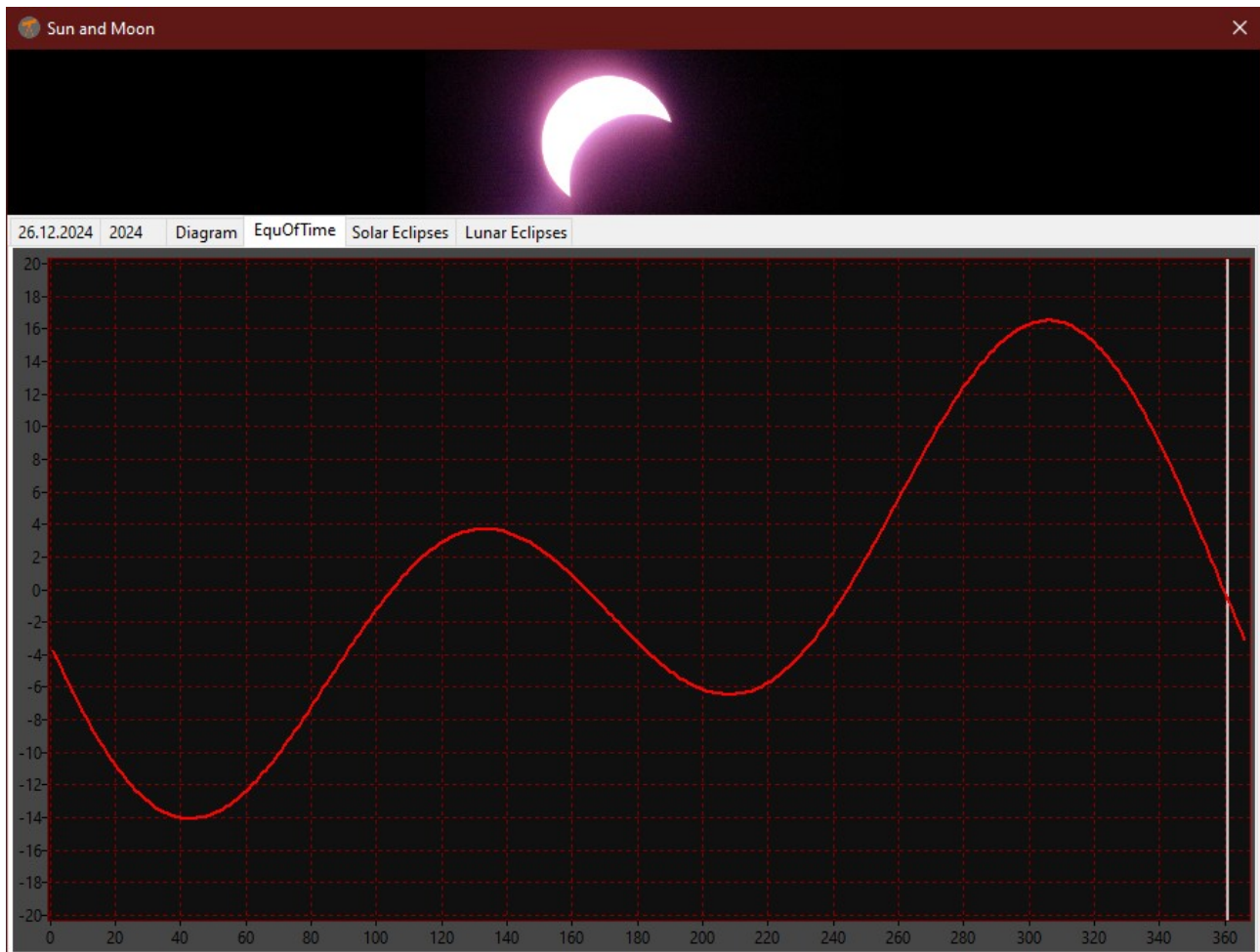
The third index card displays a diagram of the continuation of sun's and moon's set times and rise times and the time interval of dark night. The user can select which moon time (moonrise, culmination, moonset) is displayed.



Equation of Time

Index card #4 displays a diagram of the equation of time (the difference between the true time and the mean time in minutes) on the ordinate and the selected day range. The selected day range depends on the settings of index card #2 (selected month or whole year).

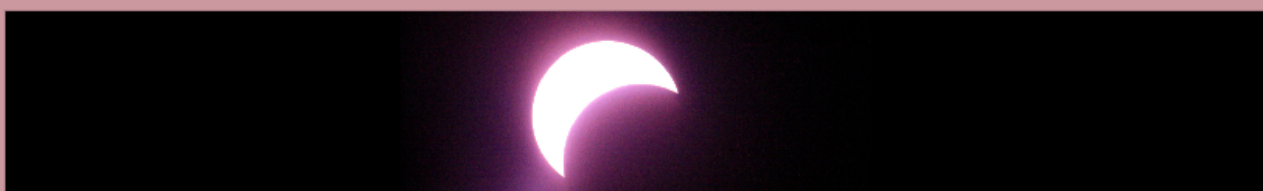
The selected day is highlighted as a gray colored vertical line.



Solar Eclipses


Index card #5 displays all solar eclipses between year 2018 and year 2029.

The columns contains date and time of maximal coverage, duration in minutes and seconds, the type of the eclipse, the coverage magnitude and the locations of the maximal coverage.

Sun and Moon				
				
10.05.2020	May 2020	Diagram	Solar Eclipses	Lunar Eclipses
Time	Duration	Type	Magnitude	Location
15.02.18 20:52	-	Partial	0.599	Antarctica, Southern South America
13.07.18 03:02	-	Partial	0.337	South Australia, Victoria, Tasmania, Indian Ocean, Budd
11.08.18 09:27	-	Partial	0.737	Northeastern Canada, Greenland, Iceland, Arctic Ocean,
06.01.19 01:42	-	Partial	0.715	Northeastern Asia, Southwestern Alaska, Aleutian Island
02.07.19 19:24	12:33	Total	1.046	Pitcairn Islands, central Argentina and Chile, Tuamotu A
26.12.19 05:18	12:40	Annular	0.97	Saudi Arabia, Bahrain, Qatar, United Arab Emirates, Oma
21.06.20 06:41	12:38	Annular	0.994	Democratic Republic of the Congo, Sudan, Ethiopia, Erit
14.12.20 06:14	12:10	Total	1.025	Southern Chile and Argentina, Kiribati, Polynesia
10.06.21 10:43	12:51	Annular	0.943	Northern Canada, Greenland, Russia
04.12.21 07:34	12:54	Total	1.037	Antarctica
30.04.22 20:42	-	Partial	0.640	Southeast Pacific, Southern South America
25.10.22 11:01	-	Partial	0.862	Europe, northeast Africa, Mid East, West Asia
20.04.23 04:17	12:16	Hybrid	1.013	Indonesia, Australia, Papua New Guinea
14.10.23 18:46	12:17	Annular	0.952	Western United States, Central America, Colombia, Brazi
08.04.24 18:18	12:28	Total	1.057	Mexico, central and northeastern United States, East Car
02.10.24 18:46	12:25	Annular	0.933	Southern Chile, Southern Argentina
29.03.25 10:48	-	Partial	0.938	Northwest Africa, Europe, northern Russia
21.09.25 19:43	-	Partial	0.855	South Pacific, New Zealand, Antarctica
17.02.26 19:43	12:20	Annular	0.963	Antarctica
12.08.26 17:47	12:18	Total	1.039	Arctic, Greenland, Iceland, Spain, Northeastern Portugal
06.02.27 16:00	12:51	Annular	0.928	Chile, Argentina, Atlantic
02.08.27 10:07	12:23	Total	1.079	Morocco, Spain, Algeria, Tunisia, Libya, Egypt, Saudi Ara
26.01.28 15:08	12:27	Annular	0.921	Ecuador, Peru, Brazil, Suriname, Spain, Portugal
22.07.28 02:56	12:10	Total	1.056	Australia, New Zealand
14.01.29 17:13	-	Partial	0.871	North America, Central America
12.06.29 04:06	-	Partial	0.458	Arctic, Scandinavia, Alaska, northern Asia, northern Can
11.07.29 15:37	-	Partial	0.230	Southern Chile, Southern Argentina

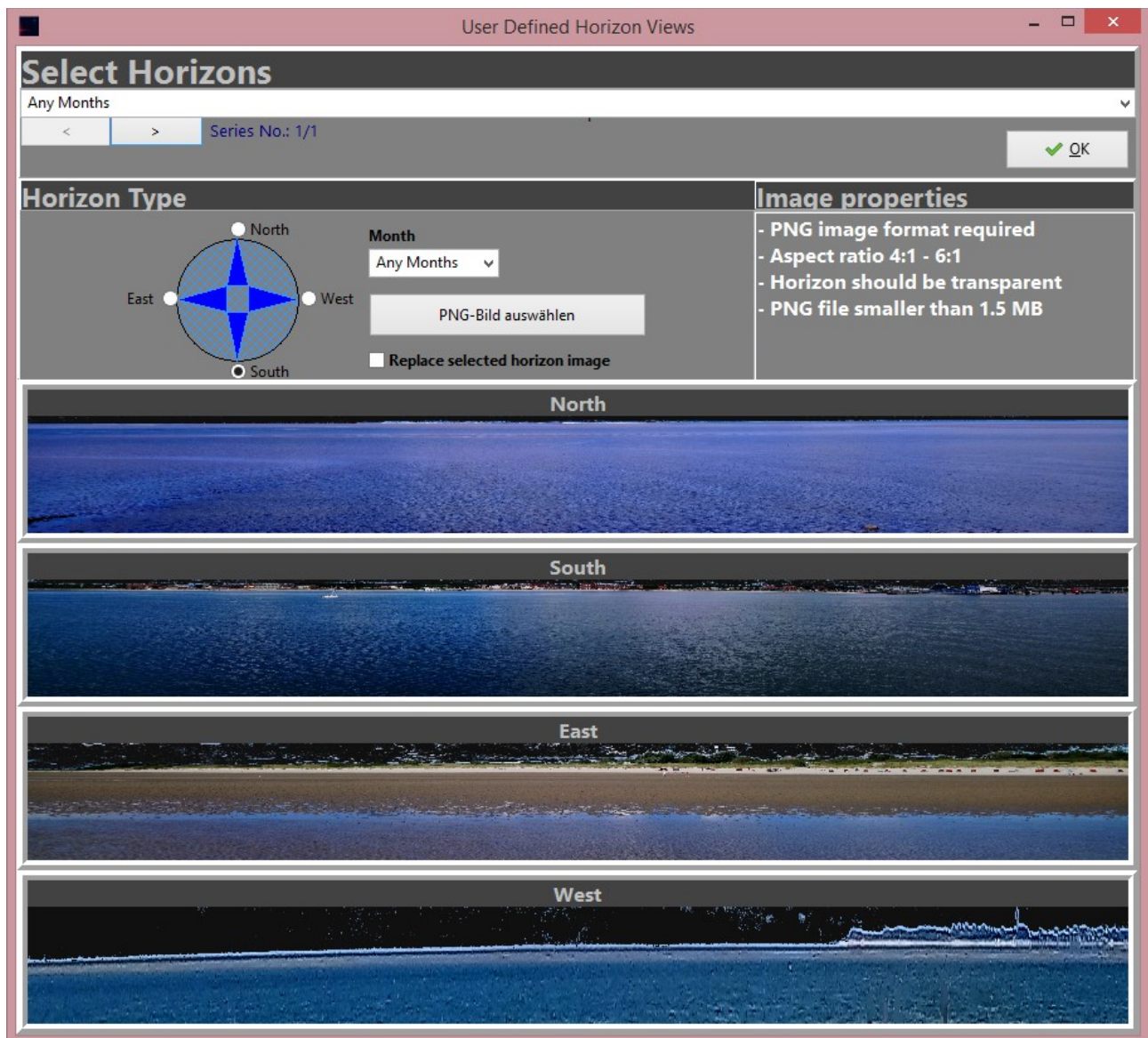
Lunar Eclipses

Index card # 6 shows all lunar eclipses between year 2018 and year 2029. The fields of the list contains the date and time of the maximal coverage, the type of the eclipse, durations of each coverage (penumbral, partial, total – if present) in hours and minutes and the locations of the maximal coverage.

Sun and Moon					
					
10.05.2020	May 2020	Diagram	Solar Eclipses	Lunar Eclipses	
Time	Type	Duration PU	Duration Part	Duration Total	Location
31.01.18 13:31	Total	05:17	03:23	01:16	Asia, Australia, Pacific, Northwest America
27.07.18 20:22	Total (c)	06:14	03:54	01:43	Southern America, Europe, Africa, Asia, Australia
21.01.19 05:13	Total	05:12	03:17	01:02	Central Pacific, Northern- / Southern America, Europe, A
16.07.19 21:31	Partial	05:34	02:58	-	Southern America, Europe, Africa, Asia, Australia
10.01.20 19:11	Penumbral	04:05	-	-	Europe, Africa, Asia, Australia
05.06.20 19:26	Penumbral	03:18	-	-	Europe, Africa, Asia, Australia
05.07.20 04:31	Penumbral	02:45	-	-	Northern- / Southern America, Southwest Europe, Africa
30.11.20 09:44	Penumbral	04:21	-	-	Asia, Australia, Pacific, Northern- / Southern America
26.05.21 11:19	Total	05:02	03:07	00:14	East Asia, Australia, Pacific, Northern- /Southern Americ
19.11.21 09:04	Partial	06:02	03:28	-	Northern- / Southern America, Northern Europe, East As
16.05.22 04:12	Total (c)	05:19	03:27	01:25	Northern- / Southern America, Europe, Africa
08.11.22 11:00	Total (c)	05:54	03:40	01:25	Asia, Australia, Pacific, Northern- / Southern America
05.05.23 17:24	Penumbral	04:18	-	-	Africa, Asia, Australia
28.10.23 20:15	Partial	04:25	01:17	-	Eastern Northern- / Southern America, Europe, Africa, A
25.03.24 07:13	Penumbral	04:25	-	-	Northern- and Southern America
18.09.24 02:45	Partial	04:06	01:03	-	Northern- and Southern America, Europe, Africa
14.03.25 06:59	Total	06:03	03:38	01:05	Pacific, Northern- and Southern America, Western Europ
07.09.25 18:12	Total	05:27	03:29	01:22	Europe, Africa, Asia, Australia
03.03.26 11:34	Total	05:39	03:27	00:58	Eastern Asia, Australia, Pacific, Northern- and Southern
28.08.26 04:14	Partial	05:38	03:18	-	Eastern Pacific, Northern- and Southern America, Europ
20.02.27 23:14	Penumbral	04:01	-	-	Northern- and Southern America, Europe, Africa, Asia
18.07.27 16:04	Penumbral	00:12	-	-	Eastern Africa, Asia, Australia, Pacific
17.08.27 07:14	Penumbral	03:39	-	-	Pacific, Northern- and Southern America
12.01.28 04:14	Partial	04:11	00:56	-	Northern- and Southern America, Europe, Africa
06.07.28 18:20	Partial	05:11	02:22	-	Europe, Africa, Asia, Australia
31.12.28 16:53	Total	05:36	03:29	01:11	Europe, Africa, Asia, Australia, Pacific
26.06.29 03:23	Total (c)	05:35	03:40	01:42	Northern- and Southern America, Europe, Africa, Middle

User defined Horizon Views

In addition to pre-defined horizons Green, Desert, and Urban the user is able to add customer specific horizon views.



Precondition is the availability of four images (PNG format) for each cardinal direction. The width/height ratio should be between 4:1 and 6:1. Furthermore the image files should be smaller than 1.5 MB each.

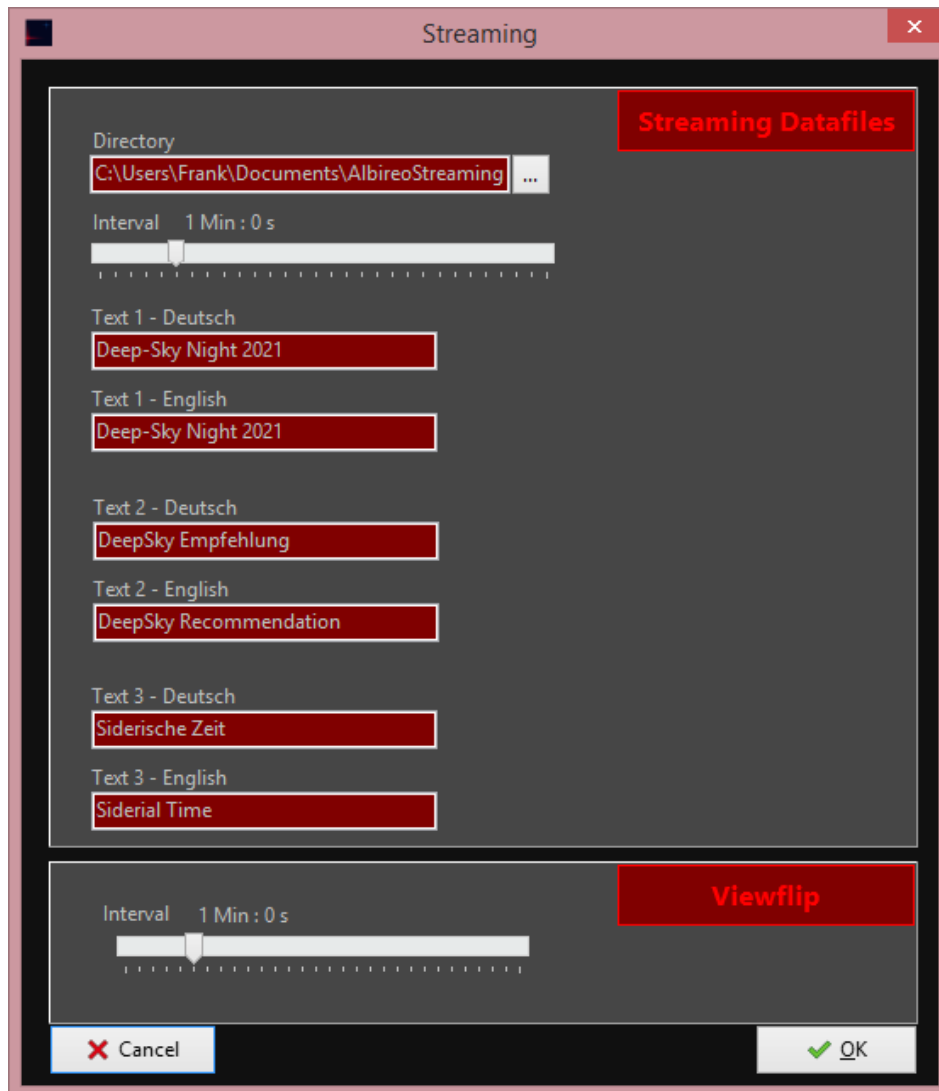
It is recommended that the sky parts of the images should be removed and replaced by transparency.

Also, the user can define monthly images, which reflects the seasonal changes of the landscape.

Livestreaming Support

Albireo Astronomy Toolbox contains special functions regarding the usage within a livestreaming session (e.g. Twitch, YouTube, a.s.o.).

The functions rely on the generation of data files and enable flip-views of the starmap screen based on pre-definable time intervals.



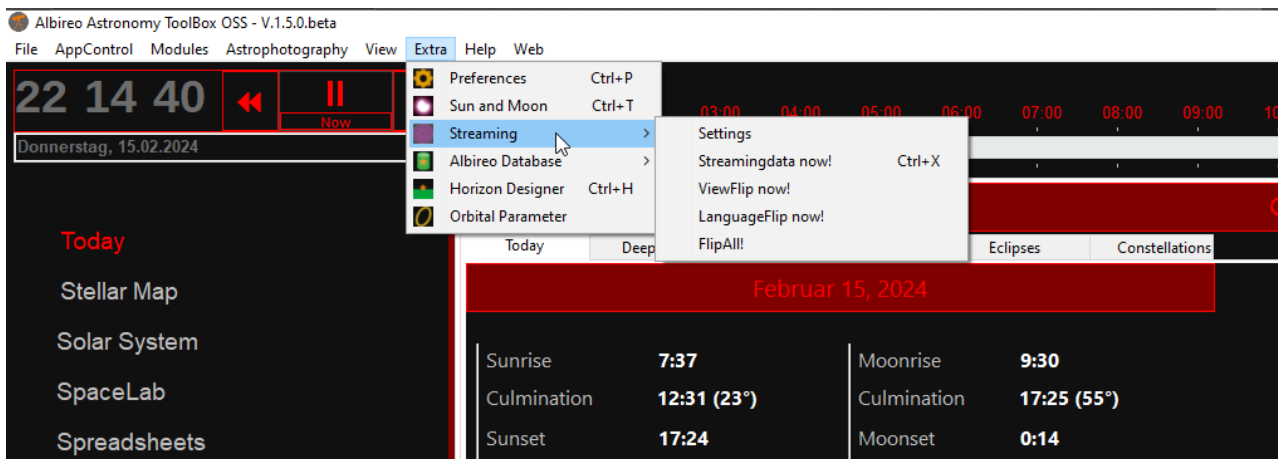
Input field *Directory* of group *Streaming Datafiles* contains the directory which hosts all generated data files used for e.g. livestreaming. Each datafile contains a specific dataset. Additionally, three text messages can be configured in German and English language respectively.

Currently we have data files for siderial time and time for sunrise, sunset, moonrise and moonset and three files each containing a text message described above.

Trackbar *Interval* defines the time interval for overriding the data files with updated data.

Trackbar *Interval* of group *View Flip* defines the time interval for the automatic view change of the starmap.

To control the streaming the user can navigate to three streaming functions represented by menu items *Extra/Streaming/StreamingDataNow!*, *Extra/Streaming/ViewFlipNow!* and *Extra/Streaming/LanguageFlipNow!*



If menu *FlipAll!* is selected, all streaming functions are switched at the same moment.

Menu *Albireo DataBase*

This menu contains submenu *Info* and *Administrate* to get statistical information about the astronomical database and to administrate orbital parameters and SIMBAD import support.

Submenu *Info*

Displays number of solar system objects like planets, asteroids, comets and trans-neptune objects.

Database Information			
Solar System		DeepSky	
Number of Planets	8	Number of Stars	1000043
Number of Asteroids	33	Number of Galaxies	360763
Number of Comets	26	Number of Quasars	453
Number of TNOs	5	Number of Globular Cluster	136
		Number of Nebula	277
		Number of Planetary Nebula	139
		Number of Open Cluster	763

Submenu *Administrate*

Should be used by experts only.

This dialogue enables recalculation of the LongitudeAtEpoch Parameter of an Asteroid to fit the corresponding position in the night sky.

Furthermore this dialog contains functions for SIMBAD import support for data of stars and galaxies, if required.

Albireo Database Manager

Asteroids Simbad LibMod

Asteroid

Name (German) (000) Asteroid Name (English) (000) Asteroid

Eccentricity 0.0 Inclination 0.0 Mass 10^{18} [kg] 0.0

Semimajor Axis (AU) 0.0 Diameter [km] 0.0 Vis. diam asec 0.0

Orbital period (Years) 0.0 Magnitude 0.0

Argument of perihelion [°] 0.0 Longitude of ascending node [°] 0.0 OmegaQ [°] 0.0

Longitude at the epoch [°] 0.0

Target data

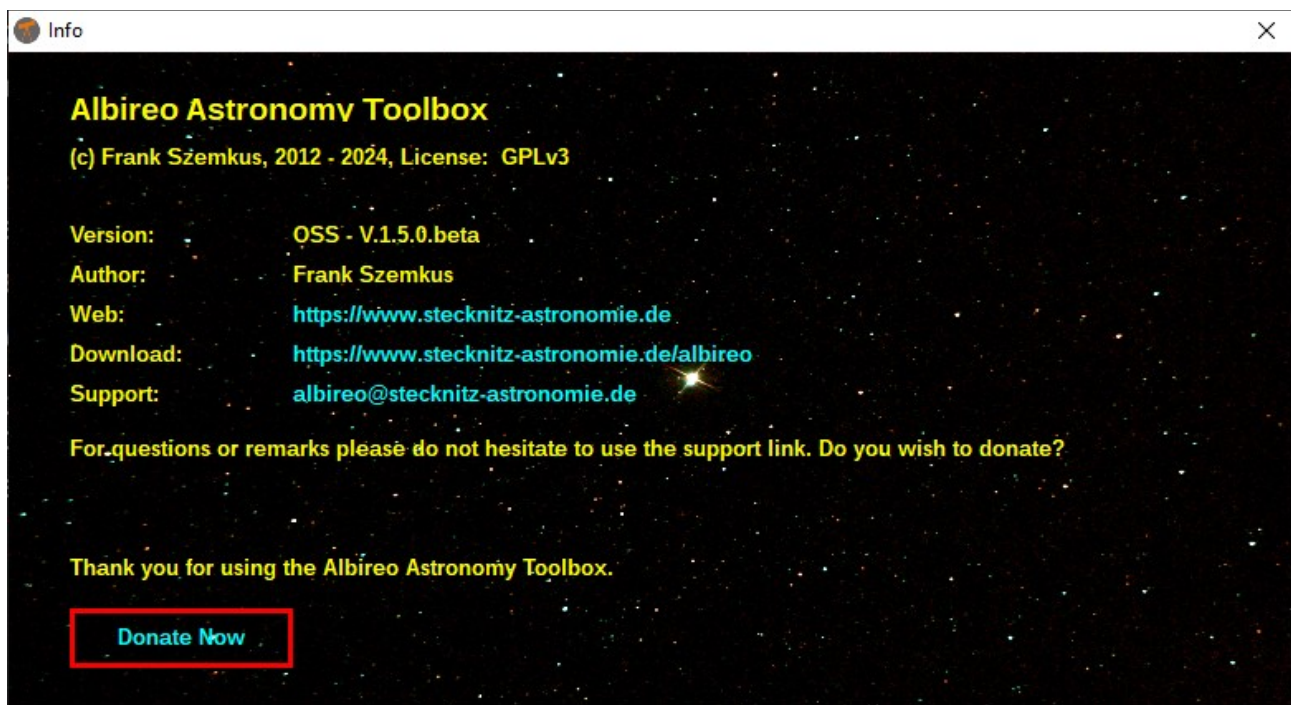
Date 09.02.2025 Time 16:43 RA HH MM SS 00 00 00 DEC Deg MM SS 000 00 00

Max Iterations 10 Epsilon 0.5

Add temporarily Add to library

Dialog Info

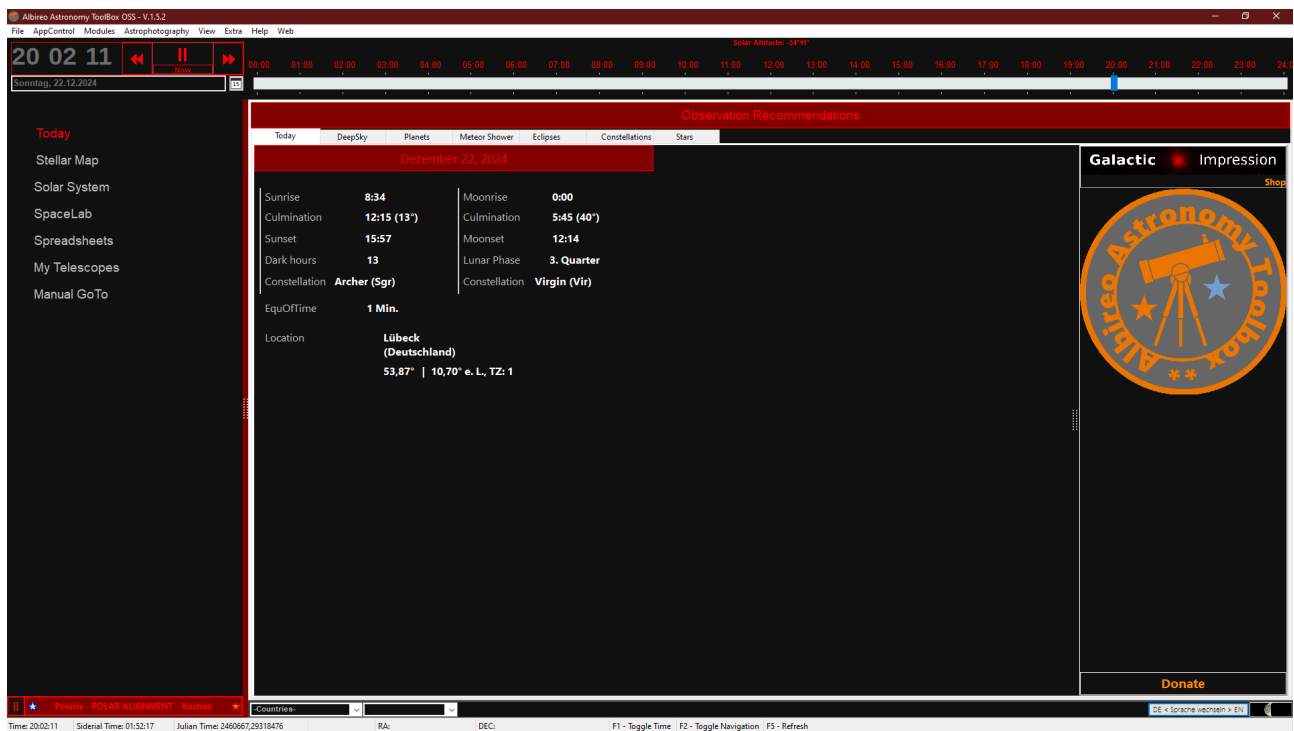
The info-dialog provides information regarding the version, author (me), the general manufacturer website (www.stecknitz-astronomie.de) and the download website of the *Albireo Astronomy Toolbox*. Furthermore an email-link for support is available.



Do not hesitate to click on the links below to get into contact with the author of the Albireo Astronomy Toolbox. Your feedback is greatly appreciated to improve the software.

After clicking on the links the standard-internet browser of your computer will be opened and connect you to the site. Also, a donation page of *Stecknitz-Astro* is presented in the internet browser, when the user is pressing the Donate-Button.

Module **Today**



Immediately after the *Albireo Astronomy Toolbox* has started up the program shows Albireo's **Today** screen (see picture above). The main area contains the current date and time, rise, culmination and set of sun and moon (and phase), estimated dark nighttime hours, the equation of time and the geographical co-ordinates taken from the preferences you made. Angle culminations values denotes the culmination height above the horizon. In addition, the constellation names of the position of sun and moon are displayed. On the right hand side some webbrowser links are available to the Astro-Gadget Shop of StecknitzAstro, the website (via the logo) and to the donation page (via 'Donate'-button). Revenues of the resources are used for website hosting and supply of materials for the astronomy course.

Furthermore, recommended astronomical objects which are visible at this time, are represented by a tab-control component. This includes DSOs, visible planets, active meteor showers, sun- und moon eclipses, constellations and bright stars. Default is the preselected time (today).


Example: Meteor Shower

The tab ‚Meteor Shower‘ displays the meteor showers of the selected month. Double-Click on table ‚Meteor Shower‘ shows a windows containing detail data of the selected meteor shower.

Meteor Shower

Pegasids

Constellation	Peg
Maximum-Day	10-07
Meteors per h	3
Speed m/s	63
Time from	00:00
Time until	04:00
Source comet	-



The left bottom area, which is also visible for any other modules, contains a button for language switching between English and German and a moon phase visualisation.

If you want to return to the home screen please press button 'Albireo' of the navigation panel.

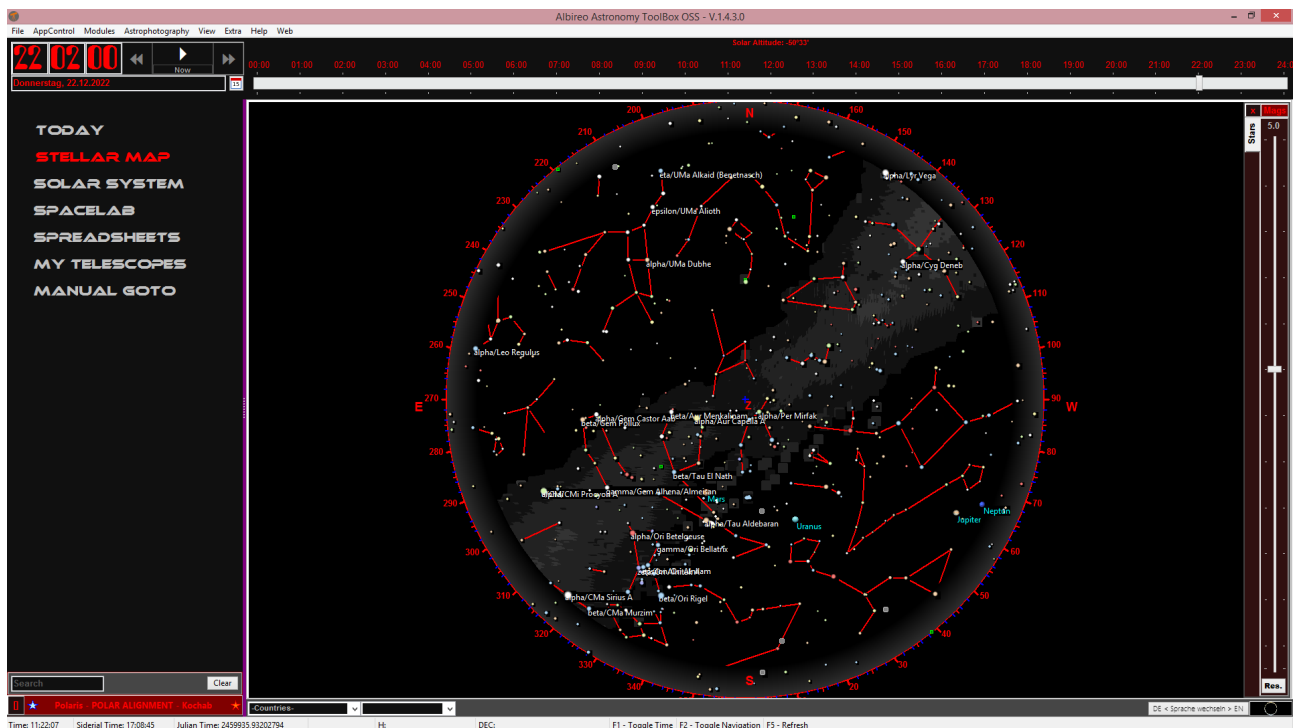
If some basic settings are not defined (e.g. your personal co-ordinates), an infobox is displayed here. It provides some additional information regarding the preferences dialogue.

A properly configured Albireo Toolbox is a precondition to simulate the night-sky correctly on your computer.

Module **Stellar Map**

Module 'Starmap' is Albireo's main module. All astronomical objects of the astronomy database are visualised via a stellar map representation. This is similar to an analogue stellar map which you can get from a book-shop.

Displayed is the starry night sky viewed by the user at the predefined geographic latitude and longitude and selected time. The spatial directions are marked by 'N'orth, 'S'outh, 'E'ast and 'W'est. If the default settings are used, stars, constellations, planets, moon and sun are displayed.



If button 'Starmap' of the navigation area is pressed, *Albireo's* main module 'Starmap' is opened. Dependent on the specified time and the geographic location of the user the corresponding starmap visualisation is displayed. The positions of sun and moon are also visualised, if visible at the sky for the selected time. Furthermore the user is able to zoom into a selected area of the starmap via a rectangular selection box..

The circular boundary around the sky visualisation illustrates the horizon line, the center of the starmap circle represents zenith's position.

Due to the default settings all stars are colorized accordingly to the spectral class. Also all visible constellations and visible planets and the largest asteroids and dwarf planets are displayed as default.

A comprehensive popup-menu is available when the user presses the right mouse button on the star map area. The menu contains various visualisation option for sun, moon, planets, ecliptic line, and optional representations of all other astronomical objects (detailed menu description see below).

When the mouse moves inside the starmap area the right ascension, declination and hour angle are shown in the status fields of the footer line. The mouse pointer image is changed from a pointer to a crosshair when it points on an object, which offers more information.

Furthermore, on the right-hand side a MAG panel is displayed. Here the user is able to control the magnitude of displayed stars and galaxies. The higher the selected magnitude the more stars and galaxies are displayed. Please note that a large number of stars and/or galaxies needs more system memory and more elapsing time for calculation.

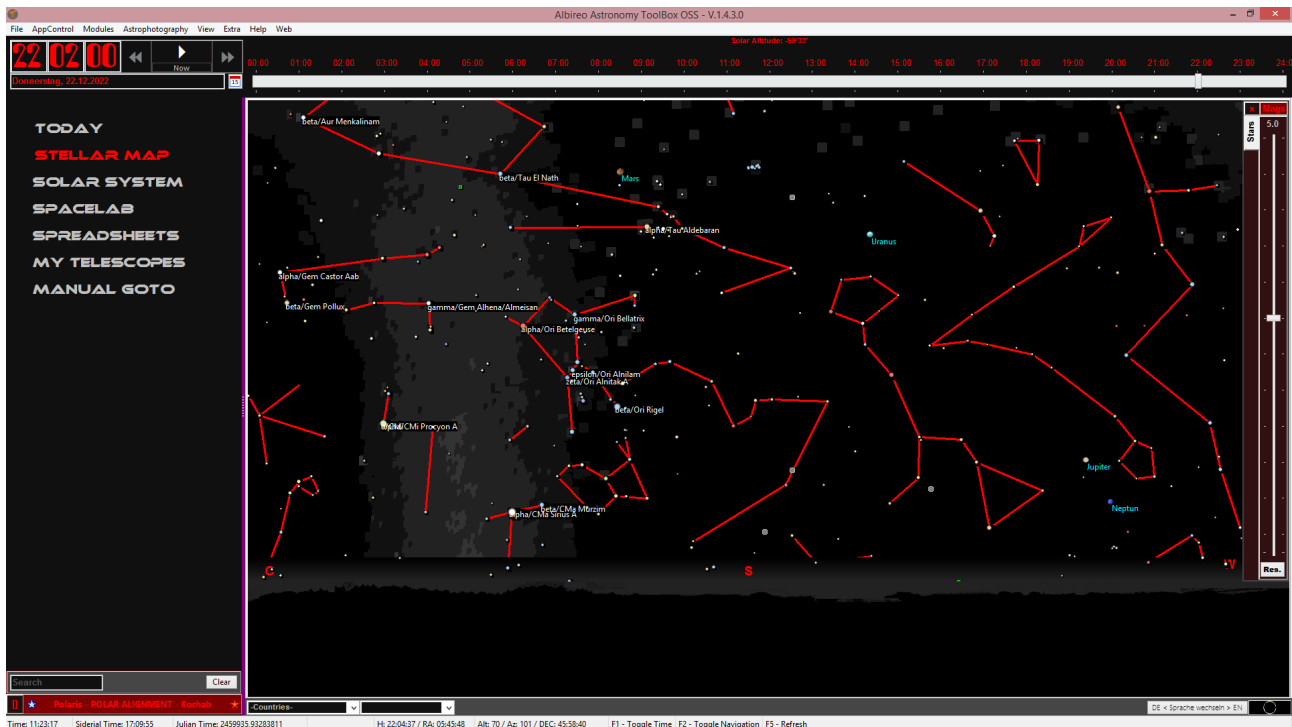
The lower area of the starmap contains combo-boxes Countries and Cities. Here you can select an alternative, temporary country and a corresponding city. Once done, the starmap will be generated for this alternative location. Key F5 will synchronise the time, too.

If you want to return to the default location, please press button *Reset to Base Location*.

Please note that the program can be closed only, if the default location is active. If not, a warning message comes up to inform you that you have to re-activate the default location using the button *Reset to Base Location*.

Horizon Views

Popup-Menu ,View/Horizon/' enables the horizon view mode. North, South, East and West directions can be selected via the horizon image to navigate into different horizon directions.



To display the navigation buttons the mouse has to move near the edges of the horizon area

The horizon picture can also be exchanged. Furthermore, the default picture is capable to visualize the current month view.

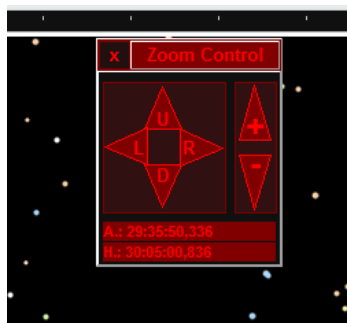
Zoom Mode

To zoom into the star map the user opens a rectangular area with the left mouse button. After releasing of the button the starmap area shows the astronomical objects within the selected rectangular frame. Additionally to stars also planetary nebula, clusters and galaxies are displayed under the zoom mode. To return into the star map mode the user presses the ESC key or simply clicks on the stellar map by the left mouse button.

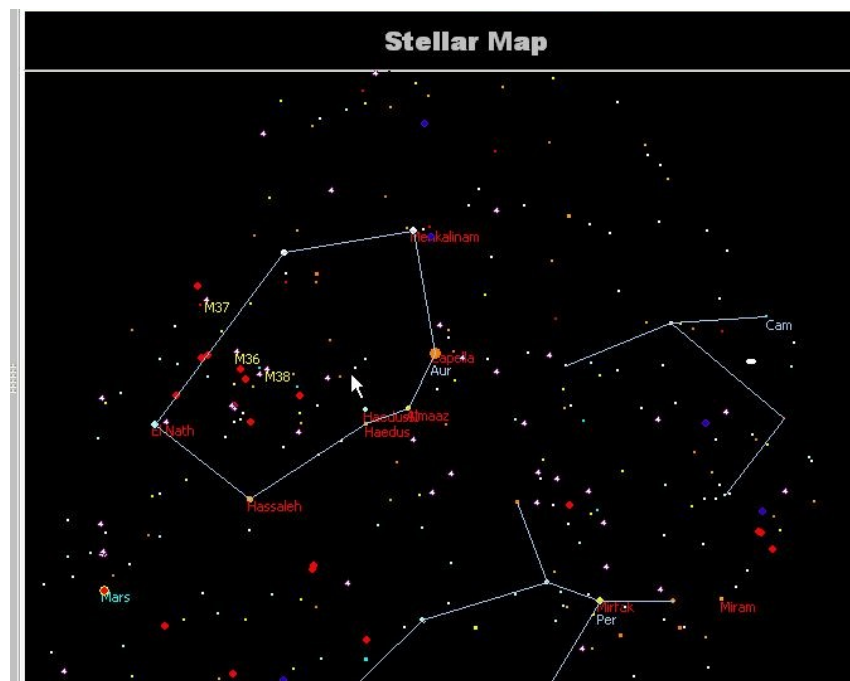
When Zoom is activated the user is able to increase or decrease the zoom factor via mouse wheel or via the Zoom-Panel located in the top of the starmap view. That panel is visible when zoom mode has been activated. Also, successive zoom or the movement of the zoomed area is supported. In the bottom of the control the dimensions of the zoom area are displayed in Azmiuth und Height (Altitude).



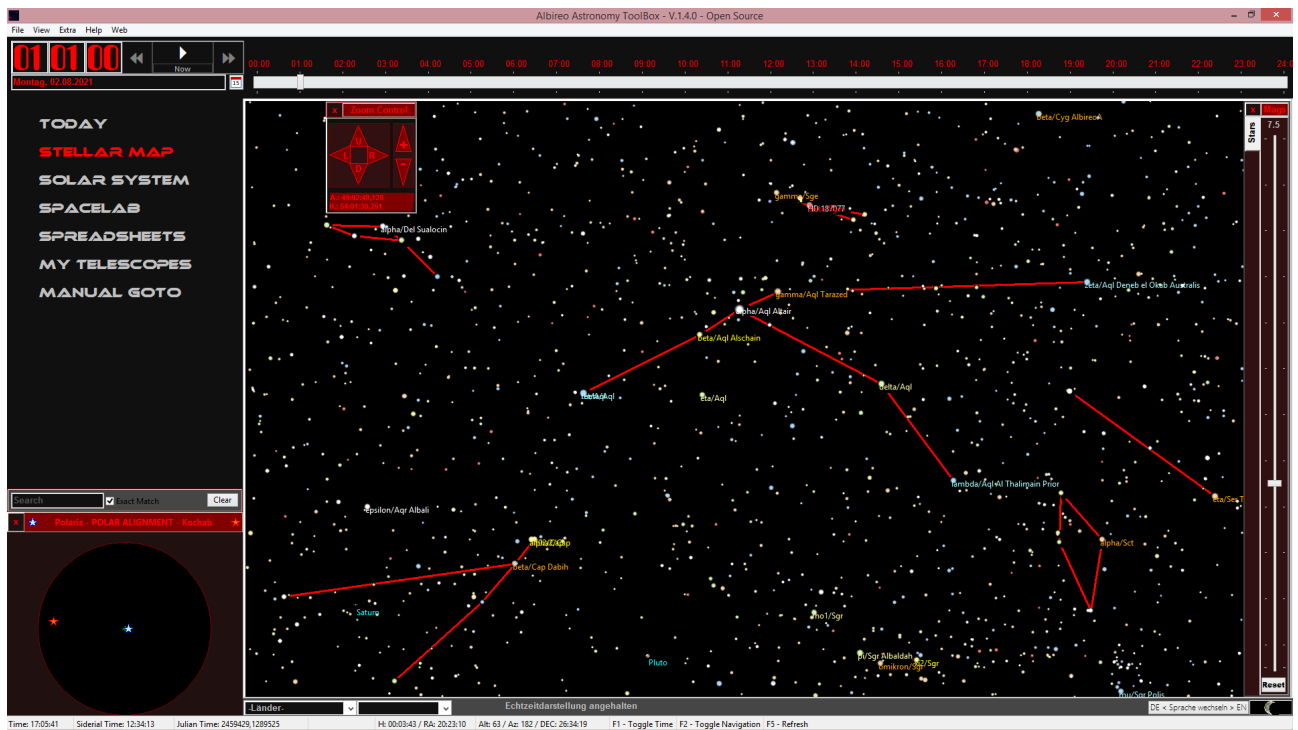
Zoom Frame



*Zoom Control
Element*



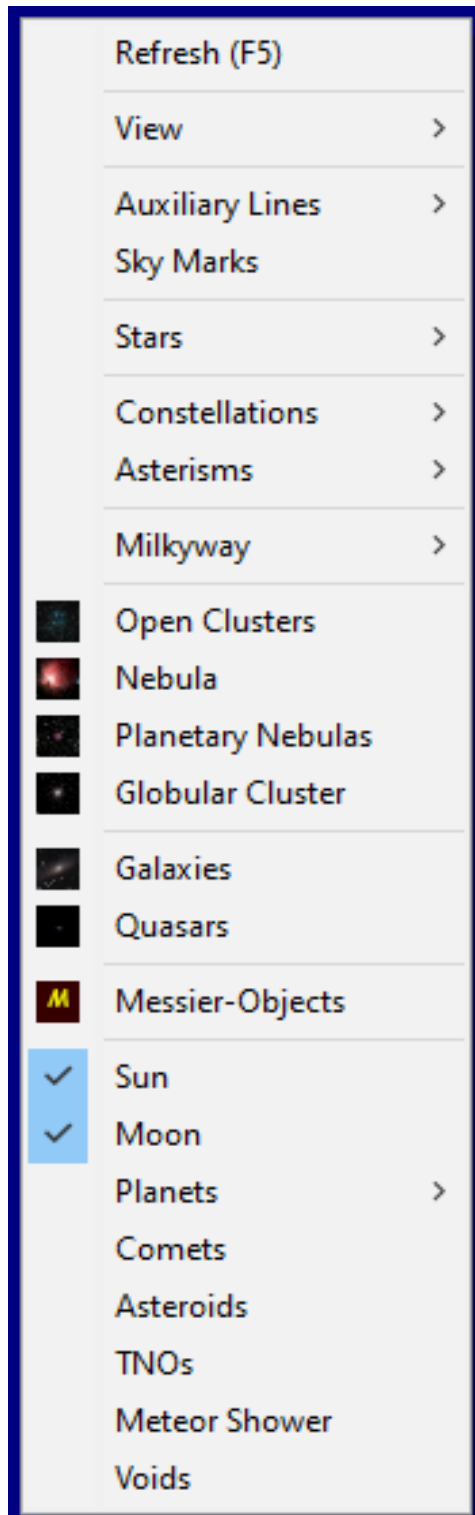
Zoomed Area



Zoomed area. The Zoom Control Panel is visible in the top of the starmap view. It can be minimized by the [x]-button. The Zoom Control Panel helps to enlarge, shrink or move the zoomed area.

The Popup-Menu

The popup-menu contains following stellar map items:



Refresh (F5): Repaints the stellar map

View – Show complete sky or show four horizon views and fullscreen mode

Auxiliary Lines: Print a variety of astronomical reference lines

Sky Marks: Shows positions of Earth rotation poles, ecliptic rotation poles, galactic rotation poles, center of milkyway and anti center of milky way

Stars – Display options of stars

Constellations – Display options for constellations

Asterisms – Display options for asterisms. Available are Summer/Spring triangle, autumn square, winter hexagon, big dipper, Brocchis cluster

Milkyway – Various milkyway representation options

Open Clusters – Show positions of open clusters

Nebula – Show positions of galactic nebula

Planetary Nebula – Show positions of planetary nebula

Globular Clusters – Show positions of globular clusters

Galaxies – Show positions of galaxies

Quasars – Show positions of quasars

Messier Objects – Show the locations of all Messier objects

Sun – Display sun position

Moon – Display moon position & phase

Planets – Show display options for planets

Comets – Show display options for comets

Asteroids – Show positions of asteroids

TNOs – Show positions of trans-Neptunian objects

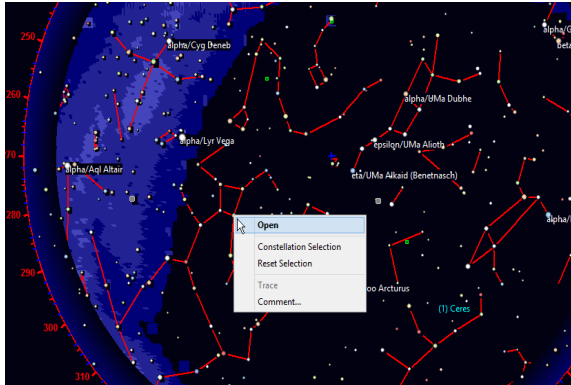
Meteor Shower – Show position of apparent meteor shower locations

Voids – Show position of known voids

(*) visible with respect to the selected time defined by the time control panel

The context menu of the selected object

An alternative menu is available for any selectable object displayed in the stellar map. This menu opens clicking on the object via the right mouse button.



Several options are available depending on the type of the selected astronomical object:

- Open: Opens the object visualisation frame
- Constellation Selection: Highlights the selected constellation of the object
- Trace: Shows the trace of a solar system member (e.g. a comet or planet) for the past 4 weeks (dark green) and next 4 weeks (bright green)
- Comment... User comments for each astronomical object

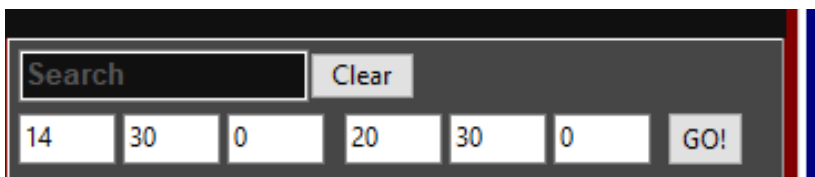
Customer images

The *Albireo Astronomy Toolbox* offers the capability to add new images into the infobox gallery. At first you have to double-click an object on the stellar map. After that the infobox is opened. Now select index card 'Photos'. Finally press button 'Add' and select the image path to add a customer image (up to three per object) from the harddisk.

Extended Navigation Area

The navigation of the stellar map module contains two additional panels: A search panel and a meteor shower table.

Search Panel

The image shows a software interface for a search panel. It features a dark grey background. At the top, there is a text input field with the placeholder text "Search" and a "Clear" button to its right. Below this, there are six small input fields for numerical values, arranged in two groups of three. The first group contains the values "14", "30", and "0". The second group contains "20", "30", and "0". To the right of these fields is a button labeled "GO!". The entire panel is bordered by a thin red line on the left and bottom, and a blue vertical bar on the right.

The search panel can be used to find out and identify each astronomical object, which is registered in the Albireo database. The search field accepts NGC and Messier numbers as well as common name and label, full or fragments, or the so-called Bayer Notation (e.g. *beta Ori*). In the case of a descriptive text fragment all matching objects are shown in the result list below and marked additionally in the stellar map. When the user clicks on a search result item a infobox opens, which shows additional object information and – in the case of stars or planets - a size comparison to the sun or earth respectively.

In addition the user is able to search a single RA/DEC-location. To do so, please enter the appropriate values into the edit fields for RA and Declination and press button GO!. After that the program moves the RA line into South (or North for southern locations) direction and calculates the corresponding local time for the star map..

Example

If you want to see all stars in constellation Orion you have to select a date for which the constellation is visible (e.g. day of December). After that it is convenient to perform the search for string *Ori*.

Object Details – The Infobox

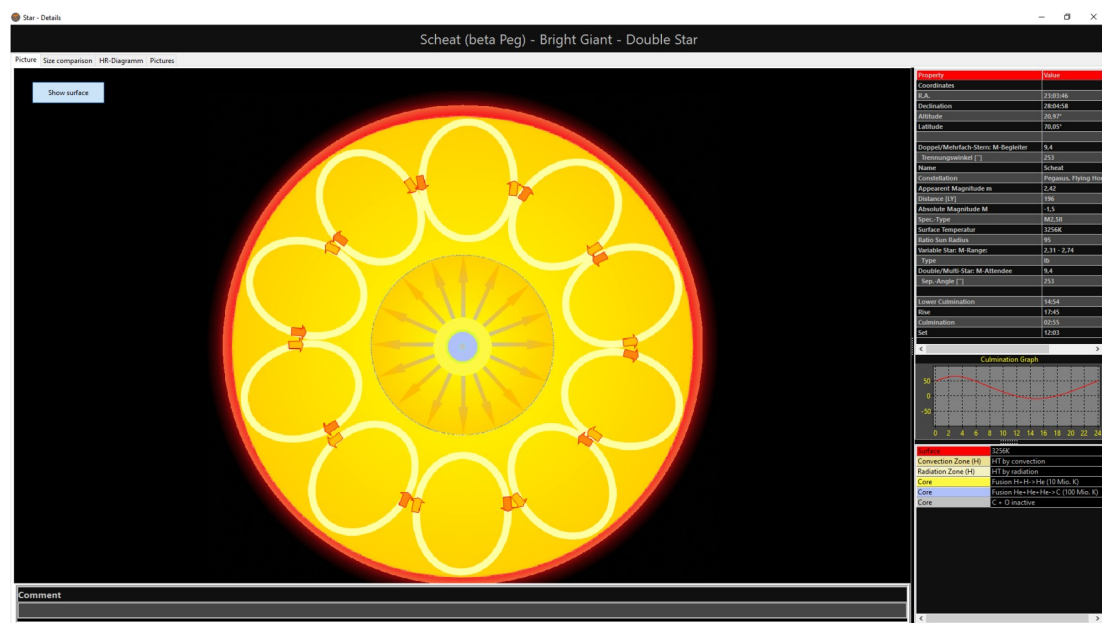
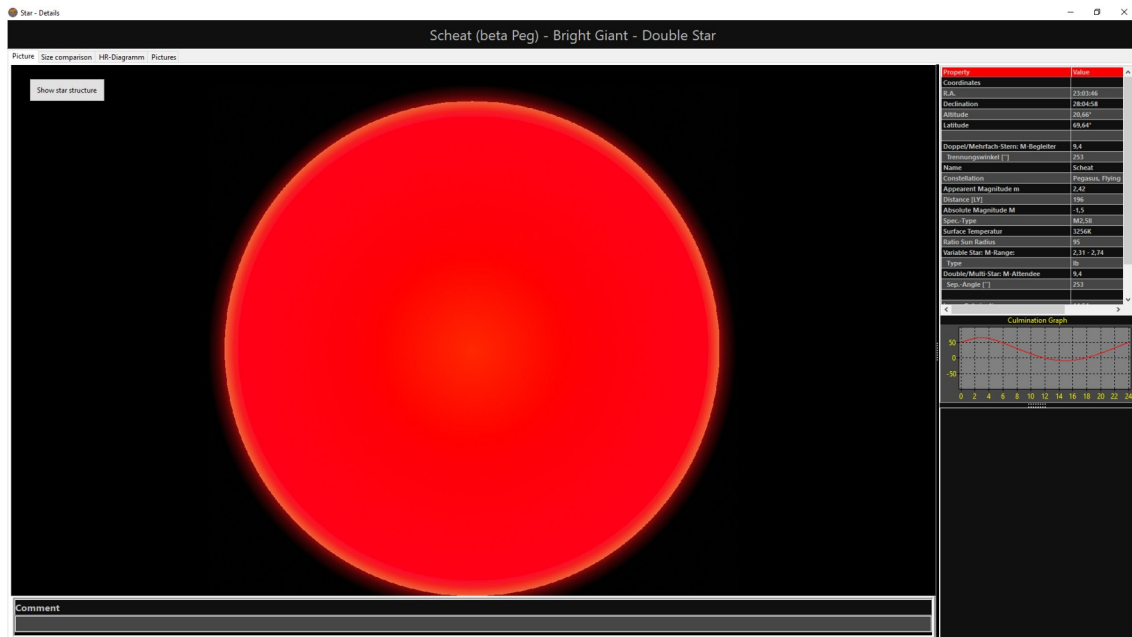
The infobox provides additional information of a selected astronomical object. In the case of stars or planets a visualisation of the diameter compared to the sun or earth is shown respectively. The scale of the scenario can be changed by the slider on the left.

Furthermore the user can assign his own customer pictures to the selected astronomical object, The images are displayed in a tab sheet at the right upper area.

The infobox is opened, when the user double-clicks on a table row in the database view or when he clicks on an object of the stellar map. The dialog contains general information of the selected astronomical object (size, distance, right ascension, declination, apparent visibility) as well as object specific properties.

Tab item: Picture

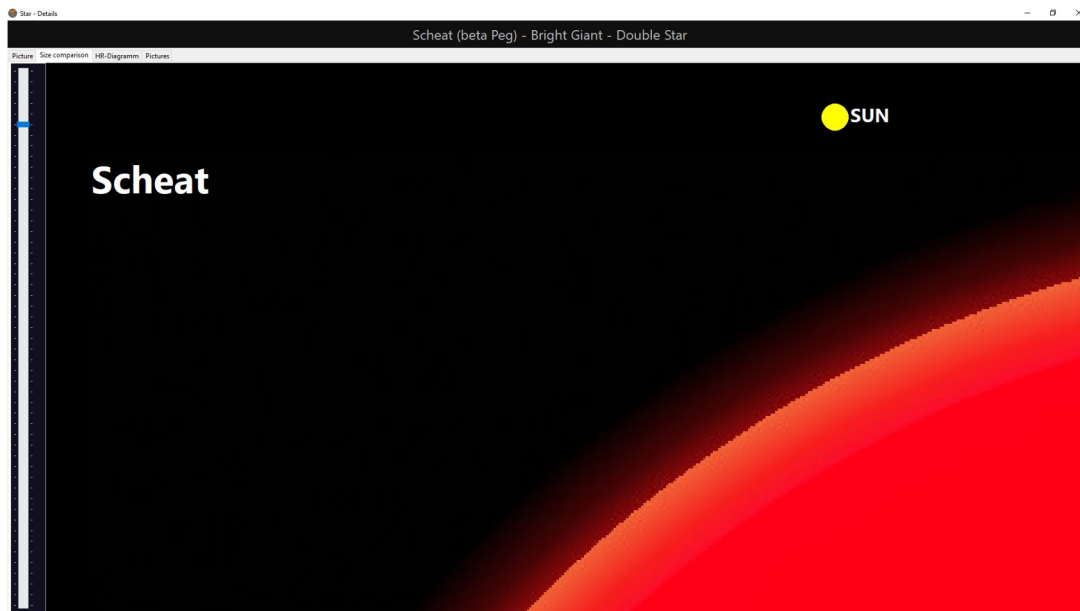
The first index tab contains a graphical representation of the selected object. In the case of a star a image of the star's surface is displayed. The color depends on the surface temperature. Furthermore a table on the left side displays major properties of the selected object,



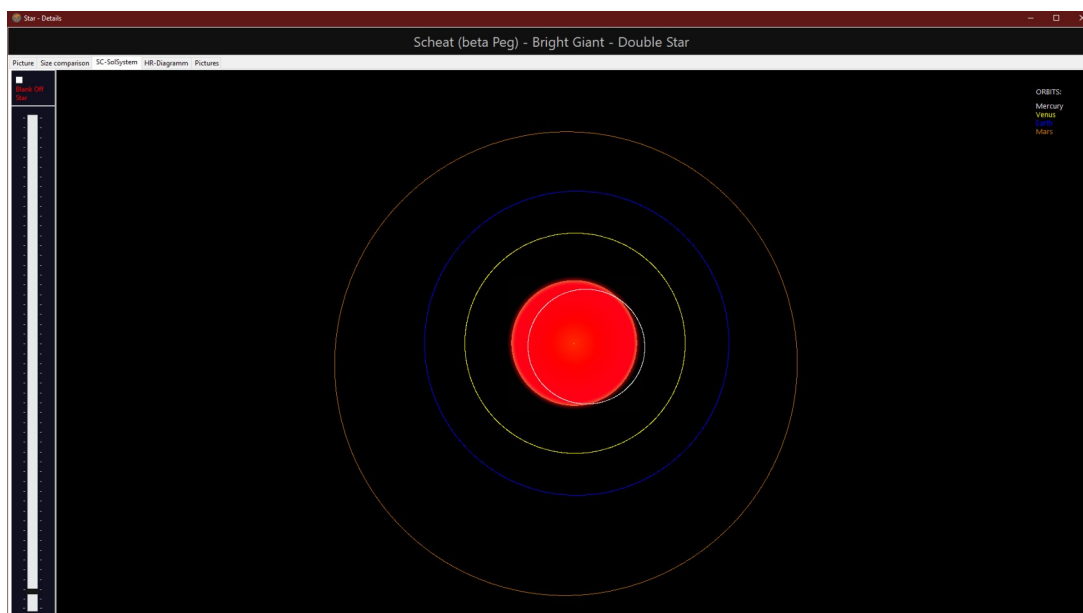
When the user clicks on button 'Show star structure' the inner parts of the star is shown like convection and radiation layers and the core. A table on the right hand side shows pyhsical prperties and detail information about each star interior including culmination data and culmination graph.

Tab item: Size Comparison

In the case of stars the dialog displays the star with a color that corresponds to the spectral type. Next to the selected star the sun is symbolised with a smaller or larger radius that depends on the ratio fraction between the star and the sun. The user can change the size of the stars using the scale slider on the left side of the animation area. This is useful especially in the case of very large stars compared to the sun (e.g. Albireo!).



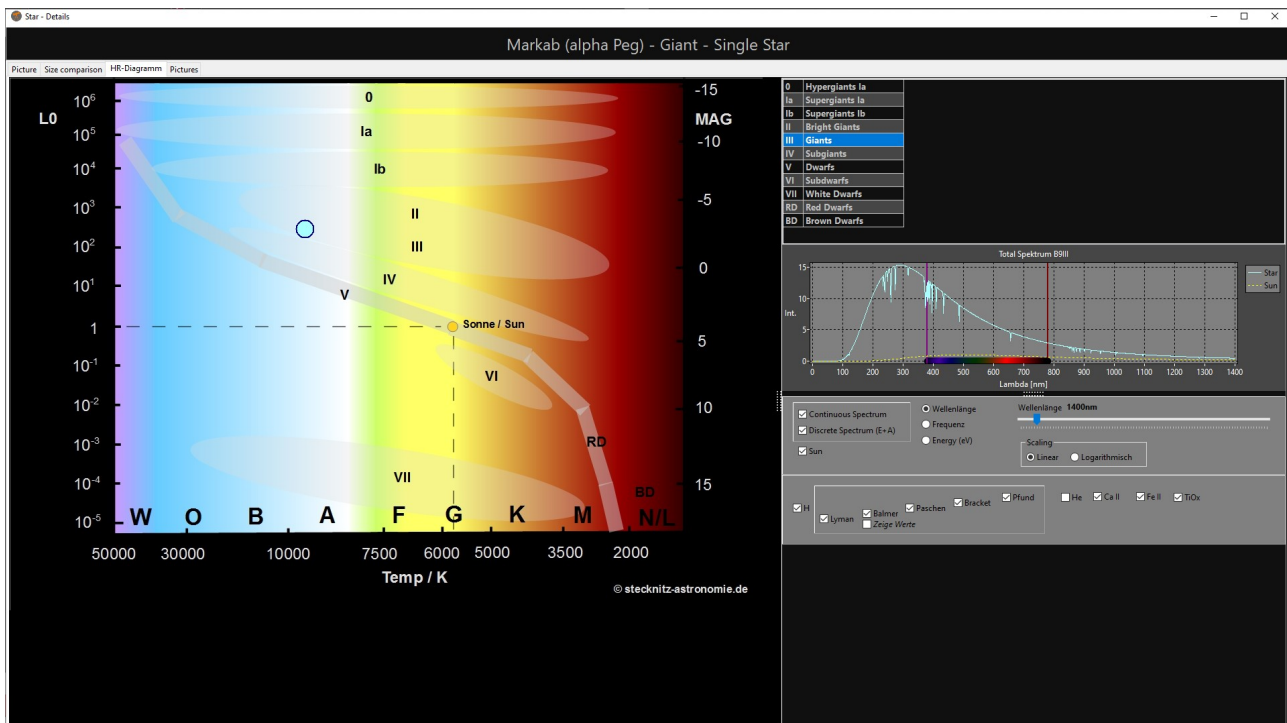
If stars are visualized, an extra size visualisation is available via index card 'SC – SolSys', showing the dimension of the selected star compared to our solar system. Optionally, the star to be displayed can also be hidden in order to emphasize the size comparison with the sun (Checkbox *Blank Off Star*).



Tab item: HR-Diagram (for stars)

The 3rd tab integrate the selected star into the Hertzsprung-Russell-Diagram. To compare with the sun the sun's position is also marked in the middle of the diagram.

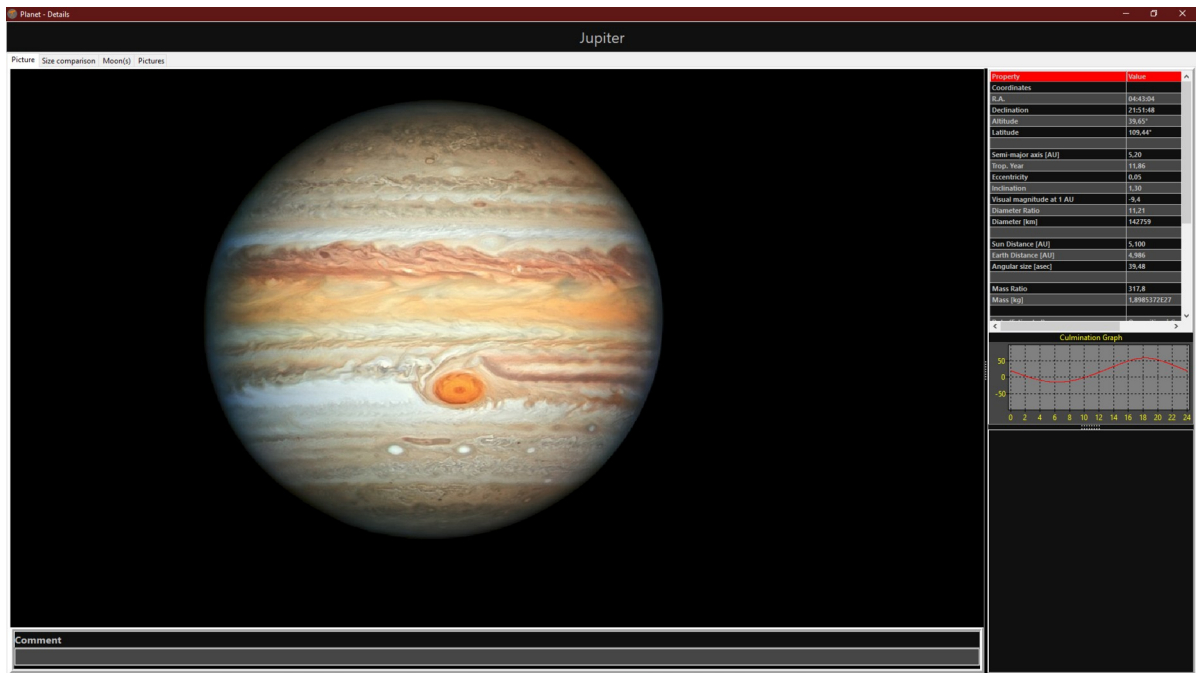
On the right hand side a table is shown displaying the types of the MK-System. Also, a diagram containing the continuous spectrum of the star is displayed, compared the the continuous spectrum of the Sun (black body radiation). Optinally, the discrete spektrum dependent of the spectral class, can be added for some specific elements.



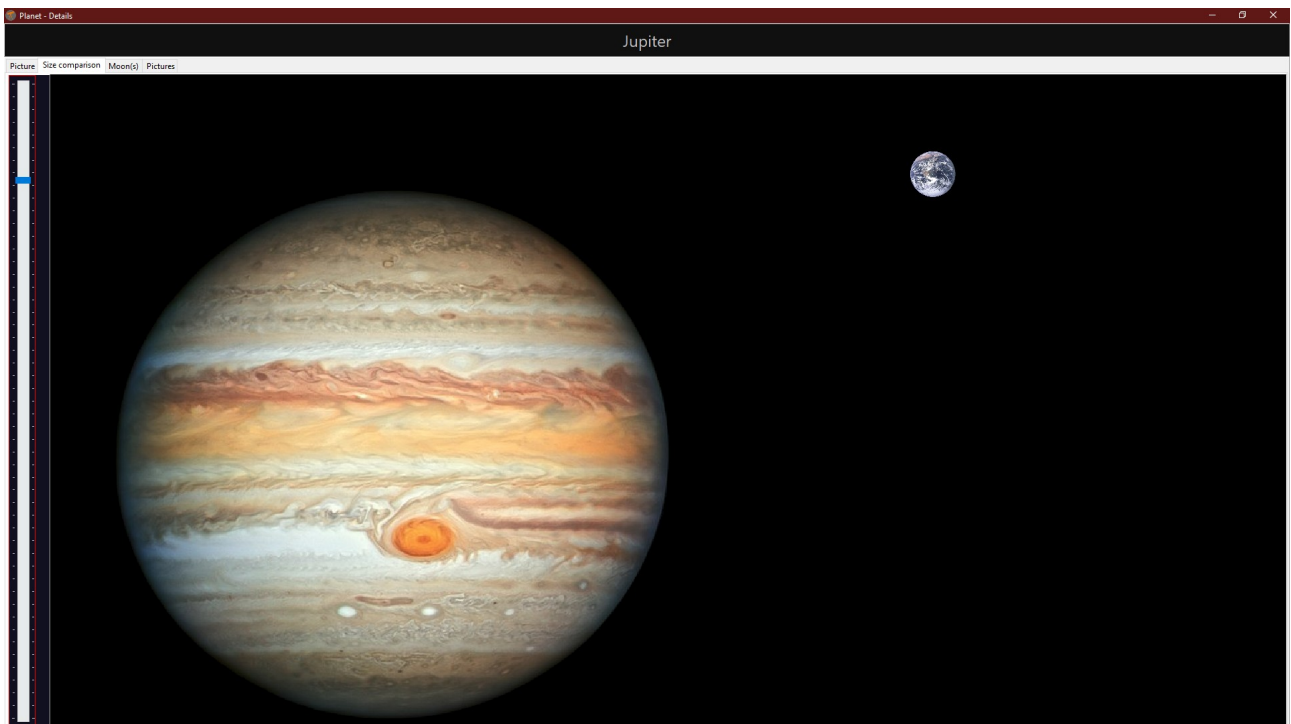
A similar simulation is used for planets.

Included is a size comparison between the earth and the selected planet.

1st tab: Planet overview



2nd tab: Planet size compared with Earth



For Jupiter and Saturn is additionally integrated the visualization of the east-west position of the brightest moons at the selected time. Also, the moon position in dependence of the selected month of each moon is displayed.

Planet - Details

Jupiter

PictureSize comparisonMoon(s)Pictures

East

Ganymede

Jupiter

Io

Europa

Callisto

West

Moons positions on 02.03.2025 at 14:52

PropertyValue

Diameter [km]3443

Mass [kg] 1.898×10^{27}

Density [g/cm³]3.56

Orbital Period [d]1.769

Semimajor Axis [km]421000

Eccentricity0.0041

Apparent Magnitude5 mag

Moon Position

Moons position 02.03.25 at 14:52, 5.3 planet radii West

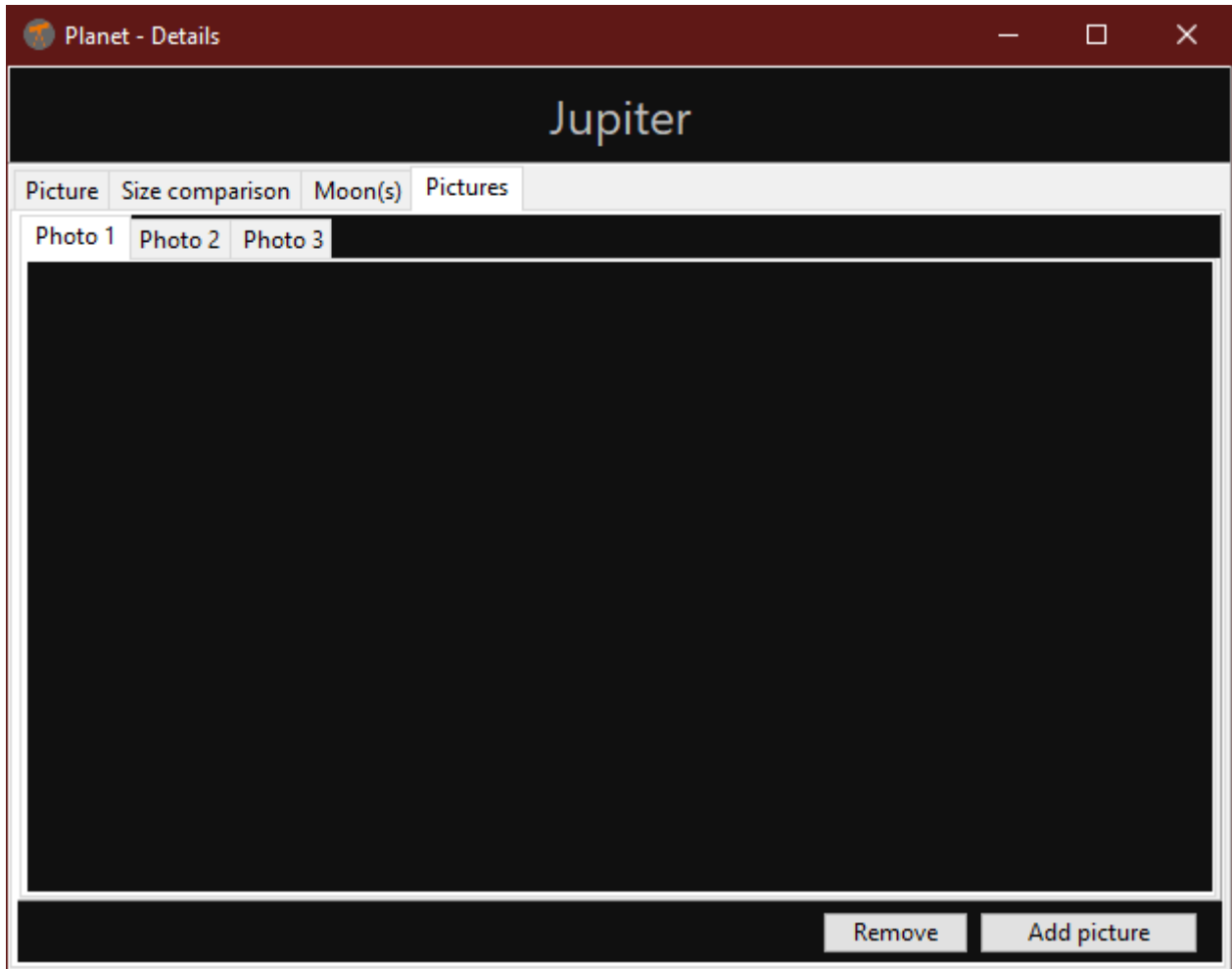
March 2025

East

West

Tab item: Pictures: Embedding customer images

In the right top of the dialog a photogallery pageview is located, which consists of three index cards. You can put there up to three of your own customer images of the selected astronomical object. Press button 'Add picture' to put there a new image. Button 'Delete' removes the current image link from the selected index card (the image file is not removed from the harrdisk).



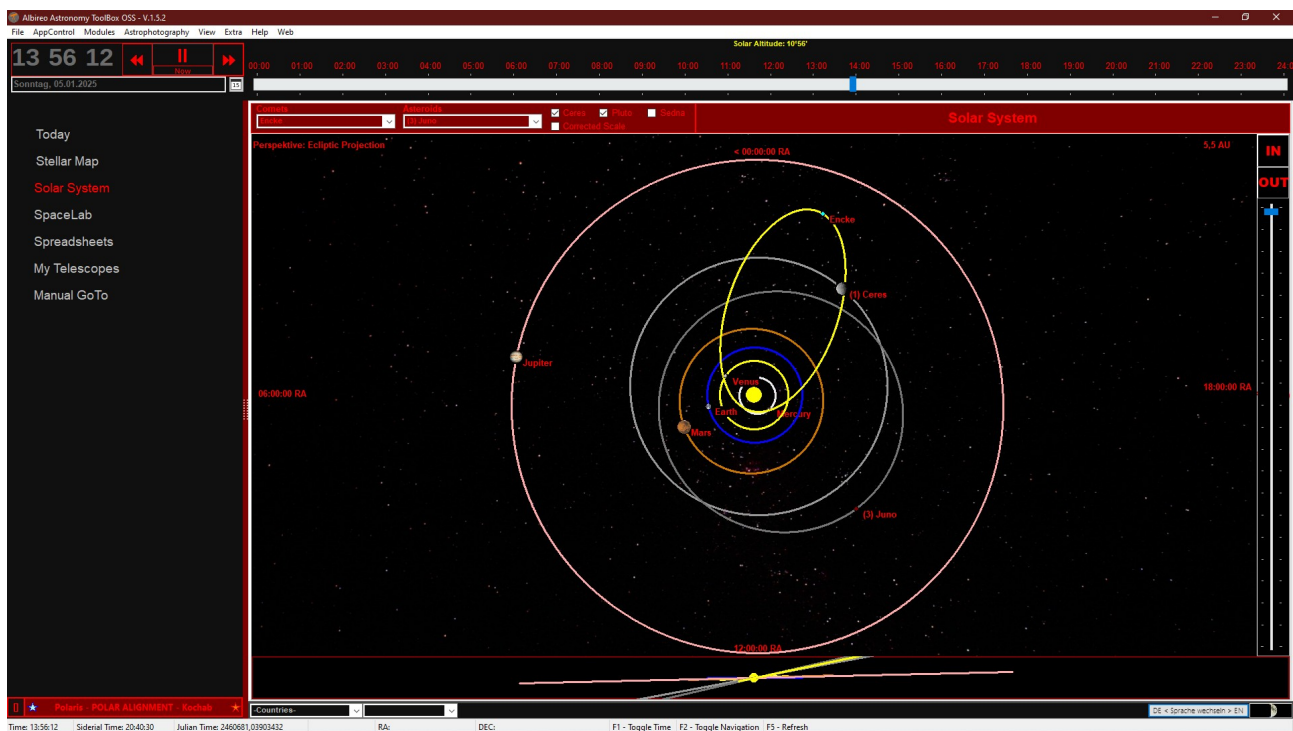
Module **Solar System**

This module is available since version 0.9.7. The orbits of the planets are visualised und planet positions are evaluated via the time control of the program.

Furthermore comets and asteroids can also be selected and displayed. To select an asteroid or comet please open one of the combobox boxes in the top of the panel. Aster that the orbit and position is immediately displayed. To de-activate an displayed orbit the object has to be selected via the combobox again.

Four spatial directions are tagged in RA. The top of the panel directs in 00:00:00 RA, that means the aries point in constellation fishes.

Planet's revolution are counterclockwise. The view is on the noth pole of the earth.

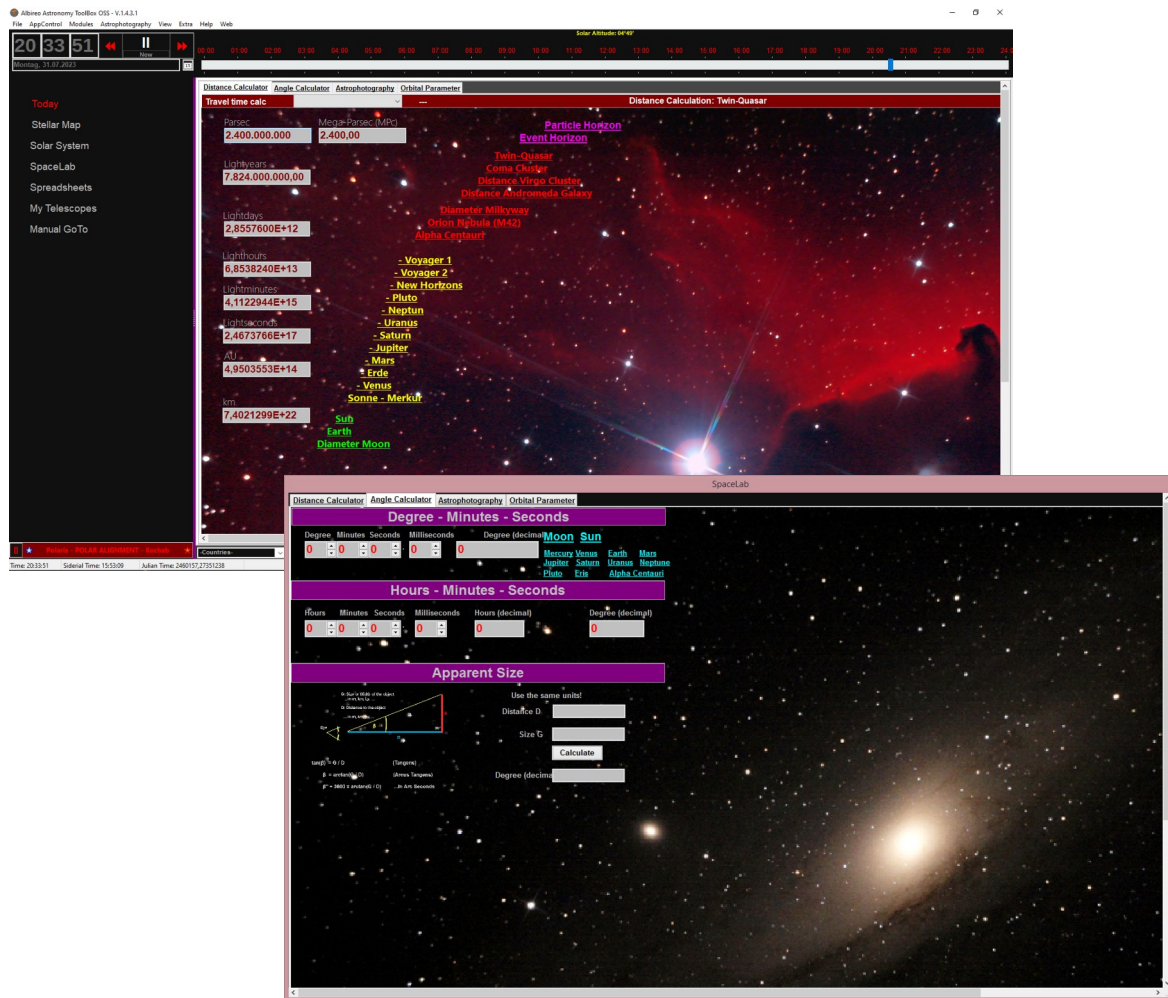


In the bottom area the inclination of the orbits of planets and comets against the ecliptical plane are visualised, too.

To zoom into or out of the solar system view the mouse wheel can be used, also the slider of the right of the solar system view. Also, buttons IN and OUT can be used.

Module **SpaceLab**

The **SpaceLab** area embraces calculation in distances and angles in various units, used commonly in astronomy and comprehensive astrophotography calculations.



Following index tabs are available:

- **Distance Calculator:** Conversion between various distance units. When you type a value in an input field each other field entries a computed automatically. Alternatively, You can click on the displayed labels to evaluate some distances or sizes of astronomical objects. In addition, the user can calculate travel times for some terrestrial vehicles.
- **Angle Calculator:** Allows conversion in decimal degrees, and the degree/hour-minute-second system. Also some astronomical examples are available.
- **Astrophotography:** This section is made for astrophotography issues. It allows pixel calculations for various cameras. Also, a Nyquist validation with respect to different seeing conditions is included.
- **Orbital Parameter:** Conversion between some orbital parameters. This is useful if you want to integrate additional astronomical objects or to adjust some values. *This tab is available only for the professional version.*

SpaceLab Tab

The *Astrophotography* index card contains additional buttons for user-defined cameras and camera setting modification. Numerous additional camera sensor data are available. Based on the advanced sensor data a lot of derived camera sensor can be calculated as well as different exposure options for astrophotography.

Button **New Camera** allows the specification of a user-defined camera which is not already listed in the build-in camera list. The new camera can be saved permanently for later usage. *This button is available only for the professional version.*

Button **Open Camera** opens a dialogue which displays the camera and sensor properties of the selected camera. Here the user can change some values to evaluate the influence of the calculated camera properties below.

Signal Values

Albireo allows the calculaton of advanced astronomical properties and effects like star signals, background signal, dark currents or background limitation in relation of the selected camera sensor.

The image displays three overlapping screenshots of the Albireo software interface, which is titled "Astrophotography: Pixels & Co." and includes tabs for "Distance Calculator", "Angle Calculator", "Astrophotography", and "Orbital Parameter".

The top-left screenshot shows the "Image in angle and pixel" module. It features input fields for "Distance" (1200.00) and "Unit" (Ly), and "Real Size" (7.00) and "Unit" (Ly). A "Calculate" button is present, and the "Result" section displays "0° 20' 3,2" Angles" and "767,5 Px Sensor".

The middle screenshot shows the "Nyquist Criterion" module. It includes a "Piercing Seeing Scale" with 10 radio button options ranging from "Extremely BAD" to "PERFECT". It also displays "Optimal focal lengths" for "Lucky Imaging (low exposure): 1276 mm" and "DeepSky related to selected seeing (high exposure): 587 mm". On the right, it shows "Radius inneres Airy-Scheibchen bei 550nm-Licht: ---", "Pixel per star: 1", and "Optimum pixel size: 3,6 mym". A note states: "Nyquist Evaluation Resolution limited by atmosphere (Seeing) UNDERSAMPED. STARS ARE ANGLED. Low Resolution. Smaller pixels or larger focal width recommended."

The bottom-right screenshot shows the "Signal level & Exposure" module. It has input fields for "A0V star" (91,29 Me-/s), "Background signal" (2,24 e-/s), and "Dark current signal" (1,9 e-/s), each with a corresponding slider and "Mag" value. It also includes "Exposure & SNR value" fields for "Single frame [s]" (60), "Number of frames" (1), "Minimum exposure time" (0 s), "Maximum exposure time" (100 Min 5 s), "(Star saturation)" (0,5 ms), and "Sensor Dynamics" (36,7 dB). A "Signal" section on the right shows "Star overexposed", "SNR: 48,7 dB", and "Signal very clearly". A checkbox "Use dB (Decibel)" is checked at the bottom right.

Furthermore estimations of exposure times and exposure handling can be calculated – based on advanced sensor and environmental data.

Also, the sensor dynamic is calculated, based on the full well capacity and the noise of the dark current.

Results are displayed in Decibel (dB) via checkbox **Use dB (Decibel)**. If not checked, the linear relation value is presented.

Module **Spreadsheets**

Via the database-area the user can extract coordinates and visibility conditions of astronomical objects – as a preparation of an astronomical night session.

Index JA	Object	Name	M	Distance (LY)(MLY)	Spectral type	02.08.2021 01:01:01 RA	DEC
1	Antares		2	5600	B0.5V/B0V	23:44:00.00	15:20:50.00
2	78 Prg		5	224	K0III	23:44:00.00	72:22:00.00
3	EW Lac		5	16.46	M4.0Vb	22:57:00.00	48:41:00.00
4	W Cya		5	570	M0III	21:36:00.00	45:22:00.00
5	Ant Cya		5	580	F7V+F8V	20:20:54.00	17:48:00.00
6	Ant Lep		5	99	G1V	20:28:54.00	17:48:00.00
7	29 Cya		5	131	A2V	20:14:32.00	36:48:23.00
8	omega1 Cya		5	1260	B2.0V	20:30:00.00	48:57:00.00
9	35 Cya		5	133.6	A4nIII	20:20:54.00	44:03:18.00
10	sigma Aul		5	780	B3V+B3V	19:38:12.00	05:23:52.00
11	17 Cya		5	69.2	F7V/M0.4	19:46:26.00	33:43:39.00
12	16 Lyr		5	126	A0V	19:01:24.00	46:56:00.00
13	3		5	554	B0III	19:24:34.00	49:06:24.00
14	theta+18.425A		5		A1V	19:18:58.00	19:08:51.40
15	39 Dra		5	184	A1V+F5V	18:23:54.00	58:48:00.00
16	95 Her		5	471	G5V	18:01:30.00	21:36:00.00
17	epsilon1 Lyr	Double Double	5	162	F5V	18:04:18.00	59:40:00.00
18	mu2 Sep		5	270	K3II	18:55:17.00	22:49:17.00
19	epsilon Sep		5	258	K0III	18:11:42.00	23:42:00.00
20	52 Her		5	180	A1Vp/SiScC+RGV	16:49:12.00	45:59:00.00
21	20R Leo		5	302.7	B0III	16:36:34.00	30:20:00.00
22	omega GIB		5	470	B1V	15:39:23.00	35:38:00.00
23	mu1 Lep		5	117	F6V	15:22:00.00	47:55:40.00
24	theta UMi		5	830	K5III	15:31:25.00	77:20:58.00
25	CO-44 10238A		5		G5V	15:25:54.00	44:57:25.00
26	10 UMi		5	83	F2V+G8V	13:00:17.00	55:22:00.00
27	53 Vir		5	106	F6V	13:12:00.00	16:12:00.00
28	70 Vir		5	59	G0V	13:28:24.00	33:47:00.00
29	omega Pya		5	886	K2III	09:29:54.00	05:05:24.00
30	27 Ma		5	222	K0III+F4V+K2V	09:30:30.00	09:33:00.00
31	CCD18_08397_2934		5		G5V	08:38:47.54	29:33:49.50
32	24 Lyn		5	267	A3Vn	07:43:00.00	58:43:00.00
33	21 Aur		5	1500	F8II	06:28:34.00	50:20:00.00
34	13 Men		5	170	B5III	06:11:46.00	10:38:00.00
35	74 Ori		5	64	F5V	06:16:24.00	12:16:00.00
36	mu C Ma		5	1249	K2/K3III	06:56:05.00	14:02:36.35
37	42 Aur		5	238	A2V	05:54:51.00	55:42:25.00
38	9 Aur		5	86	F2V	05:58:42.00	51:38:00.00
39	10 Cam		5	405	A2V	05:55:00.00	50:55:00.00
40	10 Lep		5	490	M6.2II	05:11:24.00	41:51:00.00
41	23 Ori		5	1280	B1V+B3V	05:22:42.00	03:33:00.00
42	111 Tau		5	47	F3V+B3V	05:14:24.00	17:23:00.00
43	alpha Tau		5	50	G4V	05:07:27.01	16:38:47.18
44	14		5	286	A0V	05:15:24.39	32:41:15.36
45	38 Eri		5	240	K0II+G2V	04:14:24.00	16:15:00.00
46	theta Eri		5	245	Under Horizon	04:14:24.00	16:15:00.00

When the user presses the button 'Spreadsheets' which is located in the navigation area, the system starts a module that requests Albireo's internal database of astronomical objects. A selection box, called 'Database Search Filter', is displayed in the bottom of the navigation area to pre-select a star constellation. Below the selection box the type of astronomical objects the can specified, which are displayed in the database spreadsheet.

Albireo provides following astronomical object types:

- Planets (Dwarf planets and Asteroids included)
- Comets
- Star Constellations
- Stars
- Galactic Nebula
- Galactic Clusters
- Globular Clusters
- Galaxies
- Quasars
- Messier

At first the user selects a constellation via the selection box in the top of the navigation panel. After that one of the astronomical types must be activated by an option switch below.

If the user wants to select a solar system object he/she can choose between the options

'Planet' or 'Comet' below. The table, which is located on the main area is filled with all matching objects that are located nearby of or within the constellation boundaries. Each row corresponds to a matching object (star, galaxy a.s.o.). The columns of the table contain information about object's catalog ID, distance from the earth or sun, apparent magnitude, classification and visibility conditions.

Visibility conditions are related to horizon's latitude. Objects that are below the horizon are marked at 'non-visible'. 'Good visibility' is assigned for all objects, which have an latitude angle at least 30 degree above the horizon line. Visibility is here independently of sun's position; that means that an object could be marked as 'Visible' even it is on the day sky.

When the checkbox 'show visible' is checked the table content is restricted to objects that are above the horizon for the selected time.

If the user double-clicks on a row, an infobox comes up, which displays additional information, a size comparison animation and customer's pictures of the requested object.

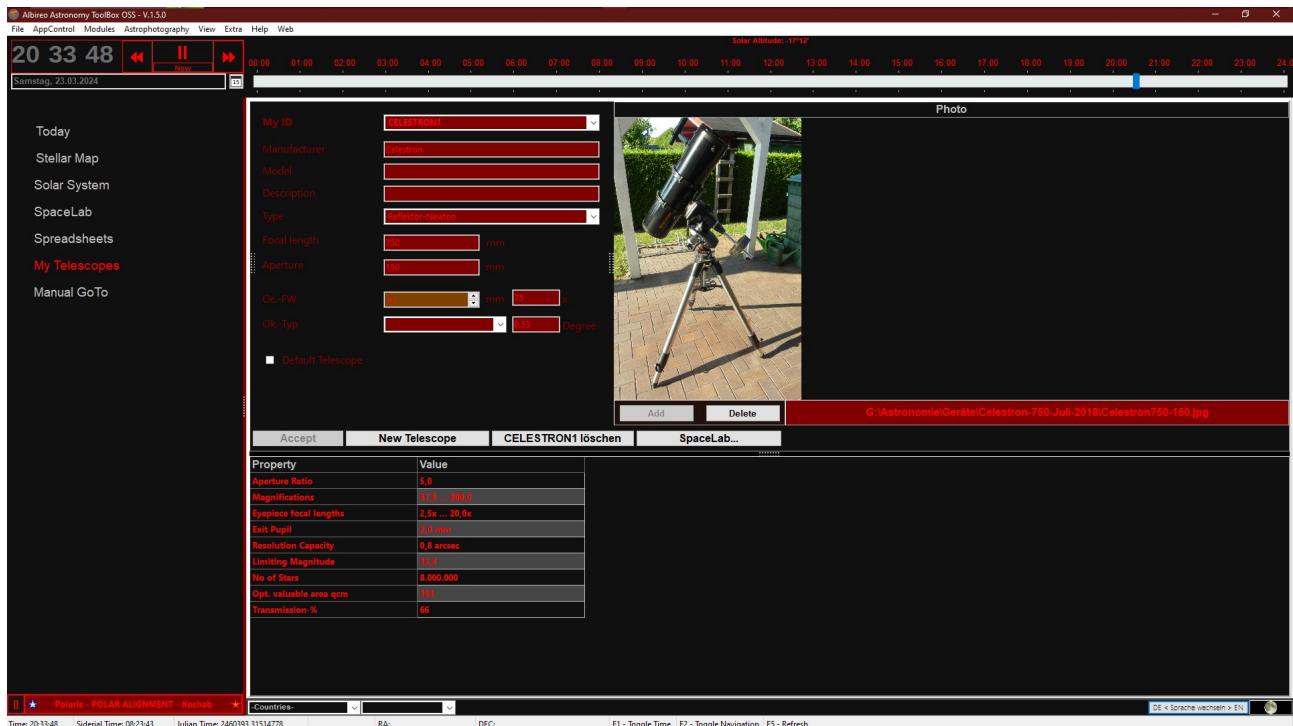
On the right-hand side a trackbar is displayed. It enables to define the magnitude interval of the displayed stars and galaxies. Especially for high magnitudes a large amount of stars and galaxies can be affect the computer system. So the program decreases the selected magnitude interval automatically in order to limitate the displayed stars and galaxies.

On the right-hand side of the area a slider-component is displayed. It allows to control the number of displayed stars and galaxies via the apparent magnitude. If the user presses the **Res** -button the default values are used.

It as a large effect especially for the professional variant of Albireo. Please note: The more stars and galaxies are displayed the more is computing time is consumed.

Module **My Telescopes**

When the user clicks on the 'My Telescopes'-button of the navigation area he enters the telescope management section of the *Alibreo Astronomy Toolbox*. Here you can put in your the property data of your own telescope equipment. The program calculates the most important telescope features. Also a picture of each managed device can be included.



Professional variants display additionally the optical valuable plane and the transmission rate of the optical system.

Registration and Management of Telescope Properties

To register a telescope press button 'New Telescope' and put the basic property data (Manufacturer, Model, Description, Focal length, aperture) into the corresponding data fields. Press button 'Accept'. After that a requester window appears to request for an ID of the dataset. Enter a short characterising name and press 'Ok' to save the data.. From now on the dataset is displayed in the selection box in the top of the device mangement area.

Please note that eyepiece values are not saved together with the telescope data because multiple eyepieces can be used per telescope. Nevertheless, the user can try different eyepiece focal lengths to calculate related telescope data like maximum and minimum magnification or luminosity.

Visualisation of telescope data

To display to a telescope dataset the user selects the corresponding dataset-ID from the upper selection box. After that all propertes of the telescope are displayed in their

corresponding fields. The user can play now with different eyepiece focal lengths to analyse the influence of the calculated telescope properties. The properties are shown in the bottom area located below index card 'Properties'.

Changing device data

At first the user has to select the appropriate telescope data set. To change properties the user can use any of the input fields of the selected device (e.g. focal length, manufacturer a.s. o.) To store the data press button 'Save'.

Changing the data-set-ID

It is also possible to change the dataset ID: At first select the dataset-ID from the selection box in the top of the device area. The system displays all data in the corresponding fields. Now open the popup-menu of the selection box by left-click into the selection box to focus the selection box. After that press the right mouse button to activate the popup-menu of the selection box. Select the item 'Change'. Type into the system requester the new identifier and take care that this ID must be unique for all devices. Lastly press button 'OK' of the requester. The dataset-ID has been changed now.

Deleting device data

At first you to select the dataset you want to delete. To do so select the dataset-ID via the selection box in the top of the device area. After that press button 'Delete' and commit via button 'OK' of the security request.

Analysis Section

The telescope analysis section is located directly below the device input field. A slider can be used to resize the area. Index card 'Properties'. It shows all telescope properties (e.g. magnification range, light sensitivity) based on the input data (e.g. focal length, aperture).

The user can play with different focal lengths of the eyepiece to see the effect on the calculated telescope properties (e.g. magnification ranges and other optical data). Also the age of the user is considered (see the birth year field under preferences dialog) to take into account the maximum width of the pupil, which depends on the age.

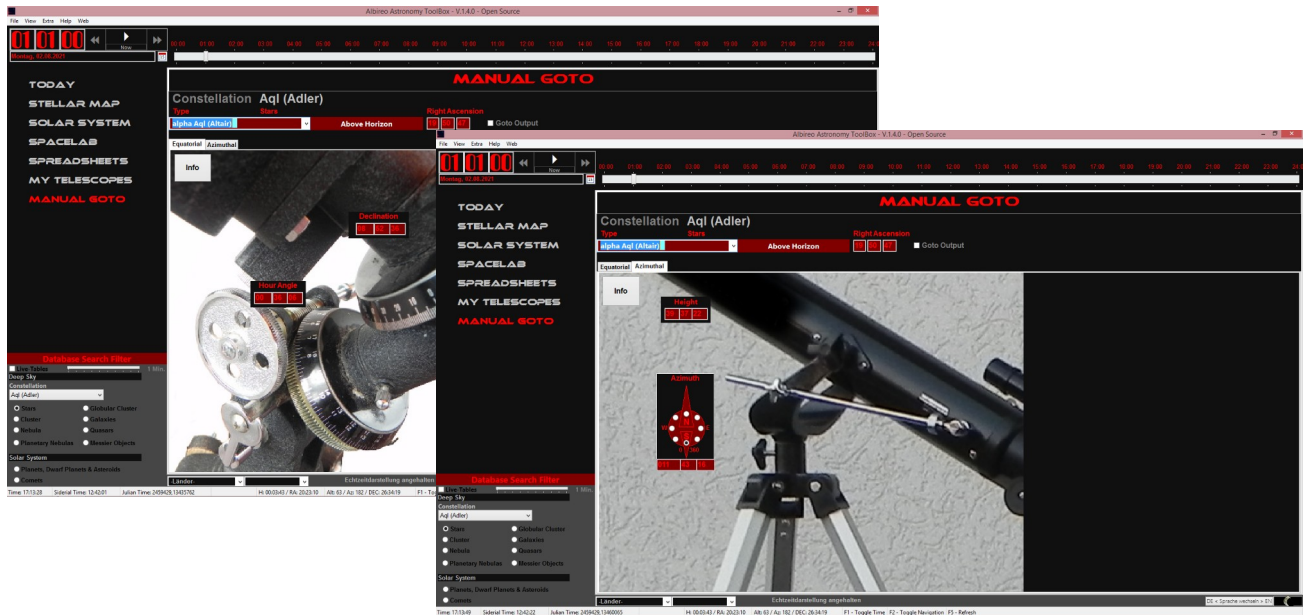
Via button 'AstroCalc...' you can enter the pixel-calculation via the selected telescope property data. There you can assign a default camera to the telescope. After that you can perform special pixel-calculations e.g. Nyquist-Matching of the telescope/camera setup or the extension of an astronomical image on the camera chip in pixel.

This button is available only for the professional version.

Module **Manual GoTo**

Albireo calculates for a selected astronomical object the coordinates for equatorial and yaw mounts: hour angle, declination, right ascension, east-west position and the latitude above the horizon. This data can be used for telescope alignment to the astronomical object accordingly to the selected date and local time.

When the user presses the button 'Manual Goto', which is located in the navigation area, The system displays the module screen above.



Area *Deep Sky* enables selection of a constellation and an astronomical object type within the constellation. Available object types are stars, nebula, cluster, galaxies, planet and comets. Please select the requested type via the option fields below the constellation selection box, which are located in the navigation panel.

The working area of this module contains two index cards. One for equatorial mount and one for yaw mount types. The fields on the image display the coordinates of the selected astronomical object. In the case of equatorial mounts the displayed hour angle and the DEC value must be used.

Telescopes of yaw mount types should use the horizon height and yaw east-west-angle respectively, which are also displayed on the right side nearby.

Please keep in mind that all scaling labels, which are fixed on the mount body must be properly calibrated and the equatorial mounts must be correctly aligned to north.

To calibrate correctly to the rotation axis of the earth near star 'Polaris' in Ursa Minor, check the area in the right bottom corner. This box displays the position of Polaris and Kochab at the time which is currently used by the time control.

If Checkbox *Goto Output* is activated, Albireo generates control files for external telescope communication programs which contains the co-ordinates of the selected object. The directory which is used can be defined in menu *Preferences*. Default output directory is [C:](#)

\. Please note that the program must have write-access to that directory. It is recommended to select a directory which is assigned to the user, e.g. ‚My Domuments‘.

That's it!

I hope that this short description note is helpful to you when you work with the *Albireo Astronomy Toolbox*. If you have further questions do not hesitate to contact me under

kontakt@stecknitz-astronomie.de.

You are also invited to visit my homepage

www.stecknitz-astronomie.de

... or check my Twitch- Livestream

[Twitch.TV/StecknitzAstro](https://www.twitch.tv/StecknitzAstro)

You can always find the newest versions of the Albireo program and the documentation on my website. Please contact me when you have found errors or you have recommendations to the *Albireo Astronomy Toolbox*.

And now? Have fun with Albireo!

Clear Skies,

Frank Szemkus

- Developer -