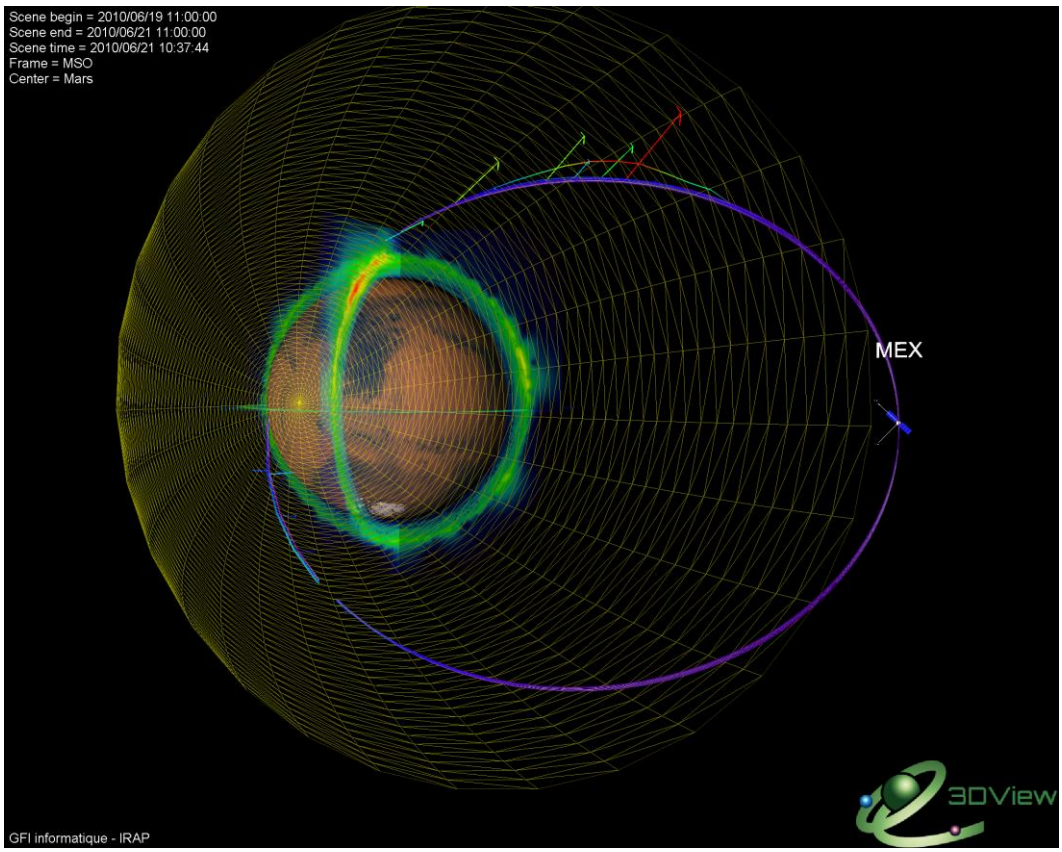

3DVIEW User Guide
Version 2.5

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Revision History

Version	Date	Released by	Detail
1.7	June 26th 2015	Michel Gangloff (IRAP)	Initial version
1.11	October 6th 2016	Michel Gangloff (IRAP)	CDPP version *including EuroPlaNet H2020*
2.0	January 3rd 2018	Michel Gangloff (IRAP)	Addition of Conjunction Search Tool
2.1	December 2nd 2021	Laurent Beigbeder (INETUM) Dominica LEUNG (CNES)	Updating 3DView application screenshots Updating §3.5.4.8 View ground station Adding §3.5.1.5 Add 3D dataset from file Adding §3.5.1.7 Add user spherical simulation Removing §3.5.4.11 Toggle objects Adding §3.5.5.11 Scene controls
2.2	February 1st 2023	Daniel Popescu (INETUM) Kéa Khum (INETUM)	Remove Body map option §3.5.4.1.3 Draw link replaced by show distances §3.5.4.3.1 Update Representation type §3.5.4.5.3 Add "Show Lagrange Point" § 3.5.5.7 Add "Load connect-tool map" § 3.5.5.9 Add "Generate iso surface from scene cube" §3.5.5.13 Update Scene controls §3.5.5.14 Update §2 Prerequisites Update §3.1 Launch
2.3	June 6th 2024	Laurent BEIGBEDER(AKKODIS)	Added §3: How to launch 3DView
2.4	October 4th 2024	Kéa KHUM (AKKODIS)	URL update (http to https) §4 Home page update §4 Add Need Help page §4.2
2.5	December 3rd 2025	Laurent BEIGBEDER (AKKODIS)	OpenJDK use §2

Note: Any notes here.

INDEX

1 INTRODUCTION

3DView offers 3D visualization of position and orientation of spacecraft and planetary ephemerides.

2 PREREQUISITES

2.1 Oracle JRE

Java Runtime Environment version 1.8, available at http://www.java.com

3DView is provided as a **Java Web Start** application. Java Web Start is a framework provided by Oracle that allows users to start application software for the Java Platform directly from the Internet using a web browser.

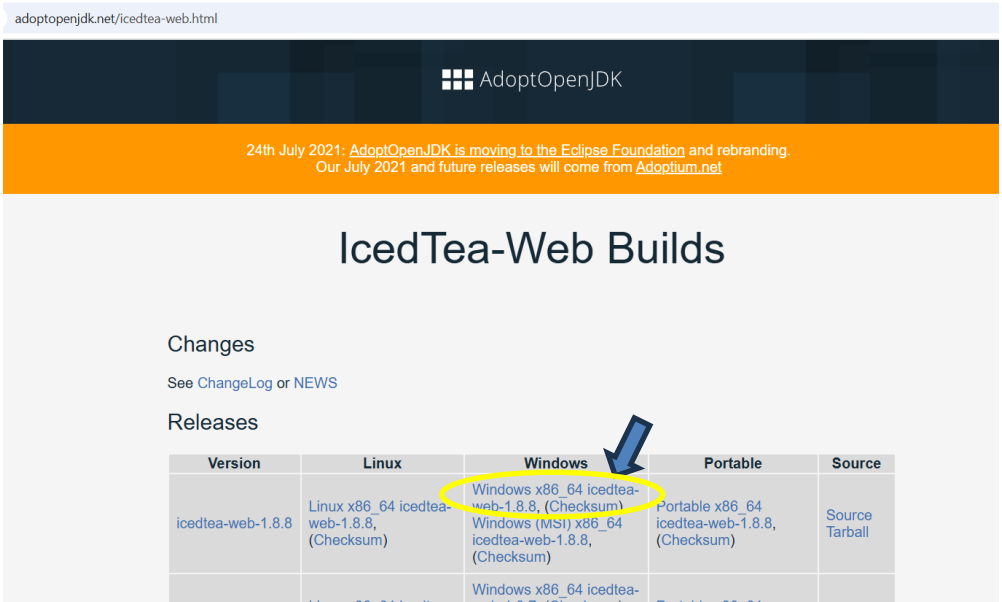
2.2 OpenJDK

If you don't have an Oracle Java License, you can use OpenJDK. Many distributions exist, one of the most common is available here:
https://adoptium.net/temurin/releases?version=8&os=any&arch=any

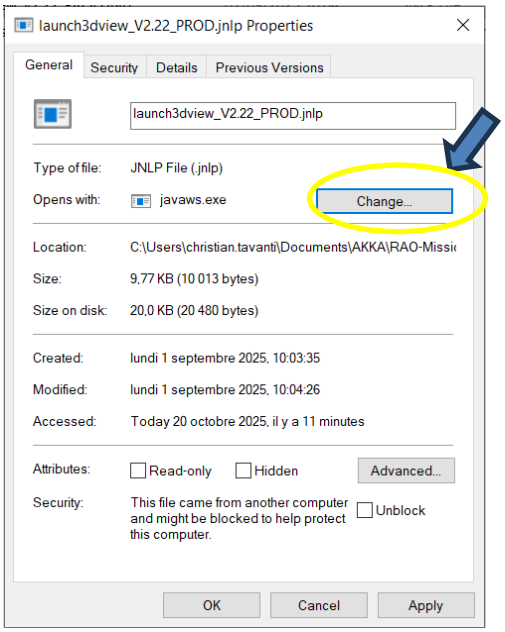
As java web start is not included in OpenJDK Binaries, an extension must be added: icedTea web (https://adoptopenjdk.net/icedtea-web.html). It is only available for Windows and Linux.

2.2.1 Windows

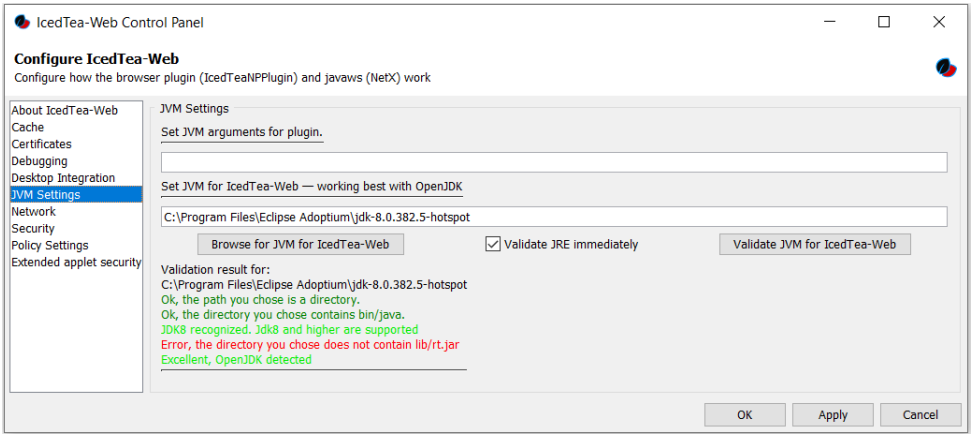
1. Get OpenJDK from adoptium.net and install it.
2. Go to IcedTea web location, and get the zip package for windows (not the MSI one as it requires administrator rights) and unzip it in a specific directory.



3. On a jnlp file, open menu Properties->General->Open with-> Change

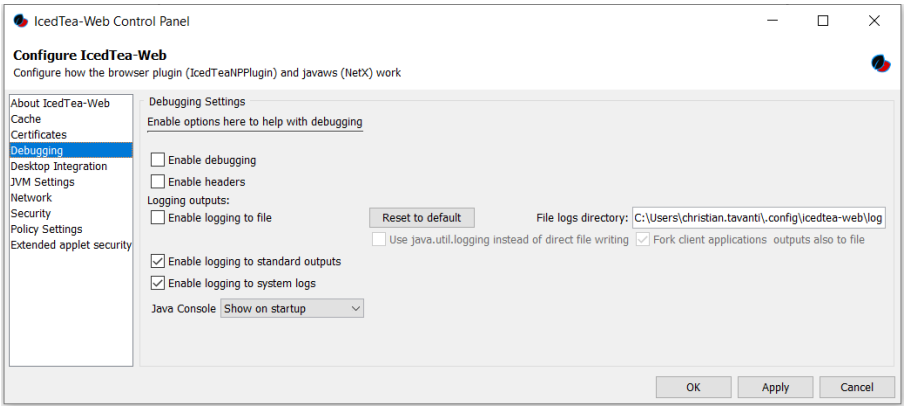


a. Find an application -> go to IcedTea folder then icedtea-web-1.8.8.win.bin/ icedtea-web-image/bin
b. Choose javaws.exe
c. Launch itweb-settings.exe and in JVM Settings, fill in “Set JVM for IcedTea-web “ with installed OpenJDK location (e.g. “C:\Program Files\Eclipse Adoptium\jdk-8.0.382.5-hotspot”)



d. Answer to all permission requests

4. To show java console, launch itweb-settings.exe and in debugging, set « Show on startup » for « Java Console ».

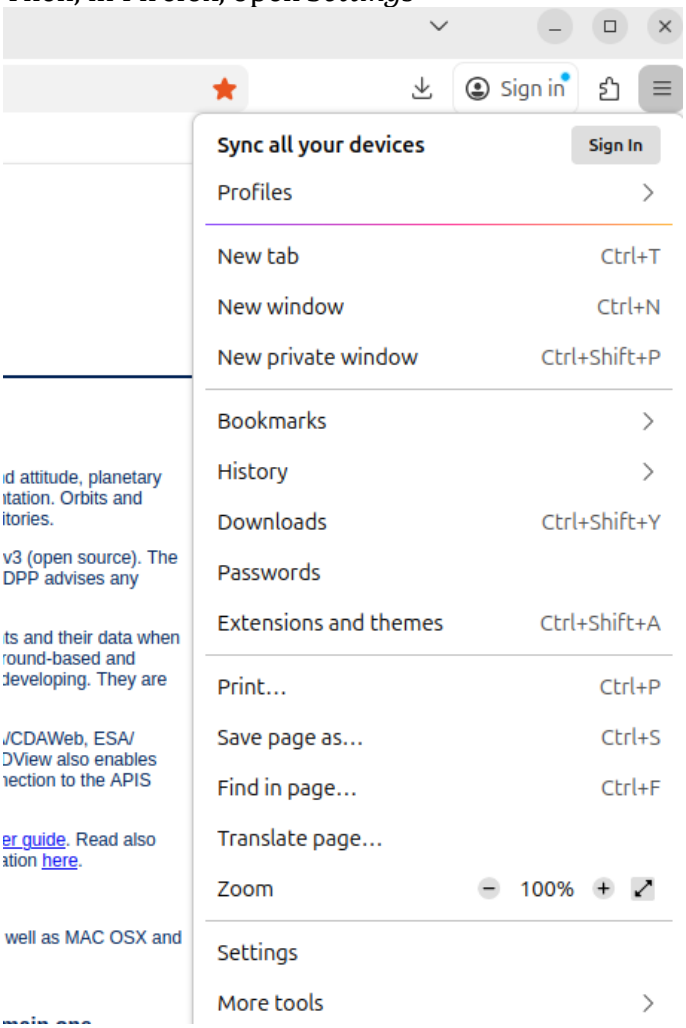


Nota Bene: in OpenJDK the java console shows the last messages on top, unlike the Oracle java console.

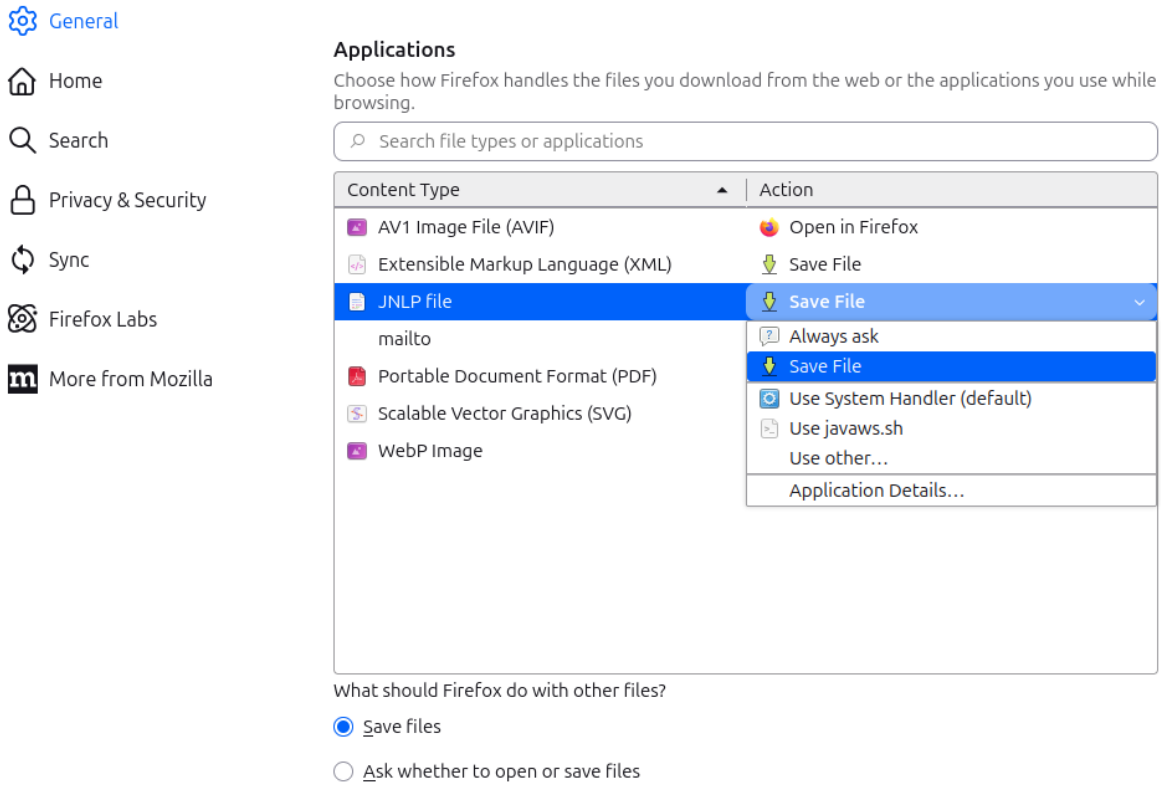
2.2.2 Linux

For Linux environments, 3DView needs icedtea-web package.
It can be called icedtea-netx, libnetx-java, icedtea-web, ...
For Debian/Ubuntu, use the command `sudo apt install icedtea-netx`
For Fedora/Redhat, use the command `sudo dnf install icedtea-web`

Then, in Firefox, open *Settings*



Then, in *General*, check that in *Applications*, if JNLP file is present, Save File is set in *Action* and if not, Save files is set in *Other files*:



2.2.3 Mac OSX

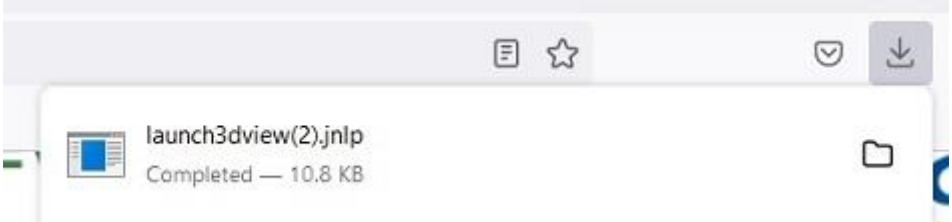
You need to install JRE (Java Runtime Environment) 1.8 to launch 3DView. You can download it from https://www.java.com/.

3 How to launch 3D view on different operating systems

When it was launched, 3DView could be easily launch from a navigator. But as security increased and java client popularity decreased, launching 3dView became more and more complicatedly
This page tries to list the easier way to launch it on most common platforms.

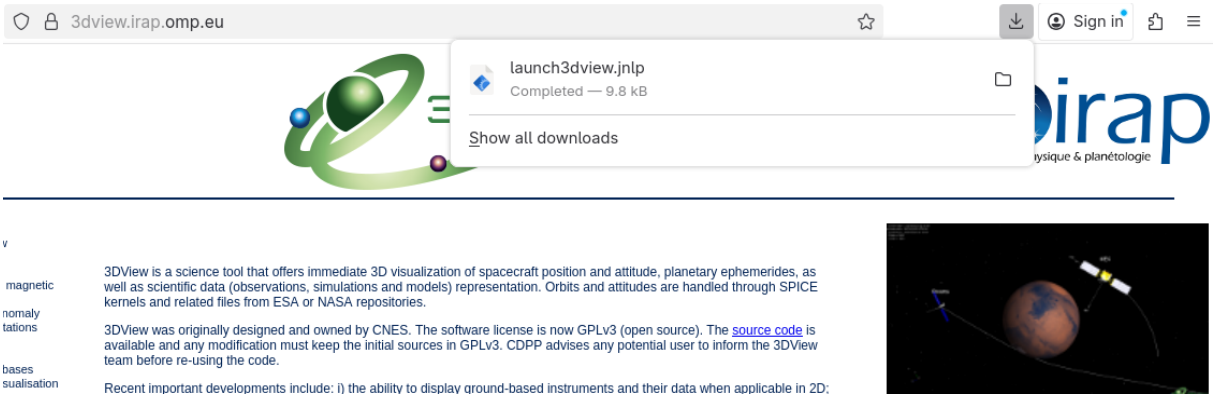
3.1 Windows 10/11 - Firefox

When you click on the "Launch 3dview" button, the jnlp file is downloaded.
Then click on the downloaded jnlp file to launch application.



3.2 Linux - Firefox

Download the jnlp file with Firefox by clicking on the button "Launch 3dview". Then, in a terminal, go the downloaded file folder and launch `javaws launch3dview.jnlp`.



3.3 Mac OSX 10 - Safari

When you click on the "Launch 3dview" button, the jnlp file is downloaded.

Then click the download icon

and then simultaneously hit CTRL key and click on the downloaded file:

4 USE 3DVIEW

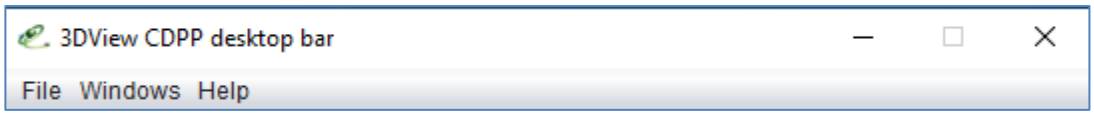
3DView is available at the following address:

https://3dview.cdpp.eu

Click the **Launch 3DView** button to start. A Java application is started using "Java Web Start" technology. This means that a file named launch3dview.jnlp is downloaded. You must execute this file to start 3Dview.

4.1 LAUNCH

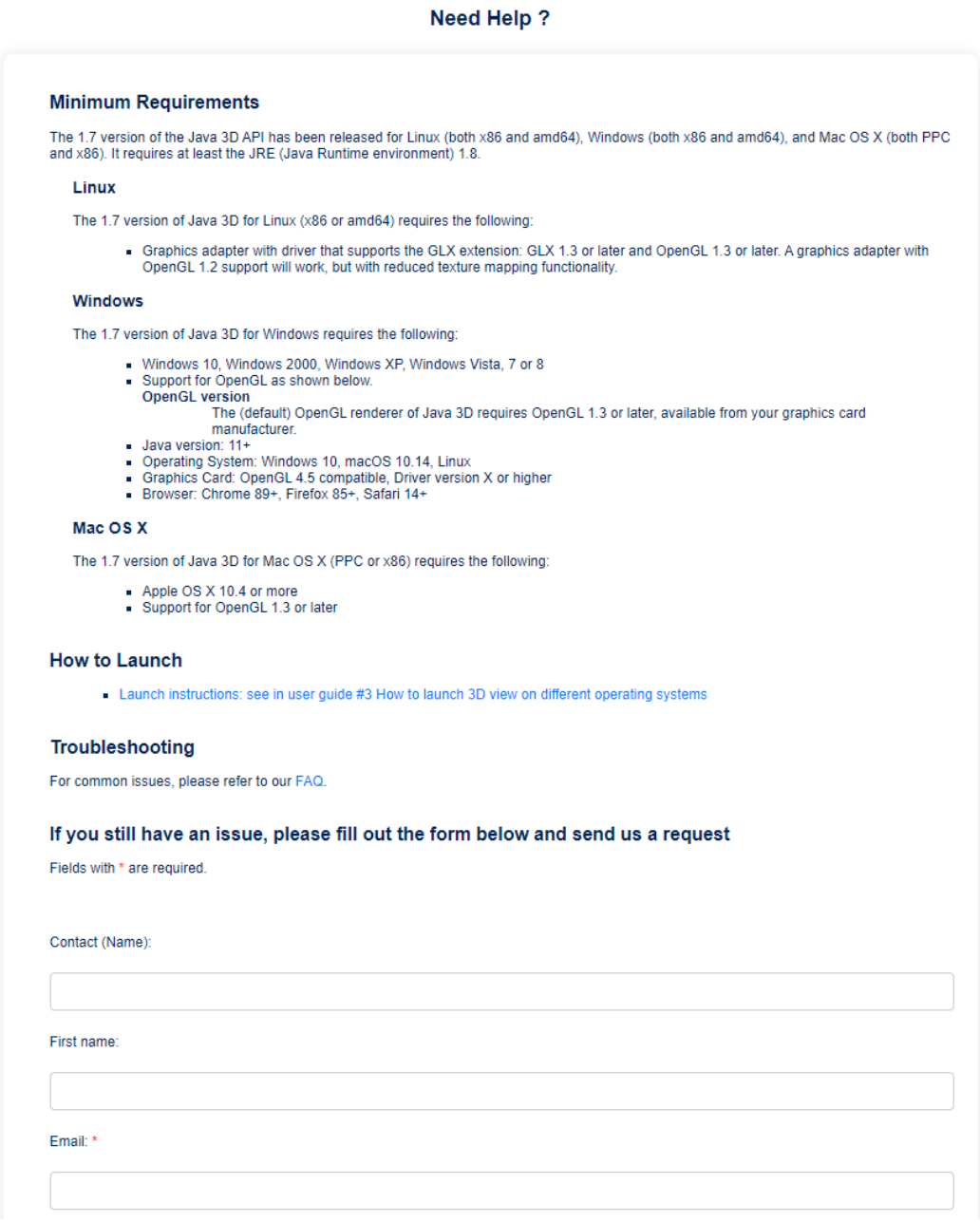
When launch3dview.jnlp is executed the desktop bar is displayed.



4.2 Need Help Link

The Need Help link is a helpful page providing assistance when users encounter technical issues or need help launching the application.

When you click on the Need Help link, a new browser tab open. This page contains several sections to help users find information about minimum requirements, application launching, and troubleshooting.
The page also includes a form to request assistance if the problem persists.



Need Help ?

Minimum Requirements

The 1.7 version of the Java 3D API has been released for Linux (both x86 and amd64), Windows (both x86 and amd64), and Mac OS X (both PPC and x86). It requires at least the JRE (Java Runtime environment) 1.8.

Linux

The 1.7 version of Java 3D for Linux (x86 or amd64) requires the following:

- Graphics adapter with driver that supports the GLX extension: GLX 1.3 or later and OpenGL 1.3 or later. A graphics adapter with OpenGL 1.2 support will work, but with reduced texture mapping functionality.

Windows

The 1.7 version of Java 3D for Windows requires the following:

- Windows 10, Windows 2000, Windows XP, Windows Vista, 7 or 8
- Support for OpenGL as shown below.
  OpenGL version
  The (default) OpenGL renderer of Java 3D requires OpenGL 1.3 or later, available from your graphics card manufacturer.
- Java version: 11+
- Operating System: Windows 10, macOS 10.14, Linux
- Graphics Card: OpenGL 4.5 compatible, Driver version X or higher
- Browser: Chrome 89+, Firefox 85+, Safari 14+

Mac OS X

The 1.7 version of Java 3D for Mac OS X (PPC or x86) requires the following:

- Apple OS X 10.4 or more
- Support for OpenGL 1.3 or later

How to Launch

- Launch instructions: see in user guide #3 How to launch 3D view on different operating systems

Troubleshooting

For common issues, please refer to our FAQ.

If you still have an issue, please fill out the form below and send us a request

Fields with * are required.

Contact (Name):

First name:

Email: *

4.2.1 Sections of the Need Help page

The page consists of 4 parts:

1. Minimum Requirements:
   This section describes the minimum system requirements to run the application (Java, Operating System, Graphics Card).

2. How to Launch:
   This section provides direct links to specific sections of the User Guide. Clicking on the links will take you to the appropriate paragraphs, which describe steps to

launch the application. This allows you to quickly access the exact instructions without browsing the entire guide.

3. Troubleshooting:
   This section contains a link to the FAQ page. You can find solutions to common issues.

4. If you still have an issue, please fill out the form below and send us a request:
   If your issue persists after consulting the previous sections, you can use this section to submit a request.
   The form is used to collect all necessary information to help the support team to diagnose your issue. Below is an explanation of the form fields:

   - Contact: First Name, Last Name, Email, Domain of activity, Location:
     Enter your information so the support team can contact you.

   - Computer Model:
     Enter the model of your computer (e.g. HP EliteBook 855 G8, ...). This can help to diagnose hardware issues.

   - Operating System:
     This field is auto filled with information about your operating system. Please ensure the information is correct and specify the exact version if necessary (e.g. Windows 10 64-bit).

   - Browser and Browser version:
     This information is auto filled. Please ensure the name and version of the browser you're using (Chrome, Firefox, Safari) are correct.

   - Java Version and IcedTea for Linux:
     Enter the exact version of Java installed on your system (e.g. Java 1.8.0_271), this following command can be helpful: .java -version.
     If you're using Linux, indicate the version of IcedTea (command: javaws --version).

   - Graphics Card and Driver Version:
     Indicate your graphics card model and driver version. You can find this information via:
     - On Windows: Open the command prompt and type dxdiag and select Display tab
     - On Linux: Use the command lspci -k | grep -EA3 'VGA|3D|Display' to get information about your GPU and driver. Admin rights may be required.
     - On MacOS: Choose Apple menu > About this Mac. The graphics cards currently in use appear next to Graphics.

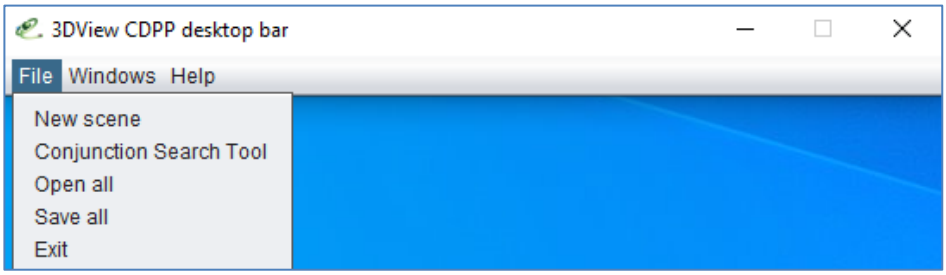
   - Java Console Output:
     Copy and paste error messages or warnings that appear when running the application. This helps to diagnose issues more easily.

- Problem Description:
  Describe the problem you're encountering, more details you provide, the better it can help to understand and resolve the issue:
  - When the problem occurs.
  - What you were doing when the issue appeared.

4.2.2 Submitting the form

After filling all fields, click the Submit button to send your request. The support team will process your request and respond to you as soon as possible.

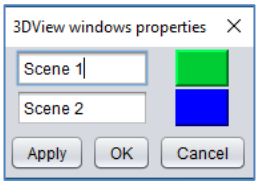
4.3 Desktop Bar

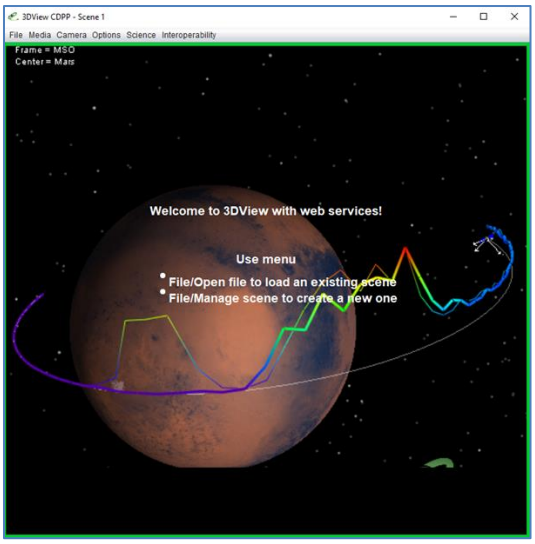


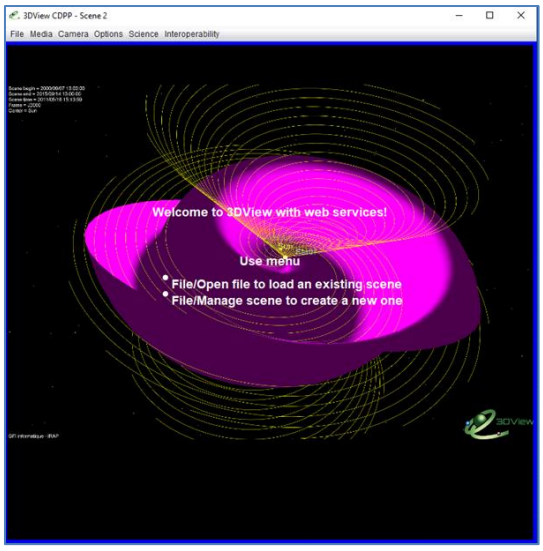
Select:

- **New** to open a new 3D scene
- **Conjunction Search Tool** to search conjunctions between instruments
- **Open all** to open a set of 3D scenes previously saved in a local file
- **Save all** to save the current scenes in a local file
- **Exit** to stop 3DView

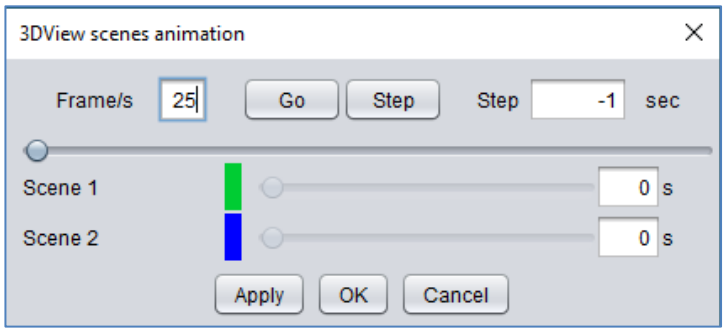
Select **Properties** to change the frame's colour of displayed scenes.







Animation is used to animate several scenes at the same time.

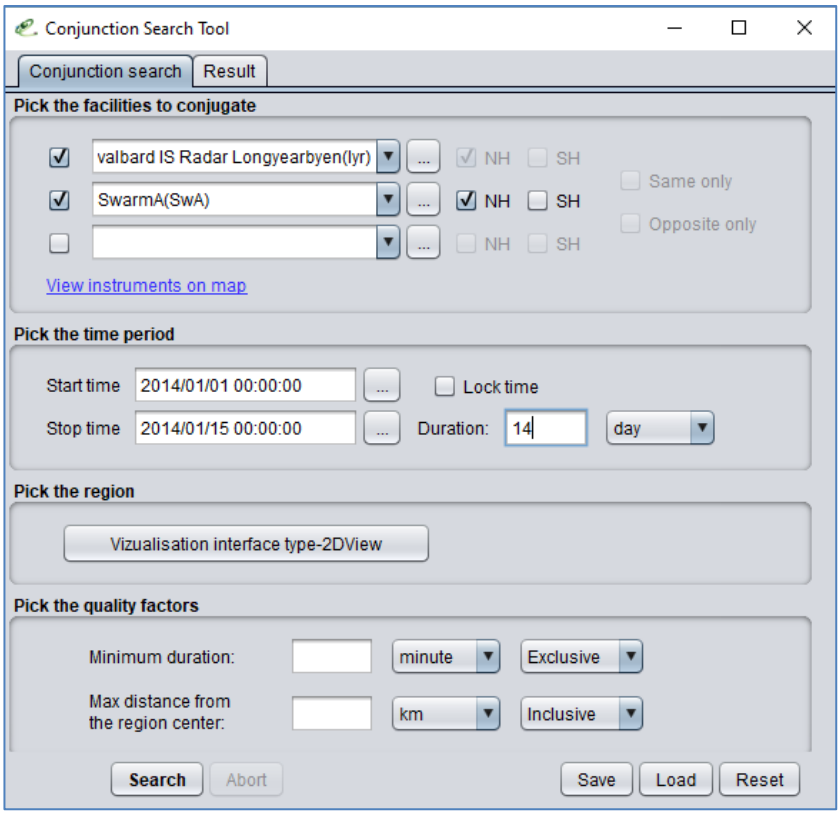


Select **About** to display the current version details.
Select **Commands** to display the list of navigation commands, using the mouse and keyboard.

4.4 Conjunction Search

4.4.1 Conjunction search window

This menu opens a window allowing the search of favorable conjunctions between up to three instruments. These conjunctions may then be used in a 3D scene.

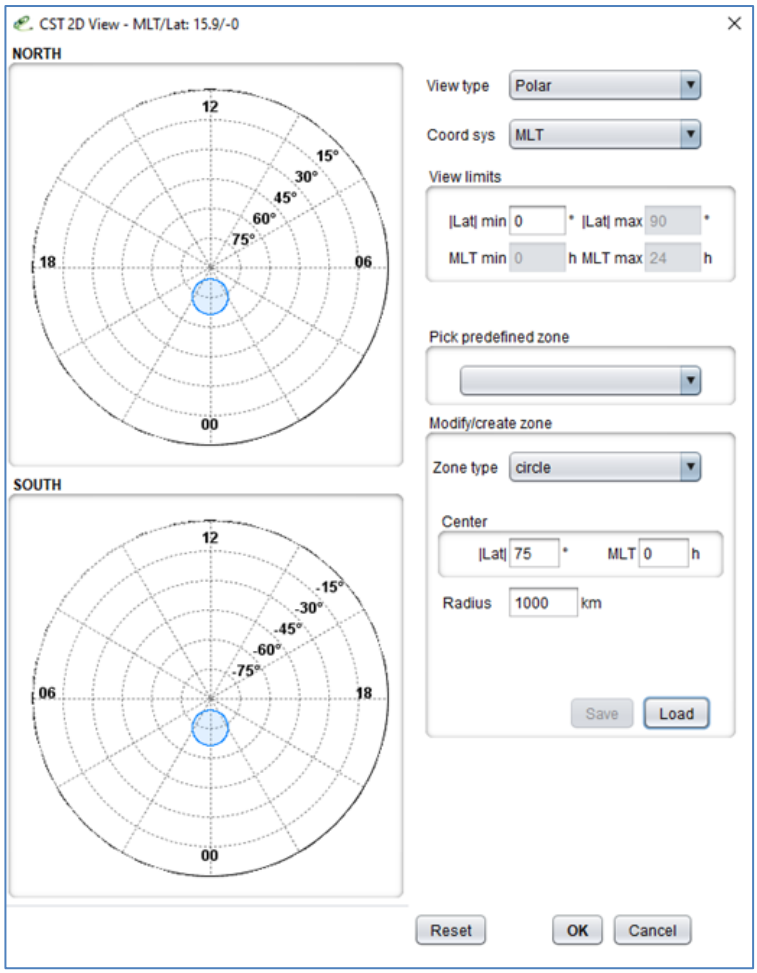


The conjunction search window is divided into four parts:

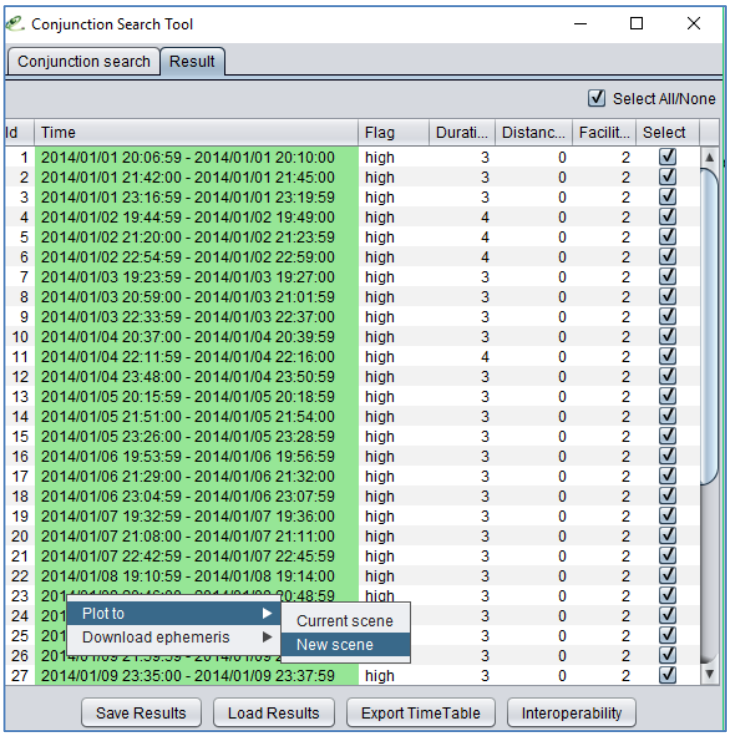
- **Pick the facility to conjugate**
  Up to three instruments. *All* means search all instruments, but limited to 24 hours and to a specific region of the magnetosphere
- **Pick the time period**
  Freeze may be used to cancel the automatic adjustment to the common operation time of the selected instruments.
- **Pick the region**
  Opens a new window to select the region to search
- **Pick the quality factors**
  Minimum duration of the conjunction and maximum distance from the centre of the searched region

4.4.2 CST 2DView window

The **Visualization interface type – 2D View** button opens the following window in which the region may be picked up.



4.4.3 Result window



From the *Result* window, right click on a conjunction to :

- plot conjuntion in the current scene or a new one, *or*
- download ephemeris in XML or ASCII

Interoperability may be used to open a SAMP HUB and send results to the HUB.

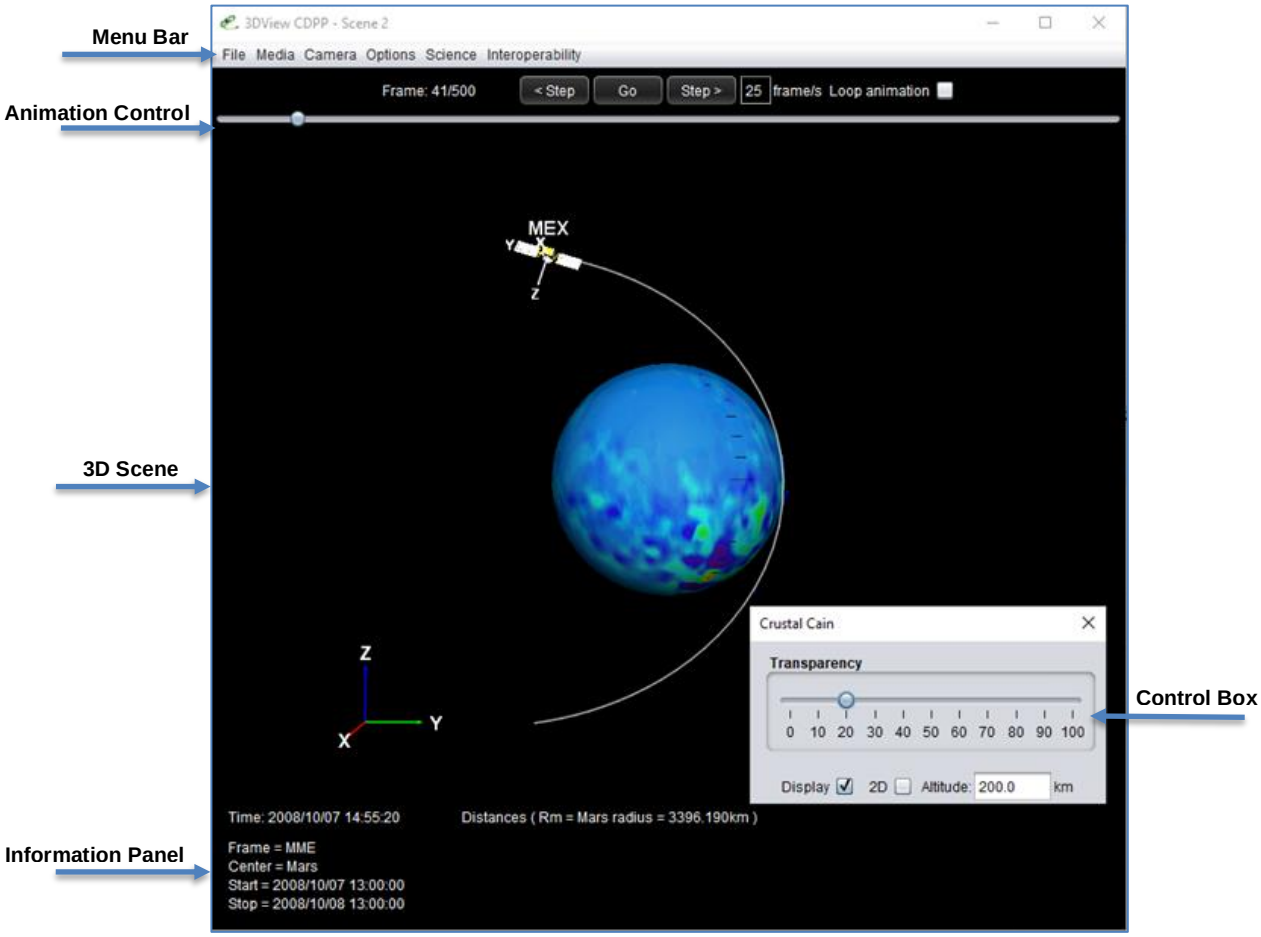
Results may be saved for further load or exported as Time table.

4.5 3D WINDOW

4.5.1 Main view

A 3D window is composed of 5 parts:

- Menu,
- Animation control
- 3D scene,
- Information panel
- Control box



4.5.2 Menu bar

The Menu bar provides access to advanced features: change display settings, display models, save images, access and display data...

4.5.3 Animation control

You can **start or stop the animation** via the button Go / Stop.
The **Step** button allows to advance step by step.
The number of frames defines the animation speed (it can be modified to change the speed).
It is also possible to play the animation by changing the cursor position directly with the mouse.
Loop animation allows to automatically and indefinitely restart the animation.

4.5.4 3D scene

The 3D scene is the main view of the application. It shows bodies selected in selection page and all other items added from menus (models, instrument views, ground traces, data...).
You can navigate through the 3D scene using mouse and keyboard.
To **rotate 3D scene** around its center, click with the left mouse button and drag.
To **zoom in and zoom out** (or forward and backward), use left button and Shift key on the keyboard. The mouse wheel can also be used for this purpose.
To **move** left or right, use the left button and the Ctrl key.
Finally, to "**look around**", use right mouse button and drag.

4.5.5 Information panel

The information panel is divided into two parts. On the left side, static information is displayed (coordinate systems, time range...). The right side is reserved for real-time display of distances or time shifts.

4.6 Menu Bar

4.6.1 File

4.6.1.1 Open file

This option opens a scene that was previously saved

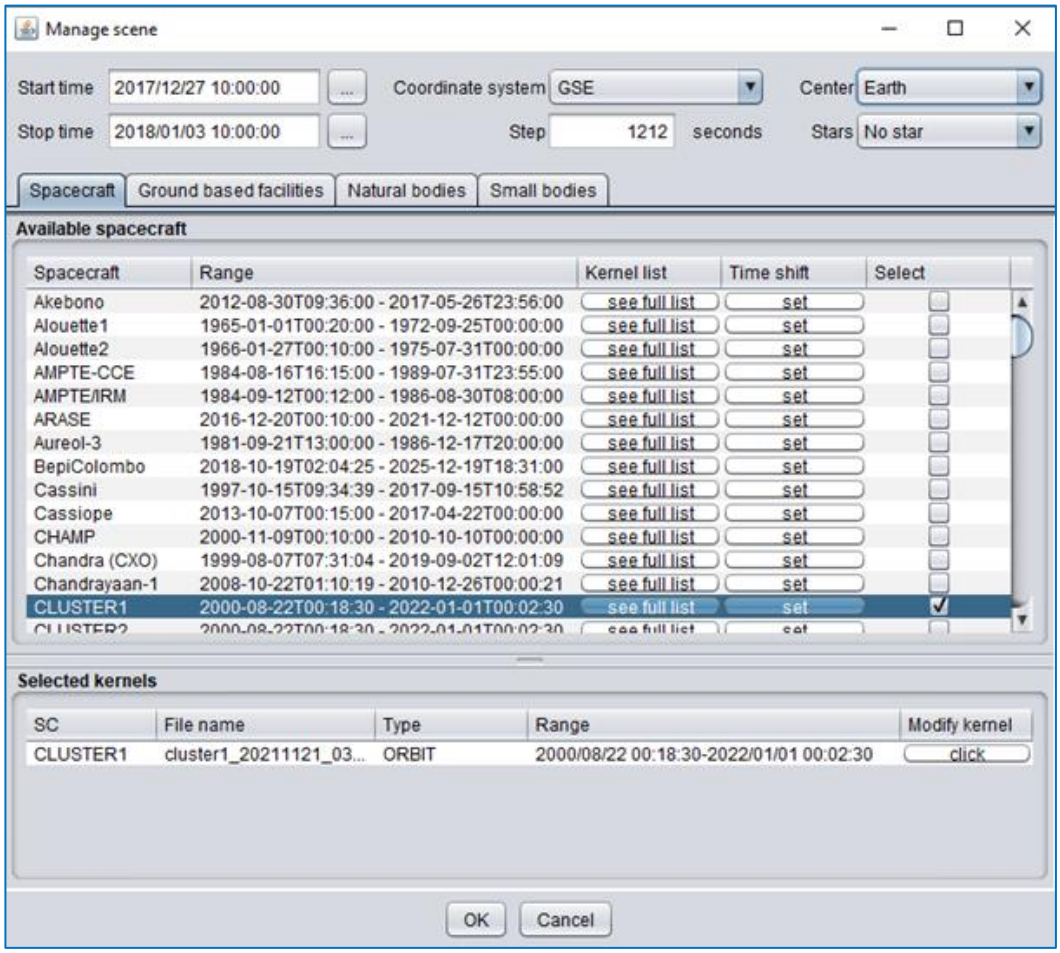
4.6.1.2 Save file

This option saves the current scene.

4.6.1.3 Manage scene

This option opens a dialog box, which allows the selection of attributes of the 3D scene that will be displayed:

- Time interval
- Coordinate System
- Time step
- Center body
- Spacecraft
- Natural Body
- Time shift

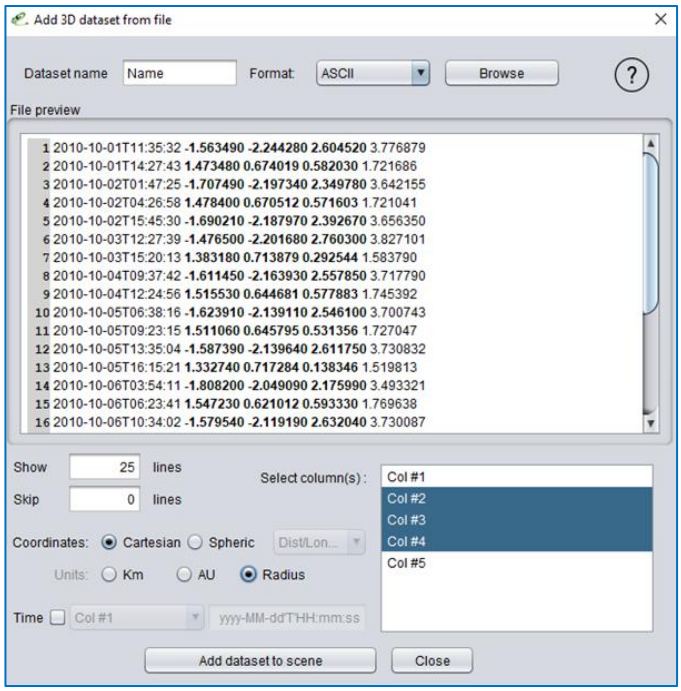


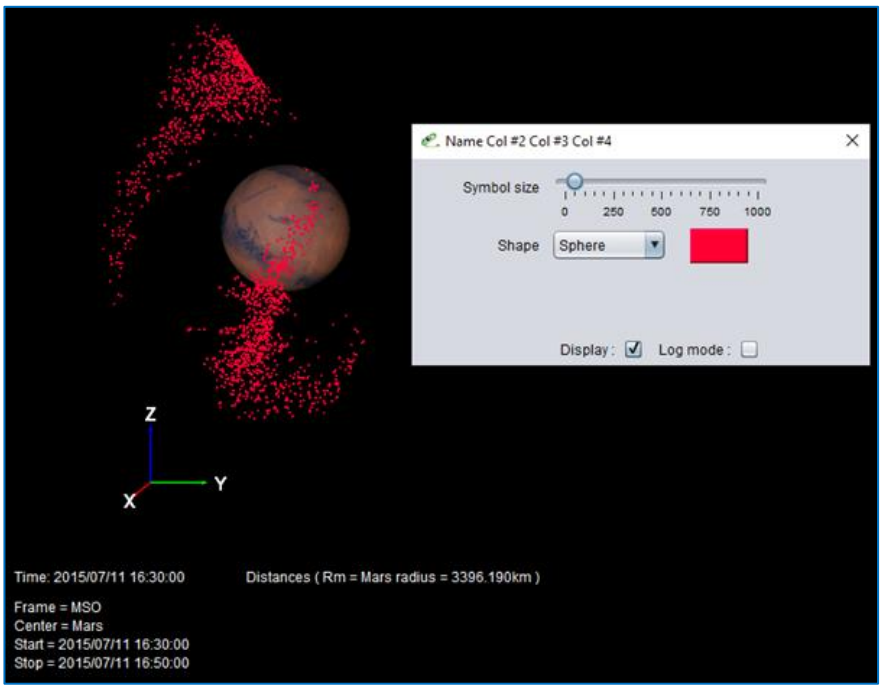
4.6.1.4 *Add user object from orbit*

This option is used to upload to the scene, the trajectory of a body, defined in a file (VOTable format).
It is possible to browse the local disk directory, or to give the URL of a remote file.

4.6.1.5 *Add 3D dataset from file*

This option can be used to display scatter plot from a 3D dataset file. The control box allows changing the plot shape, colour and size.





4.6.1.6 Add user field line from file

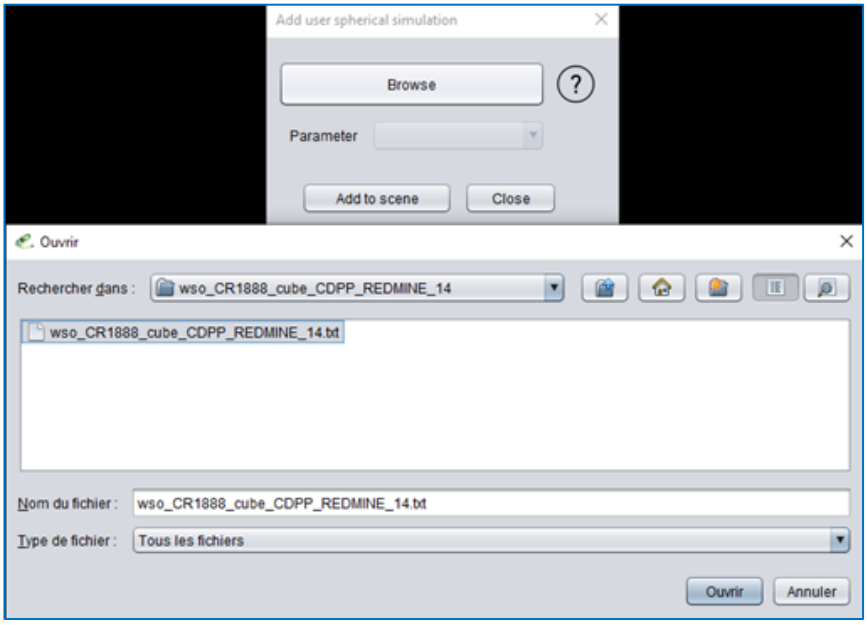
This option is used to add outputs from a field lines generator in the heliosphere contained in a local file. Each file contains only one field line with point position, field value, and optional parameters. The format is described below:

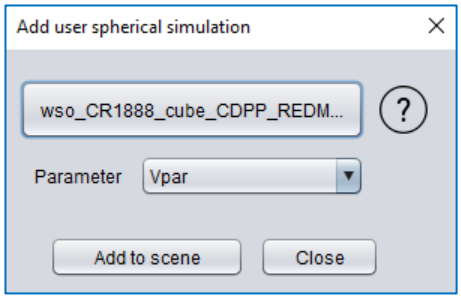
R(R_SUN) Theta(rad) Phi(rad) Br(G) Btheta(G) Bphi(G)

It is possible to plot a quantity along this line, typically the velocity.

4.6.1.7 Add user spherical simulation

This option can be used to add user spherical simulation to the 3D scene.





4.6.1.8 Add Earth spacecraft from TLE file

This option is used to add a spacecraft to the scene from a local file. This file must be in ASCII and compatible with the TLE format. See below an example:

```
NOAA 14
1 23455U 94089A   97320.90946019  .00000140  00000-0  10191-3 0  2621
2 23455  99.0090 272.6745 0008546 223.1686 136.8816 14.11711747148495
```

4.6.1.9 Add attitude to object from file

This option is used to add attitude data from a local file to a spacecraft of the scene. The format may be VOTable or ASCII. The file may contain:

- matrices (Time,xx,xy,xz,yx,yy,yz,zx,zy,zz) or
- quaternions (Time,x,y,z,w).

4.6.1.10 Add instrument FOV to object from file

This option is used to add several instruments with data related to the Field of View from a local file. The file must contain lines with the following format:
Vx,Vy,Vz, angle plein, commentaire.
Example of line: 1 ;0 ;0 ;90 ;X axis 90°

4.6.1.11 Save orbits and trajectories

This option saves orbit and attitude of spacecraft and planets in an ASCII file.

4.6.1.12 Exit

This option closes the 3D scene.

4.6.2 Media

This menu is dedicated to the generation of images and movies.

4.6.2.1 Save image

Save image takes a snapshot of displayed 3D scene as an image in PNG format. The image is saved as displayed on the screen.

4.6.2.2 Save high res image

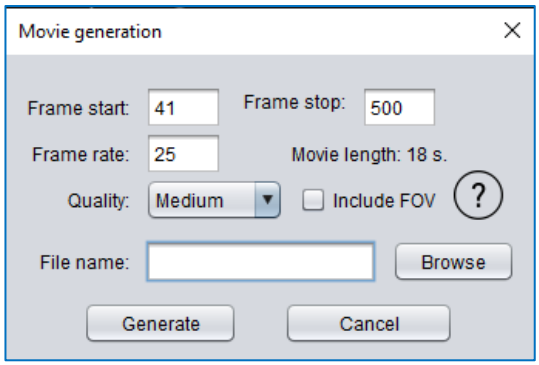
Save high res image takes a snapshot of displayed 3D scene as an image in PNG format. This option generates an image three times bigger or three times more accurate.

NB: Different graphics cards have a maximum size limit:
- Intel: 1024x1024
- ATI: 2048x2048
- NVidia: 4096x4096

If any of these manufacturers is detected, the limit of 1024 is used.
This limit also applies to movies.
If the limit is reached, the application will reduce the size factor to reach the largest possible picture on the basis of capacity of the card.

4.6.2.3 Generate movie

Generate movie is used to record all or part of the animation.



Frame start and **Frame stop** define the range of the animation to be generated.
Frame rate is the number of images per second during the movie (one image = one frame). The lower the frame rate is, the longer the movie is, but below 10 fps, the film will look jerky. Go beyond 25 is unnecessary because the eye does not see the difference.
Movie length is the length of the generated movie, depending on frame start / stop / rate.

"**Quality**" is used to adjust the movie size:

- *Good*: 2 times the screen size
- *Medium*: screen size
- *Poor*: 0.5 times the screen size

Click on **Browse** to select the file in which the movie will be saved, then start the recording with **Generate**.
Warning: *the generation of a movie may take some time and a lot of memory if a large time range and good image quality are selected.*

4.6.3 Camera

3D view menu allows changing the view of the 3D scene. *Two options* allow viewing the planes for the selected coordinates system:

- View the planes
- *Set the camera perpendicular to the plane to be viewed.*

4.6.3.1 XY View (reset view)

Sets the camera in front of the XY plane.

4.6.3.2 ZY View

Sets the camera in front of the ZY plane.

4.6.3.3 XZ View

Sets the camera in front of the ZX plane.

4.6.3.4 Chase camera

Sets the camera which follows an object.

4.6.3.5 2DView

The menu opens a 2DView window. This window is associated to the 3D scene, with a similar menu, but with some differences in *Camera* and *Science.*

4.6.3.5.1 Camera

In this menu, users can choose the Projection Type, Coordinate System, and Limits. According to the source of the data and regions of interest, cylindrical or pseudo-cylindrical **projections** are proposed (for a global 2D view of the planet and visualization of data at middle and low latitudes. Polar projections are proposed for high latitudes.

The following projections are proposed:

- Cylindrical (Mercator)
- Pseudo cylindrical(Mollweide)
- Azimuthal Polar North
- Azimuthal Polar South
- Azimuthal Polar South/North

Four **coordinate systems** are available:

- Geographic
- Quasi-dipole
- APEX
- AACGM

Limits allows the selection of a region (latitude, longitude) on a planet.

4.6.3.5.2 Science

The science menu in the 2DView window is similar to the 3D Science Menu with three additions:

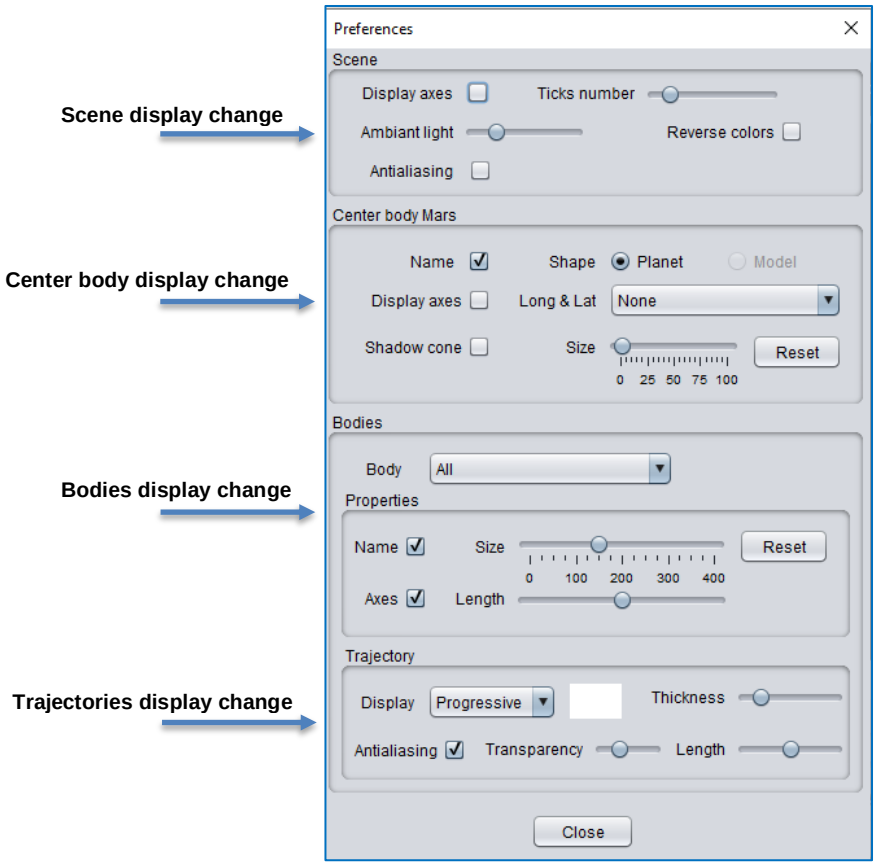
- **Satellite tracks**
  Multiple ways: *radial* to the center of the Earth or *along the magnetic field lines*, with several magnetic field models (Tsyganenko 96, 02, 05)

- **Interhemispheric mode**
  Find the magnetic conjugate from every position pointed by the mouse

4.6.4 Options

4.6.4.1 Preferences

This menu allows changing some display options.



4.6.4.1.1 Trajectory display

Thickness and display mode of bodies' trajectory may be changed. Three display modes are available:

Full: all trajectories are shown completely independently of the state of the animation
Progressive: trajectories of natural bodies (planets and satellites) are fully displayed while spacecraft are shown as the progression of the animation
None: no trajectory is shown.

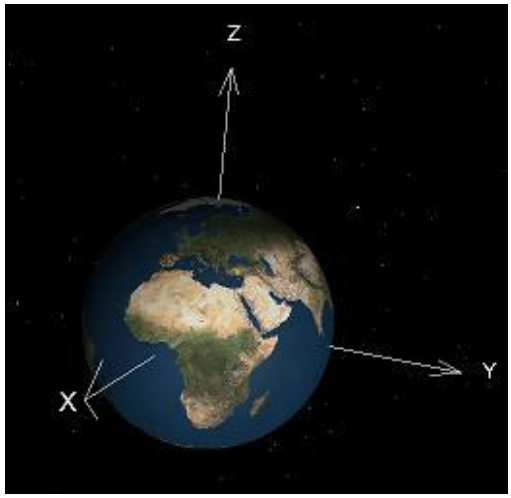
4.6.4.1.2 Bodies display

In this part, the interface allows:
- *Displaying* or not the names of bodies,
- *Modifying* the size of the spacecraft. This is useful to adapt spacecraft size to display after a zoom.

4.6.4.1.3 Central body display

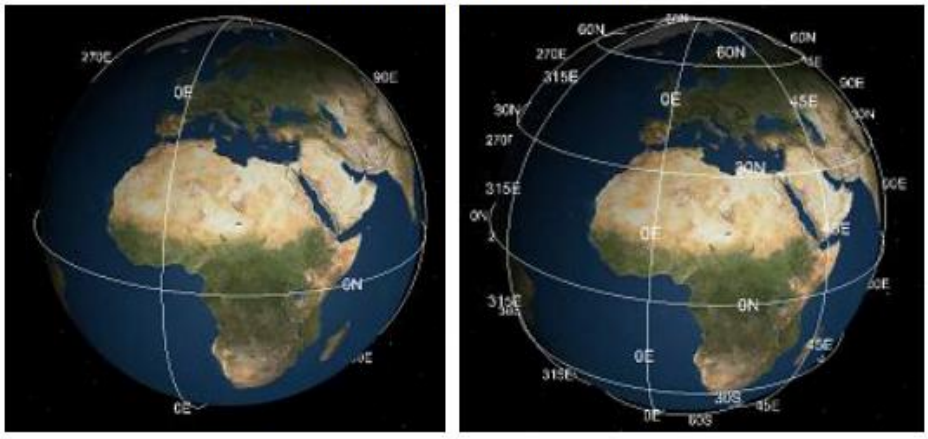
The central body is always a natural body (planet, satellite, asteroid...)
Several options are available to change the display of the central body:
Body shape: to choose a sphere (Planet) or a 3D model (Model) to represent the body (only available for asteroids).

Display axes: displays the axes X, Y, Z on central body

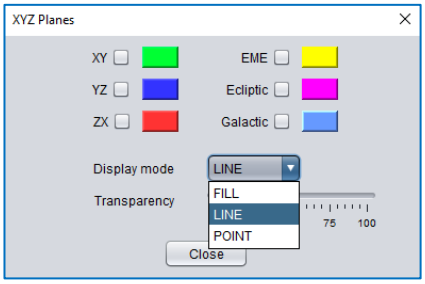


Body size: changes the size of the central body. This is useful when flying over an asteroid, for example, where the difference between asteroid size and the fly-by distance does not allow to clearly distinguishing the two objects in the same scene.
Long & Lat: Displays a grid representing the longitudes and latitudes.

Normal and *Precise* modes



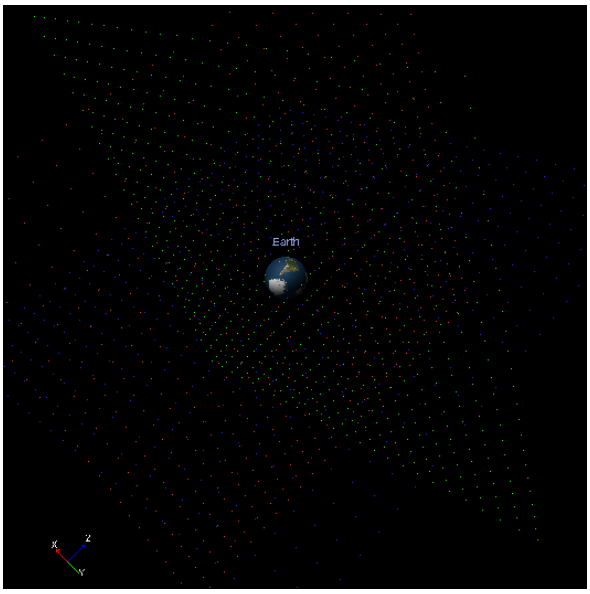
4.6.4.2 XYZ planes



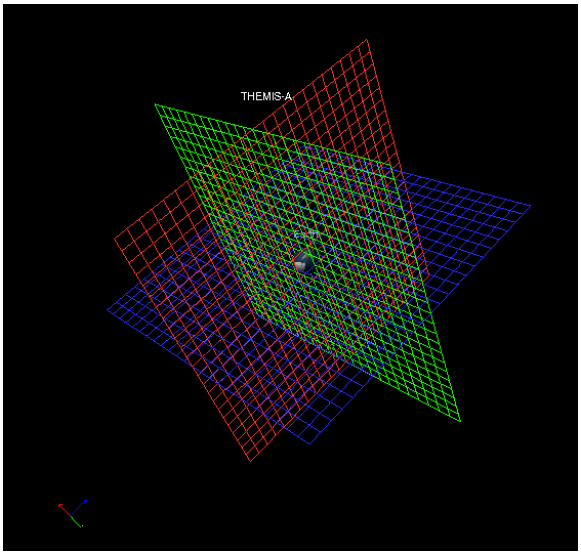
XYZ planes can be displayed as a shape of grids, points or translucent plans.

To view planes, check the boxes. Clicking on it can change the colour. The selection box allows selecting the plane display mode:

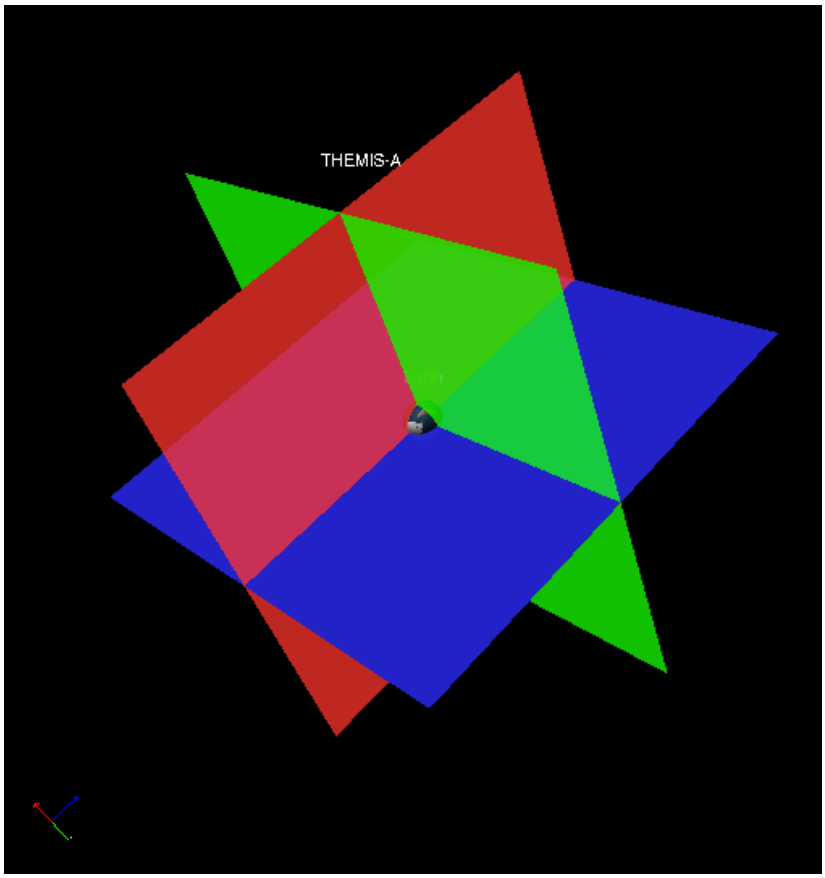
Points **(POINT)**



Matrix **(LINE)**



Translucent plane **(FILL)**

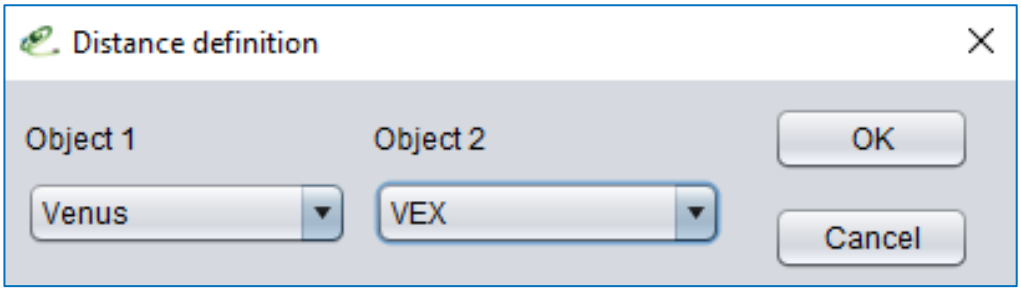


The width of the grid corresponds to the display unit (radius earth, Mars, astronomical unit...)

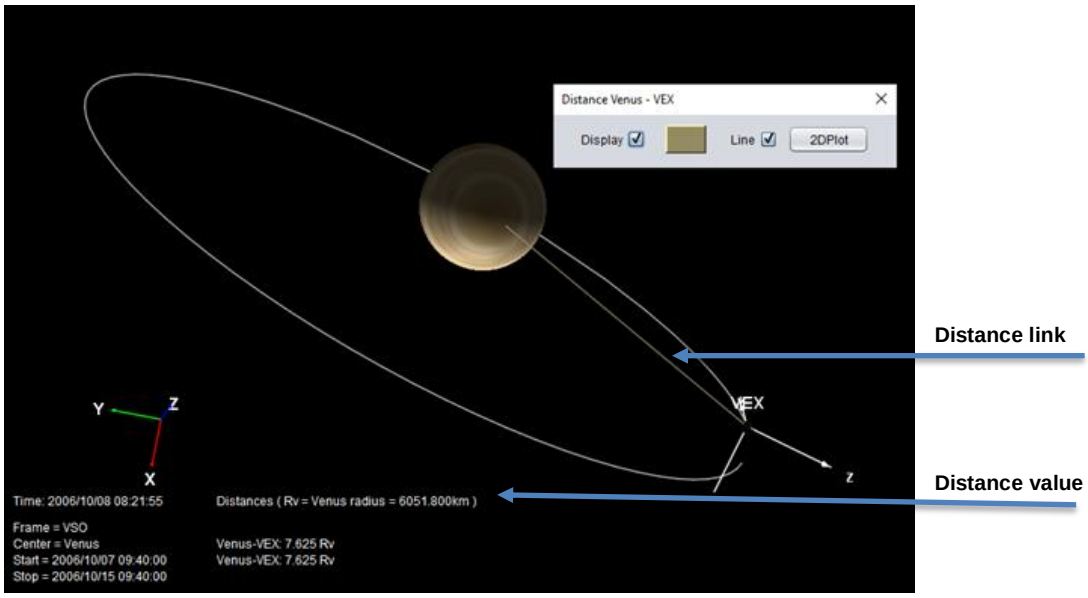
4.6.4.3 Distance between 2 objects

4.6.4.3.1 Show distance

This option is used to define a distance between two objects.

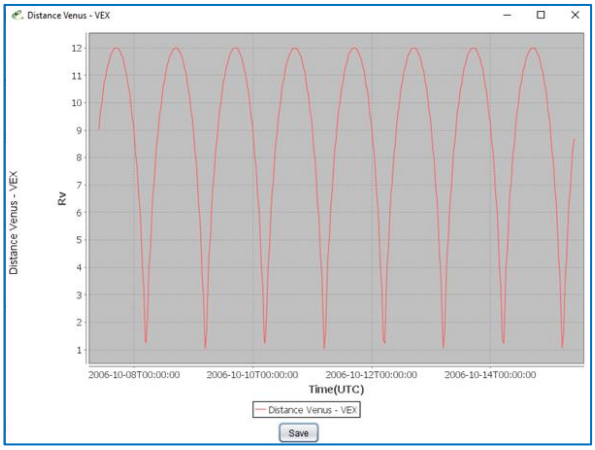


Selecting **Show distances** provides a link between the objects in the 3D scene. The distance value is displayed on the right side of the information panel.



4.6.4.3.2 2DPlot

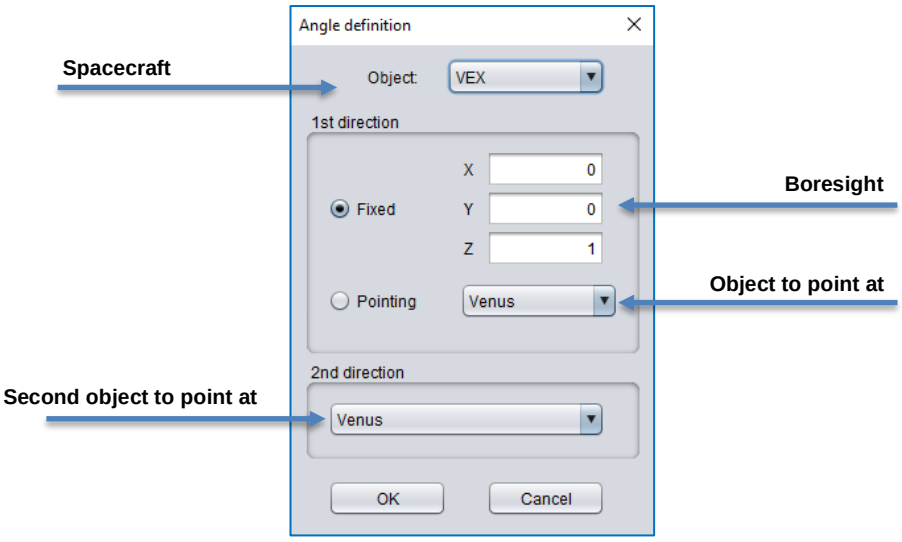
This option may be used to plot the evolution of the distance.
The first launch may last a little due to 2D package loading.



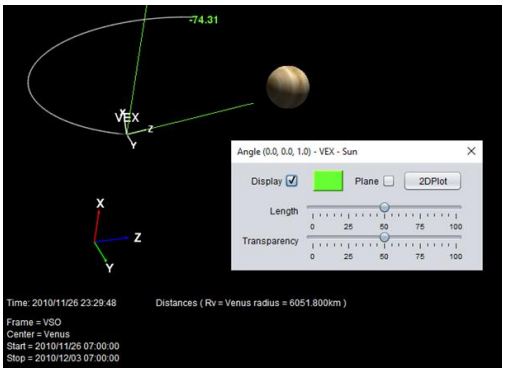
*4.6.4.4 **Show angles***

4.6.4.4.1 Angle definition

This menu allows users to see an angle between one direction (referred to an instrument) and a body. This allows for example to get the angle between the sun and the bore sight of a camera.

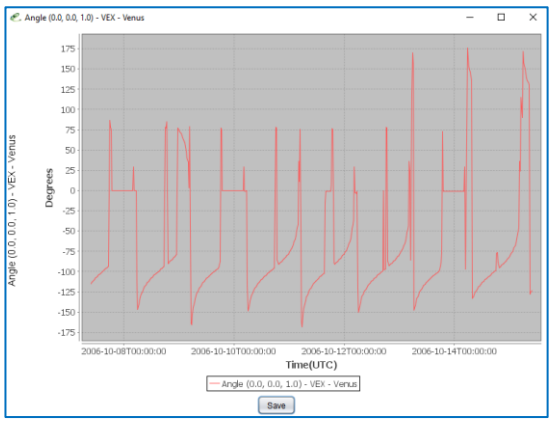


Result in the 3D scene:



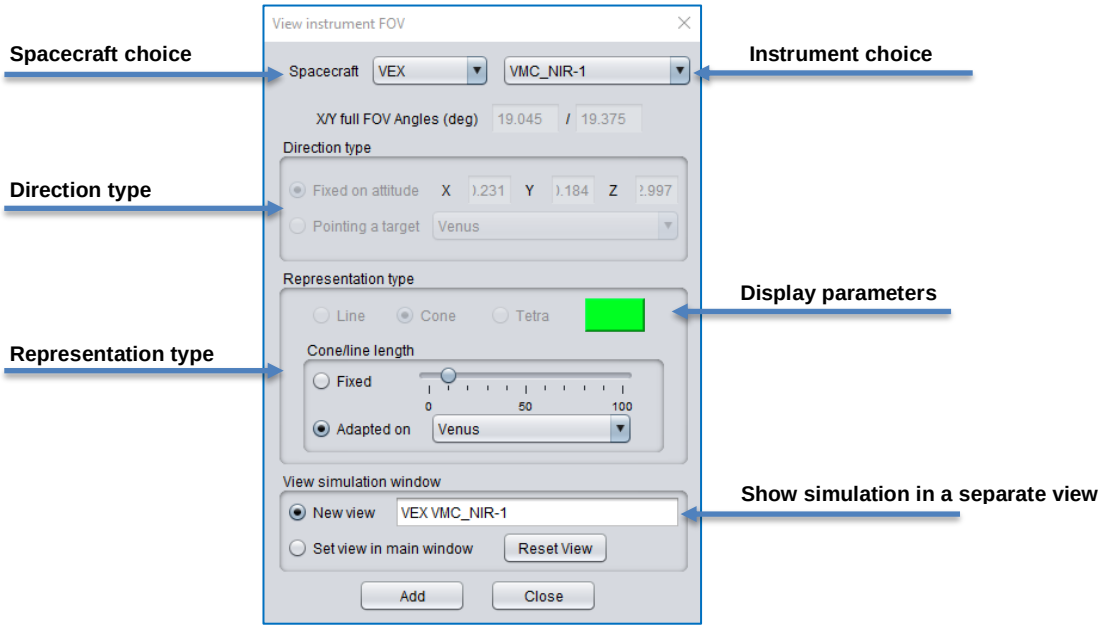
4.6.4.4.2 2DPlot

This option displays angle values as a function of time.



4.6.4.5 Show instrument FOV

This menu allows users to simulate an instrument view. It may be useful to simulate a camera or a detector. It is possible to run several times this function to simulate different instruments simultaneously.
The configuration window appears:



4.6.4.5.1 Spacecraft and instrument choice

The list allows choosing a body among those displayed in the 3D scene and the instrument for which the field of view is displayed.

4.6.4.5.2 Direction type

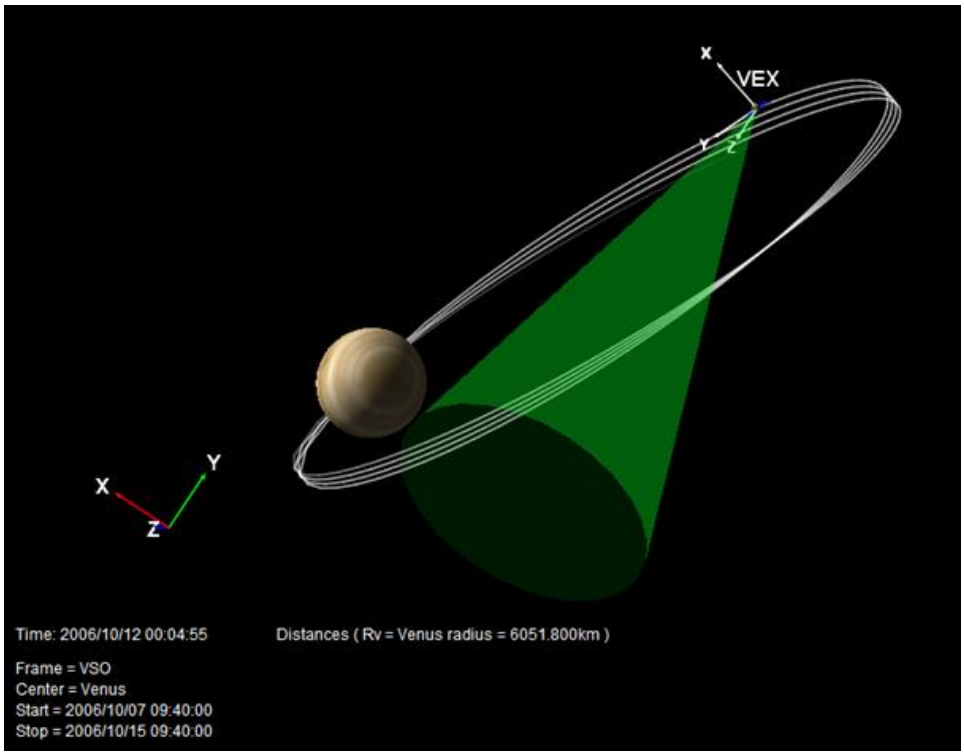
The type allows choosing between a **fixed direction** in the spacecraft coordinate system or a **target to point at.**
The first option allows simulating an instrument while attitude data is available. You must enter the direction vector relative to spacecraft coordinate system. It is not necessarily normalized.
With the second option, you can choose to point instrument direction to an object in the scene. The right ascension / declination of the direction in EMEJ2000 will be displayed if the simulation is displayed in a separate view (New View).
Depending on the instrument you choose, the direction type is set by default.

4.6.4.5.3 Representation type

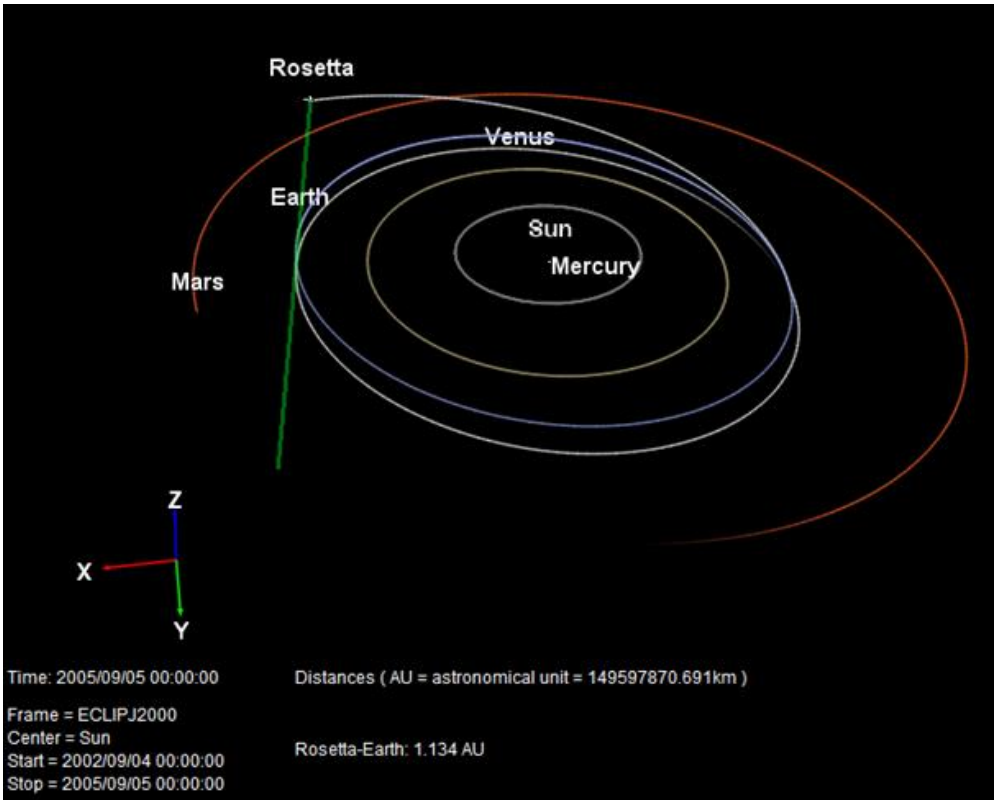
Three types of representation are available:

- **Cone**
- **Line**
- **Tetra**

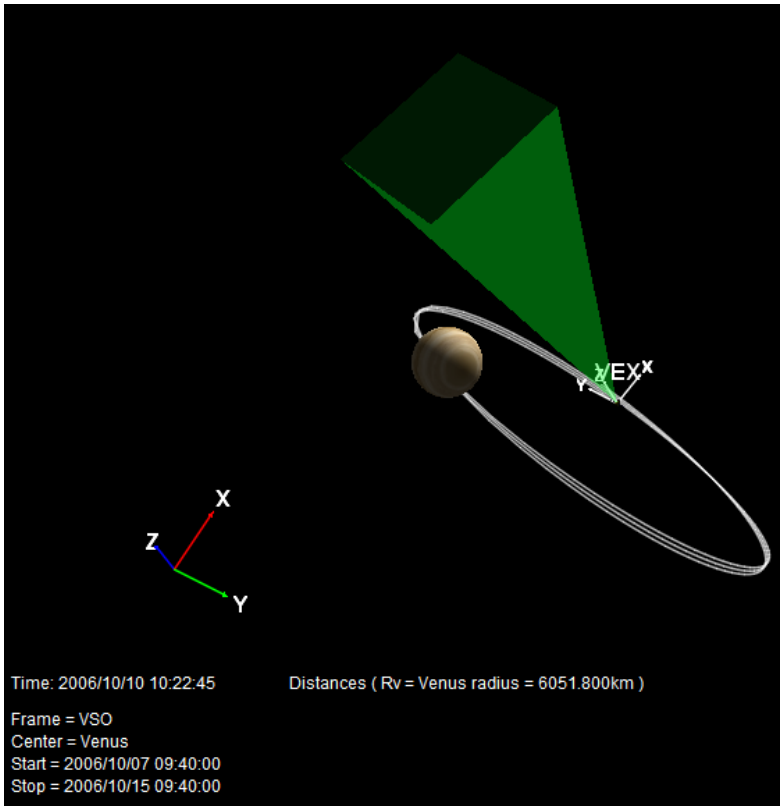
The first option allows representing an instrument bore sight with a cone such as a camera:



The second one draws a line in the axis of the entered vector.



The third option allows representing an instrument bore sight with a tetra such as a camera:



The third is different from the previous ones: it places the user in place of the instrument so that he sees on the screen what the instrument sees. The view is centered on the spacecraft and follows the orbit and attitude. The navigation functions remain active but, except the zoom, any movement will loose the direction defined at the outset.
To return to the starting view, select the menu **Camera/ZY view**.

4.6.4.5.4 Cone/line length

The length of lines, cones and tetra can be set to “Fixed” or “Adapted on”.

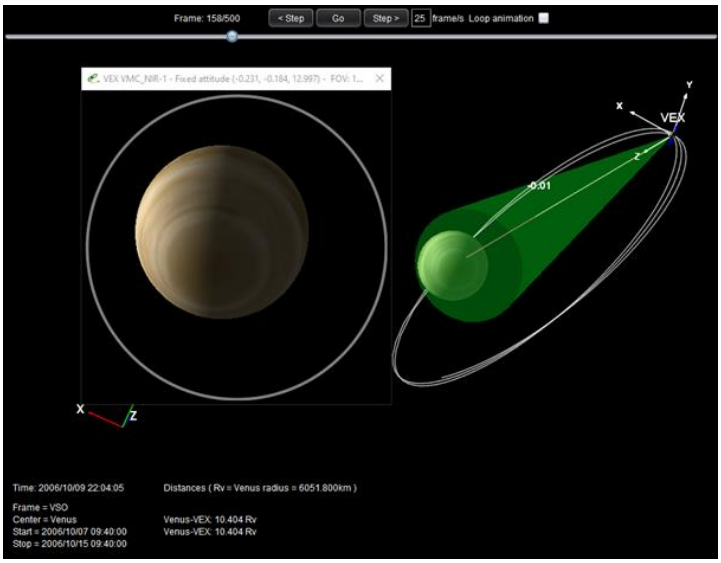
Fixed
A slider allows changing the length of lines, cones and tetra:

Adapted on
The length of the lines, cones and tetra is adapted to the object selected in the adjacent drop down list.

the colour of the line or cone is editable by clicking on the coloured area.

4.6.4.5.5 Simulation view in separate window

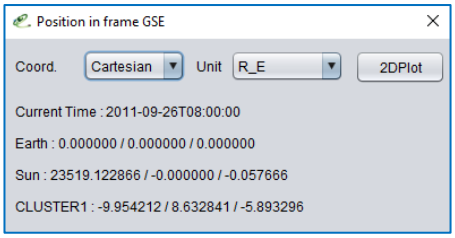
To represent the instrument view by a cone and simulate at the same time the view of the instrument in a separate window, select **New view** in the “View simulation window” panel. A text box allows naming this window in addition to the information already recorded in the title.



Closing the window automatically removes the cone in the main window.

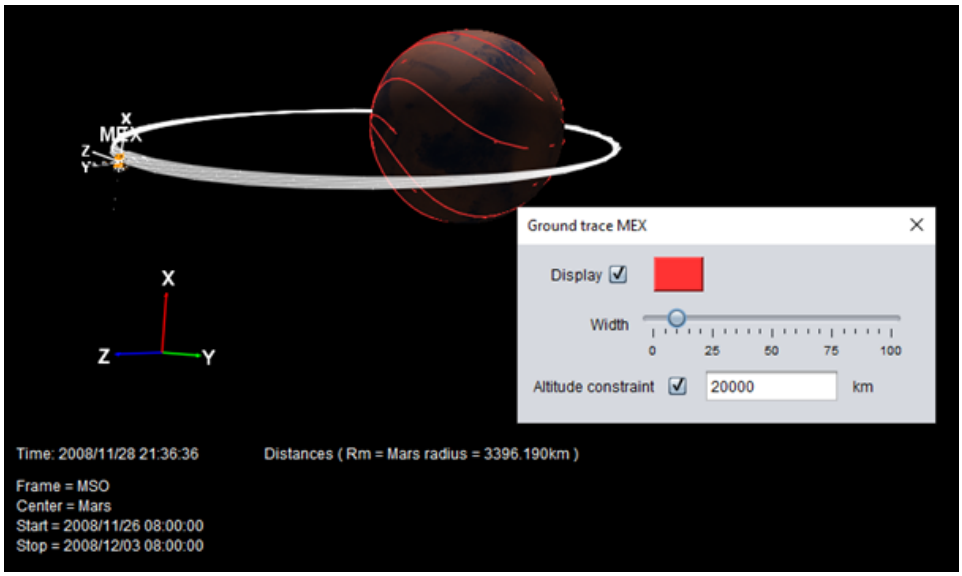
4.6.4.6 *View Positions*

Used to display the position of the bodies selected in the scene. For example:



4.6.4.7 *Show ground traces*

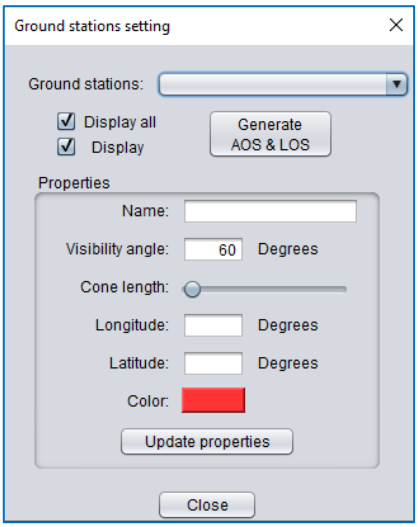
Used to display the ground trace of a spacecraft on the central body.



The maximum generation altitude of the ground trace allows generating the ground trace only once the distance between the spacecraft and central body surface is below this limit.

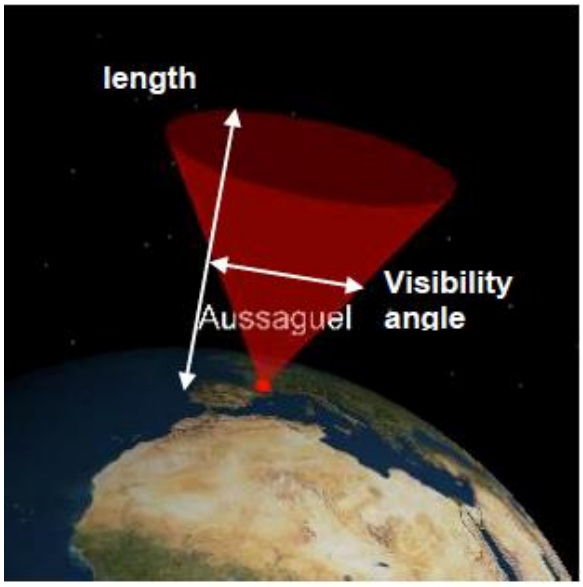
4.6.4.8 Show ground stations

When the central body is the Earth and a spacecraft in scene has ground stations defined (e.g., THEMIS-A), this menu allows visualizing the location of ground stations and their zone of influence.



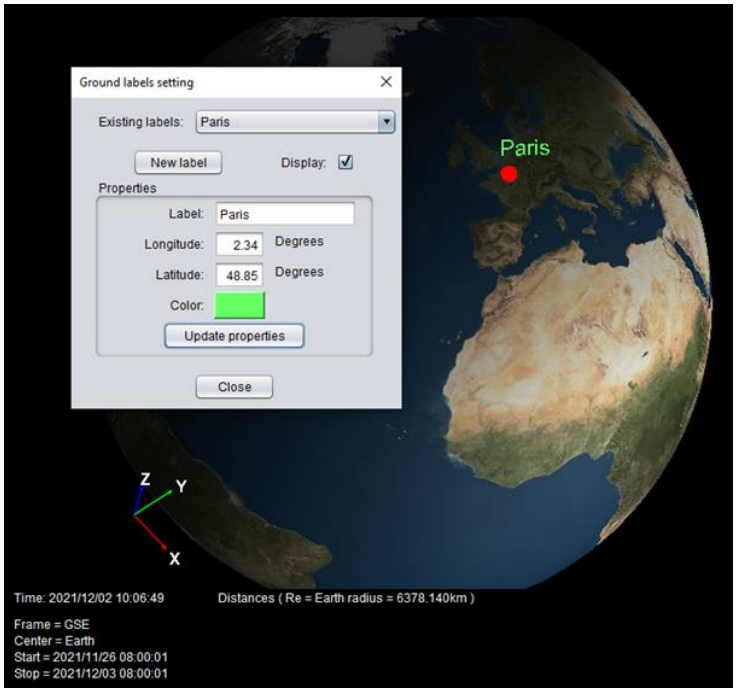
To view a ground station:

1. Choose the desired station among those proposed,
2. Activate the display in the 3D scene,
3. Modify the properties (only the angle of the cone of vision, its length and its colour can be modified),
4. Validate changes: “Update properties”. These changes will not be retained after a restart of the application.



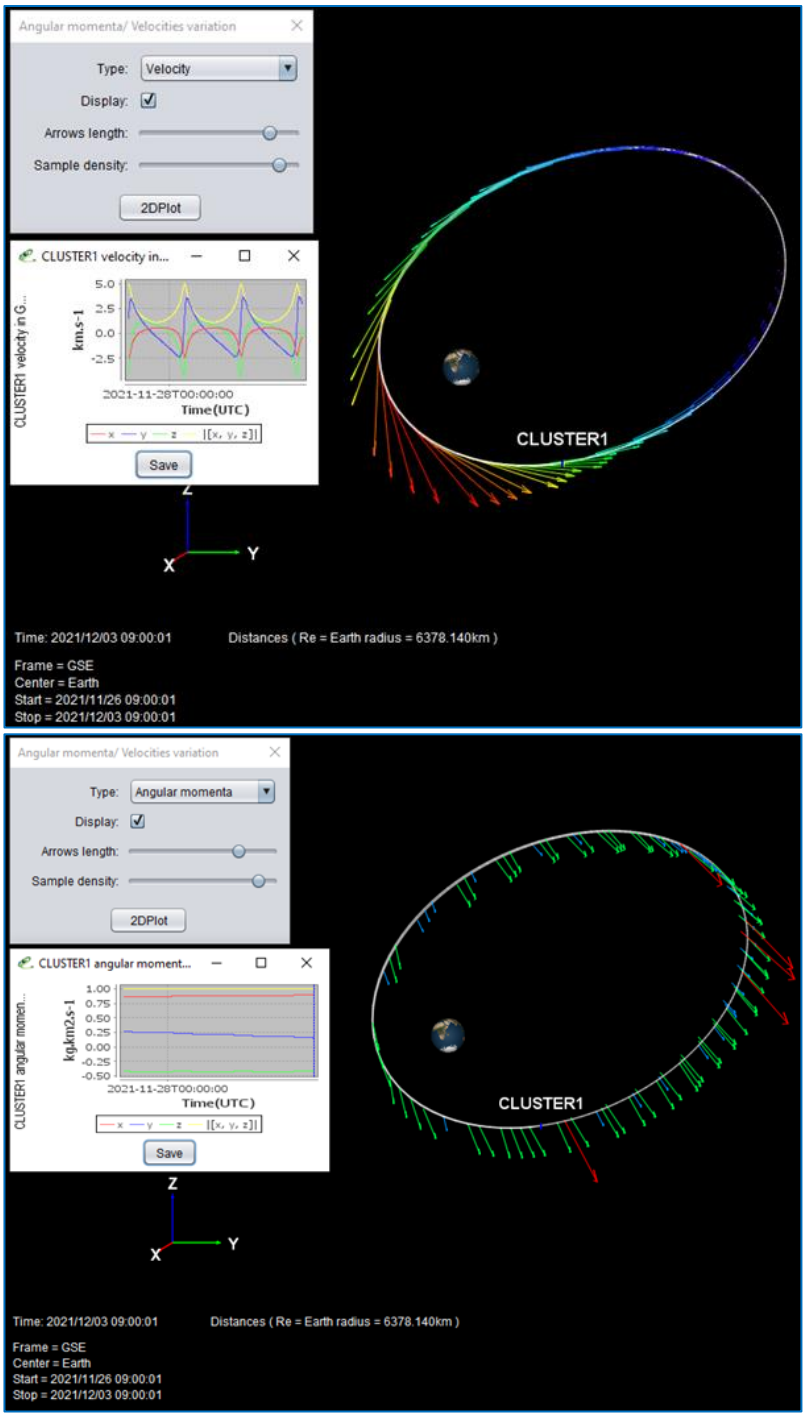
4.6.4.9 *Show ground labels*

This menu allows setting labels on a body. Select Options>View ground labels



4.6.4.10 *Show Angular momenta/Velocities*

This menu allows displaying Angular momenta and/or velocities of a Spacecraft on its trajectory or as time series in a 2D plot.
Select Options>View Angular momenta/Velocities



4.6.5 Science

4.6.5.1 Remote data (IMPEx)

This option is used to display the following dialog box, which allows the selection of data, from databases of simulations or observations, implementing the IMPEx protocol. The hierarchy of data displayed in the dialog box corresponds to the Body and Time selection chosen previously in the **Manage scene** dialog box.

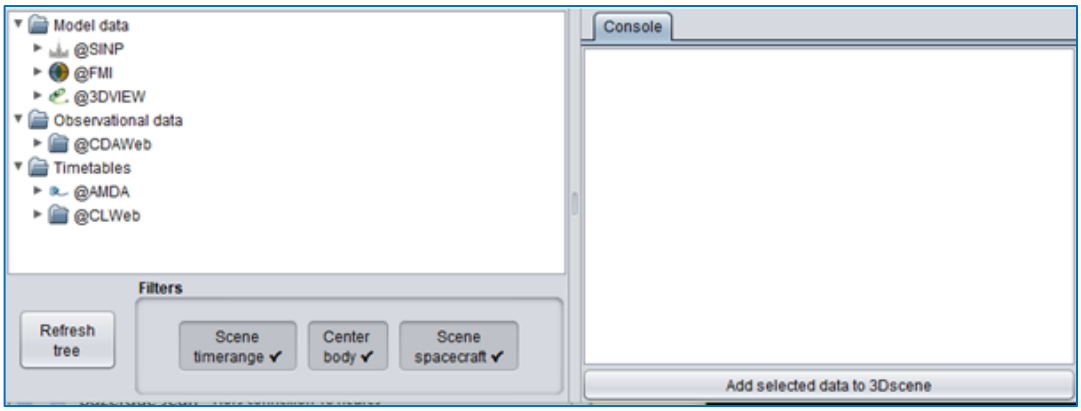


Figure 1 All filters ON

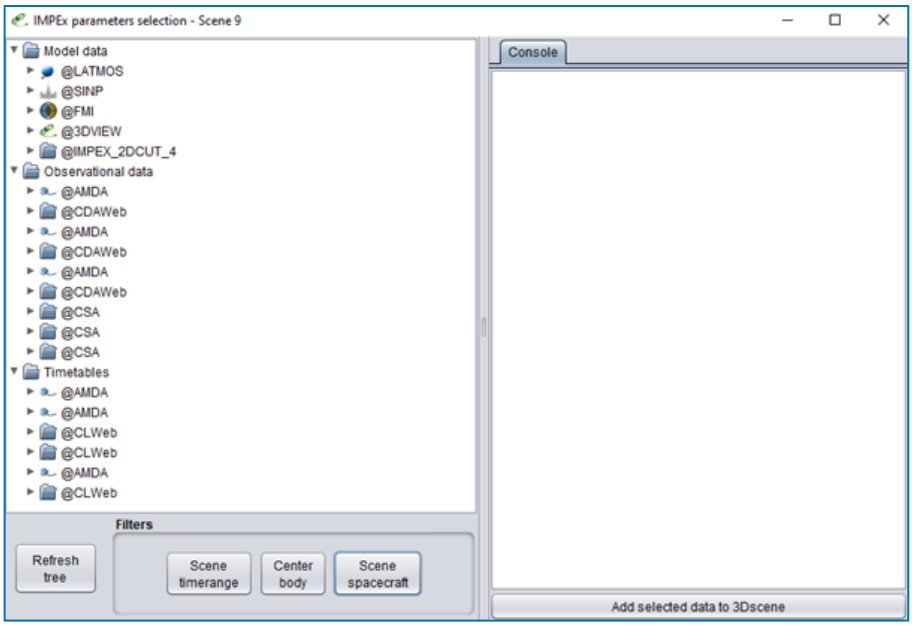


Figure 2 All filters OFF

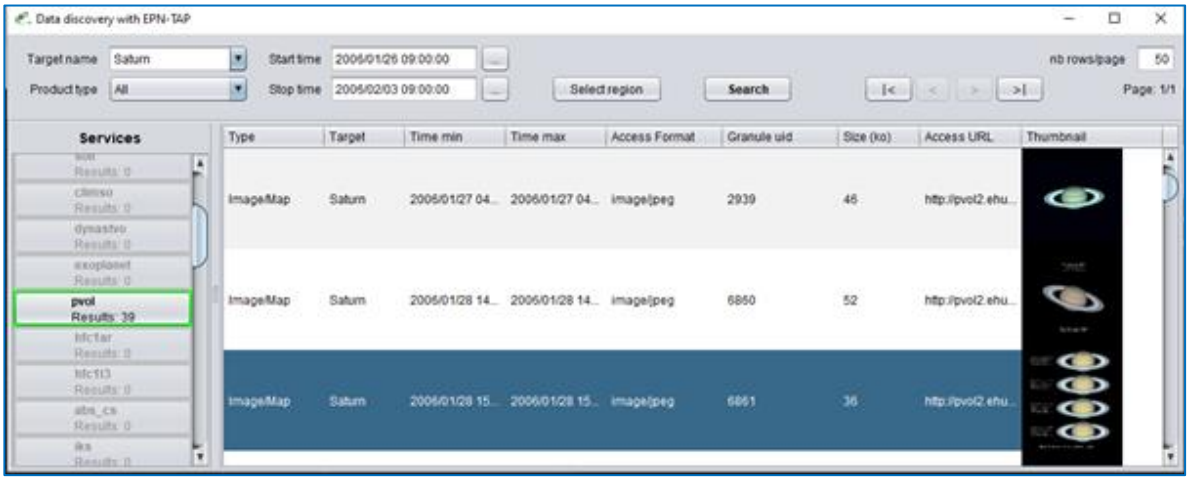
Three filters may be used to modify the displayed hierarchy :

- **Scene timerange** to extend the selection outside the scene time range. A link to a new database is displayed.
- **Center body** to extend the selection to all bodies. A link to a new database is displayed.
- **Scene spacecraft** to extend the selection to all spacecraft. A link to a new database is displayed.

Add selected data to 3Dscene is used to display the selected data in the 3Dscene.

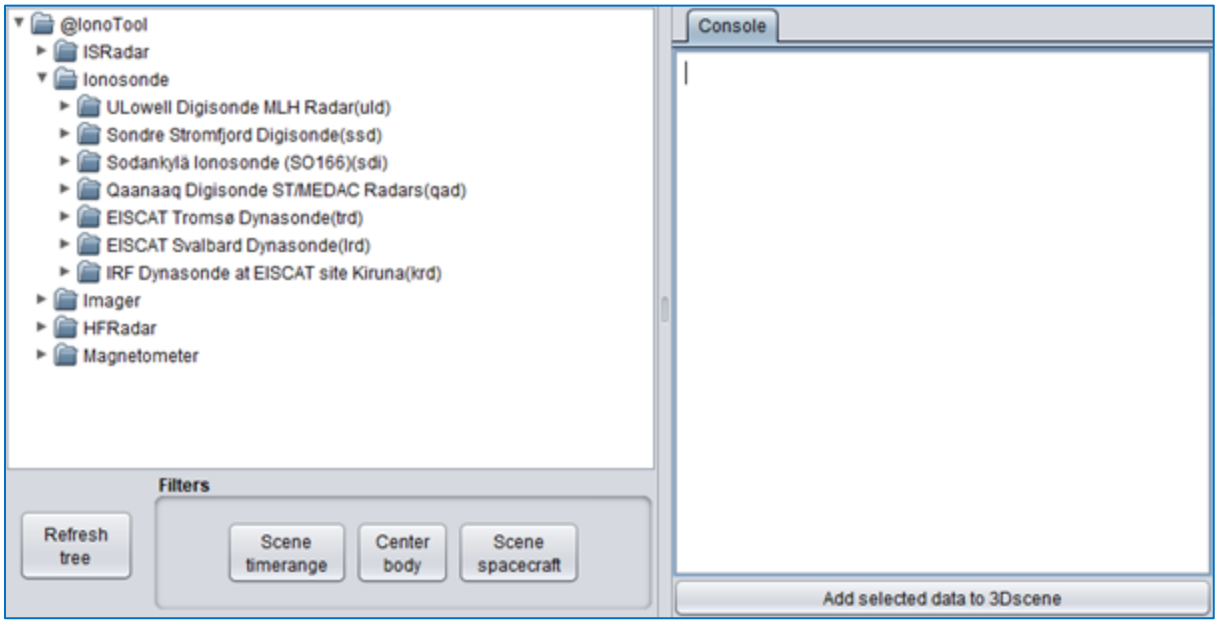
4.6.5.2 Remote data (VESPA)

This option is used to search for data provided through VESPA.



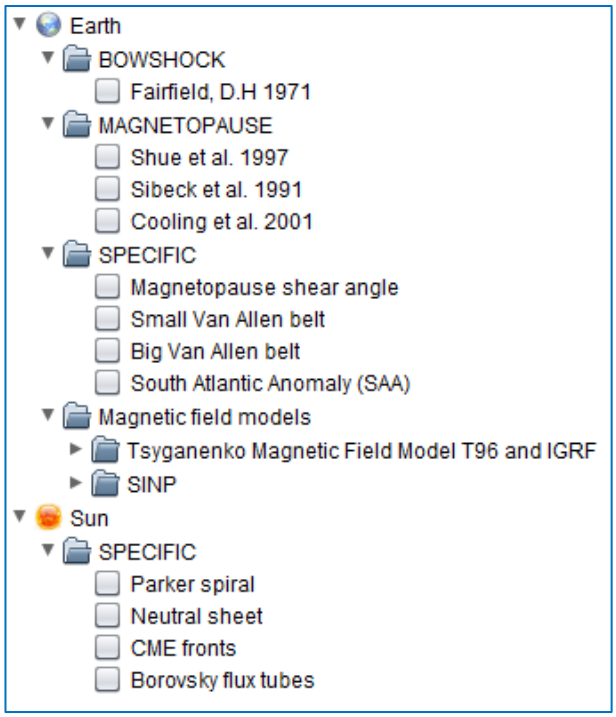
4.6.5.3 *Remote ground instrument data*

This menu is similar to the *Remote Data (IMPEx)* menu, for ground instruments.

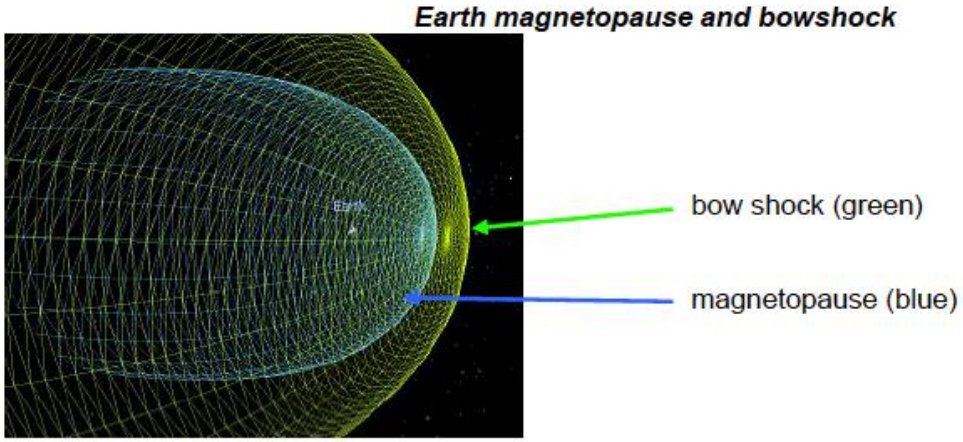


4.6.5.4 *Models*

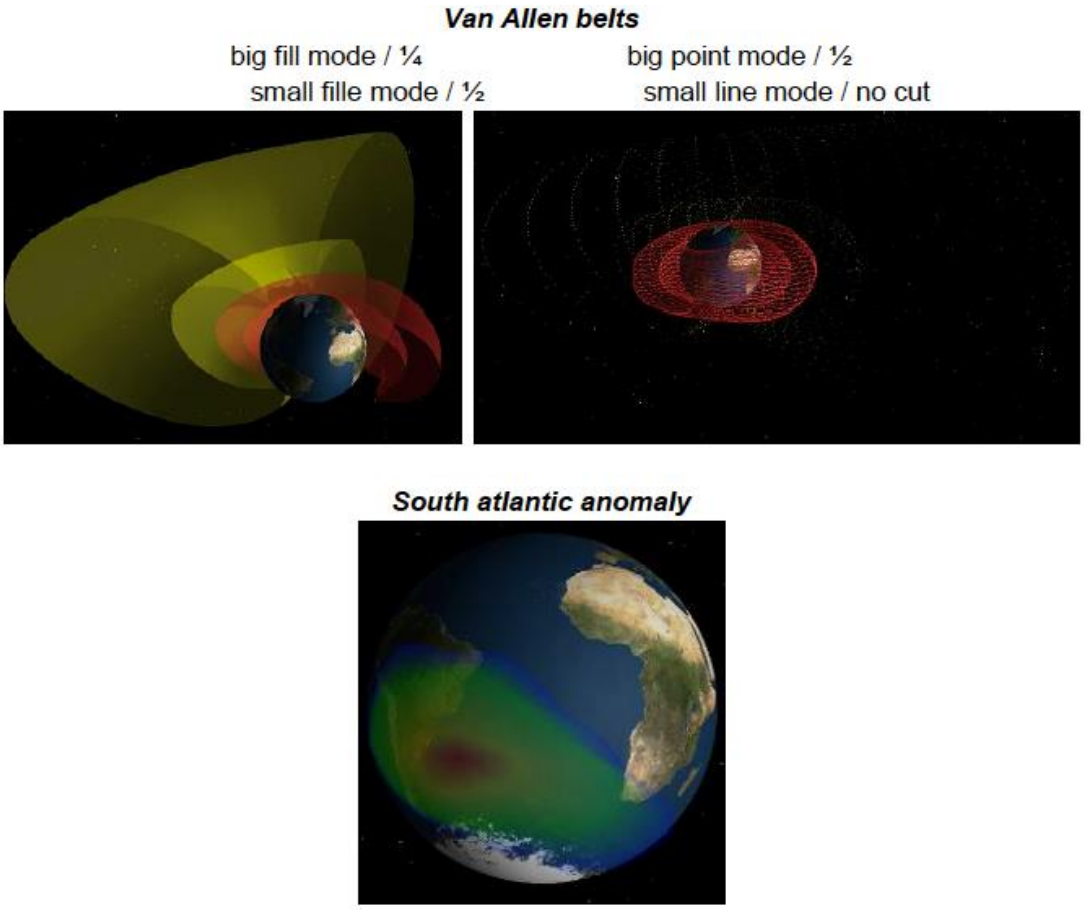
For some central bodies (Earth, Mars and Venus for the moment), static physical models are available. Here is the list of implemented models.



4.6.5.4.1 Earth models

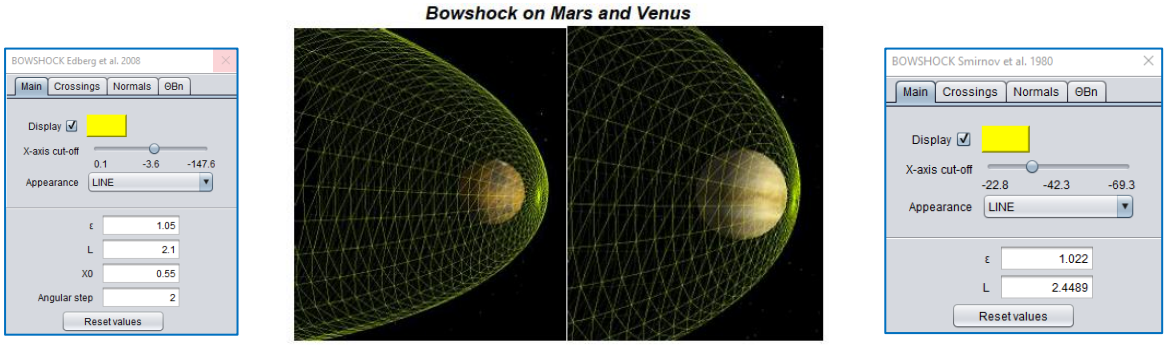


For all models except the South Atlantic anomaly, it is possible to choose the colour.
For each radiation belt, it is possible to select different display modes (point (POINT), wired (LINE) and full (FILL)) and cutting (no cutting, ½, ¼, ¾). Here are some examples showing different models:



4.6.5.4.2 Mars and Venus models

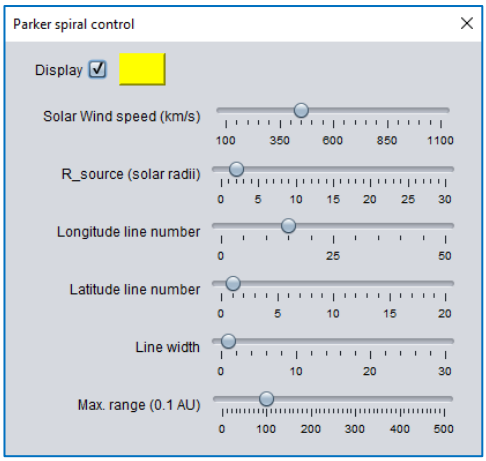
For Venus and Mars, only bow shock is available. Bow shock on Mars and Venus



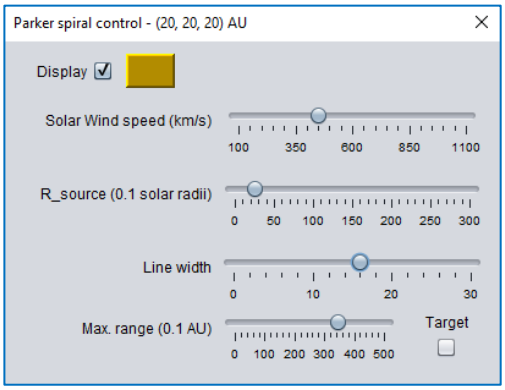
4.6.5.4.3 Parker spiral

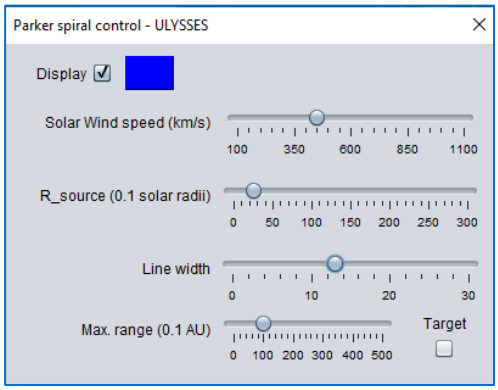
Three options are provided to display the Parker Spiral

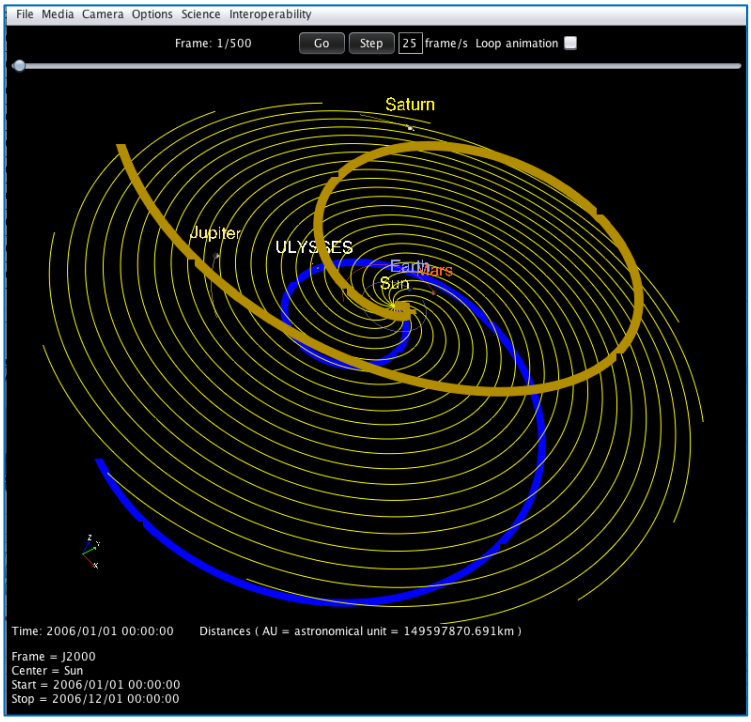
- Free (Yellow): displays a set of lines



- Fixed point (Brown): displays one line depending on one point defined by the user
- Follow scene object (Blue): displays one line depending on the trajectory of a spacecraft





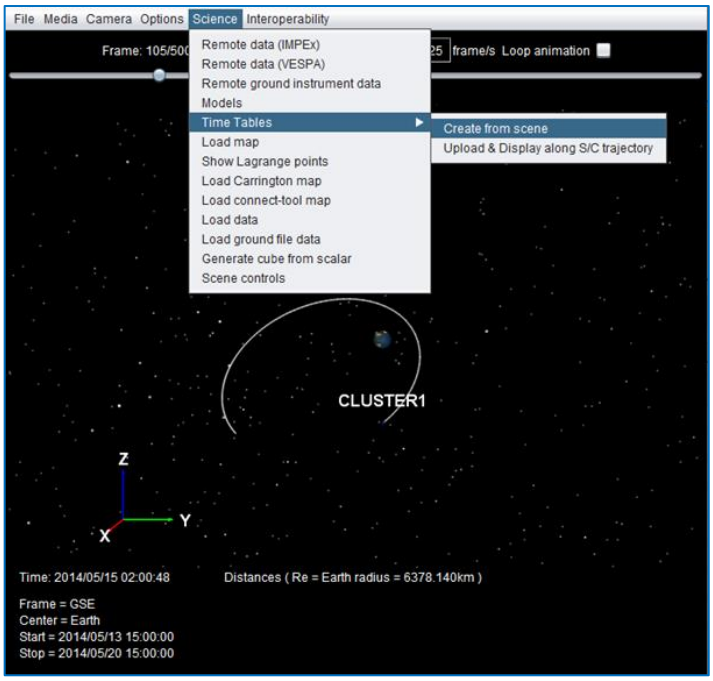


4.6.5.5 Time Tables

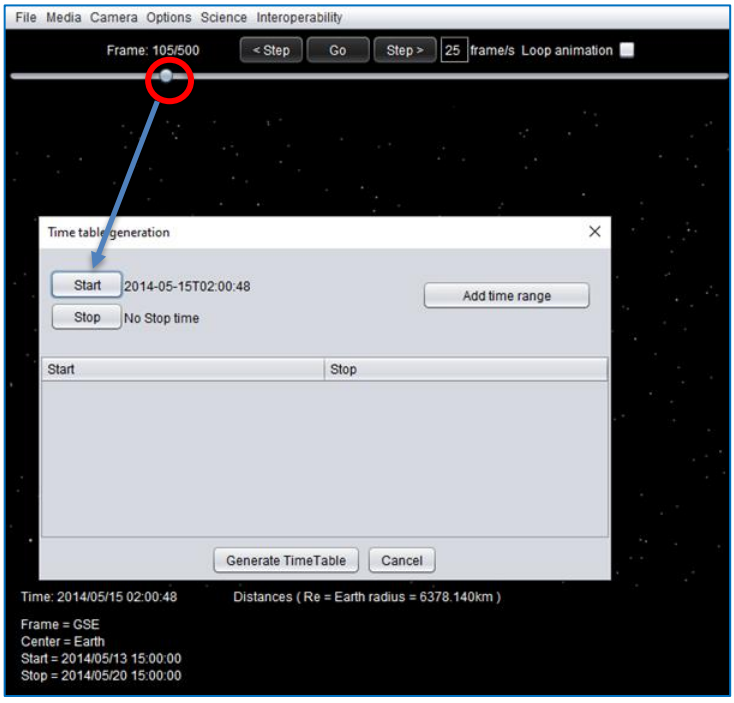
4.6.5.5.1 Create from scene

The generation of Time Tables from a 3DView scene is made by selecting time intervals on the time bar in the following way:

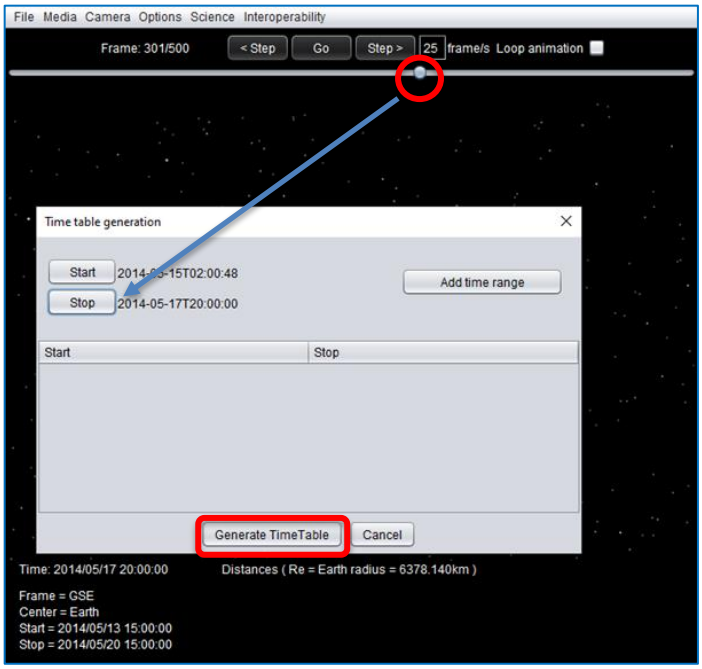
1) Open the selection interface



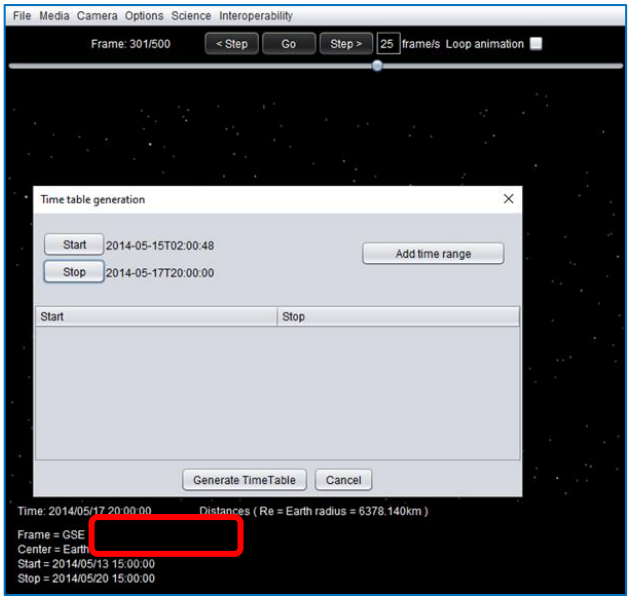
2) Put the cursor at the starting point of the interval on the time bar.



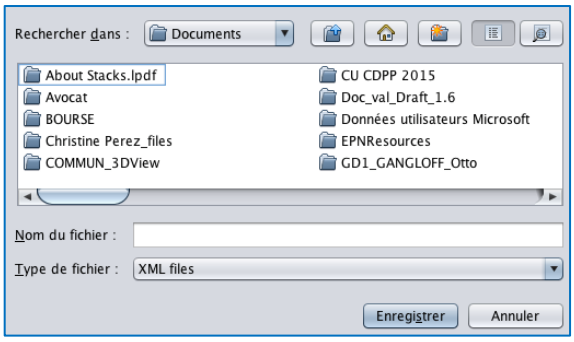
3) Add the start time with the START button.
4) Put the cursor at the ending point of the interval on the time bar. Add the stop time with a button of the selection.



6) Addition of a new interval in the same way as 2)
7) Or stop and generate the Time Table.

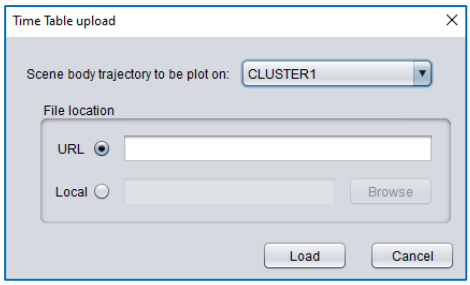


8) Select a directory and enter a file name, which will be created with a ".xml" extension



4.6.5.5.2 Upload and display along S/C trajectory

Users can upload Time Tables in 3DView. Corresponding data are attached to a spacecraft of the scene.



4.6.5.6 Load Map

This option allows displaying a projected map from a list on the 3DView server or from the users' disk.

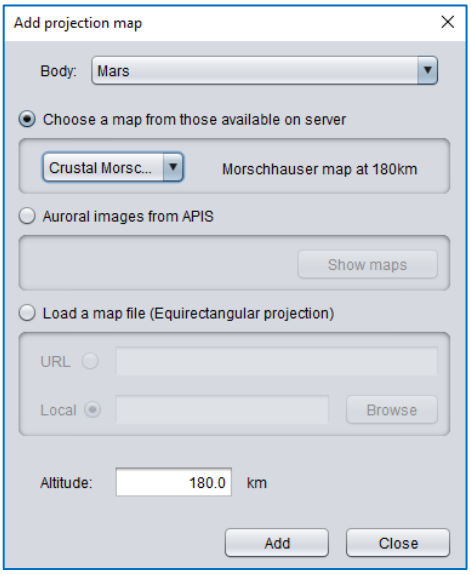


Figure 3 Load Map Control Window

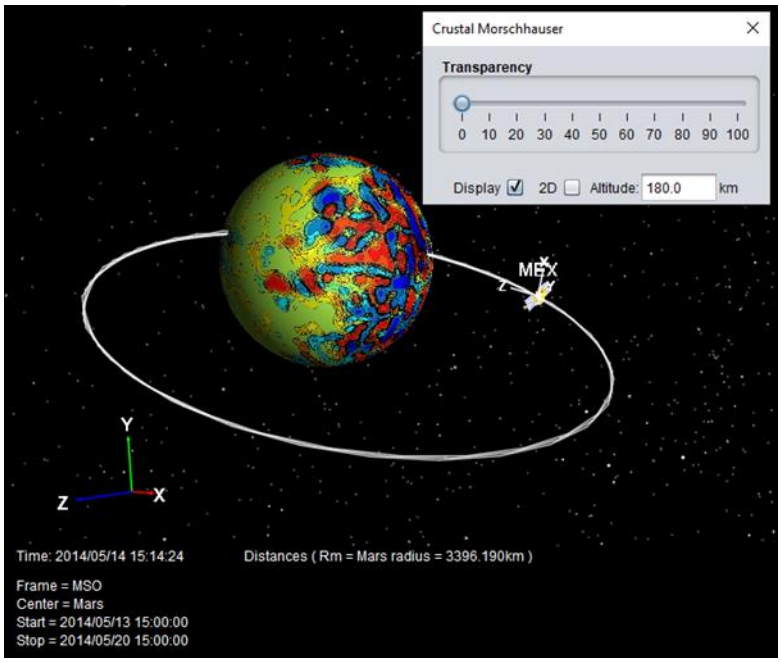
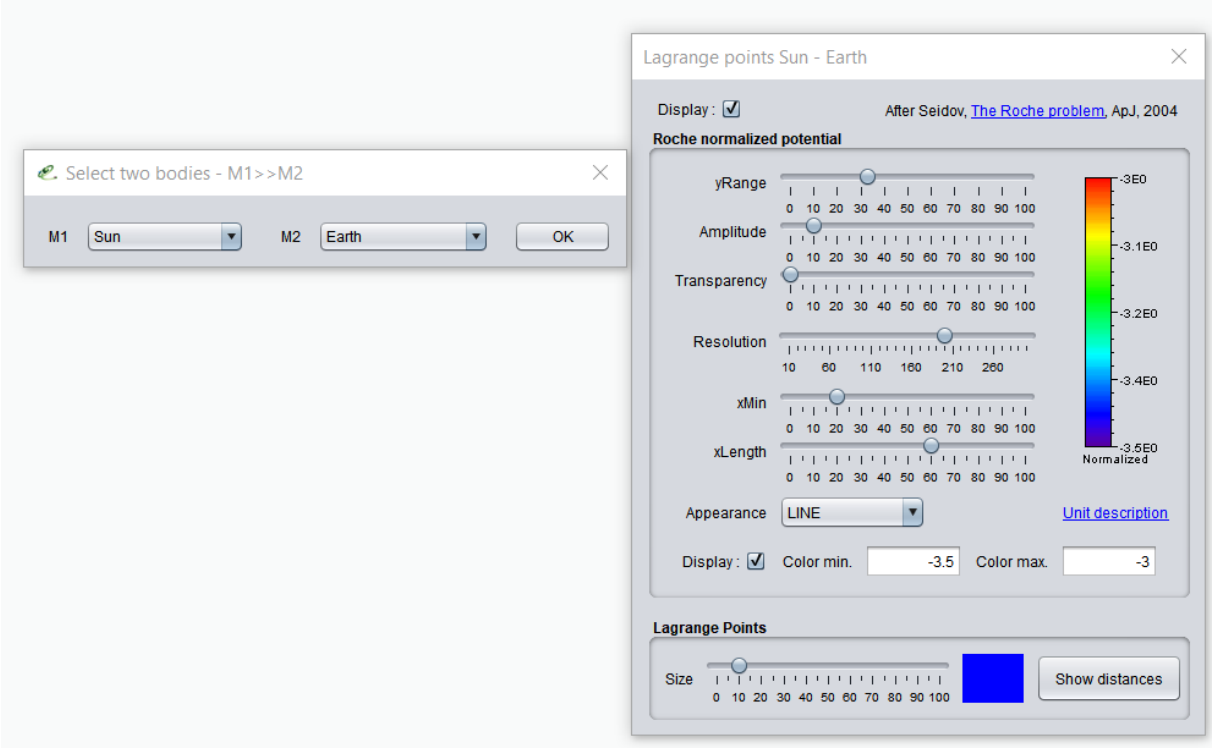


Figure 4 Example of Map over Mars

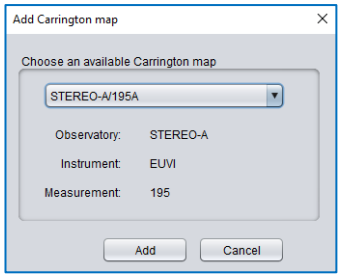
4.6.5.7 *Show Lagrange Points*

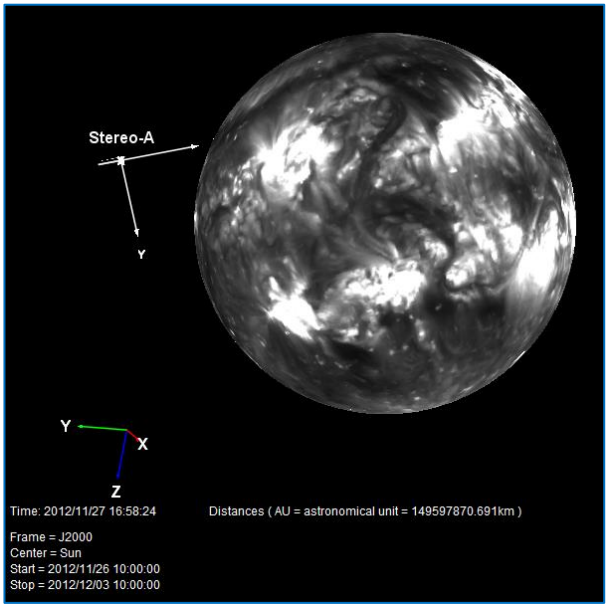
This option allows displaying the 5 Lagrange point in 3D scene based on two bodies.



4.6.5.8 *Load Carrington map*

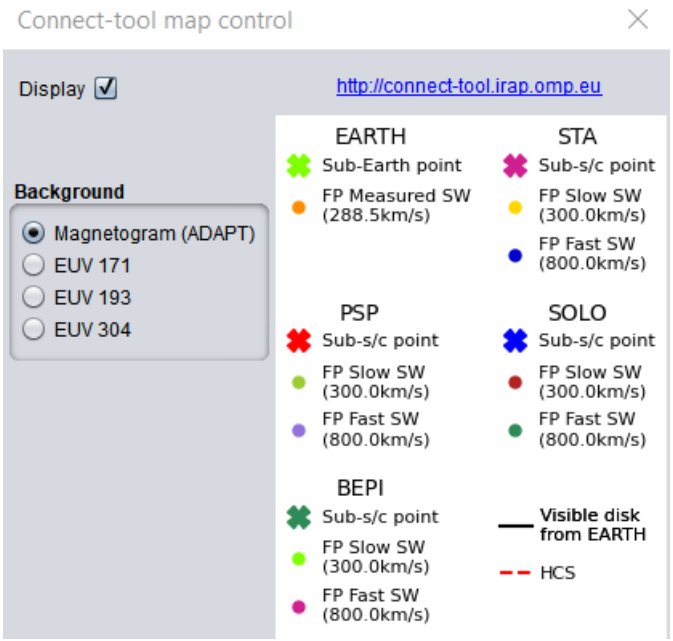
This option is used to add Carrington maps from STEREO, EIT or SDO to the Sun as central body.





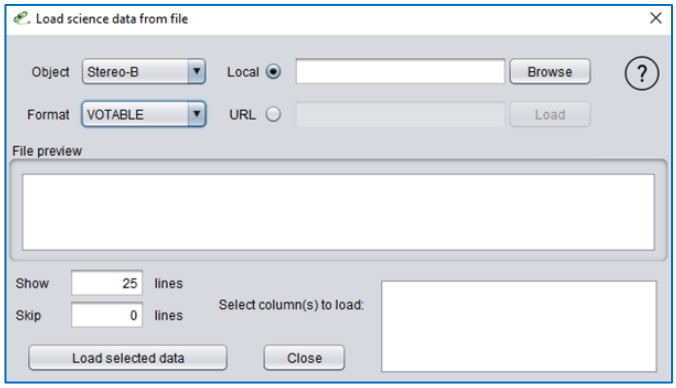
4.6.5.9 *Load connect-tool map*

This option is used to load a Carrington map provided by the Magnetic Connectivity Tool (http://connect-tool.irap.omp.eu/).



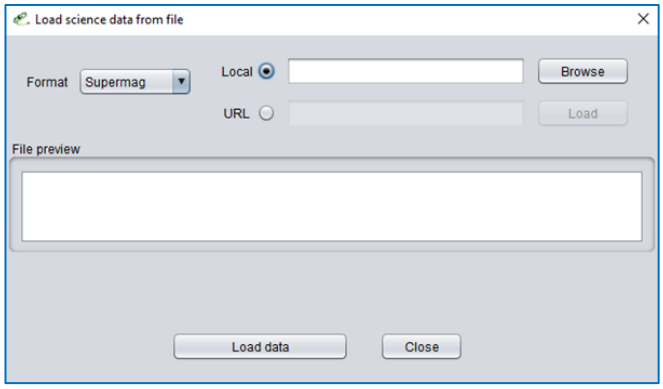
4.6.5.10 *Load data*

This option is used to upload a data file related to a *spacecraft*.



4.6.5.11 *Load ground file data*

This option is used to upload a data file related to a *ground facility*.

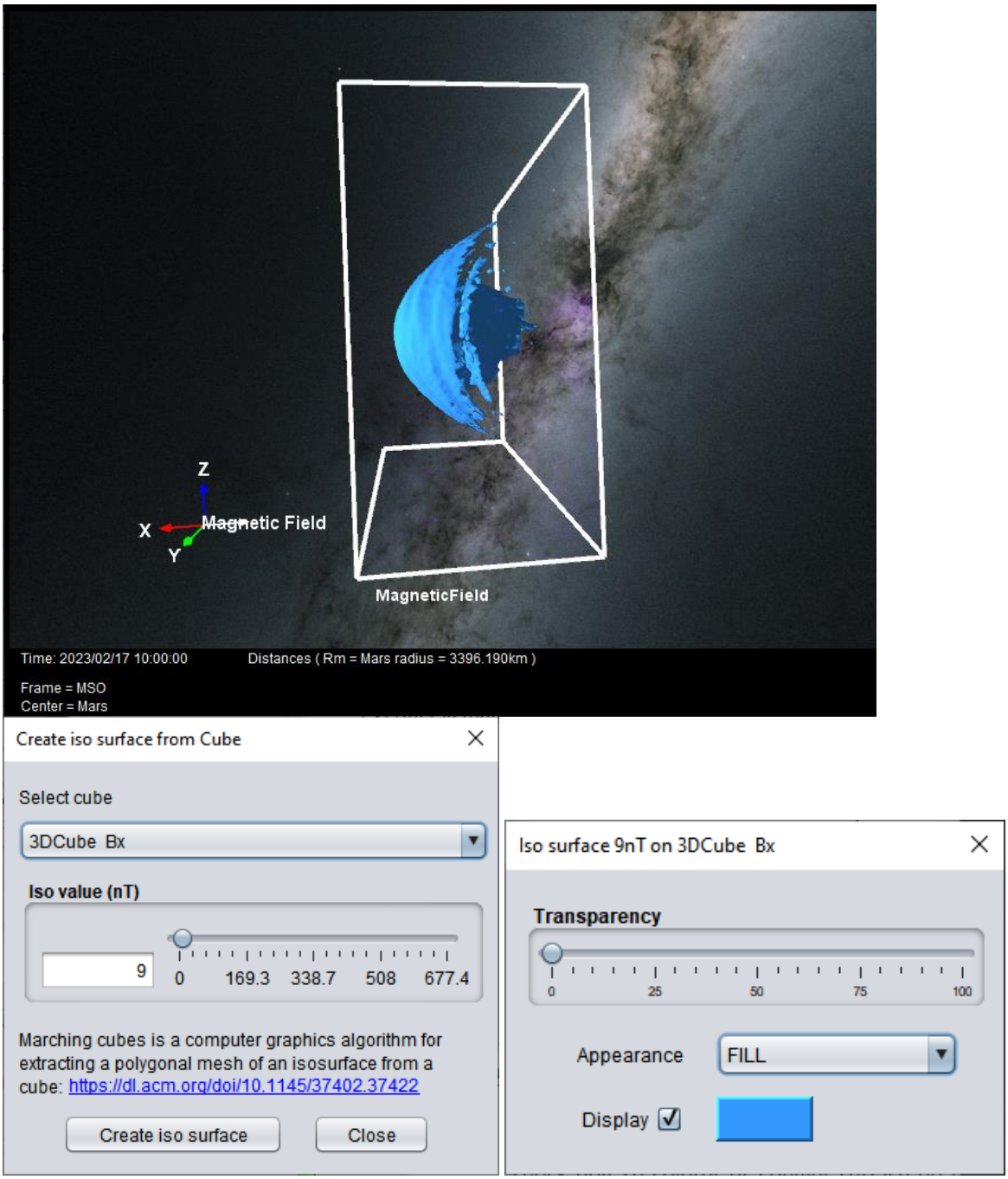


4.6.5.12 *Generate cube from scalar*

This option allows the display of 3D histograms along a trajectory. The values of a parameter along the trajectory of a spacecraft are accumulated in a grid of parallelepipeds. Users may set the size of these parallelepipeds.

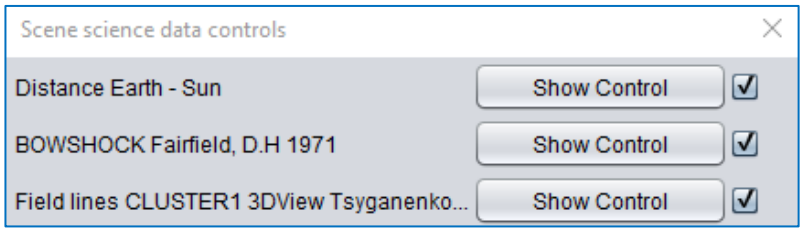
4.6.5.13 *Generate iso surface from scene cube*

This option displays a surface within a simulation cube corresponding to points with a single scalar value. The user can select the isovalue, the drawing mode (FILL, LINE, POINT) and the transparency of the surface.



4.6.5.14 ***Scene controls***

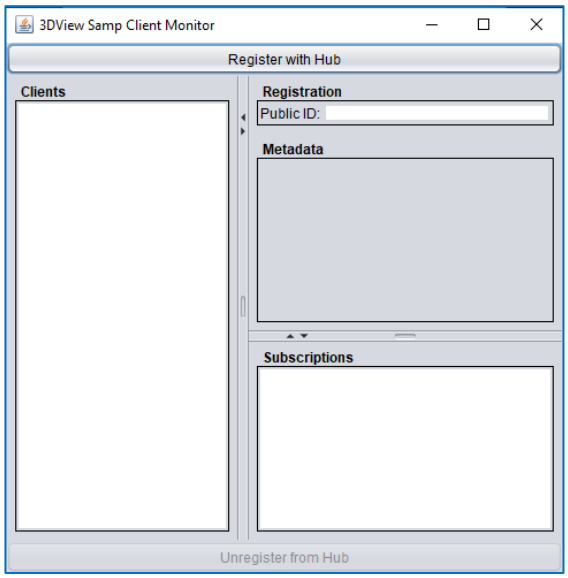
This option is used to control plots in the 3D scene. It lists all the available controls related to the current scene.
Depending on the scene and the options enabled, the content of the window can be different.



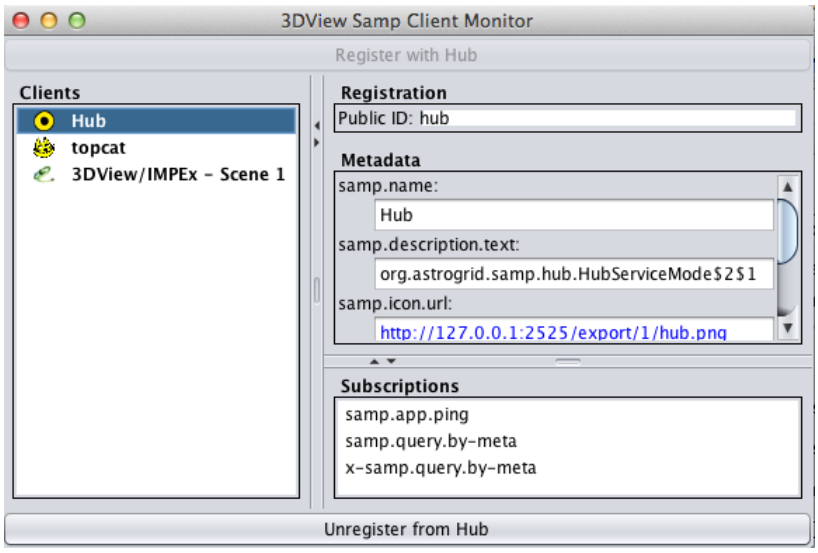
4.6.6 Interoperability

4.6.6.1 SAMP

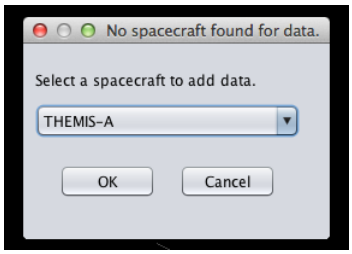
This option is used to set up a connection between 3DView and a SAMP Hub. A SAMP Hub must be active, via TOPCat or AMDA for example. Data provided to 3DView via SAMP are displayed along the trajectory of a spacecraft.



Click on **Register with Hub** to connect 3DView to the Hub. This opens the following window:

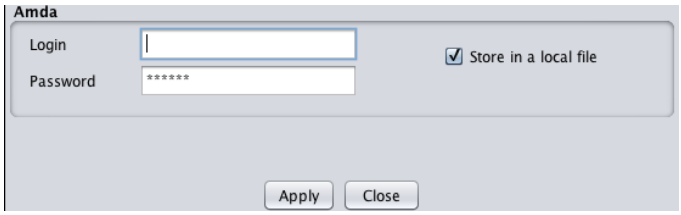


As soon as data are available on the SAMP Hub, the following pop-up window is displayed by 3DView. Select the spacecraft name. Data are then displayed along its trajectory.



4.6.6.2 *AMDA login*

This menu allows users to give their ID (login, password) in AMDA. This information is used to give access to personal data in AMDA (e.g. Time Tables).

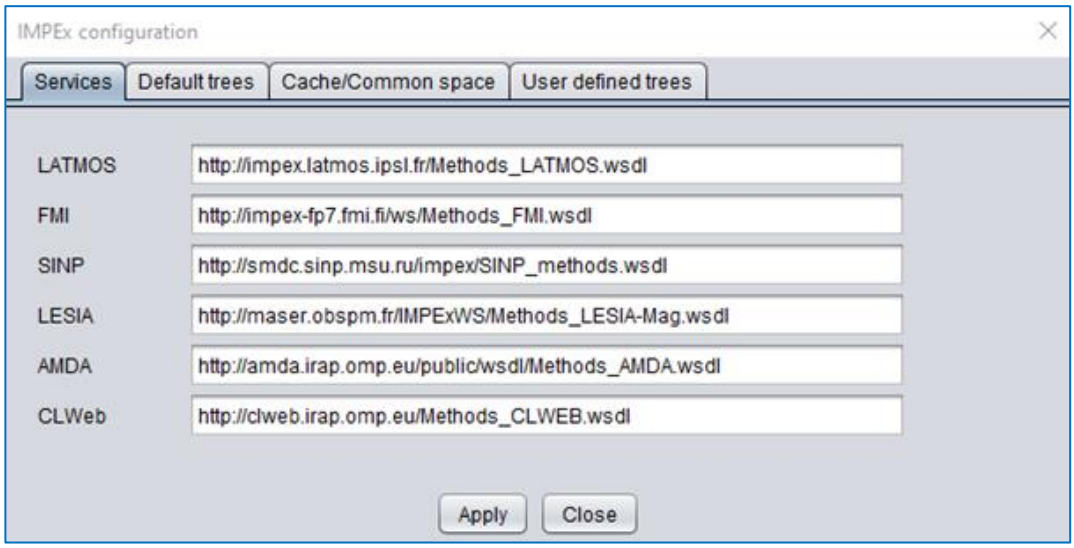


If the ID information given by the user is correct, the following message is displayed "Login successful"
If the ID information given by the user is not correct, the following message is displayed "AMDA login procedure failed".
As soon as the ID information is validated, the **Remote Data(IMPEx)** window is updated with the list of user owned Time Tables.
The "Store in a local file" option is used to save the given values. These values will be used for further sessions.

4.6.6.3 *IMPEx configuration*

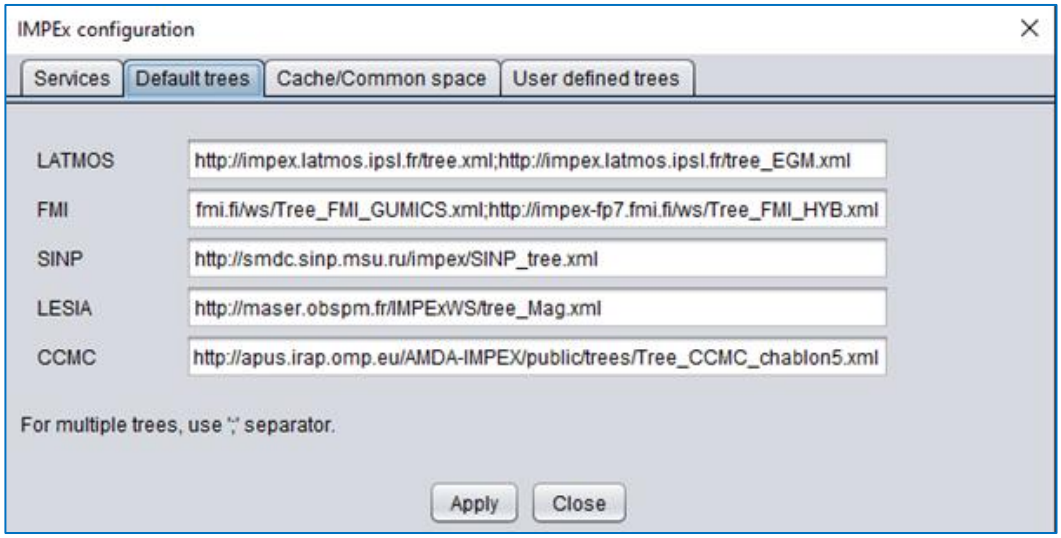
4.6.6.3.1 Services

This option displays the URL of IMPEx services providing access to observations and simulations.



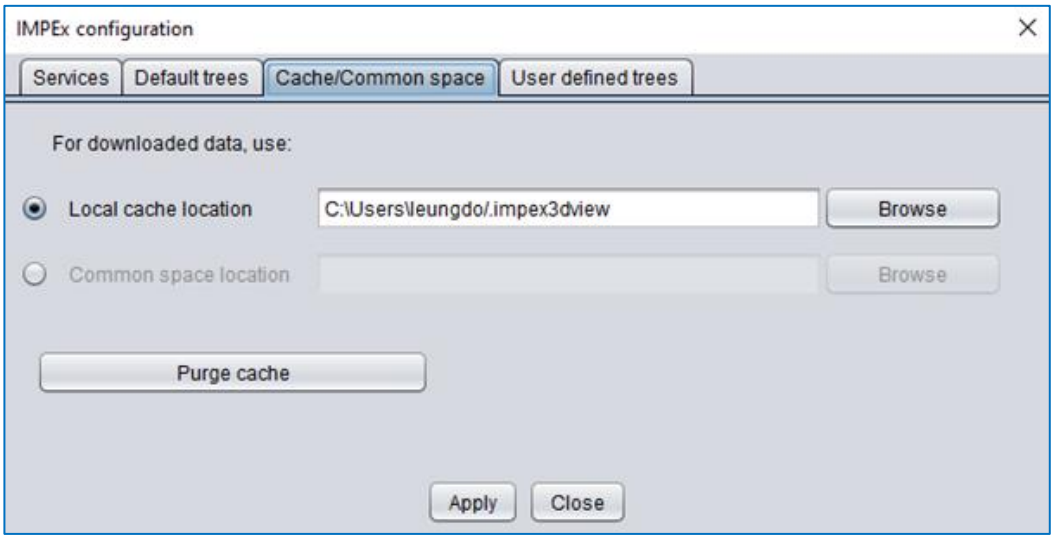
4.6.6.3.2 Default trees

This option displays the URL of IMPEx files providing the description of simulation resources:



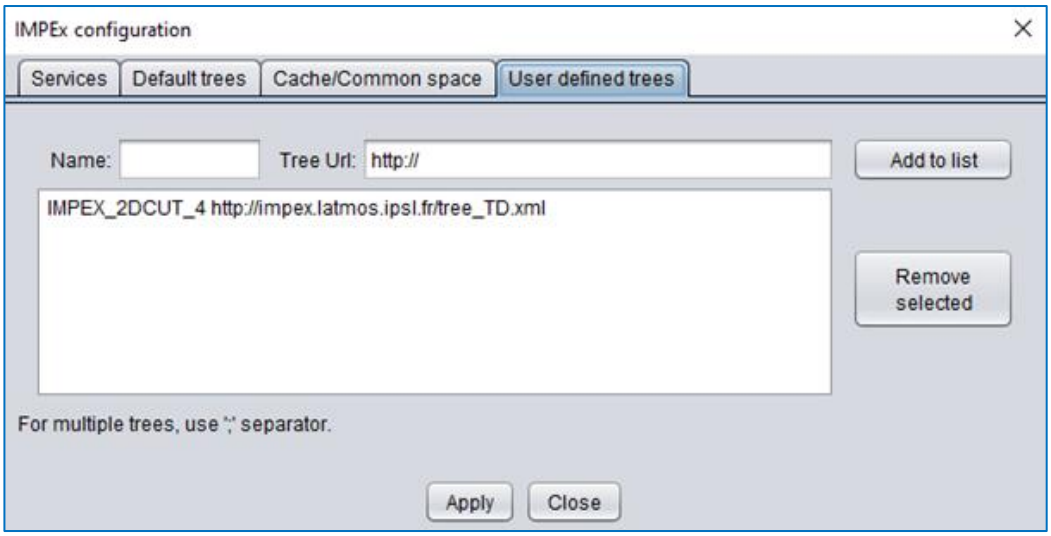
4.6.6.3.3 Cache/Common space

This option is used to give the name of a local directory used to store shared information and data.



4.6.6.3.4 User data only trees

This option is used to add a new tree of simulation data. This tree of data is made accessible via the Remote data (IMPEx) menu.


IMPEx configuration
Services
Default trees
Cache/Common space
User defined trees
Name:
Tree Url:
http://
Add to list
IMPEX_2DCUT_4 http://impex.latmos.ipsl.fr/tree_TD.xml
Remove selected
For multiple trees, use ";" separator.
Apply
Close