Voyager Control Manual (version a0.2)

Welcome to Voyager! This document outlines the control interface for the Voyager Software System.

Please be advised that this document is intended for Voyager Version a0.2 only, and will likely change as the software advances toward the full version.

Contents

Suggested System Requirements

To run the current version of Voyager, you should have:

- Windows 7/8/8.1 OR Mac OS
- 40MB free disk space
- Mouse
- Keyboard

The current version does not support Linux environments.

Setup Instructions

Follows these instructions to set up and run Voyager a0.2.

Step 1: Download Voyager a0.2.rar

Download the file named 'Voyager 0.2.rar', and place it in a convenient directory.

Step 2: Decompress the Software

Open the .rar file using WinRAR (if you do not have WinRAR, you can download it here). Click on the 'Extract To' button on the top ribbon as shown in Figure 1, and extract the folder to the same directory as the .rar file.

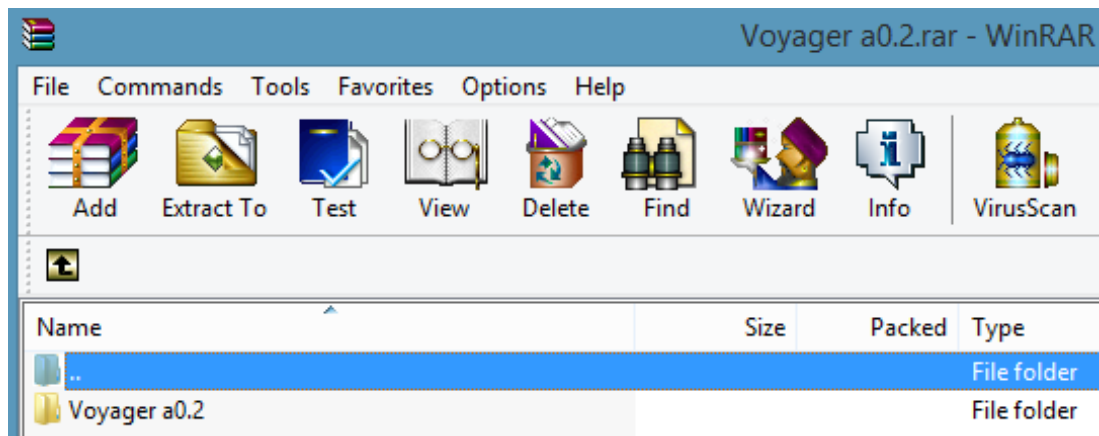*Figure 1 - Extracting from the Voyager a0.2.rar file*

Step 3: Running Voyager

Inside the folder 'Voyager a0.2' there will be two folders, one for the PC and one for the MAC operating systems. In the Mac folder, simply open the .app file. In the PC folder, there will be two items (Figure 2 below). Double click on the 'Voyager a0.2.exe' file to begin the program.

Figure 2 - Items inside PC folder

A popup configuration window will appear (as in Figure 3) asking for setup input. Ensure that the Windowed box is check marked, and that you have selected a resolution that fits within your screen resolution. The graphics quality does not matter at this point, as all options will result in the same graphics resolution.

When these settings have been entered to your satisfaction, press the 'Play!' button to start the program.
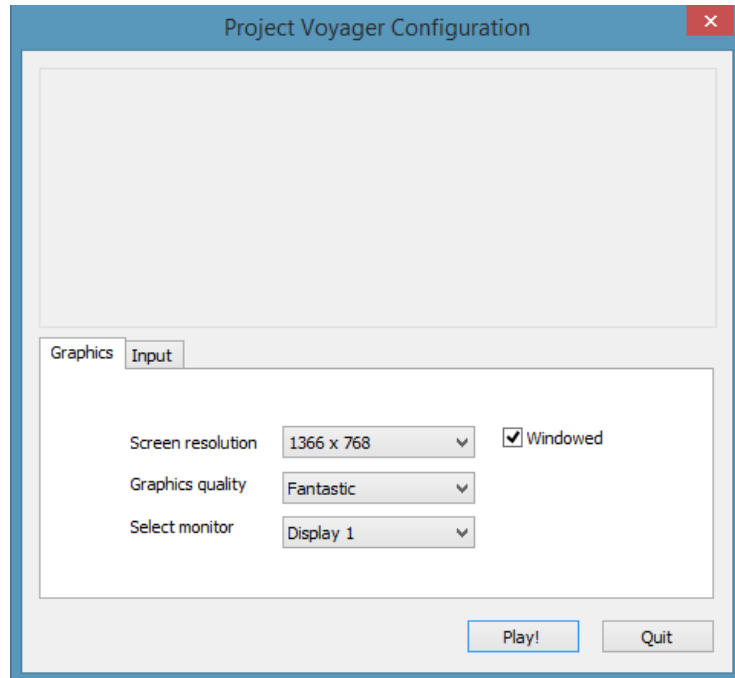

Figure 3 - Project Voyager Configuration window

Using Voyager

The current version of Voyager makes use of several UI windows, text entry fields, and buttons. These will likely be phased out in later versions to make way for a cleaner, context based interface.

Getting Started with the Camera

When the program first starts, you will most likely see a window that looks like Figure 4.

Figure 4 - Voyager opening screen. The camera is positioned very close to the sun.

Figure 5 - Once zoomed out, the sun in its entirety should come into view.

with their IDs noted in brackets. (Ex. Earth [ID: 399])

Clearly this is not what we want to be seeing.

When Voyager starts, the camera is positioned very close to the Sun [ID: 10] (this is for debugging purposes and will be phased out in a later build). In order to get into a better view, use the mouse scroll wheel and scroll back until your image is more like that of Figure 5.

The scroll wheel can be used to zoom in and out in the Voyager User Interface (UI), and will dynamically slow down as the camera moves closer to the object of focus.

From here, you can click and hold the right mouse button, and rotate the camera about its current target. In this case, the camera's target is the Sun [ID: 10]. The rotation is not limited by the object, so as you rotate and zoom, you can observe all objects from all angles.

Voyager makes use of the NASA JPL Horizons Database in order to determine the location of celestial objects over time, and so the ID scheme for each planet, moon, and star currently rendered in Voyager matches that found in the Horizons Database. For reference, a table of the bodies and their IDs are provided in the quick reference sheets found in Appendix A. For practice, all bodies named in this document will be written

The User Interface

The tools currently available in the user interface can be used to jump between object in space, retrieve information on objects, and to move the objects back and forth in time. A numbered image of the interface is show in Figure 6 below, and a description of each numbered item follows.
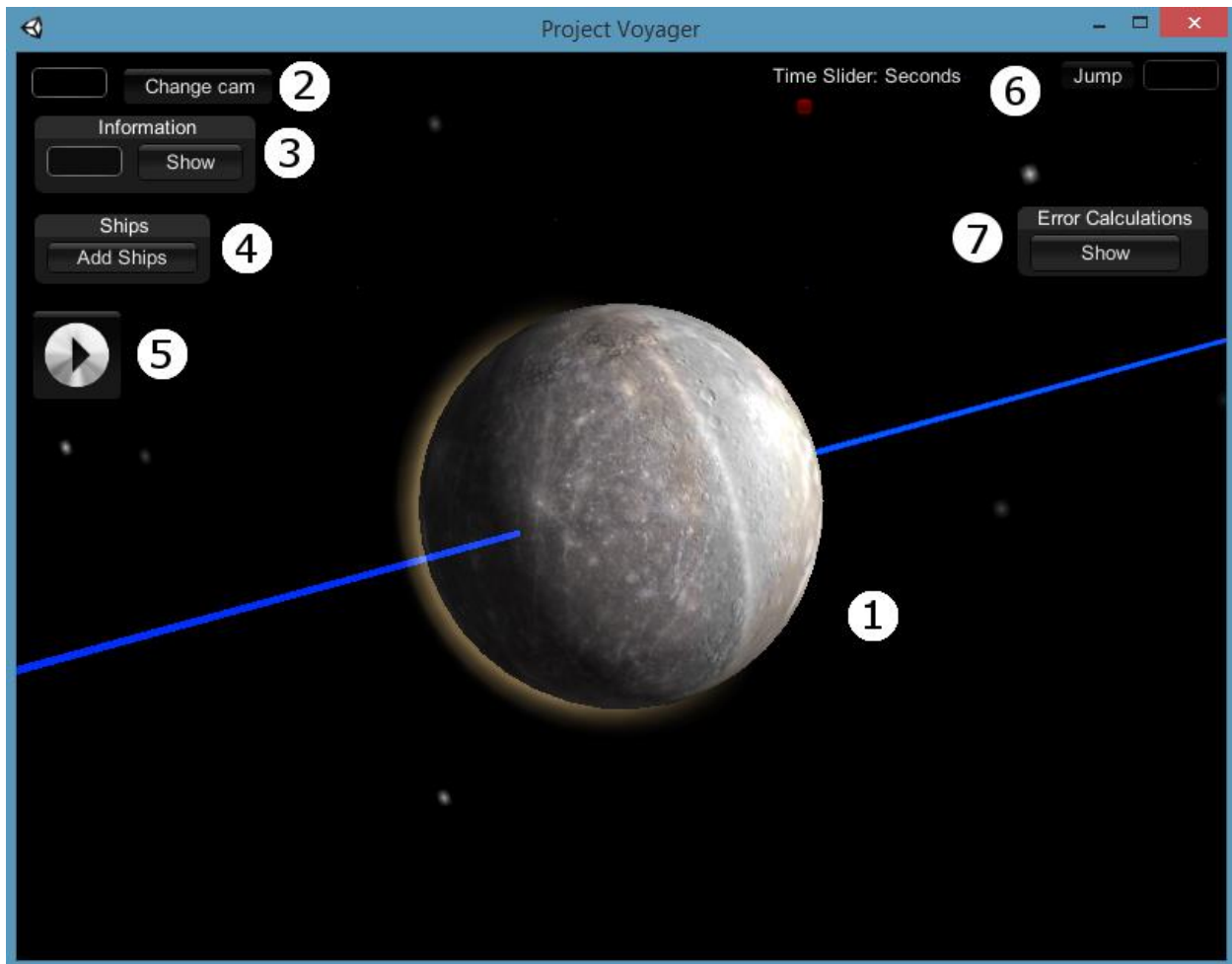

Figure 6 - Voyager UI elements

1. The object in the center of the screen is the current **Target**. When you hold down the right mouse button and rotate, or when you use the scroll wheel on your mouse to zoom in our out, the **Target** is what the camera is focused on. When time is moving forward, the camera stays pinned to this object.

2. The Change Cam button lets the user switch the current **Target** to another object. This is done by clicking on the entry window to the left of the Change Cam button, and typing in an object ID number. Once the number is entered, you can switch targets by either hitting the **Enter** key on your keyboard, or pressing the Change Cam button on the UI.

   It should be noted that if multiple objects are visible in the UI (ex. A planet and a moon), then you can also switch your **Target** by double clicking with the left mouse button on the object you want to switch focus to.

3. The information window allows you to pull up simple information about each object, referenced by their object ID number. To pull up information, click on the entry box and type in the ID number of the object you are interested in. Then click the Show button. A new window with information will appear, and this can be clicked on and dragged to a good location on the screen. To close this new window, make sure that the same object ID is typed into the entry box, and click the Hide button.

At this time, the information is very rudimentary and is intended only for debugging functionality.

4. The Add Ships button allows you to add simple vessels to the interface. To do this, click on the Add Ships button. The window shown in Figure 7 will appear, and allow you to specify the orbital parameters and mass information of the vessel.

Make sure to pay particular attention to the Orbiting Focus entry field, as it designates what object the vessel will be orbiting. Be aware that entering a Semi-major axis value smaller than the radius of the Orbiting Focus body will result in an error message.

When you are satisfied with your parameters press the Add button, and your vessel will be generated.

Figure 7 - Ship generation window

The ships are quite small (though not yet to scale), and their orbits are highlighted in green, unlike like those of the larger bodies which are blue. If you cannot see your ship, enter 'Ship1' in the Change Cam field, and press enter. You will notice that all ships currently generated are given the model of the Voyager 1 probe, as shown in Figure 8 below.
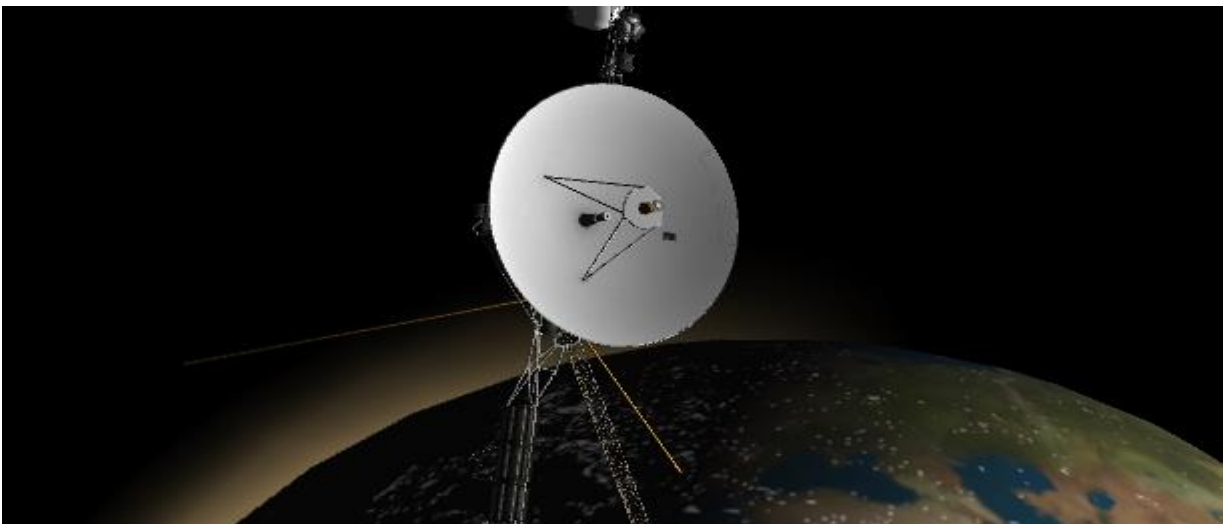

Figure 8 - Voyager 1 probe in orbit around Earth

5. The large Play button commands the system to start moving through time at the currently selected speed, as selected by the time control described in item 6 below.

6. The time controls let the user move time forward at different rates, with each object traveling on its predicted course over time. To increase or decrease the play speed, simply drag the red slider bar left or right to move faster or slower respectively. You can press the Play button (item 5) to set time moving, and press it again to stop time. In order to jump to a specific time index, simply click on the entry box above the controls, enter a time in seconds, and press 'Jump'. This method is most commonly used for resetting the time to 0.

7. The error calculation window is a debugging window that allows the user to determine the exact position of an object in Voyager at a given time. This position data is provided in Euclidian coordinates with the Sun positioned at the origin for simplicity. This data is used to check against the Horizons database to ensure the accuracy of the planetary and lunar orbits. When the Show button is clicked, a new window will appear as in Figure 9. By entering the object ID number into the entry window and pressing the Fetch button, the exact position data for the specified body can be acquired.

Error Calculations

Fetch

Time: 0s 38min 8hr 1d

Position | Distance
From sun:

x:

y:

z:

From :

x:

y:

z:

All numbers are in km.
The x-y plane is the horizontal plane.
Hold down "Enter" to get real-time updates.

Hide

Figure 9 - Error Calculation window

Appendix A: Quick Reference

Mouse Control

Left Mouse Button
Double click to select
new *Target*

Scroll Wheel
Scroll to zoom the
camera in/out

**Right Mouse
Button**
Click and hold while
moving mouse to
rotate camera

Object ID Number

HORIZONS ID	NAME
10	Sun
199	Mercury
299	Venus
399	Earth
301	Moon
499	Mars
401	Phobos
402	Deimos
599	Jupiter
501	Io
502	Europa
503	Ganymede
504	Callisto
505	Amalthea
506	Himalia
507	Elara
508	Pasiphae
509	Sinope
510	Lysithea
511	Carme
512	Ananke
513	Leda
514	Thebe
515	Adrastea
516	Metis
517	Callirrhoe
518	Themisto
519	Megaclite
520	Taygete
521	Chaldene
522	Harpalyke
523	Kalyke
524	Iocaste
525	Erinome
526	Isonoe
527	Praxidike
528	Autonoe
529	Thyone
530	Hermippe
531	Aitne
532	Eurydome
533	Euanthe
534	Euporie
535	Orthosie
536	Sponde
537	Kale
538	Pasithee
539	Hegemone
540	Mneme
541	Aoede

HORIZONS ID	NAME
542	Thelxinoe
543	Arche
544	Kallichore
545	Helike
546	Carpo
547	Eukelade
548	Cyllene
549	Kore
550	Herse
699	Saturn
601	Mimas
602	Enceladus
603	Tethys
604	Dione
605	Rhea
606	Titan
607	Hyperion
608	Iapetus
609	Phoebe
610	Janus
611	Epimetheus
612	Helene
613	Telesto
614	Calypso
615	Atlas
616	Prometheus
617	Pandora
618	Pan
619	Ymir
620	Paaliaq
621	Tarvos
622	Ijiraq
623	Suttungr
624	Kiviuq
625	Mundilfari
626	Albiorix
627	Skathi
628	Erriapus
629	Siarnaq
630	Thrymr
631	Narvi
632	Methone
633	Pallene
634	Polydeuces
635	Daphnis
636	Aegir
637	Bebhionn
638	Bergelmir
639	Bestla
640	Farbauti
641	Fenrir
642	Fornjot
643	Hati
644	Hyrrokkin
645	Kari
646	Loge

HORIZONS ID	NAME
647	Skoll
648	Surtur
649	Anthe
650	Jarnsaxa
651	Greip
652	Tarqeq
653	Aegaeon
799	Uranus
701	Ariel
702	Umbriel
703	Titania
704	Oberon
705	Miranda
706	Cordelia
707	Ophelia
708	Bianca
709	Cressida
710	Desdemona
711	Juliet
712	Portia
713	Rosalind
714	Belinda
715	Puck
716	Caliban
717	Sycorax
718	Prospero
719	Setebos
720	Stephano
721	Trinculo
722	Francisco
723	Margaret
724	Ferdinand
725	Perdita
726	Mab
727	Cupid
899	Neptune
801	Triton
802	Nereid
803	Naiad
804	Thalassa
805	Despina
806	Galatea
807	Larissa
808	Proteus
809	Hallimede
810	Psamathe
811	Sao
812	Laomedeia
813	Neso
999	Pluto
901	Charon