Orbiter Simulator 2010

Orbital Sciences Corporation

Antares Launch Vehicle
Cygnus Cargo Vehicle
Version 1.5

OSC, Rev B
January 18, 2014

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INTRODUCTION

Providing a commercial cargo vehicle to the ISS

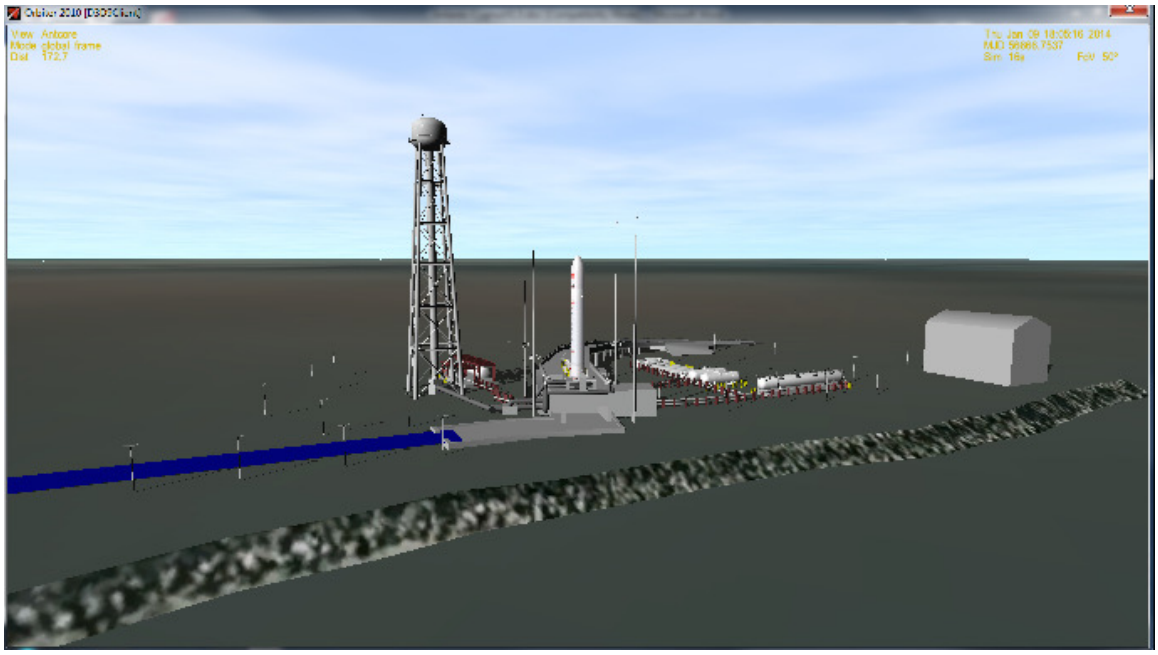
With the recent launch of the Cygnus cargo vessel to the ISS on January 9, 2014, I contacted my friend, Don Gallagher and asked him if his Cygnus vessel was available for use. He not only provided me with the Cygnus, but also meshes for the Cygnus launch vehicle, Antares. After a previous release of Cygnus, I worked on the launch vehicle Antares using Vinka's Multistage2. I also discovered that the Cygnus vessel has some navigation lights. While testing the launch vehicle I re-discovered an old Multistage problem, when a payload is released it has no on-board fuel. I have updated the Cygnus model to work around the fuel issue, and I have provided navigation lights as well as a dialog box. I hope you enjoy these two models from Don as much as I do.

D.Hopkins (David413)
January, 2014

The Antares Launch Vehicle and Cygnus Cargo Vehicle

Launching the Antares to the ISS

Start the scenario titled “Antares ORB-1 Launch” located in the Antares folder. It is 18:05 UTC on January 9, 2014 and the Antares rocket with its Cygnus payload on the launch pad at Wallops Island.

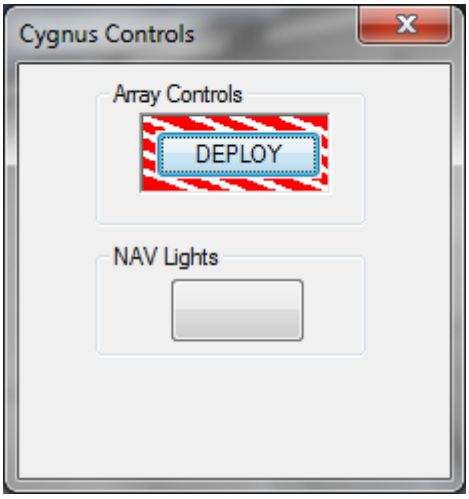


At 18:07:03, press the “p” key to start the Multistage2 guidance file to launch the Antares. The first stage will fire for 234 seconds, and upon MECO staging will occur. The fairing will be released and after a few seconds the second stage will fire to drive the Cygnus into orbit. Once the second stage burns out it will be discarded and the Cygnus cargo vessel will be released.

This scenario was developed using real-world state vectors for the ISS at the time of launch on 1/9/2014.

Flying the Cygnus

Once the Cygnus is free-flying on its own, the dialog box for controlling the Cygnus can be opened by pressing the key combination of “CTRL+SPACE bar”.



Using the NAV Lights and Deploying the Solar Arrays

The dialog box contains two controls, the array controls button and the navigation lights button. The nav lights button is an on/off toggle, the array deploy button will only be active (and not “greyed-out”) if the arrays are less than fully deployed.

This will allow the user to turn the lights on and off. The control dialog box can be moved to either a second screen (on a multiple screen system) or placed along the top. Double-clicking on the title bar will “minimize” the controls to just the title bar, double-clicking again will restore the controls.

Because of a limitation associated with the Multistage2 platform, the Cygnus was created without any fuel. To provide a full fuel load, use the “CTRL+F” key to fill the Cygnus’ fuel tanks. This can only be performed one time.

CREDITS

As previously mentioned, this add-on would not have been possible without the work of my Orbiter partner, Don Gallagher (“Donamy”). Thanks for all the wonderful models over the years Don!

Thanks to Vinka for the Multistage platform for creating launchers.

Thanks to Dr. S for Orbiter over all of these years.

KEY SUMMARY

Antares (using Multistage2)

KEY	ACTION
P	Initiate auto-launch guidance
F	Manually separate fairing
J	Manually separate stages

Cygnus

KEY	ACTION
CTRL+F	Auto-Fuel (fill tank; one-time use)
CTRL+L	Toggle nav lights (on/off)
K	Deploy solar panels

Additional Notes:
In the scenario file entry for the Cygnus, the panels are retracted with a setting of "1.0000" and fully deployed with a value of "0.0000".

The scenario file entry also contains a setting for cargo mass that will allow for adding mass to the model (max load is 2000 kg).

The thrusters and main engine have actual thrust settings of 27 N for the attitude jets and 440 N for the main engine.