

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS (D2)
Future Space Transportation Systems (4)

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ORBITAL SCIENCES' COTS/CRS MISSION OVERVIEW

Abstract

The U.S. government has chosen to retire the Space Shuttle, by the end of 2010. The Shuttle has been primarily used to assemble and resupply the International Space Station (ISS). The US is committed to supporting the ISS until 2015, and President Obama has just proposed extending ISS support to at least 2020. The ISS requires continual resupply of human beings, food, water, air, clothes, equipment, experiments, etc.

The U.S. government has decided that the U.S. portion of post-Space Shuttle ISS resupply will be accomplished by commercial domestic U.S. companies. NASA is purchasing a commercial ISS resupply service, covering the time period 2010 through 2015. NASA chose to assist in the development of this new ISS commercial resupply service by holding a competition for and awarding two Space Act Agreements (SAAs), to Space Exploration (SpaceX) in 2005, and to Orbital Sciences, in February 2008. In the spring of 2008, NASA also initiated an open competition for a Commercial Resupply Services contract. NASA announced SpaceX and Orbital as the winners, in December 2008, with Space X awarded a *1.6B ISS commercial resupply contract*, and Orbital awarded a *1.85B ISS commercial resupply contract*.

Since the spring 2008, Orbital has been developing a new rocket (Taurus II), a new launch pad (at Wallops Flight Facility in Virginia), and a new spacecraft/cargo container (together called Cygnus) via its existing COTS Development SAA with NASA. A demonstration launch, carrying no cargo, but transporting itself all the way to the ISS is to launch by March 2010. Commercial resupply missions are to start in 2011, with 8 such missions resupplying the ISS a total of 20 MT of supplies from 2011 through 2015. The resupply system also disposes of 20 MT of trash over the same time period. Orbital's solution transports up to 2700 kg of cargo mass per mission to the ISS. The cargo is unloaded onto the ISS, then Cygnus is filled with up to 2700 kg of trash. Upon departure from the ISS, Cygnus destructively re-enters the Earth's atmosphere, and is totally consumed on the way down.

This IAC2010 Section D.2.4 Future Space Transportation Systems paper will describe the Orbital Sciences COTS/CRS mission, in overview format. Top level mission architecture, system design, expected system performance, and the anticipated ISS cargo delivery schedule will be described. This information is new, original, and has not been published at any conference to date.