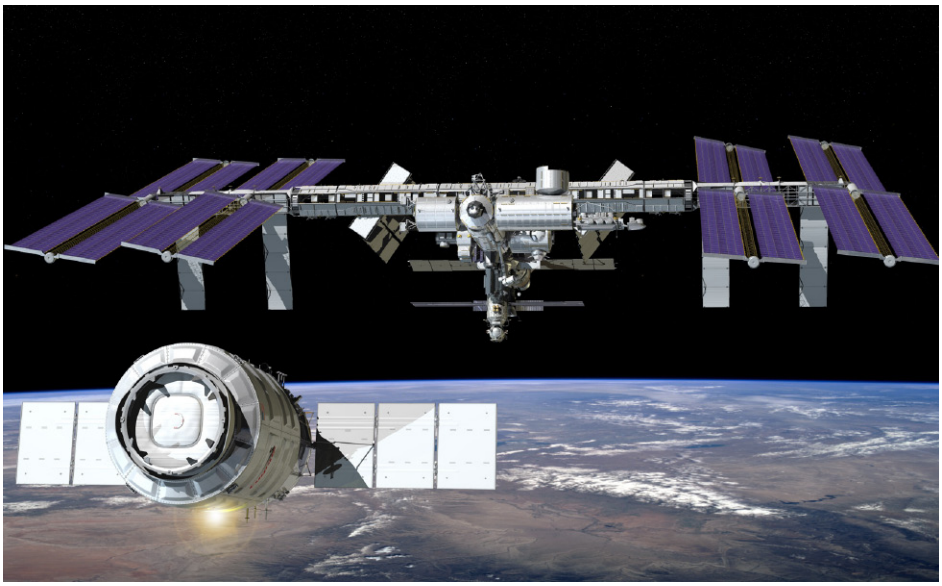
Orbital
Innovation You Can Count On®

FACT SHEET

COTS/CRS

Commercial Orbital Transportation Services/Commercial Resupply Service



Overview

Under the joint NASA/Orbital Commercial Orbital Transportation Services (COTS) program, Orbital is developing the Cygnus™ advanced maneuvering space vehicle, which is designed to meet the stringent safety requirements for International Space Station (ISS) operations. Under a separate but related effort, Orbital is privately developing and qualifying the Antares™ launch vehicle, designed to provide low cost, reliable access to space for medium-class payloads. These elements will be used for flight demonstration of Orbital's commercial resupply capability to the ISS.

In addition to the COTS development and demonstration program, Orbital was selected to begin ISS resupply flights under the Commercial Resupply Service (CRS) contract. This NASA contract authorizes eight missions starting in 2013 carrying approximately 20,000 kilograms of cargo to the ISS as well as disposal of ISS waste. The Commercial Resupply Service utilizes the Cygnus spacecraft and Antares launch service elements demonstrated under the COTS program.

Cygnus Advanced Maneuvering Spacecraft

The Cygnus spacecraft consists of a common service module and a modular pressurized cargo module. The service module incorporates avionics systems from Orbital's flight-proven LEOStar™ and GEOStar™ product lines plus propulsion and power systems from our GEOStar communications satellites. The pressurized cargo module is based on the Multi-Purpose Logistics Module (MPLM), developed by Thales Alenia Space for the ISS. Performing a similar function as the MPLM, the Cygnus pressurized cargo module will carry crew supplies, spares and scientific experiments.
After being launched into low-Earth orbit by Antares, the Cygnus spacecraft has substantial maneuvering capability as it transports the cargo from a low parking orbit to the ISS where it is grappled by the ISS robotic arm and berthed to the station. After the cargo is removed and any ISS disposal items are added, Cygnus is steered to a safe destructive reentry over the Pacific Ocean.

QUICK FACTS

Mission Partners:

Orbital Sciences Corporation
Prime contractor and operator of the COTS/CRS program, including the Cygnus spacecraft, the Antares launch vehicle, mission and cargo operations

Thales Alenia Space
Pressurized cargo module

Mitsubishi Electric Corporation (MELCO)
Proximity link system

Draper Laboratory
Guidance, navigation and fault tolerant computer support

Odyssey Space Research
Visiting vehicle requirements support

KB Yuzhnoye/Yuzhmash
Antares Stage 1 core tank design, production and verification

Aerojet
Antares Stage 1 engines

ATK
Antares Stage 2 motor

JAMSS America, Inc.
Operations support

Vivace
Systems engineering support

Cygnus will be boosted into orbit by Orbital's Antares medium-class space launch vehicle.

COTS/CRS

Antares Medium-Class Space Launch Vehicle

Orbital is privately developing and qualifying Antares, a new launch vehicle designed to provide low cost, reliable access to space for medium-class payloads. Antares will also be used to conduct COTS and CRS launches as well as future NASA science and exploration, commercial and national security space missions. The Antares launch system utilizes Orbital's proven MACH avionics system and many management approaches, engineering standards, production and test processes common to Orbital's family of highly successful small-class Pegasus®, Taurus®, and Minotaur launch vehicles. These proven launch technologies, along with hardware from one of the world's leading launch vehicle integrators, combine to provide cost-effective medium-class launch services.

Mission Operations

Cygnus mission operations will be managed from Orbital's state-of-the-art Mission Control Complex in Dulles, Virginia, in concert with NASA Johnson Space Center in Houston, Texas.

Mission Control Complex (MCC)

Key Contacts

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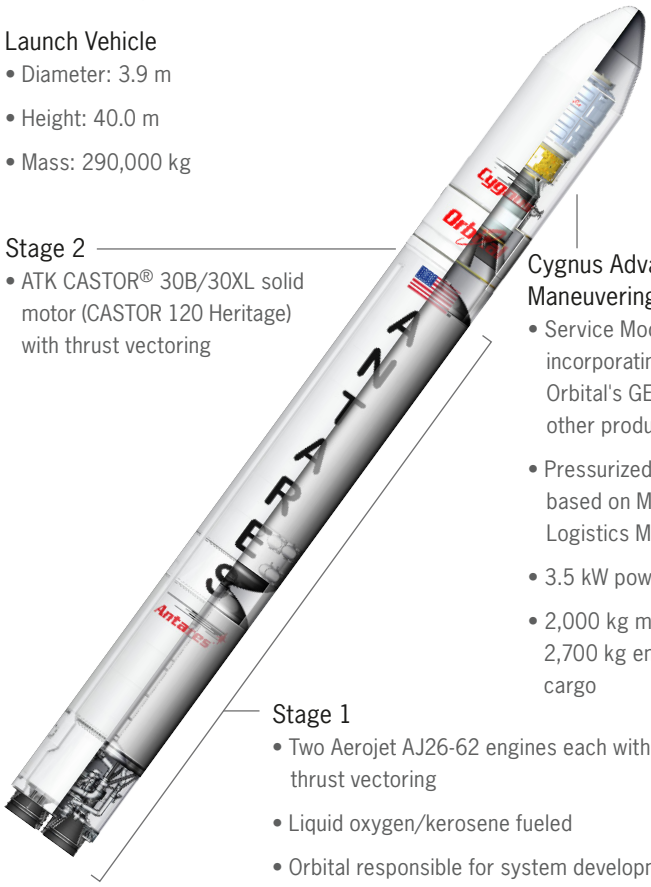
Antares Expanded View

Launch Vehicle

- Diameter: 3.9 m
- Height: 40.0 m
- Mass: 290,000 kg

Stage 2

- ATK CASTOR® 30B/30XL solid motor (CASTOR 120 Heritage) with thrust vectoring

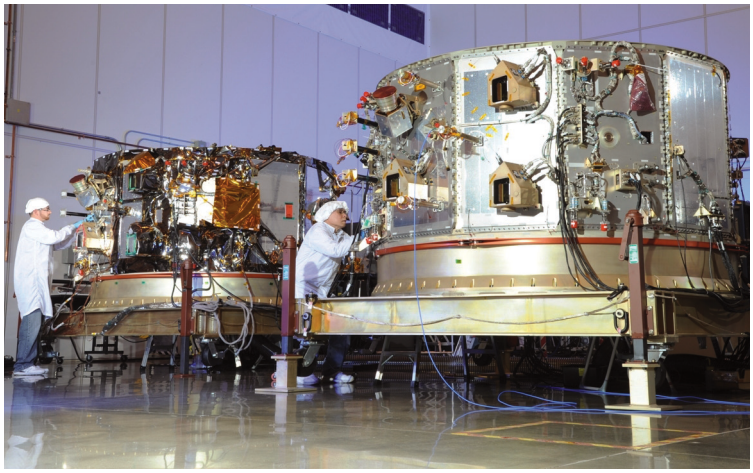


Cygnus Advanced Maneuvering Spacecraft

- Service Module incorporating avionics from Orbital's GEOStar bus and other product lines
- Pressurized Cargo Module based on Multi-Purpose Logistics Module
- 3.5 kW power output
- 2,000 kg mass standard/ 2,700 kg enhanced total cargo

Stage 1

- Two Aerojet AJ26-62 engines each with independent thrust vectoring
- Liquid oxygen/kerosene fueled
- Orbital responsible for system development and integration
- Core tank design and design verification by KB Yuzhnoye (Zenit-derived heritage)
- Core tank production by Yuzhmash



Two Cygnus spacecraft Service Modules in production.

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