

# Cygnus™ Advanced Maneuvering Spacecraft

Cargo Delivery Spacecraft for the International Space Station (ISS)



## Overview

Orbital developed the Cygnus advanced maneuvering spacecraft to demonstrate cargo delivery services under a NASA Commercial Orbital Transportation Services (COTS) Space Act Agreement. In addition to the COTS development and demonstration program, Orbital will utilize Cygnus to perform ISS resupply flights under the Commercial Resupply Service (CRS) contract. Starting in 2013 Orbital will conduct eight missions to deliver approximately 20,000 kilograms of cargo to the ISS.

The Cygnus system is a low-risk design incorporating elements drawn from Orbital and its partners' existing, flight-proven spacecraft technologies. Cygnus consists of a common service module and a pressurized cargo module. Cygnus will carry crew supplies, spares and scientific experiments to the ISS.

The service module incorporates avionics systems from Orbital's flight-proven LEOStar™ and GEOStar™ satellite 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 NASA.

## QUICK FACTS

### Mission Partners:

Orbital Sciences Corporation  
Prime contractor; engineering and development; Cygnus Service Module, 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

JAMSS America, Inc.  
Operations support

Vivace  
Systems engineering support



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

## Specifications

### Service Module

Heritage: GEOStar™, LEOStar™  
Power Generation: 2 fixed wing solar arrays, ZTJ Gallium Arsenide cells  
Power Output: 3.5 kW (sun-pointed)  
Propellant: Dual-mode N<sub>2</sub>H<sub>4</sub>/MON-3 or N<sub>2</sub>H<sub>4</sub>

### Pressurized Cargo Module

Heritage: Multi-Purpose Logistics Module  
Total Cargo Mass: 2,000 kg Standard/2,700 kg Enhanced  
Pressurized Volume: 18.9 m<sup>3</sup>/27 m<sup>3</sup>  
Berthing at ISS: Node 2 Common Berthing Mechanism (CBM)

## Key Contacts

Frank DeMauro, VP and Program Director COTS/CRS Program  
(703) 948-8766, demauro.frank@orbital.com

Carl Walz, VP, Deputy Program Manager COTS/CRS Program  
(703) 404-7475, walz.carl@orbital.com



Space Transportation System Architecture



The Cygnus Service Module incorporates systems from Orbital's flight proven LEOStar and GEOStar satellite product lines.



Cygnus spacecraft for the COTS Demonstration Mission at the Wallops Island, Virginia launch site.

