Northrop Grumman developed the Cygnus advanced maneuvering spacecraft to demonstrate cargo delivery services under a NASA Commercial Orbital Transportation Services (COTS) Space Act Agreement. Northrop Grumman uses Cygnus to perform International Space Station resupply flights under the Commercial Resupply Service (CRS) contract. Under the initial CRS contract, Northrop Grumman is conducting 11 missions delivering approximately 30,000 kilograms of cargo to the space station. The first of these was successfully completed in early 2014. Under the follow-on CRS contract, Northrop Grumman will provide at least 6 logistics serving missions carrying over 20,000 kg of cargo to the ISS.

The Cygnus system is a low-risk design incorporating elements drawn from Northrop Grumman and its partners’ existing, flight-proven spacecraft technologies. Cygnus consists of a common service module and a pressurized cargo module. Cygnus is used to carry crew supplies, spare equipment and scientific experiments to the space station.

The service module incorporates advanced avionics developed by Northrop Grumman and guidance and navigation components that allow for fully autonomous rendezvous with the space station. The avionics design fully meets all of the demanding NASA safety requirements imposed on human-rated vehicles.

The pressurized cargo module is based on the Multi-Purpose Logistics Module (MPLM), developed by Thales Alenia Space for NASA.

Mission Partners

Northrop Grumman
Prime contractor; engineering and development; Cygnus Service Module, mission and cargo operations

Thales Alenia Space
Pressurized cargo module

L-3 Cincinnati Electronics
Communications

Jena Optronix
Lidar

Neptec
TriDAR

Barrios Technology
Operations Support

Odyssey Space Research
Visiting vehicle requirements support
Specifications

Service Module
Heritage: GEOStar™, LEOStar™
Power Generation: 2 fixed wing UltraFlex™ solar arrays, ZTJ Gallium Arsenide cells
Power Output: 3.5 kW
Propellant: Dual-mode N₂H₄/MON-3 or N₂H₄

Pressurized Cargo Module
Heritage: Multi-Purpose Logistics Module
Total Cargo Mass: 3,500 - 3,750 kg
Pressurized Volume: 26.2 m³
Berthing at International Space Station: Node 1 or Node 2 Common Berthing Mechanism (CBM)

For CRS Missions, Cygnus is boosted into orbit by Northrop Grumman's Antares™ medium-class space launch vehicle (left) or a United Launch Alliance Atlas V rocket (right)

More Information
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