Northrop Grumman's Cygnus advanced maneuvering space vehicle is designed to meet the stringent safety requirements for International Space Station operations. Cygnus will provide cargo resupply to the space station program under the Cargo Resupply Services (CRS) Contract with eleven flights scheduled from 2014 to 2019. Under the follow-on CRS contract, Northrop Grumman will provide at least 6 logistics servicing 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 (SM) and a Pressurized Cargo Module (PCM).

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. For the first three CRS missions a standard PCM was employed to carry up to 2,300 kilograms of cargo. The enhanced PCM is designed to carry up to 3,750 kg of cargo.

**Facts At A Glance**

**Internal Available Volume**
- Enhanced PCM: 26.2 m³

**Cargo Capability**
- Enhanced PCM: 3,500 - 3,750 kg

**Length**
- Enhanced PCM: 5.1 m

**Power**
- Solar Array Power: 3,500 W (32V main bus)
- Battery Capacity: 20,262 W-Hrs
- Hosted Payload Power: 1,300 W

**Orbit**
- Altitude: 390-500 km
- Inclination: 51.62° - 51.68° (+0.1°)
Specifications

Standard Locker Cygnus Payload Accommodations
Cygnus can carry up to four mid-deck lockers for stowage or experiments
• Four powered – 75 W each continuous
• CGBA payload successfully flown on Orb-1 (first CRS flight) and four Polar freezers flown on OA-7

Large Internal Payload Accommodations
Cygnus has the ability to host large payloads in the pressurized volume area, such as the NASA Glenn Research Center payload Saffire, (spacecraft fire safety experiment).
• Large footprint internal volume
• 35.3” width, by 21” height, by 52.5” length
• 22.0 ft³ volume
• Up to 225 kg in mass

Northrop Grumman Available Resources
• Two power services with inhibits; 300W, 22-35 VDC, fused - 15 amps each
• RS-422 data/command: telemetry links
• RS-485 high speed data downlink
• 5 Mbps downlink through selected ground stations

Unpressurized Payload Accommodations
Several external locations are available on the service module and PCM to accommodate unpressurized payloads to the Space Station or some other orbital altitude.

Large External Payload Accommodation
• Approximately 33” x 18” x 18”
• Robust twelve-point attachment interface (14.0” bolt circle); 130 kg capability
• 190 watts continuous, 7 Amp, switched
• RA-422 Asynchronous Data; 480ms pulse controls (x2)

Small External Payload Accommodation
• Approximately 8” x 5” x 3”; 1 kg
• Qualified structural accommodation; 1 kg
• Power supply 32 VDC unregulated (27.5-33.6 V)
• 40 watts continuous, 1.5 Amp, switched
• RS-422 Asynchronous data

Cygnus Parameters/Specifications

Operational Lifetime
Dependent on propellant available, up to 1 year free-flight operations possible after standard mission.

S-Band Communications
3 Mbps downlink, 2 kbps uplink (5 Mbps downlink through selected ground stations).

Ground Network Compatibility
Universal Space Network, NASA Near Earth Network.

Bulk Memory Storage:
8 Gbits flash storage.