→ CYGNUS ADVANCED MANOEUVRING SPACECRAFT

US Commercial logistic vehicle

The Cygnus is an unmanned automatic vehicle which will be put in orbit by the Taurus II launcher. It will provide to the International Space Station pressurized passive cargo. It will be also capable to transport active cargo with a dedicated configuration of the Pressurized Cargo Module (PCM) internals. At the conclusion of the mission it will also removes waste from the station performing a destructive re-entry into Earth's atmosphere.
The system is being developed in two versions:

- A Standard concept ensuring a 2 t P/L transportation;
- An Enhanced concept, with higher mass and dimensions, ensuring a 2.7 t transportation.

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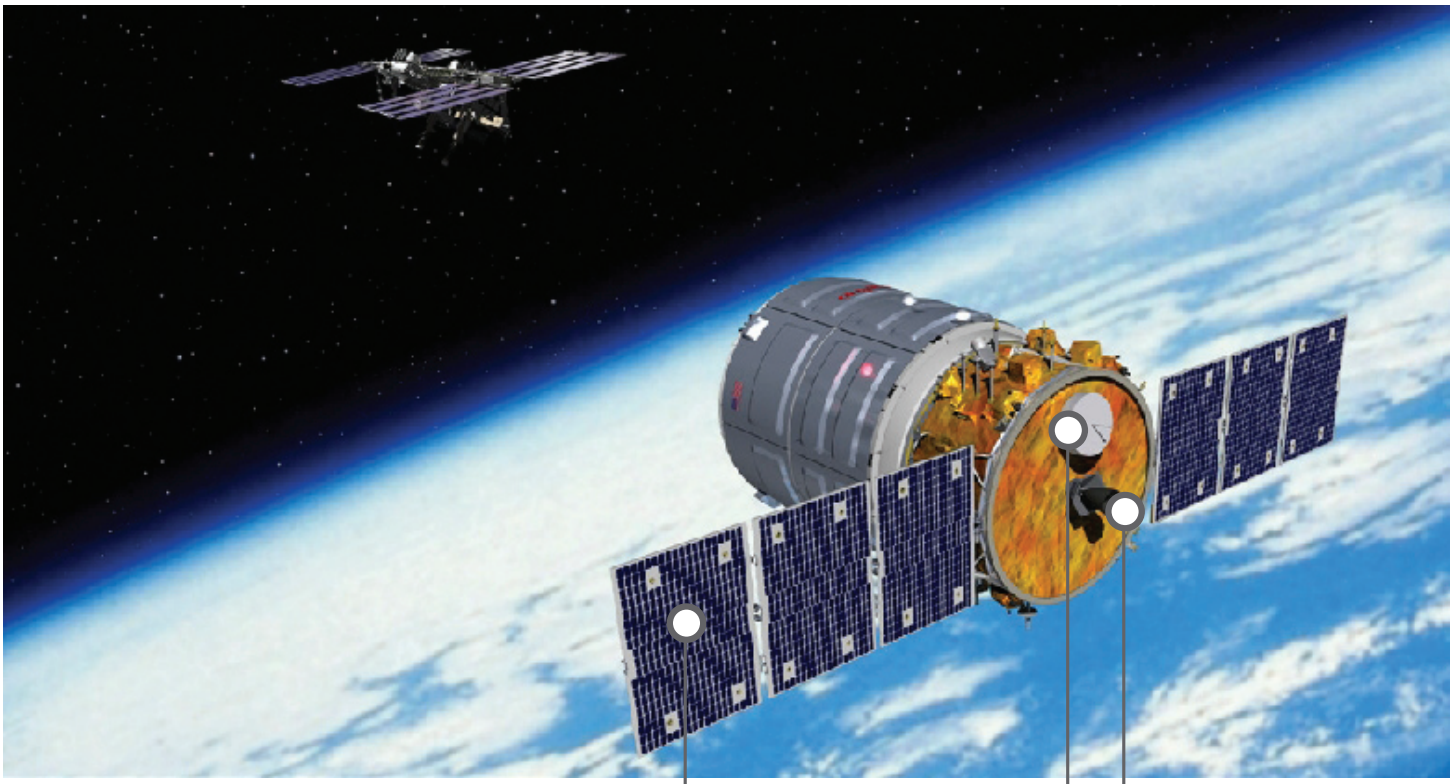
Common Berthing Mechanism

Orbital Hatch
37 inches crew passageway

Pressurized Compartment (active or passive configuration)
Cargo Volume up to 11 m^3, Cargo Mass up to 2,700 kg, Cargo Power Supply up to 150 W average



2 solar panel wings Gallium-Arsenide cells
3.5 kW power generation

Grapple Fixture

Main Propulsion and Attitude Control System
Dual-mode propulsion N_2H_4/MON-3 or N_2H_4.

Specifications

DIMENSIONS

Length: ~ 6,7 m max
Largest diameter: ~ 3,4 m max

MASS BUDGET

Mass at launch: ~ 6,600 kg max

CARGO

Cargo Volume: ~ 11 m^3

CARGO CONTAINERS

- Single and double middeck lockers
- Cargo Transfer Bags (CTBs) and M01/M02 bags

CARGO MASS

- 2,000 kg of pressurized cargo to the ISS with the Standard Pressurized Cargo Module (PCM)
- 2,700 kg of pressurized cargo to the ISS with the Enhanced PCM

CARGO POWER

Power supply to pressurized active cargo of 150 W (28 V)

SERVICE MODULE MAIN FUNCTIONS

Orbital mission management (data handling, GNC), propulsion (thrusters),
power generation and storage (solar panels, batteries),
thermal control of SM avionics and communication.

PRESSURIZED CARGO MODULE MAIN FUNCTIONS

P/L support (power supply, cooling, environmental control)
P/L operations support (access, illumination etc...)
RdV and berthing support (via Common Berthing Mechanism)

MAIN CONTRACTOR

Orbital Sciences Corporation

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Please note that Cygnus is under development and this data sheet was produced with available data from public domains. Therefore, the information provided is according to ESA's best knowledge as of 1 September 2010. For detailed and latest information and context, please visit the companies' web page: www.orbital.com

Utilisation Relevant Data

LAUNCH

Launch Stack:
The Cygnus will be composed by the:

- Service Module (SM), ensuring propulsion function and services to the pressurized payload (P/L) module in the orbital phase;
- Pressurized Cargo Module (PCM), the pressurized P/L module supporting all along the mission the P/L and the P/L operations and providing the berthing interface to the ISS (the Common Berthing Mechanism).

Cygnus will be launched with the solar panels closed to the body of the spacecraft. The orbital power generation system will not be active up to the insertion in orbit. Power supply during launch will be provided by batteries.

Launch Vehicle: Taurus II
Launch under fairing
Launch site: Wallops Flight Facility (WFF) - Virginia (USA)
First Flight: 2011 - demonstration flight, 2012 operational
Flight rate: 2/year

ON-ORBIT

The solar arrays will be deployed to ensure power supply and the heat rejection will be performed via space radiators.

The system will perform orbital manoeuvres and will berth at the International Space Station (ISS), supported by the SSRMS (Space Station Robotic Manipulation System).

After the completion of the cargo operations at the ISS (download of cargo and upload of waste), the Cygnus will separate from the Station and will perform a destructive re-entry into Earth's atmosphere.

Cygnus' flight profile.