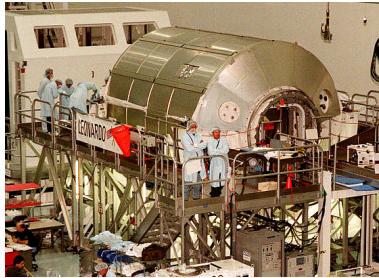


## ➤ The MPLM

The MPLM (Multipurpose Pressurized Logistics Modules) - namely Leonardo, Raffaello and Donatello, provide a pressurized logistics system, each element being carried on by the Shuttle Orbiter, to transport supplies and materials between Earth and the Space Station (25 flights in 10 years). Two docking mechanisms are installed on the module for the transfer between the ISS and the Shuttle using the mechanical arm system commanded from the Station. The MPLM can be visited and inhabited by the Crew during the entire mission duration (typically 12 days + margins). Each MPLM is 6.6 meters long and 4.2 meters in diameter, with a total cargo capability of 9000 Kg). Each module is designed for an operational life of 10 years and 25 missions.

**As prime contractor to ASI/NASA, Thales Alenia is in charge of the design, development, qualification and integration of the three MPLM units. It also supports NASA for their utilization through ALTEC (Advanced Logistic TEchnology Centre) throughout the operational life.**



## ➤ PMM : to expand ISS habitable capacity

PMM (Permanent Multipurpose Module) results from a bilateral agreement between ASI and NASA aiming at converting a MPLM module into a permanent element. The PMM, that will be launched at the end of 2010, will remain in orbit as an integral part of the ISS for over 10 years. It will offer 70 additional cubic metres of pressurized volume for stowage and for scientific utilization.

PMM program is being realized for ASI by the same industrial team that designed, build and successfully operated MPLM.

The PMM conversion involved 3 major modifications such as reinforcing its structure for the PMM to stay in order during 10 years, changing the module's interior to make it more user-friendly, and reducing the module's weight.

## ➤ ISS Commercial resupply services : CYGNUS resurized Cargo Module

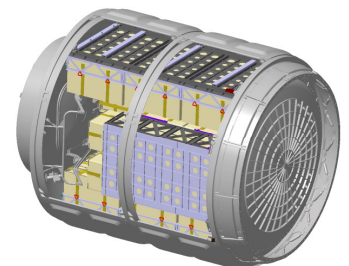
The Cygnus maneuvering spacecraft is being developed by Orbital Space Science to demonstrate cargo delivery under NASA Commercial Orbital Transportation Services (COTS) agreement. In addition to the COTS development and demonstration program, Orbital will utilize the Cygnus to perform the ISS resupply flights under the Commercial Resupply Service (CRS) contract. This NASA contract authorizes eight missions between 2011 and 2015 carrying approximately 20,000 Kg of cargo to the ISS as well as disposal of ISS waste

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.

Thales Alenia Space Italia, under contract with Orbital Sciences Corporation designs, develops, produces and delivers pressurized modules for cargo transport – including equipment, spare parts, scientific experiments and other items – to the International Space Station. The pressurized cargo module is based on the Multi-Purpose Logistics Module (MPLM).

Using a staggered delivery schedule, a total of nine PCMs will be provided to Orbital for cargo loading and integration with the Orbital Service Module (SM). The series of nine pressurized modules will start with one unit being built for the COTS demonstration mission, followed by two "standard" configuration units, and be completed with six "enhanced" configuration units.

The SM/PCM, known jointly as the Cygnus, will be launched by the Orbital Taurus® II and captured and berthed to the ISS at the Node 2 Nadir Port. After completion of the ISS mission the Cygnus will be de-orbited for a destructive re-entry.



**Thales Alenia Space is in charge of design, development, production and delivery of nine pressurized modules for cargo transport to Orbital Sciences Corporation.**