

➤ Cupola : A window over the Earth

Developed by Thales Alenia Space, Cupola is a spectacular technological, robotised control room, which will allow the astronauts to see and work through seven windows, looking out 360° around the International Space Station. It will be attached to the Node 3 Tranquility, also developed by Thales Alenia Space, and will be used as a flight control center for the ISS during spacewalks, spacecraft maneuvers or work requiring the station's robotic arm. It should last about 10 years in orbit.

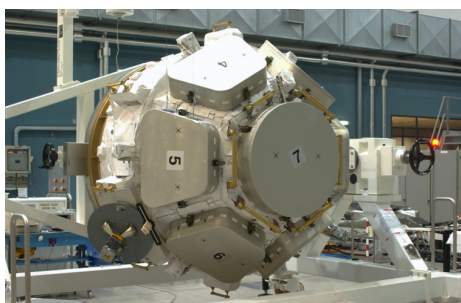
Built by Thales Alenia Space in Italy, the Cupola is 6.5 feet wide (2 meters) and 5 feet high (1.5 meters). The dome-like Cupola is forged from a single 1.8-ton chunk of aluminum with slots for six trapezoid-shaped windows and one large circular viewport that will be the largest window to fly in space when launched. It comprises a set of external shutters - one per window - clamps over the viewports to protect the glass from micrometeorite impacts and to prevent solar radiation from heating up the Cupola. The shutters are also designed to help maintain the temperature within the ISS. The shutters can be opened by the crew inside the Cupola with the simple turn of a wrist.

Each window has three subsections: an inner scratch pane to protect the so-called pressure panes from accidental damage from inside the Cupola; two 25 mm-thick pressure panes to help maintain the cabin pressure and environment (the outer pane is a back-up for the inner pane); and a debris pane on the outside to protect the pressure panes from space debris when the Cupola shutters are open.

Cupola's internal layout is dominated by upper and lower handrails around the inside of its cabin supporting most of the equipment and by 'close-out' panels, which cover the harness and water lines attached to the Cupola. These internal panels form a pressurized air distribution system with the outer structure. These panels are removable to allow inspection and connection of different utilities.

The Cupola joined the Space Station onboard Endeavour's STS-130 Mission on February 8th, 2010.

As prime contractor to ESA, Thales Alenia Space developed and integrated the Cupola.



➤ Node 2 and Node 3 : A complex architecture

The Nodes form a key element of the global architecture of the International Space Station, and are used for the interconnection and management of the various pressurized modules as well as for docking of the visiting carriers to the Station.



The Nodes are multifunctional elements that interconnect the various crew living and operations quarters, thereby increasing the habitable space and making the environment suitable for the crew to live and carry out their research in microgravity conditions.

The Station features 3 Nodes. The Node 1 was manufactured in the U.S. and is already deployed at the Station. The Node 2 Harmony, and the Node 3 Tranquility, have been developed by Thales Alenia Space as prime contractor on behalf of ESA and ASI. Node 2 was launched in October 2007 and connects the Columbus Laboratory. Node 3 was launched in February 2010 and connects the Cupola. Nodes 2 and 3 are similar in structure: 4.6 meters in diameter, 7 meters long and weighing around 14 tons.

The ISS community generally recognizes Node 3 as the most complex pressurized element of the station. Thales Alenia Space did an outstanding job in showcasing the capabilities in Europe to develop and build space technology. This masterpiece of engineering is an extremely complex Space Station module which will accommodate vital environmental support and life support systems for the Station's crew.

As prime contractor to ESA/ASI, Thales Alenia Space has been responsible for the design, development, qualification and integration of Nodes 2 & 3 and will provide the necessary support to NASA for the final verifications and launch preparation as well as on-orbit operations.