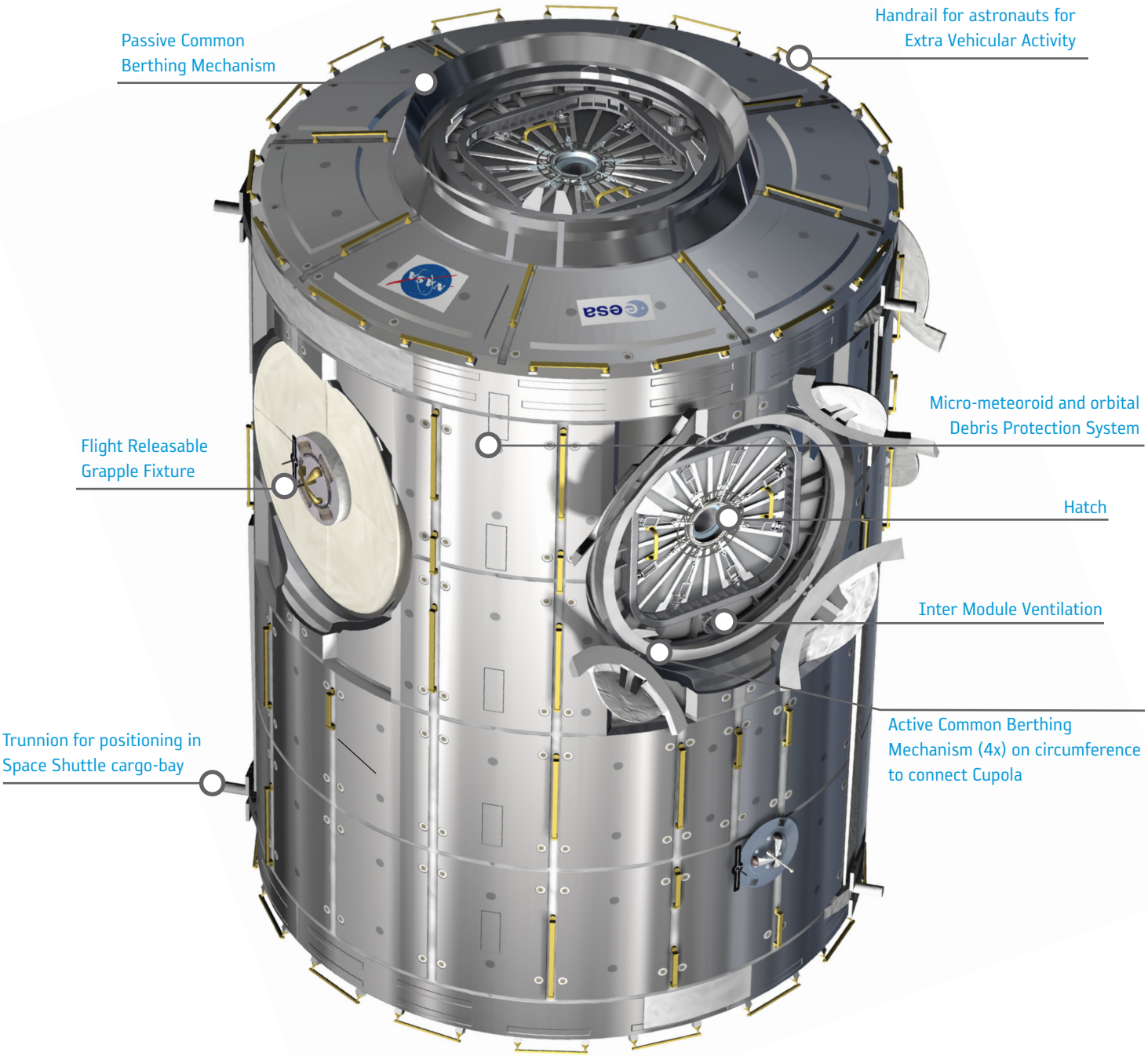
→ NODE-3 (TRANQUILITY)

Connecting module

Node-3 controls and distributes resources from Node-1 to the connected element Cupola. It also houses primary and redundant key environmental control and Life Support systems for atmosphere revitalisation, oxygen generation, crew hygiene, waste management and water processing. It also accommodates equipment to support internal habitability and the distribution of avionics and fluid resources.



esa	PROJECT: International Space Station	
TITLE: Node-3	DOCUMENT N°: ESA-HSO-COU-006	REV. 2.0

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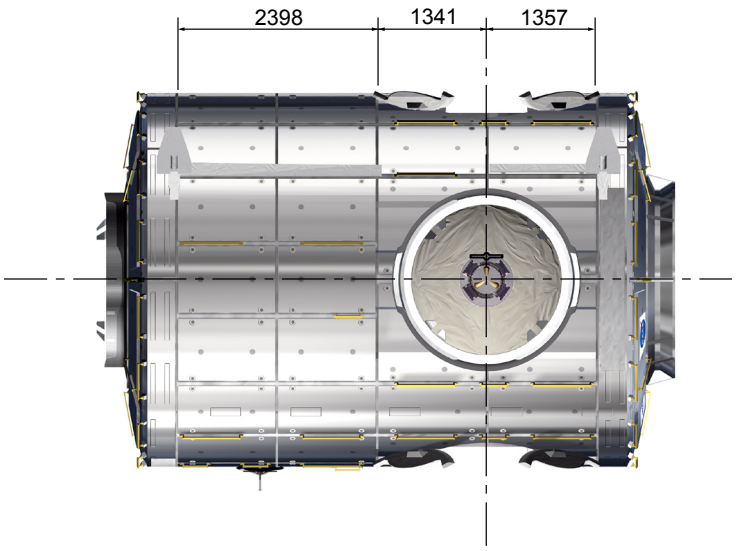

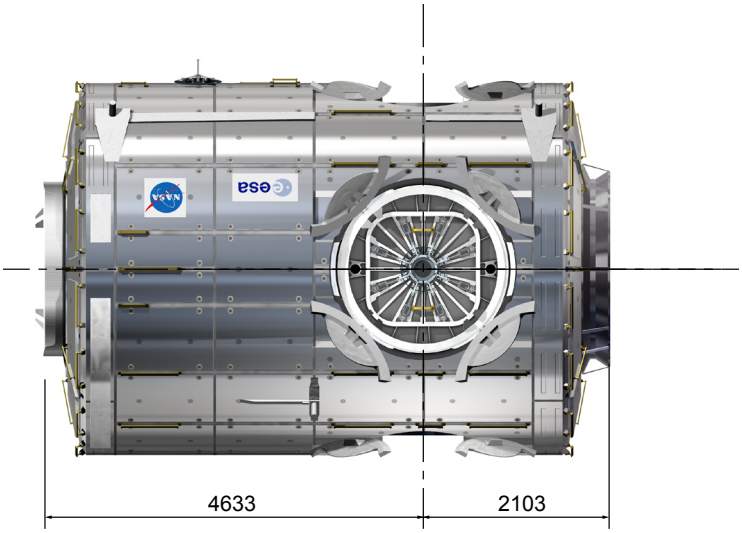

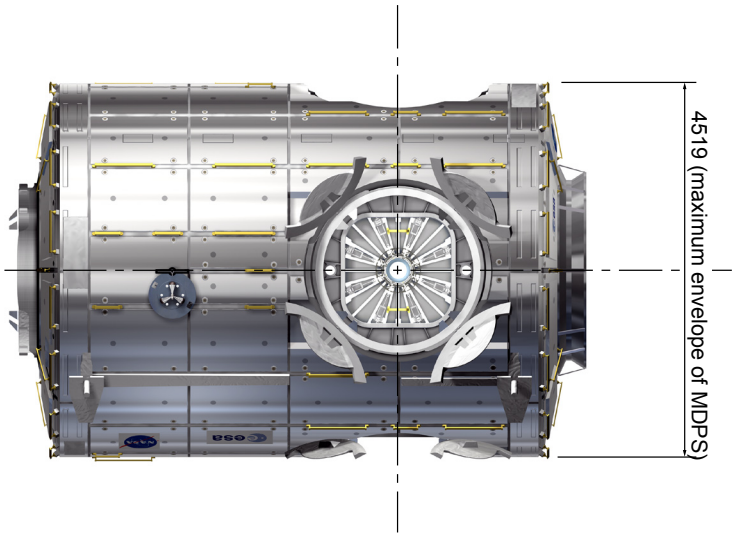

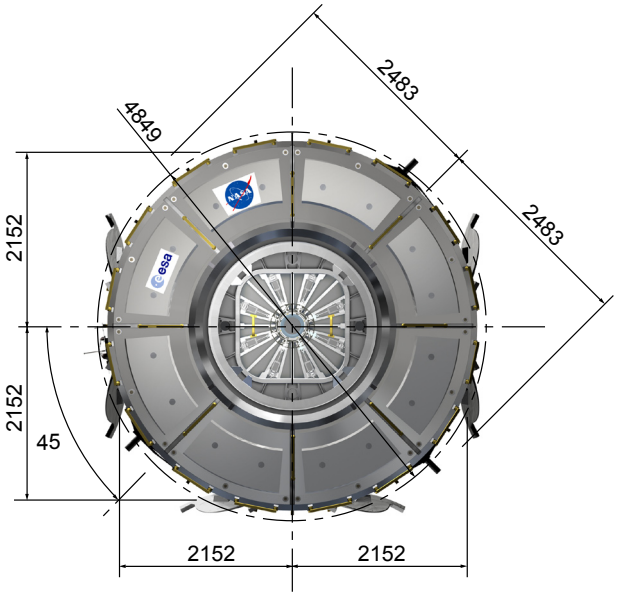

Node-3 and Cupola in the payload bay of the Shuttle

A close-up view of Node-3 and Cupola attached to the ISS

Specifications

DIMENSIONS

Length:	6706 mm
Diameter:	4480 mm
Maximum envelop of mops:	4519 mm

MASS BUDGET

Launch mass:	15500 kg
On orbit payload mass:	17992 kg

COMMUNICATIONS AND DATA INFRASTRUCTURE

Audio and Video communications via optical fibers, analog lines and coax.
Data acquisition and processing to support: power distribution, thermal control and environmental control inside the Node as well as data exchange between Node and all attached elements.

ENVIRONMENTAL CONTROL

Air Revitalization System rack:	Carbon dioxide removal, trace contaminants control and atmospheric components monitoring
Oxygen Generation System rack:	Oxygen production from water electrolysis (plus CO2 reduction to water)
Waste Recovery System rack 1:	Waste water processing to potable water
Waste Recovery System rack 2:	Pre-treated urine to urine distillate processing
Waste & Hygiene Compartiment 1&2:	Crew urine and fecal collection and crew personal hygiene

ELECTRICAL POWER

Regulation and distribution of electrical power to attached elements and internal Node loads, sized for 23 kW

MAIN CONSTRUCTION MATERIAL

Pressure shell:	Aluminum 2219 - T851
Micro-meteoroid and orbital Debris Protection System:	Al-6061-T6, Aluminum bumper for the primary barrier Kevlar/resin panels for the secondary barrier
Passive Thermal control:	Goldised Kapton MultiLayer Insulation blanket

OWNERSHIP AND DEVELOPMENT AUTHORITY

Technical and programmatic responsibility delegated by ESA to ASI.
Delivered to NASA (final owner) under a barter agreement for the launch of the European Columbus Laboratory by the US Space Shuttle

MAIN CONTRACTOR

Thales Alenia Space, leading a consortium of European subcontractors

esa

PROJECT: International Space Station

TITLE: Node-3

DOCUMENT N°: ESA-HSO-COU-006

REV. 2.0

Astronauts Terry Virts, Nicholas Patrick and Stephen Robinson free-floating in the newly-installed Node-3

ESA astronaut Paolo Nespoli in Cupola

Specification

LAUNCH CONFIGURATION

Launched with 2 Avionics and 2 ECLSS racks

Launch vehicle: Space Shuttle Endeavour
Launch site: Kennedy Space Center
Launch date: 8 February 2010

ON ORBIT CONFIGURATION

Attached to Node-1 (Unity) port (left-hand) side port
Cupola attached to Nadir, Earth-facing port

FLIGHT HARDWARE

6 Environmental Control and Life Support System racks
2 Flight Crew System racks

EXTERNAL SECONDARY STRUCTURES

Meteoroids and debris protection panels (98 panels with different characteristics like single or double bumper, shapes and dimensions)
Support restraints and mobility aids for EVA operations
2 Flight Releasable Grapple Fixtures used for deployment from Space Shuttle cargo bay and installation on Node-1