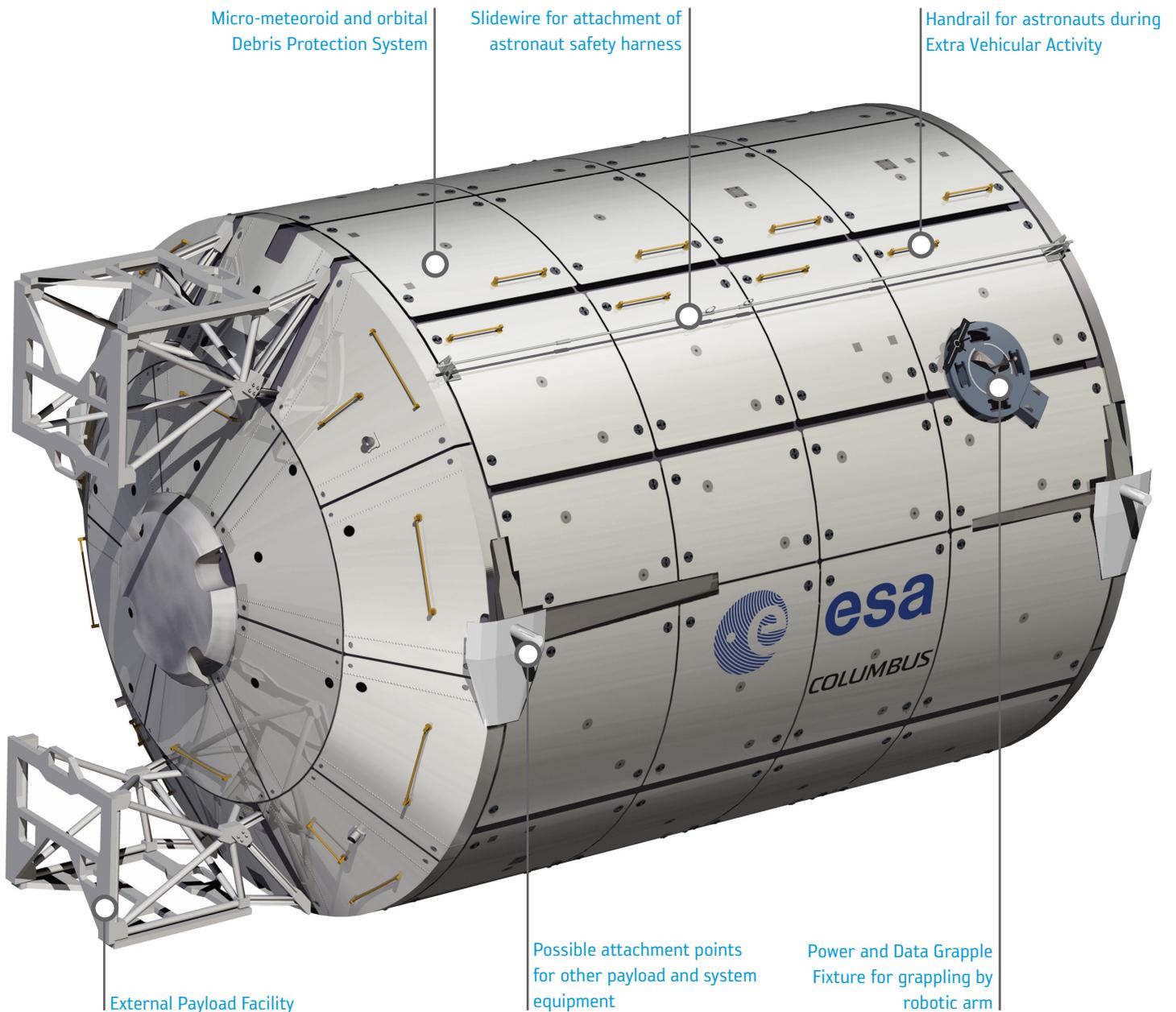


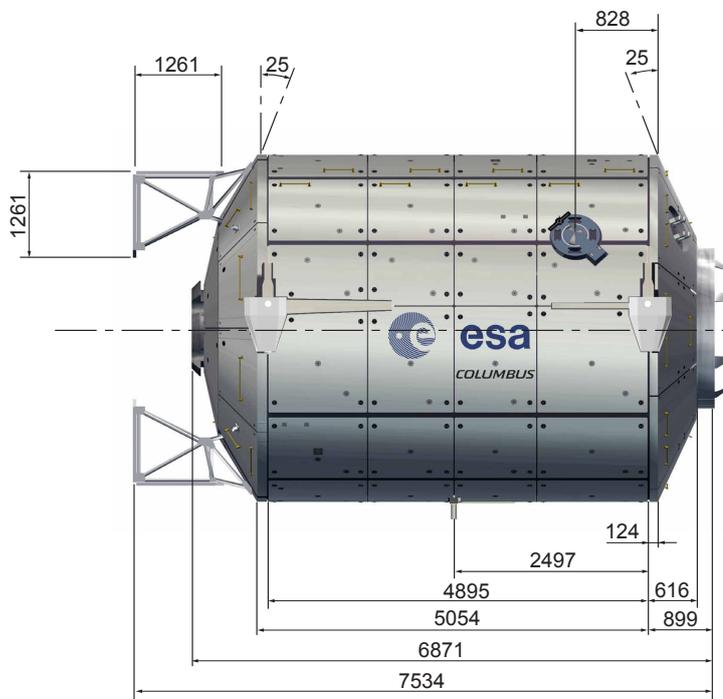
→ COLUMBUS

European research laboratory

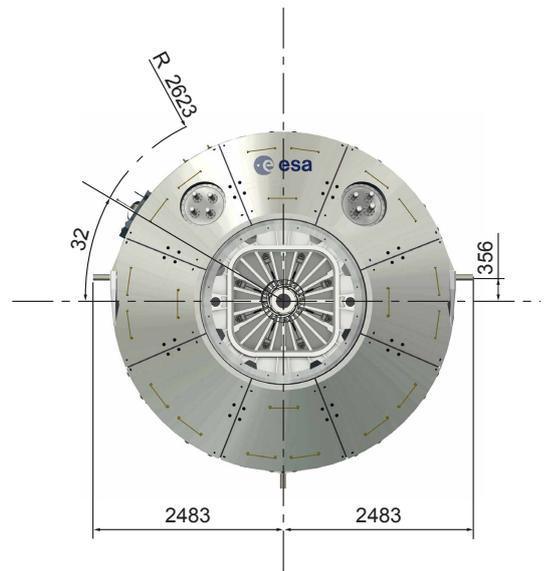
A research laboratory which is permanently attached to the International Space Station and provides internal payload accommodation for experiments in the field of multidisciplinary research into material science, fluid physics and life science. In addition, an external payload facility hosts experiments and applications in the field of space science, Earth observation and technology.



	PROJECT:	International Space Station	
	TITLE:	Columbus	DOCUMENT N°: ESA-HSO-COU-002



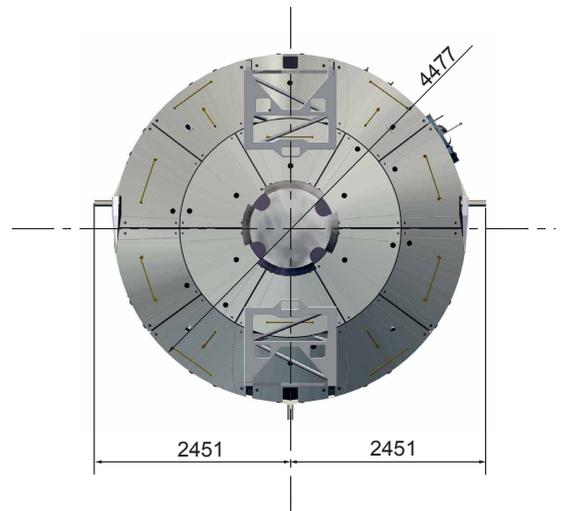
FRONT VIEW



PORT VIEW

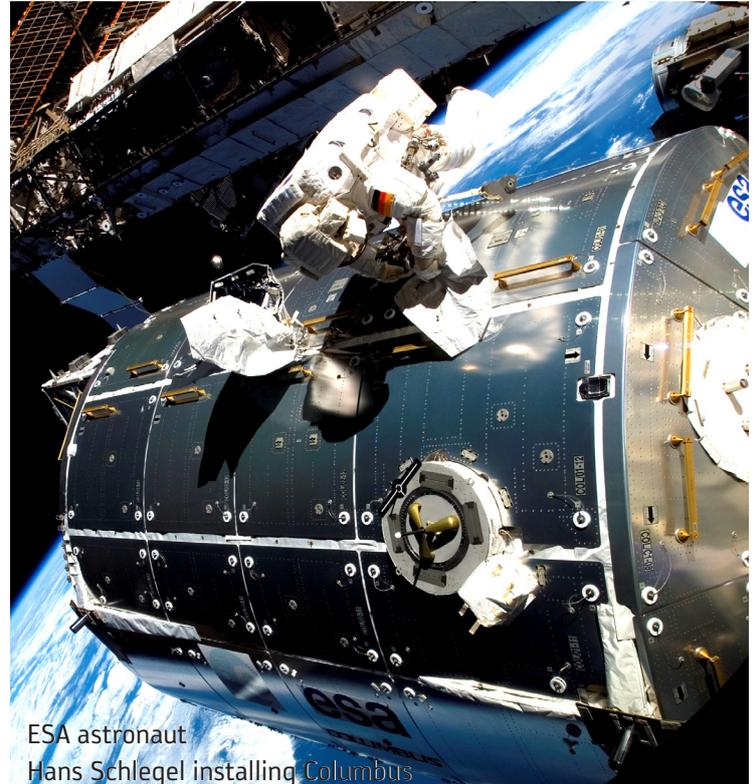
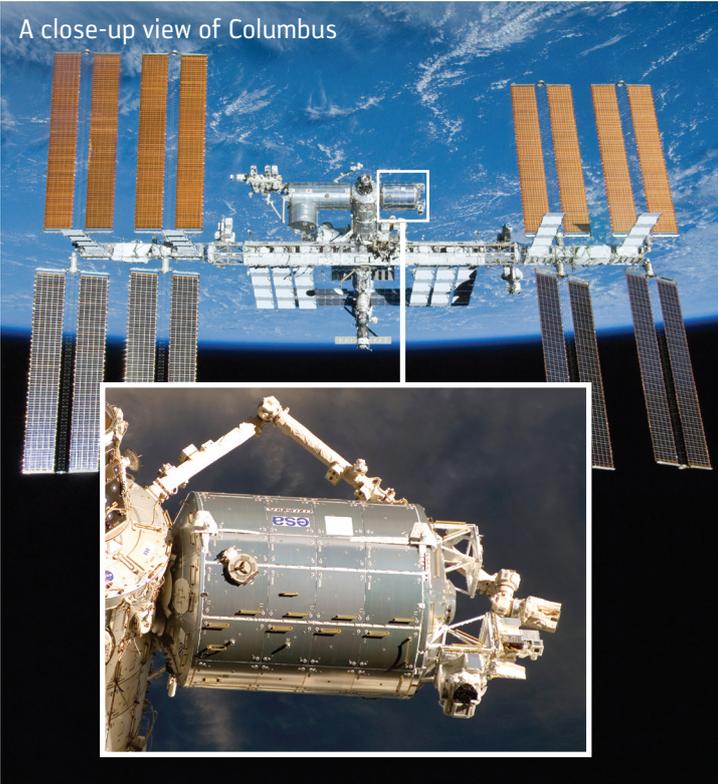


ZENITH VIEW



STARBOARD VIEW

A close-up view of Columbus



ESA astronaut Hans Schlegel installing Columbus

Specifications

DIMENSIONS

Total module length: 6,871 mm
Largest diameter: 4,477 mm
Total internal volume: 75 m³
Volume of payload racks: 25 m³

MASS BUDGET

Mass without payload: 10,275 kg
Launch mass: 12,775 kg (2,500 kg payload)
Maximum payload mass: 9,000 kg (internal)
370 kg x 4 (external)
Maximum on orbit mass: 21,000 kg

COMMUNICATIONS INFRASTRUCTURE

Down-link via NASA: 50 Mbps (Ku-band) 192 kbps (S-band)
Up-link via NASA: 72 kbps (S-band)

ENVIRONMENTAL CONTROL

Supported crew: 3 continuous
Cabin temperature: Between 16° and 27° C
Air pressure: Between 959 and 1,013 hPa
Heat rejection: Up to 22 kW through moderate and low temperature cooling loops

ELECTRICAL POWER

Total power: 20 kW (120 V dc) provided by the station
Payload power: Up to 13.5 kW

CONSTRUCTION MATERIAL

Pressure shell: Aluminium 2219
4.8 mm thick, decreasing to 3.8 mm for the end-cones
Micrometeoroid and Debris Protection System: Aluminium bumper made of Al-6061-T6 for the primary barrier, Kevlar/Nextel panels for secondary barrier
Thermal Protection Material: Aluminised Kapton Multi Layer
Insulation blanket
Internal secondary structure: Aluminium 7475
Aluminium 7075
Aluminium 5056
Aluminium 2024
External Payload Facility: Aluminium 7075
Aluminium 7050
Payload Racks: Carbon fiber: NASA racks
Aluminium 7075: ESA racks

MAIN CONTRACTOR

EADS Astrium leading a consortium of many subcontractors



PROJECT: **International Space Station**

SCALE: 1:75
DIMENSIONS: mm

TITLE: **Columbus**

DOCUMENT N°:
ESA-HSO-COU-002

REV.
2.0



The payload racks inside Columbus



ESA astronaut Frank de Winne with Biolab

Utilisation Relevant Data

LAUNCH CONFIGURATION

Fluid Science Laboratory, European Physiology Module, Biolab, European Drawer Rack, European Transportation Carrier installed. Remaining racks were installed while on orbit.

Launch vehicle: Atlantis
Launch site: Kennedy Space Center
Launch date: 7 February 2008

ON-ORBIT CONFIGURATION

Payload: Attached to Node 2 starboard docking port.
Accommodation: 10 International Standard Payload Racks (ISPR) (maximum 998 kg each)
 4 external payloads (maximum 370 kg each)

FLIGHT HARDWARE

Biolab, Fluid Science Laboratory, European Physiology Module, European Drawer Rack, European Transportation Carrier, Mares (Muscle Atrophy Research + Exercise System), Data and mission computers Command/ Measurement Units, High Rate Multiplexer, Mass Memory Unit, Video Camera (2), and Monitor Audio system, Master Alarm Light panel (2), Emergency Fire Extinguisher (2), Portable Breathing Apparatus (2), Inter Module Ventilation valves and fans, Thermal Control System valves, Power Distribution Unit, Vital Telemetry Computer units, Heat Exchangers, Circulation Fan Assembly, other small internal payload facilities and equipment, and External Payload platform (SOLAR, EUTEF).

