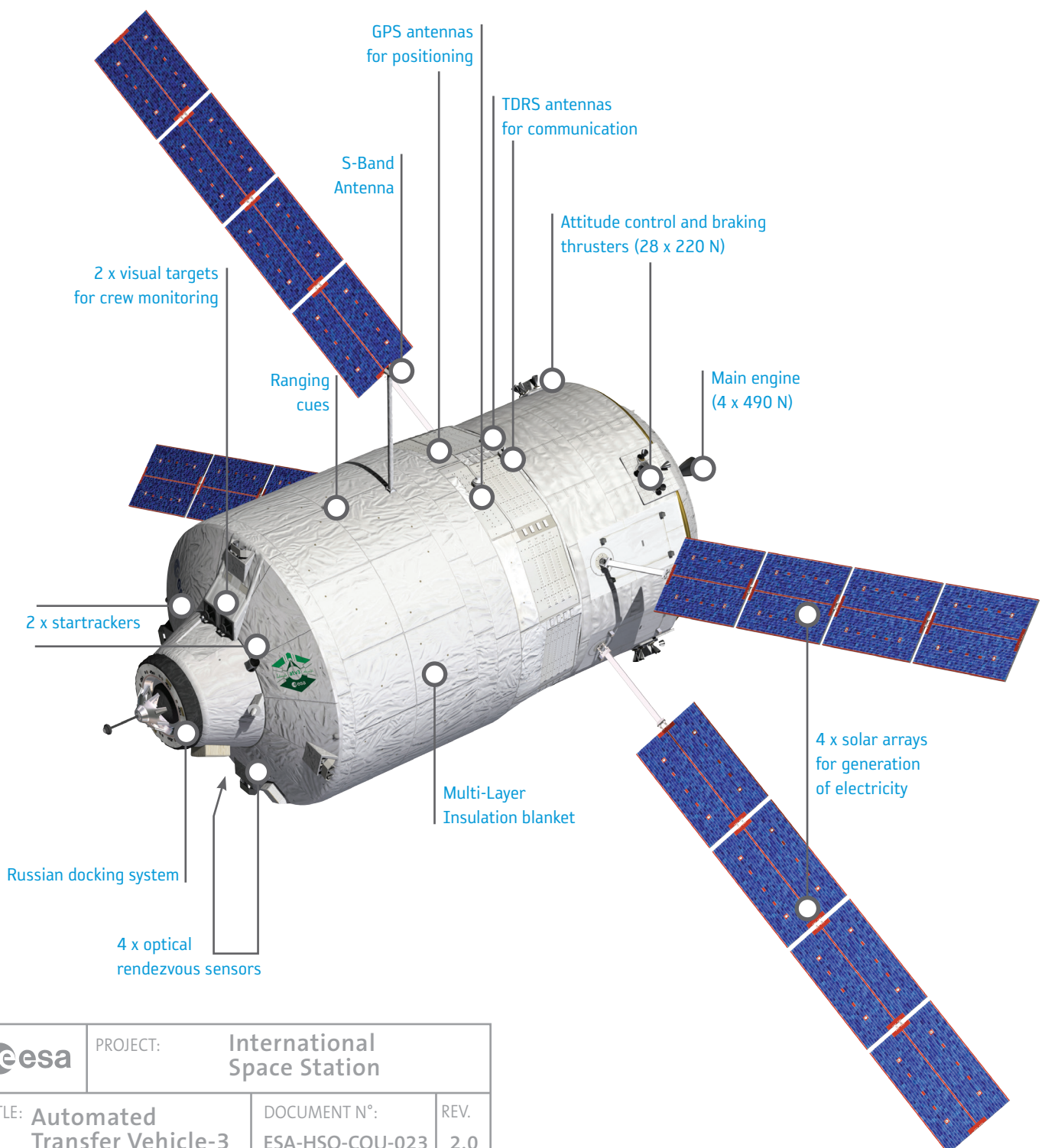
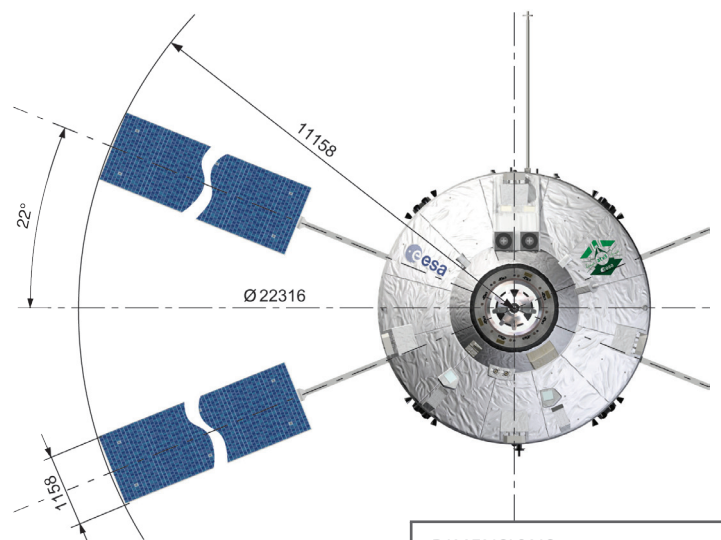
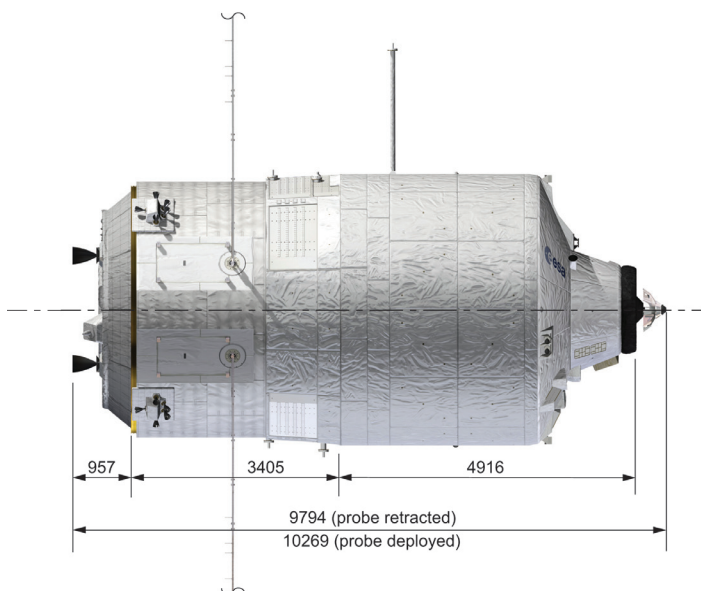
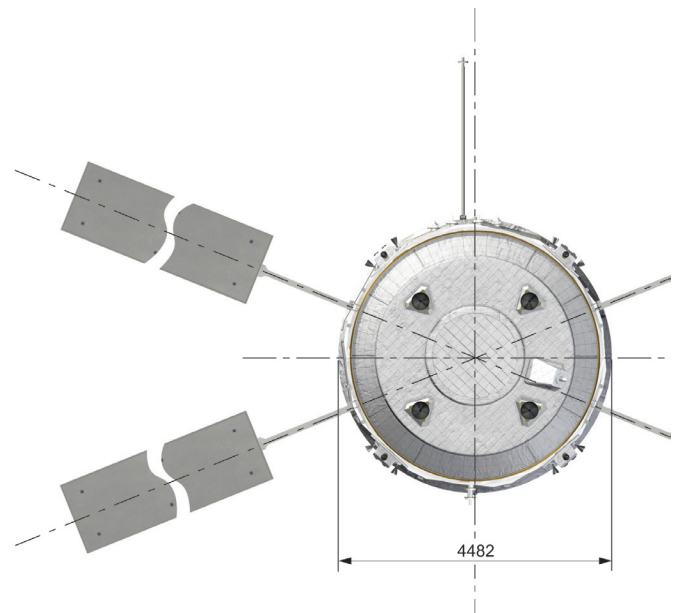
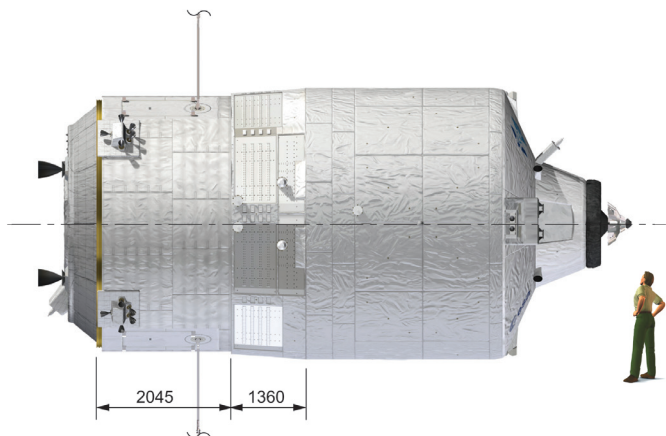


→ ATV EDOARDO AMALDI

European servicing and logistics vehicle

The Automated Transfer Vehicle (ATV) is an unmanned automatic vehicle which is put in orbit by the European Ariane 5 launcher. It provides the International Space Station with: pressurised cargo, water, air, nitrogen, oxygen and attitude control propellant. It also removes waste from the station and reboosts it to a higher altitude to compensate for the atmospheric drag.





DIMENSIONS:
in mm

The Integrated Cargo Carrier (ICC)



Specifications

DIMENSIONS

Length:	9794 mm (probe retracted)
Largest diameter:	4480 mm
Solar array span:	22281 mm

MASS BUDGET

Vehicle dry mass:	9778 kg
Vehicle consumables:	2261 kg
Total vehicle mass:	12039 kg
Total cargo upload capacity:	7384 kg
Mass at launch (max):	20100 kg
Waste download capacity:	6495 kg (420 km altitude, 51.6° inclination)

PROPULSION

Main propulsion system:	4 x 490 N thrusters (pressurised liquid bipropellant system)
Attitude control system:	28 x 220 N thrusters (pressurised liquid bi-propellant system)
Propellant:	Monomethyl hydrazine fuel and Nitrogen tetroxide oxidiser
Pressurization:	Helium pressurant at 31 MPa

AVIONICS

- 2-failure tolerant architecture
- Equipment Interconnection via multiple redundant MIL-STD-1553B buses
- 2-fault tolerant Computer via voting mechanisms
- Flight Application Software: 450000 lines of code

COMMUNICATIONS INFRASTRUCTURE

To ground:	S-band via TDRS satellite
ATV to ISS:	S-band antenna via Proximity link

RELATIVE NAVIGATION

- Relative GPS
- Optical rendezvous sensors

THERMAL/ENVIRONMENTAL CONTROL

Thermal Control:	Multi Layer Insulation material, active thermal control using Variable & Constant Conductive Heat Pipes and paints
ECLSS:	Fire detection, air circulation, air temperature monitoring

ELECTRICAL POWER

Ascent to ISS and deorbit:	4 solar panel wings of 4 panels each and 40 Ah rechargeable batteries
Number of arrays:	4
Number of panels/array:	4
Generated power:	3800 W after 6 months in orbit
Required power:	< 400 W Dormant mode
supplied by ISS:	< 900 W Active mode

MAIN CONSTRUCTION MATERIAL

Pressure shell:	Al-2219
Micrometeoroid and Debris Protection System:	Primary bumper: Al-6061-T6 Secondary bumper: Nextel/Kevlar blankets
Internal structure (racks):	Al-6061-T6
Thermal insulation:	Goldised Kapton Multilayer Insulation blanket & aluminised beta cloth
Solar arrays:	Silicium solar cells on 4 carbon fibre reinforced plastic sandwich panels

MAIN CONTRACTOR

Astrium-Space Transportation, leading a consortium of many subcontractors



PROJECT: **International Space Station**

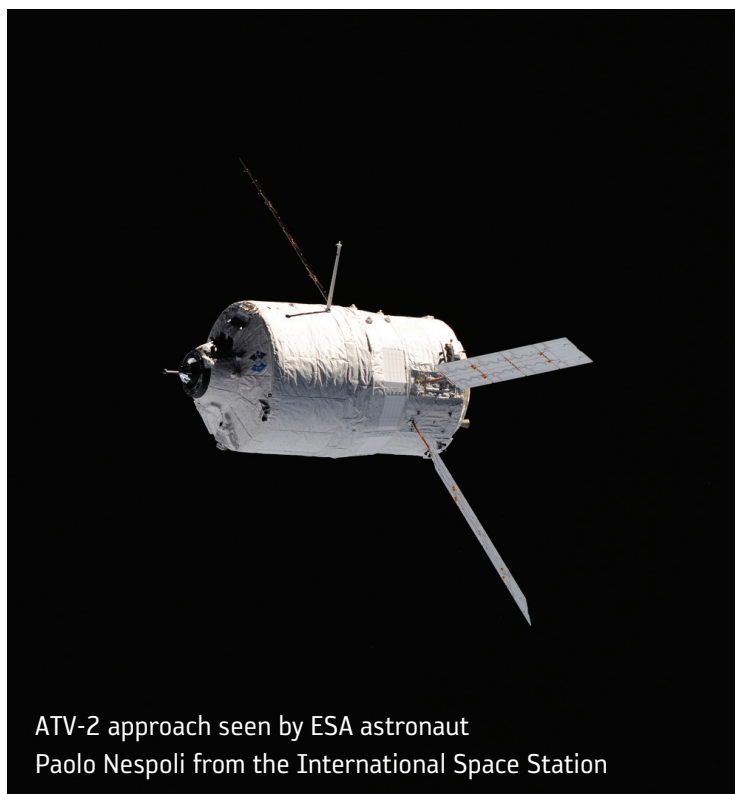
TITLE: **Automated Transfer Vehicle-3**

DOCUMENT N°: **ESA-HSO-COU-023**

REV. **2.0**



ATV-3 in preparation at the Guiana Space Centre



ATV-2 approach seen by ESA astronaut Paolo Nespoli from the International Space Station

Utilisation Relevant Data

LAUNCH CONFIGURATION		ON ORBIT CONFIGURATION
Payload:	8 racks with 1.25 m ³ each	Deployed solar arrays, with a total span of 22.3 m, that provide electrical power to rechargeable batteries for eclipse periods. Automated flight to the International Space Station.
envelope:	1.005 m ³ in front of 2 racks	
Cargo mass:	Dry cargo: 2400 kg Water: 285 kg Gas (nitrogen, oxygen, air, max. 2 gases/flight): 100 kg ISS refuelling propellant: 860 kg (306 kg of fuel, 554 kg of oxidiser) ISS reboost and attitude control propellant: 2959 kg Total cargo upload capacity: 6604 kg	
Launch vehicle:	Ariane 5 (300 x 300 km, 51.6° transfer orbit) ATV-3 will be launched with its solar panels folded to the body of the spacecraft. Electrical power will be supplied by rechargeable batteries.	FLIGHT HARDWARE Propulsion and reboost system Avionics equipment Guidance navigation and control system Communications system Power generation and storage system Thermal control system Russian docking and refuelling system
Launch site:	Kourou, French Guiana	
Launch date:	9 March 2012 <i>(as of 7 December 2011)</i>	

