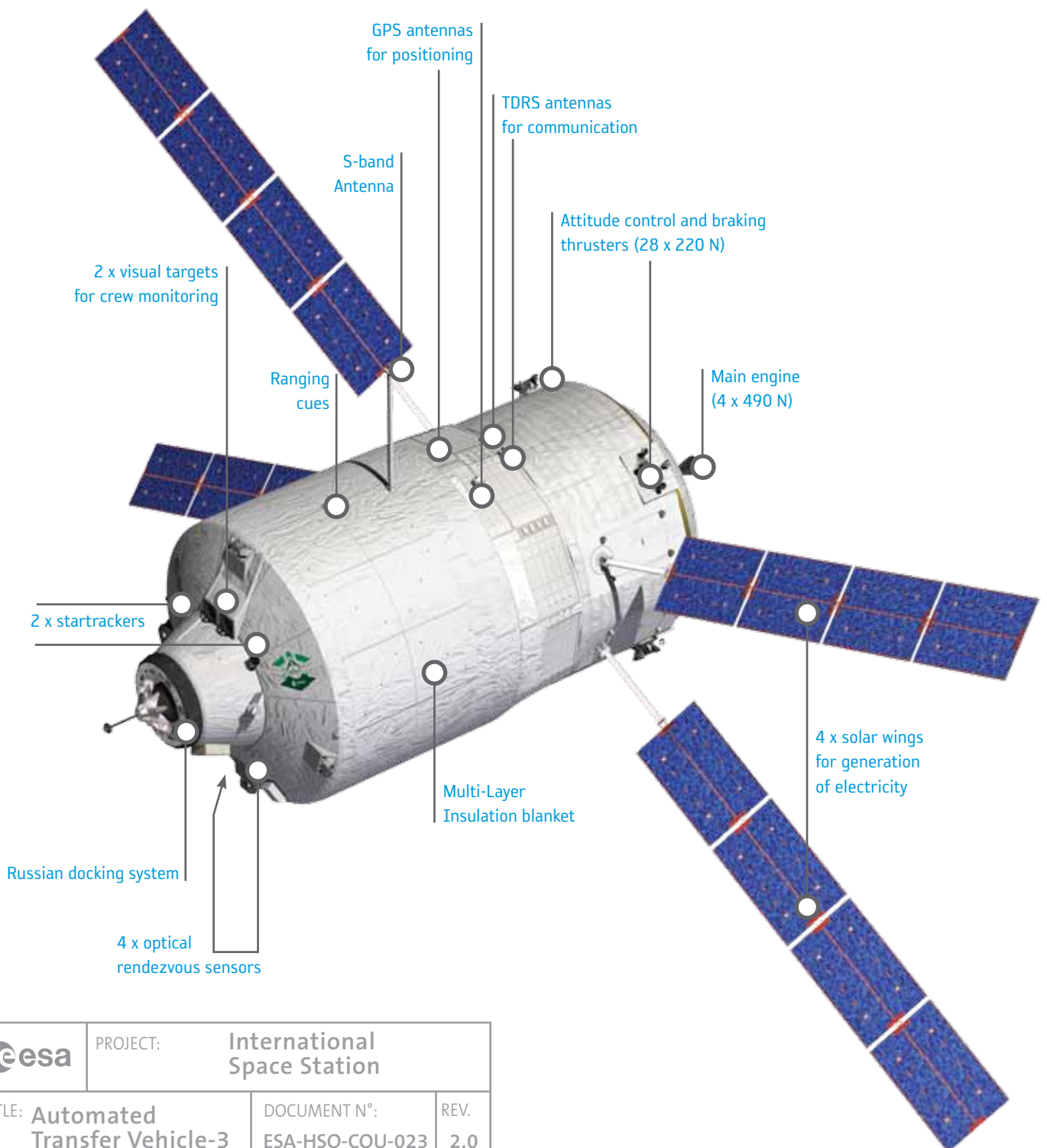


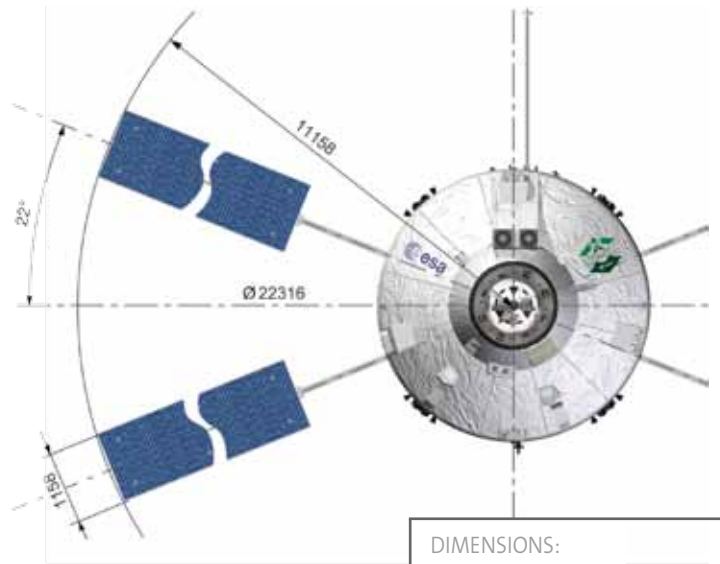
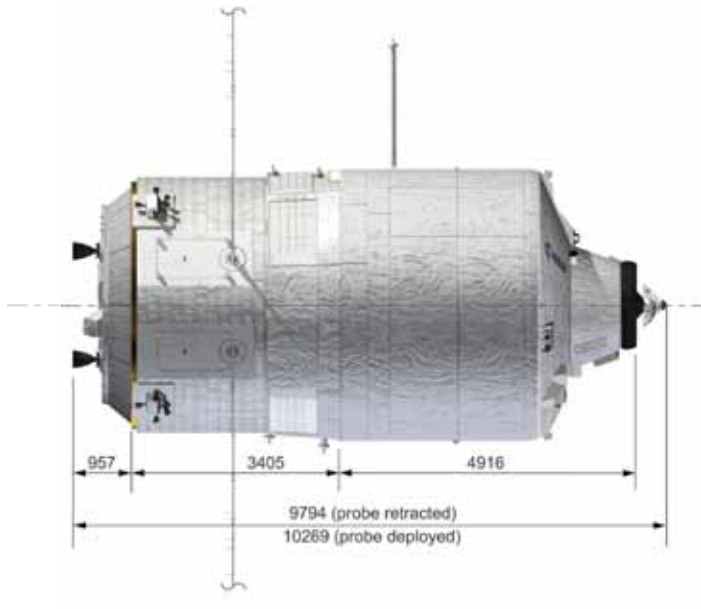
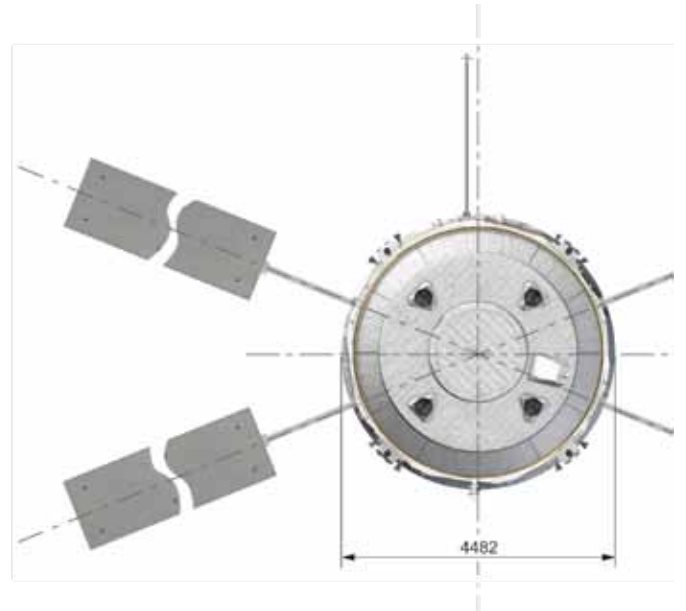
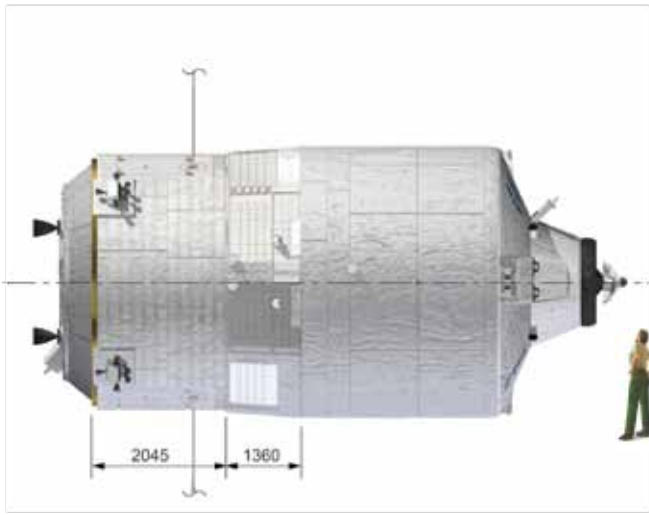
→ ATV EDOARDO AMALDI

European servicing and logistics vehicle

The Automated Transfer Vehicle (ATV) is an unmanned automatic vehicle sent into orbit by the European Ariane 5 launcher. It provides the International Space Station with: 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 atmospheric drag.

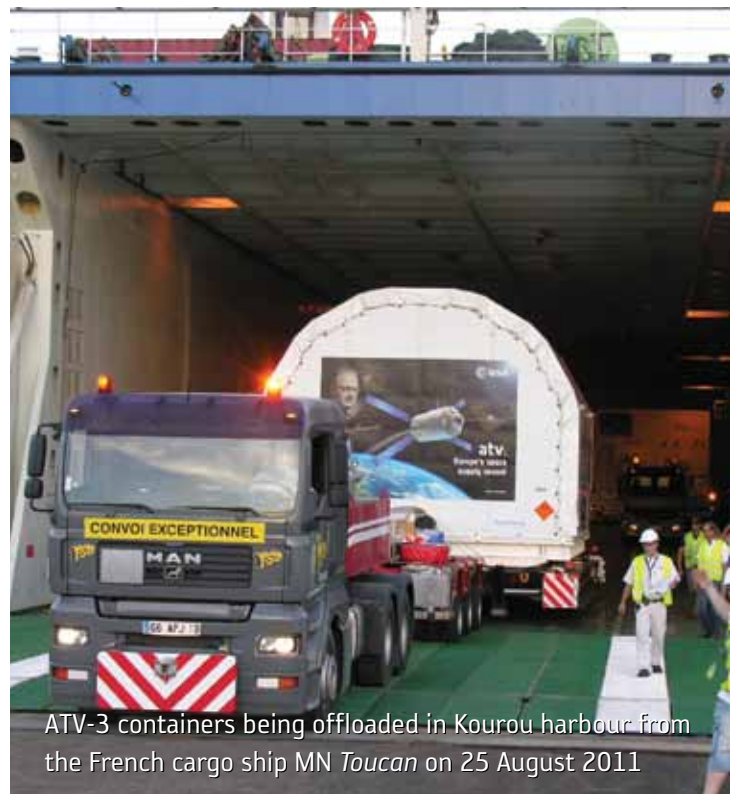


	PROJECT:	International Space Station	
	TITLE: Automated Transfer Vehicle-3	DOCUMENT N°: ESA-HSO-COU-023	REV. 2.0




DIMENSIONS:
in mm

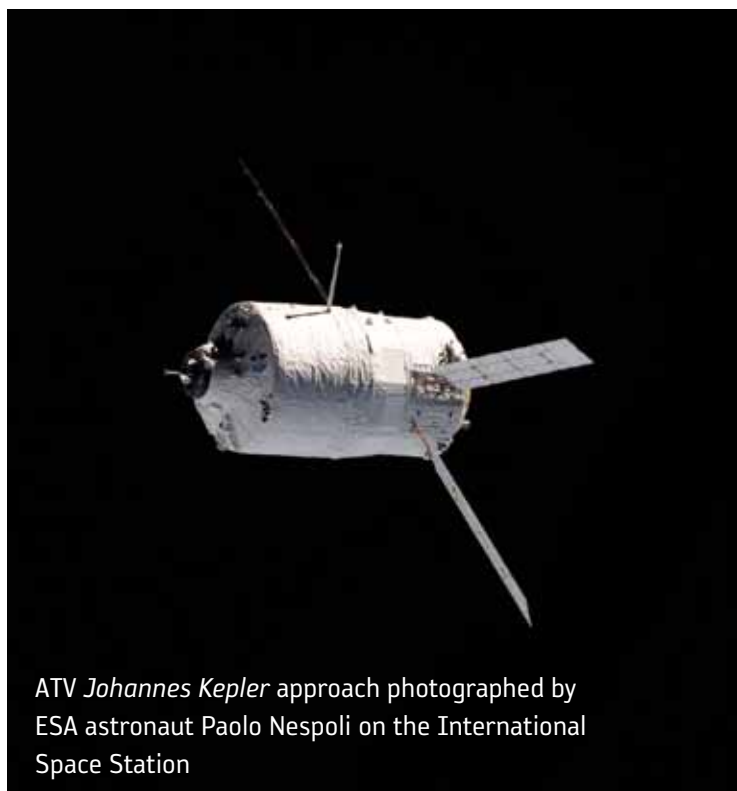
Integrated Cargo Carrier



ATV-3 containers being offloaded in Kourou harbour from the French cargo ship MN *Toucan* on 25 August 2011

Specifications

DIMENSIONS		THERMAL/ENVIRONMENTAL CONTROL	
Length:	9794 mm (probe retracted)	Thermal Control:	Multi-Layer Insulation material, active thermal control using variable & constant conductive heat pipes and paints
Largest diameter:	4480 mm	ECLSS:	Fire detection, air circulation, air temperature monitoring
Solar array span:	22 281 mm	ELECTRICAL POWER	
MASS BUDGET		Ascent to ISS and deorbit:	4 solar wings of 4 panels each and 40 Ah rechargeable batteries
Vehicle dry mass:	9778 kg	Number of arrays:	4
Vehicle consumables:	2261 kg	Number of panels/array:	4
Total vehicle mass:	12 039 kg	Generated power:	3800 W after 6 months in orbit
Total cargo upload capacity:	7384 kg	Required power:	< 400 W dormant mode
Mass at launch (max):	20 100 kg	Supplied by ISS:	< 900 W active mode
Waste download capacity:	6495 kg (420 km altitude, 51.6° inclination)	MAIN CONSTRUCTION MATERIAL	
PROPULSION		Pressure shell:	Al-2219
Main propulsion system:	4 x 490 N thrusters (pressurised liquid bipropellant system)	Micrometeoroid and Debris Protection System:	Primary bumper: Al-6061-T6 Secondary bumper: Nextel/Kevlar blankets
Attitude control system:	28 x 220 N thrusters (pressurised liquid bipropellant system)	Internal structure (racks):	Al-6061-T6
Propellant:	Monomethyl hydrazine fuel and Nitrogen tetroxide oxidiser	Thermal insulation:	Goldised Kapton Multi-Layer Insulation blanket & aluminised beta cloth
Pressurisation:	Helium at 31 MPa	Solar arrays:	Silicon solar cells on 4 carbon fibre reinforced plastic sandwich panels
AVIONICS		MAIN CONTRACTOR	
<ul style="list-style-type: none"> 2-failure-tolerant architecture Equipment interconnection via multiple redundant MIL-STD-1553B buses 2-fault-tolerant computer via voting mechanisms Flight Application Software: 450 000 lines of code 		Astrium-Space Transportation, leading a consortium of many subcontractors	
COMMUNICATIONS INFRASTRUCTURE			
To ground:	S-band via TDRS satellite	 PROJECT: International Space Station	
ATV to ISS:	S-band antenna via proximity link		
RELATIVE NAVIGATION			
<ul style="list-style-type: none"> Relative GPS Optical rendezvous sensors 			
TITLE: Automated Transfer Vehicle-3		DOCUMENT N°: ESA-HSO-COU-023	REV. 2.0



Utilisation Data

LAUNCH CONFIGURATION		IN-ORBIT CONFIGURATION
Payload:	8 racks with 1.25 m ³ each	Deployed solar array, with a total span of 22.3 m, provide electrical power to rechargeable batteries for eclipse periods. Automated flight towards the International Space Station.
Envelope:	1.005 m ³ in front of 2 racks	
Cargo mass:	Dry cargo: 2200 kg Water: 285 kg Gas (oxygen and air): 100 kg ISS refuelling propellant: 860 kg (306 kg of fuel, 554 kg of oxidiser) ISS reboost and attitude control propellant: 3150 kg Total cargo upload capacity: 6595 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.	
Launch site:	Kourou, French Guiana	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 date:	9 March 2012 <i>(as of 4 February 2012)</i>	

