

Liftoff of the Ariane 5 ES-ATV launcher from the Ariane Launch Complex no.3 (ELA-3), on 9 March 2008. On board is ATV-1 *Jules Verne*.



ATV-1 *Jules Verne* following undocking from the International Space Station

Utilisation Relevant Data

LAUNCH CONFIGURATION

Payload: 8 racks with 2 x 0.314 m³ and 2 x 0.414 m³

envelope: each 1.146 m³ in front of 4 of these 8 racks

Cargo mass: Dry cargo: 1,500 - 5,500 kg
Water: 0 - 840 kg
Gas (Nitrogen, Oxygen, air, 2 gases/flight): 0 - 100 kg
ISS Refueling propellant: 0 - 860 kg (306 kg of fuel, 554 kg of oxidizer)
ISS re-boost and attitude control propellant: 0 - 4,700kg
Total cargo upload capacity: 7,667 kg

Launch vehicle: Ariane 5 (300 x 300 km, 51.6° transfer orbit) ATV-2 will be launched with its solar panels folded to the body of the spacecraft. Electrical power will be supplied by non rechargeable batteries.

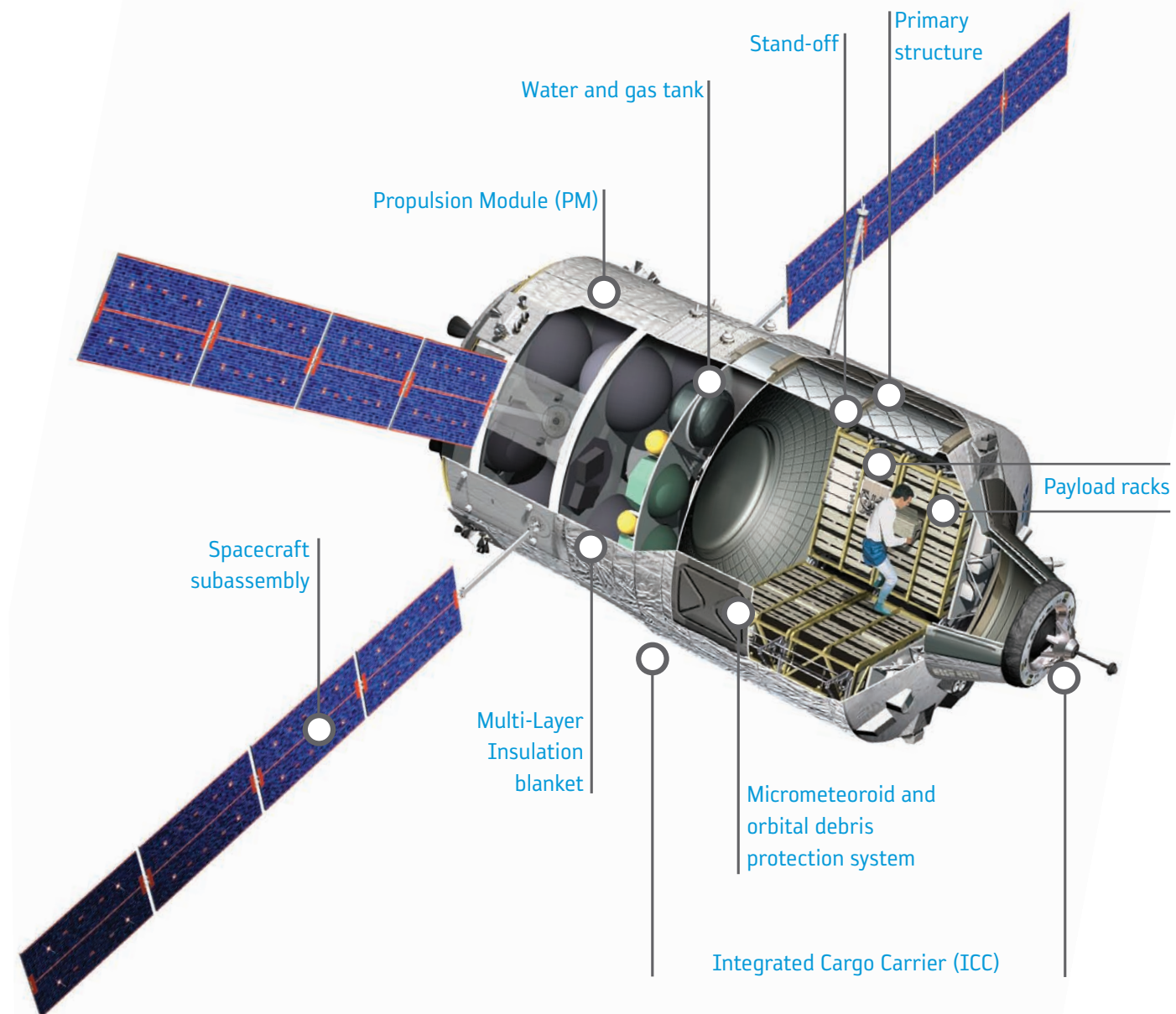
Launch site: Kourou, French Guiana
Launch date: 15 February 2011

ON ORBIT CONFIGURATION

Deployed solar arrays, with a total span of 22.3 m, that provide electrical power to rechargeable batteries for eclipse periods. Automated flight towards the International Space Station.

FLIGHT HARDWARE

Propulsion and re-boost system
Avionics equipment
Guidance navigation and control system
Communications system
Power generation and storage system
Thermal control system
Russian docking and refueling system

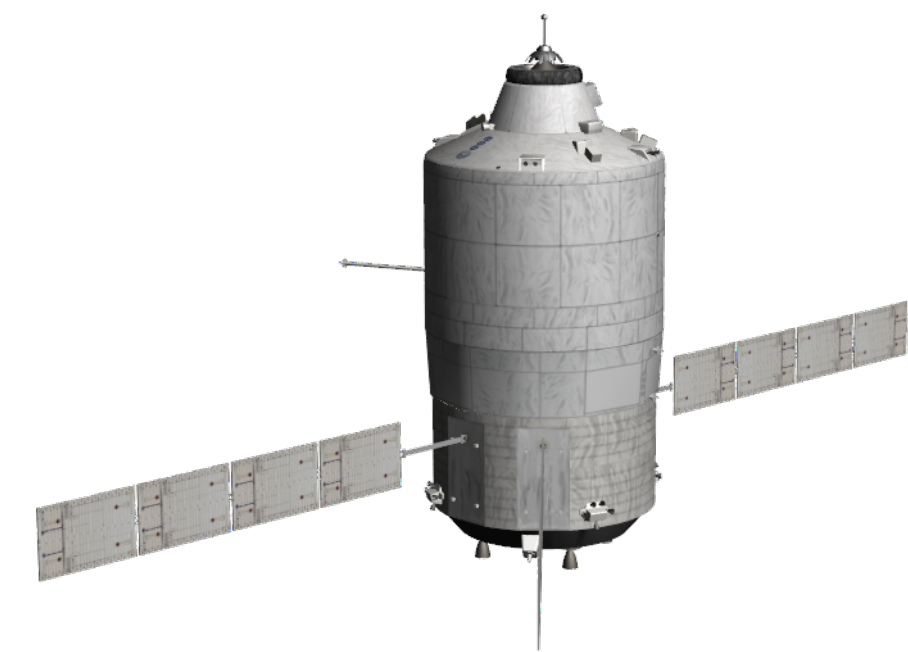


<http://erasmus.spaceflight.esa.int>

→ ATV-2 JOHANNES KEPLER

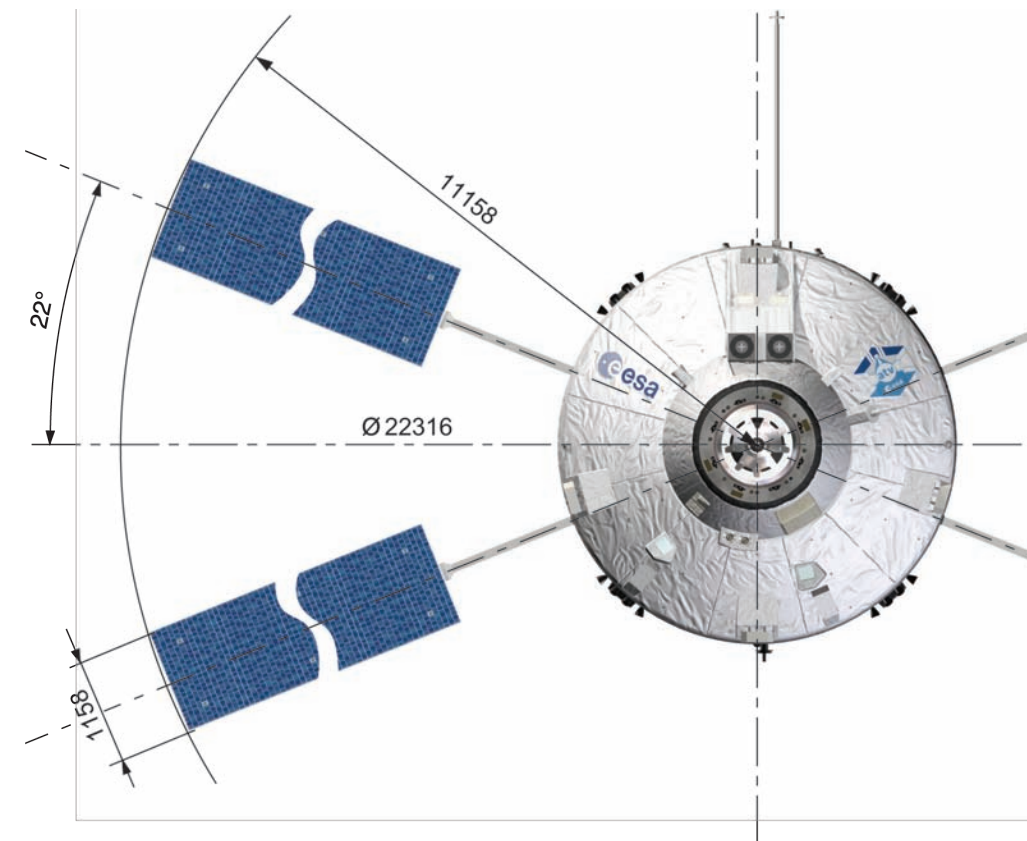
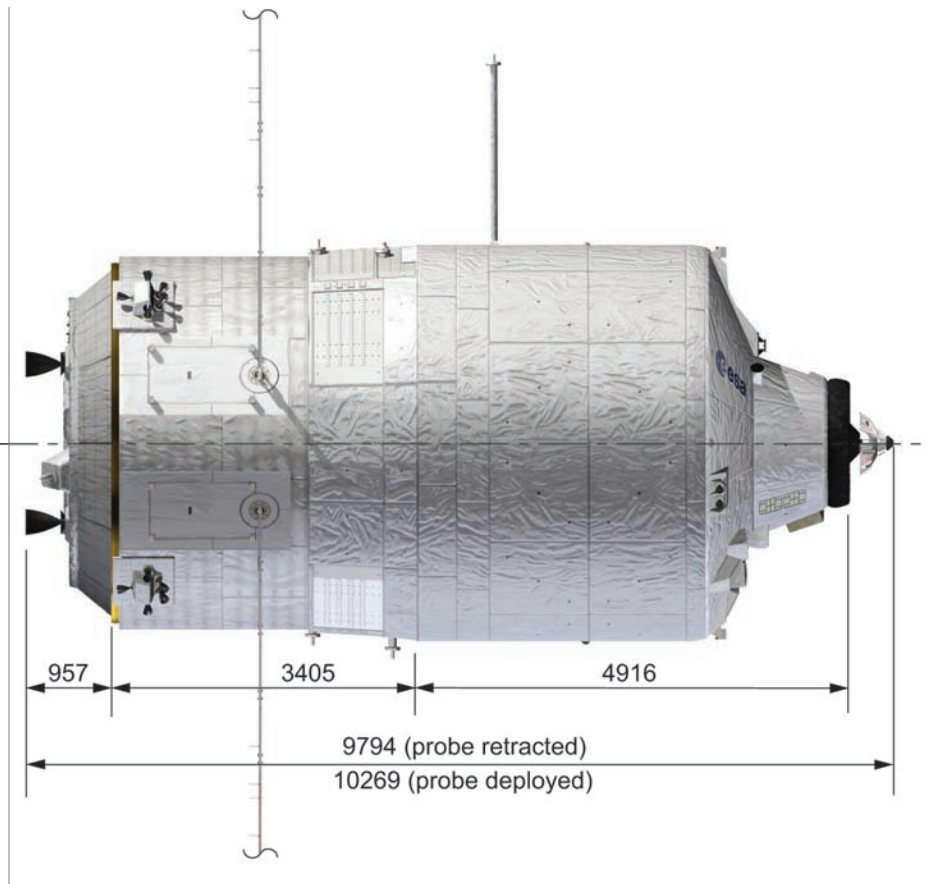
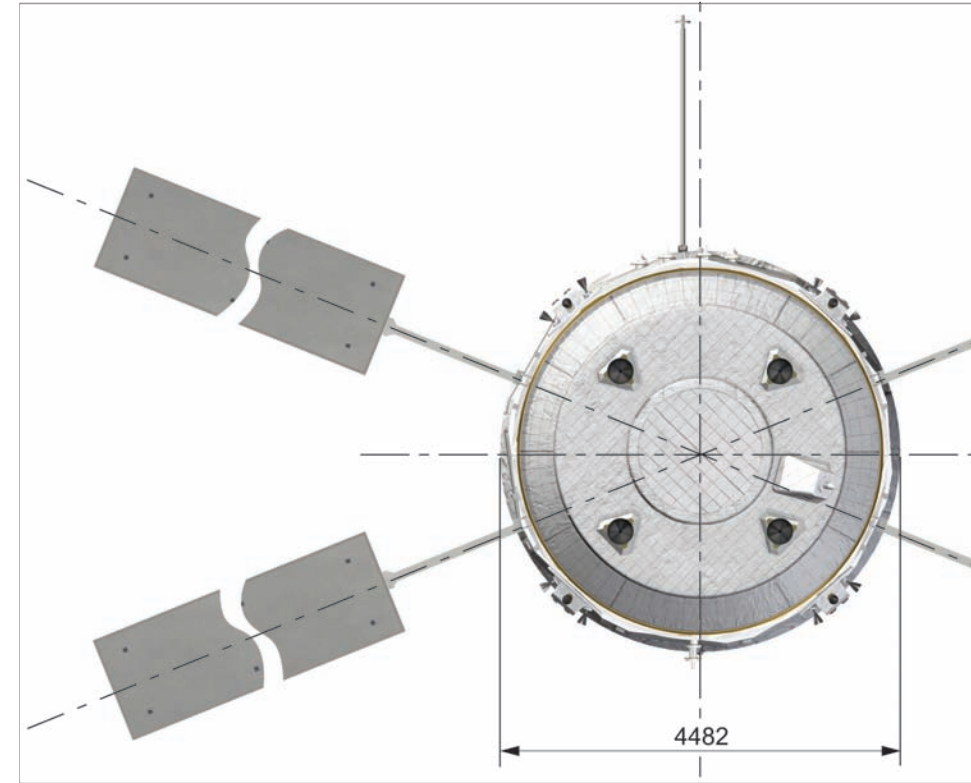
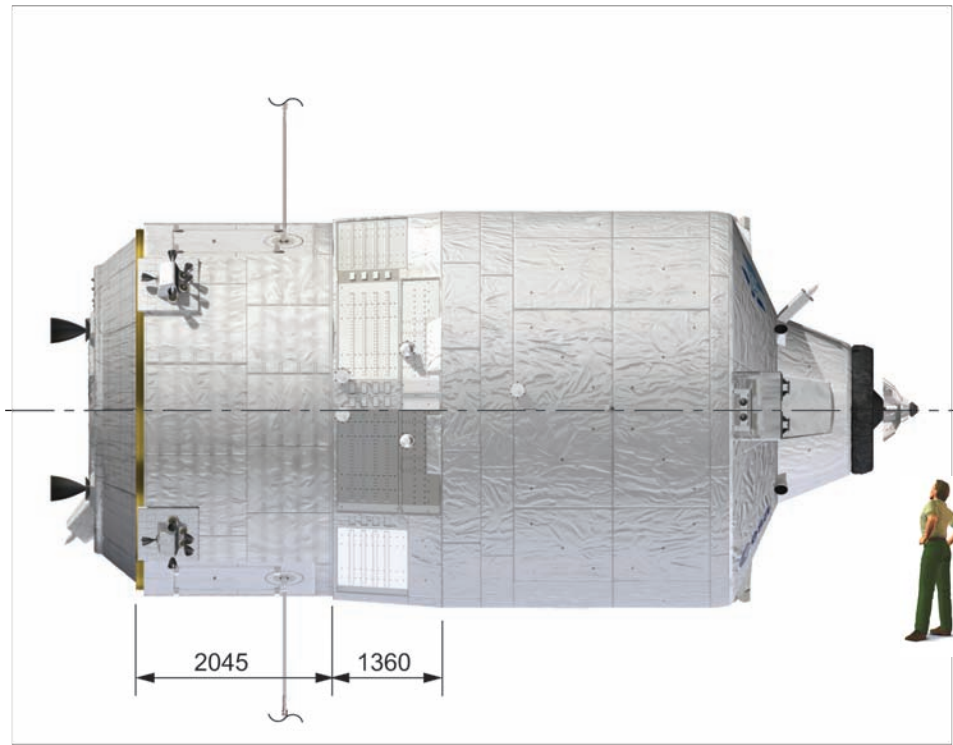
European servicing and logistics vehicle

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: pressurized cargo, water, air, nitrogen, oxygen and attitude control propellant. It also removes waste from the station and re-boosts it to a higher altitude to compensate for the atmospheric drag.



	PROJECT:	International Space Station	
	TITLE:	DOCUMENT N°:	REV.
	Automated Transfer Vehicle-2	ESA-HSF-COU-024	2.0

ERASMUS Centre - Directorate of Human Spaceflight



Specifications

DIMENSIONS
 Length: 9,794 mm (probe retracted)
 Largest diameter: 4,480 mm
 Solar arrays span: 22,281 mm

MASS BUDGET
 Vehicle dry mass: 10,470 kg
 Vehicle consumables: 2,613 kg
 Total vehicle mass: 13,083 kg
 Total cargo upload capacity: 7,500 kg
 Mass at launch (max): 20,750 kg
 Waste download capacity: 6,300 kg (420 km altitude, 51.6° inclination)

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

COMMUNICATIONS INFRASTRUCTURE
 To ground: S-band via TDRS satellite
 ATV to ISS: S-band antenna via Proximity link
 Navigation: GPS

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

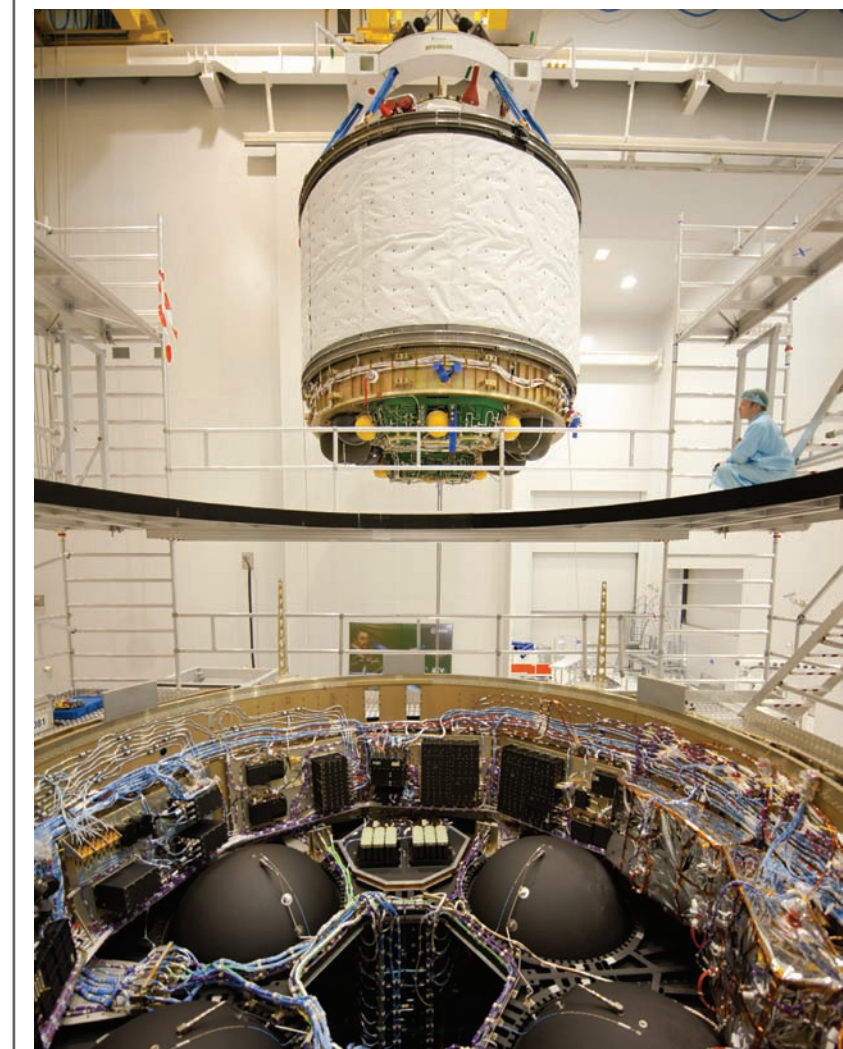
ELECTRICAL POWER
 Ascent to ISS and de-orbit: 4 Solar panel wings of 4 panels each and 40 Ah rechargeable batteries
 Number of arrays: 4
 Number of panels/array: 4
 Generated power: 3,800 W after 6 months in orbit
 Required power: < 400 W Dormant mode
 supplied by ISS: < 900 W Active mode

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 Multi-layer Insulation blanket & aluminised beta cloth
 Solar arrays: Silicon Solar Cells on 4 Carbon Fibre Reinforced Plastic Sandwich panels

MAIN CONTRACTOR
 EADS-Space Transportation, Leading a consortium of many sub-contractors

	PROJECT: International Space Station	SCALE: 1:75
		DIMENSIONS: mm

TITLE: Automated Transfer Vehicle-2	DOCUMENT N°: ESA-HSF-COU-024	REV. 2.0
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ATV-2 Johannes Kepler ready for mating



ATV-2 Johannes Kepler tanking up, 10 January 2011