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ATV Johannes Kepler on its way to the ISS

16 February 2011

The Automated Transfer Vehicle Johannes Kepler was launched on a specially modified launcher, the Ariane 5ES, at 22:50 CET on 16 February 2011 from Europe's spaceport in French Guiana. The second space cargo carrier in the Automated Transfer Vehicle (ATV) programme, it is now en route to the International Space Station (ISS). The German contribution to the ATV programme is managed by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) through its Space Agency. This first launch of the year was also the Ariane's 200th. In addition to food, dry cargo, propellants and gases, the unmanned ATV-2 is carrying the German GeoFlow II experiment, which scientists will use to study processes in the Earth's mantle.

The space cargo carrier separated from the upper stage of the Ariane launcher at an altitude of 260 kilometres, and is approaching the ISS autonomously, using GPS, radar and optical sensors. The ATV-2 will then dock automatically with the Russian service module Zvezda, where it will remain for at least three months. On 4 June at the earliest, the transporter will undock from the ISS and burn up in Earth's atmosphere during a controlled re-entry. The second ATV carries a total payload of 7090 kilograms, including 5386 kilograms of propellant and 100 kilograms of air. The remaining freight consists of a variety of items needed by the astronauts, as well as replacement parts and experiments.

GeoFlow II – studying the Earth in space

One of the experiments on ATV Johannes Kepler is the German instrument GeoFlow II, to be installed in the Columbus laboratory. GeoFlow II is a successor of the experiment GeoFlow, which was installed on the ISS in 2008. Scientists from Brandenburg University of Technology Cottbus (Brandenburgische Technische Universität; BTU) plan to use it to simulate convection currents in the Earth's mantle. One of the experiment's objectives is to better understand heat transfer and flow patterns of magma. The research is scheduled to begin in spring 2011, and will continue until early summer.

ATV – a success story

ATV Johannes Kepler will be more capable than its predecessor, ATV Jules Verne. The latter's successful mission in 2008 demonstrated the reliability of the new technology. The knowledge obtained from this first flight was incorporated in the design of ATV-2. It has two more cubic metres of usable volume and can transport an additional 300 kilograms of payload. But ATV Johannes Kepler is not just a freight transporter; it will also be used to boost the orbit of the ISS using its engines. Each of these manoeuvres will raise the altitude of orbit by five to seven kilometres.

Ariane rocket modified for ATV launch

Weighing 20,100 kilograms, ATV Johannes Kepler is the heaviest payload to be carried by a member of the Ariane family. The Ariane 5ES has been adapted specially for ATV missions. Following the launch of ATV Jules Verne on 9 March 2008, this is its second use.

At Astrium in Bremen, work continues on the construction of ATVs 3, 4 and 5. ATV-3 is scheduled for delivery to Europe's Spaceport in French Guiana this summer and its launch is planned for February/March 2012. The other ATV launches will follow at one-year intervals.

Crucial role of German companies

The ATV is a joint European project under the leadership of the European Space Agency (ESA). The mission is monitored from the ATV Control Centre in Toulouse. The DLR Space Agency team, on behalf of the German Federal Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Technologie; BMWi), is responsible for managing the German contribution to the programme and for representing Germany's interests in ESA's ISS activities. Astrium is responsible for the industrial management of the project. The German reignitable upper stage engines of the Ariane 5ES were tested at the DLR site in Lampoldshausen. DLR Oberpfaffenhofen is the central communications node for the control centres participating in ATV operations.

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Launch of the ATV on board Ariane 5ES

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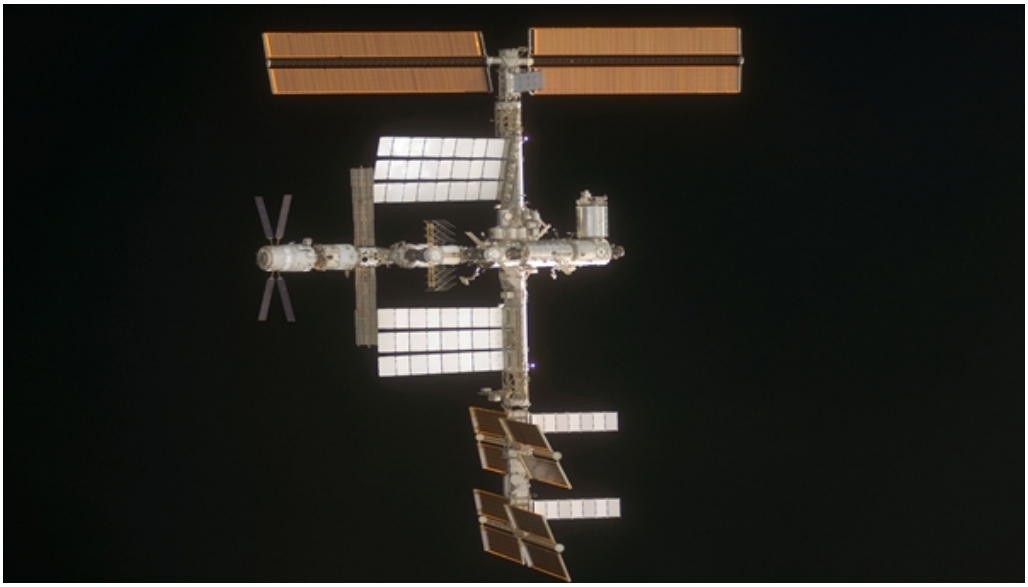
Credit: Arianespace.

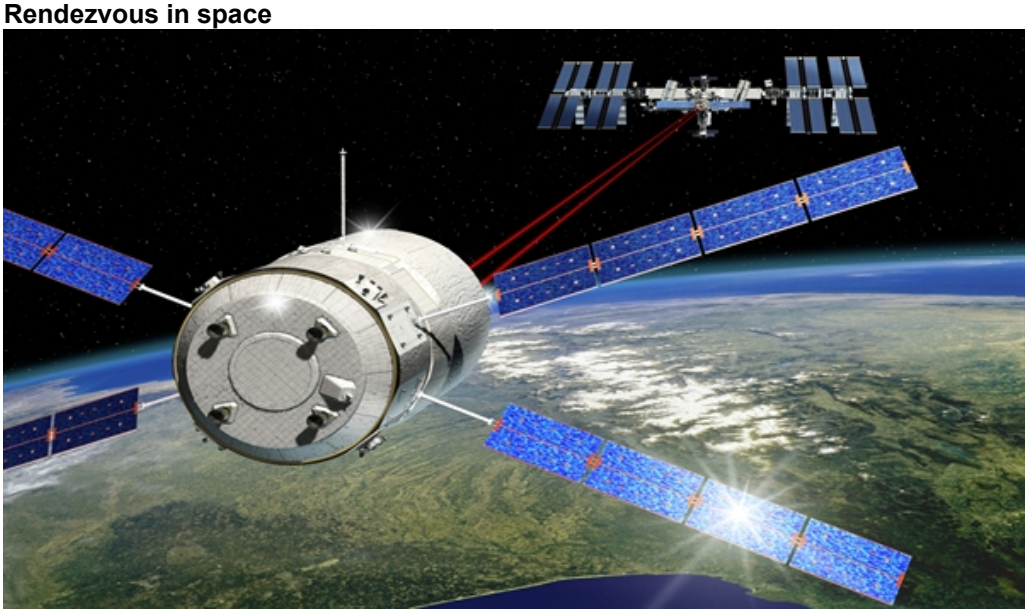
ATV Jules Verne docked with the ISS



ATV Jules Verne docked with the International Space Station (ISS) in April 2008. This picture was taken from the Space Shuttle STS 124. The transporter, recognisable due to its X-shaped solar panels, can be seen on the left as an extension of the central axis of the ISS.

Credit: NASA.

Rendezvous in space



ATV Johannes Kepler docks with the International Space Station using optical sensors.

Credit: ESA/D. Ducros.

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