Successful launch of ATV-3 'Edoardo Amaldi'

23 March 2012

It is a freighter, storage facility and propulsion system all in one – and an important link between the astronauts on board the International Space Station (ISS) and their base on Earth. The third European Automated Transfer Vehicle (ATV) space transporter was launched on 23 March 2012 at 05:34 CET (01:34 local time) on board an Ariane 5ES rocket, from Europe's Spaceport in French Guiana. The ATV-3 is named after Italian physicist and space flight pioneer Edoardo Amaldi. The German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) is participating in the ESA mission.

The six astronauts on board the ISS are very happy; if all goes to plan, within the next week they will receive clean clothes, fresh food, air and water, inside the ATV-3. There will also be experiments, replacement parts and tools for maintenance work, medicines and medical supplies. In addition, there will be 3.3 tons of propellants for performing avoidance manoeuvres in the event of a threat from space debris and to raise the ISS orbit by means of regular reboost manoeuvres. This third transport spacecraft in the ATV series is scheduled to dock with the Russian Zvezda ISS module on 28 March 2012.

'Edoardo Amaldi' will serve the ISS for 5 months

"The third successful deployment of a European ATV is a repeated demonstration of the efficiency of the German aerospace industry," declared Johann-Dietrich Wörner, Chairman of the DLR Executive Board. "With its great technical reliability, the ATV transport system could form the basis for contemplating possible future developments in terms of international cooperation," Wörner added.

ESA astronaut André Kuipers and his Russian colleague Oleg Kononenko will monitor the docking and can intervene if necessary. 'Edoardo Amaldi' will remain attached to the ISS for five months, at an altitude of around 380 kilometres. The ATV has an integrated freight area, which is used by the ISS crew as a supply store and gradually emptied. Before undocking from the ISS, planned for 27 August 2012, the ATV-3 will be loaded with refuse that will burn up with the ATV during its controlled re-entry into Earth's atmosphere.

The largest, heaviest and most complex European spacecraft

The ATV-3 is the heaviest, largest and most complex space vehicle to have been built in Europe. "It weighs over 20 tons with cargo, has a diameter of four and a half metres and is 10 metres long. The deployed solar panels have a span of more than 22 metres," explains Volker Schmid, Head of the ISS Division at DLR Space Administration, who is responsible for coordinating the German contributions to the European Space Agency’s ATV programme.

"Germany is responsible for 48 percent of the production of the space transporter," says Schmid. In total, 30 companies from 10 European countries and eight companies from Russia and the USA have supplied parts and components for the space vehicle, which will navigate to and dock with the ISS fully autonomously. When this happens, the ISS and the ATV will be travelling around the Earth at a speed of about 28,000 kilometres per hour. But 'Edoardo Amaldi' will be travelling about seven centimetres per second faster than the ISS. "The ATV will use the GPS satellite navigation system, an integrated Russian radar system, a radio link, laser sensors and video cameras to carry out the docking to an accuracy greater than six centimetres," explains the DLR expert. However, this will also be carried out – as is standard during space missions – in tandem with a safety network and ground station link; the ATV Control Centre in Toulouse, France, monitors every movement of the space transporter.

DLR and the ATV programme

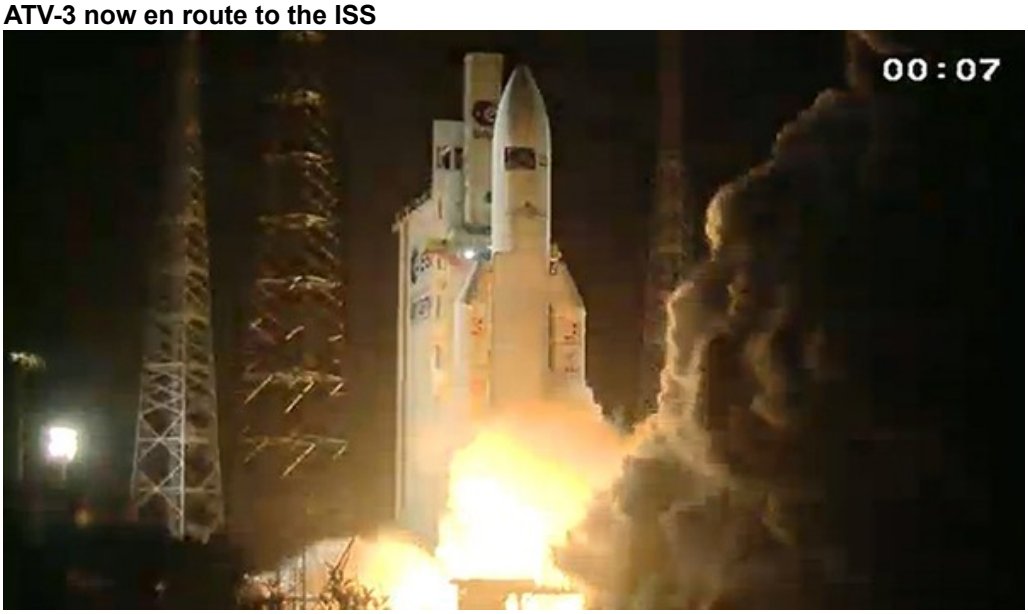
In addition to German industry, under the leadership of EADS Astrium GmbH, DLR is also involved in the ATV programme. The re-ignitable Ariane 5 upper-stage engines that are required for the ATV missions are manufactured in Germany and tested at the DLR site in Lampoldshausen. Communications for the control centres involved in operating the ATV, in Toulouse, Moscow, Houston and Redù in Belgium, are routed through DLR Oberpfaffenhofen. DLR Göttingen was involved in the basic research needed for the design of the ATV thrusters.

Contacts

Elisabeth Mittelbach
German Aerospace Center (DLR)
Communications, Space Administration
Tel.: +49 228 447-385
Fax: +49 228 447-386
Elisabeth.Mittelbach@dlr.de

Volker Schmid
German Aerospace Center (DLR)
Space Administration, Human Spaceflight, ISS and Exploration
Tel.: +49 228 447-305
Fax: +49 228 447-737
volker.schmid@dlr.de

ATV-3 now en route to the ISS



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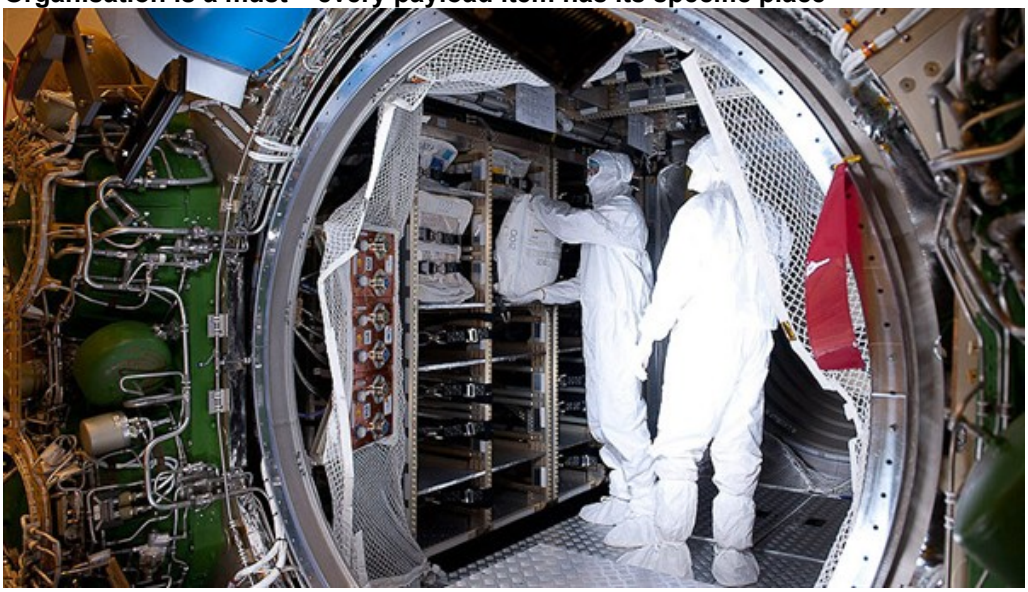
Credit: ESA.

ATV-3 being moved into the Ariane 5 integration building

ATV-3 'Edoardo Amaldi' being moved into the Ariane 5 integration building at Europe's Spaceport in French Guiana.

Credit: ESA/CNES/Arianespace/Optique Video du CSG - P. Baudon.

Organisation is a must – every payload item has its specific place



Specialists at Europe's Spaceport in French Guiana stowing the dry cargo by hand in the ATV-3 space freighter.

Credit: ESA/CNES/Arianespace/Optique Video du CSG - S. Martin 2011.

Propellant to raise the ISS altitude

The ATV uses up to 4.7 tonnes of propellant to raise the ISS altitude which naturally decreases with the residual atmospheric drag. In combination with ESA's new Ariane 5, 8.5 m-long Automated Transfer Vehicle (ATV) will enable Europe to transport cargo to the International Space Station. The 45 m³ pressurized module of the ATV delivers up to 7.2 tonnes of equipment, fuel, food, water and air for the crew.

Credit: ESA-D. Ducros.

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