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## Thirty years of the space shuttle - launch of Atlantis marks the end of the US Space Shuttle Programme

08 July 2011

The successful launch of the US Space Shuttle Atlantis en route to the International Space Station (ISS) marked the beginning of the final space shuttle mission and the end of the 30-year era of US space shuttle flights. Atlantis lifted off from its launch site, Pad 39A at the Kennedy Space Center in Florida, on Friday, 8 July 2011 at 11:29 local time (17:29 CEST).

This is the 135th shuttle mission, referred to as STS-135. The Space Transportation System (STS) comprises not just the orbiter, in which the four astronauts, Commander Chris Ferguson, Pilot Doug Hurley and Mission Specialists Sandra Magnus and Rex Walheim are making their way to mankind's largest outpost in space, but also the external fuel tank and the two solid-propellant boosters.

### **Raffaello Multi-Purpose Logistics Module on board**

During the mission, the Raffaello Multi-Purpose Logistics Module (MPLM) will dock with the ISS so the occupants can unload supplies. During this mission, the crew will also perform a space walk to install the Robotic Refueling Mission, designed to demonstrate and evaluate the technologies and techniques needed for robotic satellite refueling. The team of four will also bring more than two tons of equipment back to Earth.

Atlantis' final journey is scheduled to last 12 days and end early on the morning of 20 July 2011 at 07:06 local time (13:06 CEST), when it lands at Kennedy Space Center. US space agency NASA's shuttle missions have taken a total of 356 astronauts into space since the first shuttle mission on Columbia on 12 April 1981. Including this final mission, the shuttles have flown a total of 864,401,219 kilometres, which corresponds to roughly the average distance between Earth and Jupiter. 14 astronauts lost their lives in the Challenger and Columbia accidents on 28 January 1986 and 1 February 2003 respectively.

### **Astronauts from 16 countries**

Astronauts from a total of 16 countries have flown on US shuttle missions, including seven Germans: Ulf Merbold, Reinhard Furrer, Ernst Messerschmid, Ulrich Walter, Gerhard Thiele, Thomas Reiter and Hans Schlegel. The latter was the only German astronaut to fly on Atlantis; he was responsible for and participated in the deployment of Columbus, a European ISS laboratory module designed to carry out research in the environment of space. In February 2008, a dedicated ESA ground control station set up at the DLR site in Oberpfaffenhofen monitored this milestone in European spaceflight.

Gerhard Thiele flew on board space shuttle Endeavour in February 2000. He was Mission Specialist for the Shuttle Radar Topography Mission (SRTM), which acquired radar remote sensing data about the surface of Earth. "I still remember 11 February 2000 very clearly. We were six astronauts facing a challenging scientific mission. The atmosphere in the cockpit was tense yet cheerful and confident. Those 11 days in space still remind me of the great achievements mankind is capable of." When asked about the significance of the space shuttles for manned space flight, the 58-year-old physicist and former astronaut replied: "Undoubtedly, the shuttle has been used to carry out very successful scientific missions, such as the Hubble missions and SRTM. The shuttles have also played a significant role in the construction of the ISS."

Johann-Dietrich Wörner, Chairman of the Executive Board at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR), associates the space shuttle with personal moments: "I followed the shuttle era from the very beginning. In the summer of 2005, before being appointed Chairman of DLR, I visited the Smithsonian National Air and Space Museum in Washington DC with my family. During our visit, a TV broadcaster asked me how I felt about the first shuttle launch since the Columbia accident. Clearly the TV crew took notice of my tension and, at the same time, fascination with this special mission, called Return to Flight."

Wörner also offers a view into the future of manned spaceflight: "in Europe, we will also depend on Russian Soyuz spacecraft in the future, though it has been contractually agreed that Europe will be able to provide other services like flights for activities such as deploying a research laboratory on the ISS." Thus, a certain influence on the costs is possible. When the shuttle flights end, unmanned space vehicles will be used to supply the ISS with vital cargo. "A few weeks ago, Europe successfully concluded the ATV-2 mission. The Automated Transfer Vehicle (ATV) was developed in Germany and is constructed here as well. In the next few years, there will be another three ATV missions," the chairman of DLR explains.

The limited opportunities available for transporting material from the ISS back to Earth in the future are also of concern to DLR staff at the Columbus Control Centre in Oberpfaffenhofen. They are planning to use the last shuttle flight primarily to bring back equipment from the European research laboratory. "We will ask the astronauts to load a sample of Columbus coolant and some larger experiment components onto Atlantis for further analysis here on Earth," explains Norbert Porth, Flight Director responsible for STS-135 in the Columbus control centre.

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## Last shuttle launch of Atlantis on 8 July 2011 at 11:29 local time from Kennedy Space Center



On Friday, 8 July 2011 at 11:29 local time (17:29 CEST) the US Space Shuttle Atlantis lifted off from its launch site, Pad 39A at the Kennedy Space Center in Florida, on mission STS-135 to the International Space Station (ISS). This flight of Atlantis marks the end of 30 years of the Space Shuttle Programme. The shuttle is scheduled to return to Earth on 20 July 2011, after 12 days in space.

Credit: NASA/Bill Ingalls.

### Crew of the Atlantis STS-135 mission before the launch



The crew of STS-135 on Pad 39A at NASA's Kennedy Space Center in Florida (from left to right): Chris Ferguson (commander), Doug Hurley (pilot), and Rex Walheim and Sandy Magnus (mission specialists).

Credit: NASA/Kim Shiflett.

### Engineers in the Columbus Control Centre at DLR Oberpfaffenhofen support the final shuttle mission



In the Columbus Control Centre at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) facility in Oberpfaffenhofen, the signals are 'green'. Flight Director Norbert Porth must agree with his system expert, Thomas Hiriart, before giving the Shuttle Launch Director at the Kennedy Space Center in Florida the 'Go' for launch of Atlantis. By doing so, he confirms that the European International Space Station (ISS) research module Columbus is configured for the upcoming mission.

Credit: DLR (CC-BY 3.0).

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