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## Space Shuttle Endeavour flies to the ISS for the last time

16 May 2011

### **DLR supports research with the Alpha Magnetic Spectrometer**

On 16 May 2011 at 08:56 EDT (14:56 CEST), Space Shuttle Endeavour lifted off from Launch Pad 39A at Kennedy Space Center (Florida) on the penultimate shuttle mission (STS-134) to the International Space Station (ISS). On board are the commander Mark Kelly, pilot Gregory H. Johnson, mission specialists Michael Fincke, Greg Chamitoff, Andrew Feustel and Italian ESA astronaut Roberto Vittori.

Endeavour is carrying the Alpha Magnetic Spectrometer (AMS) and the external carrier platform 'EXPRESS Logistic Carrier 3' to the ISS. The AMS is equipped with several particle detectors that will investigate cosmic radiation. The task of the magnetic spectrometer is to explore fundamental questions about the origin, matter and structure of the Universe. DLR's Space Administration is supporting significant participation by German scientists in the AMS experiment with funding from the German Federal Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Technologie; BMWi) to the amount of ten million Euro.

In Germany, the Institute of Physics at RWTH Aachen University and the Institute of Experimental Nuclear Physics at the Karlsruhe Institute of Technology (Karlsruher Institut für Technologie; KIT) are responsible for the Transition Radiation Detector, components of the particle tracker and a lateral particle shield.

Staff at DLR's German Space Operations Center (GSOC) in Oberpfaffenhofen will work closely with the shuttle and the ISS crews during the mission. They will support the crew as they work in the station's European Columbus module – such as when they are replacing a disk drive in one of the experiments. In advance of the shuttle's arrival, GSOC engineers together with the ISS astronauts have already removed parts from an ESA experiment rack. These will be brought back to Earth by Endeavour for repair.

Also on board Endeavour is a sample container with spores of the microorganism 'Bacillus subtilis MW01' from the DLR Institute of Aerospace Medicine in Cologne. "These are descendants of the space-proven bacterium *Bacillus subtilis*, which we bred for the space experiment ADAPT and the Phobos Grunt mission to Mars' moon. Phobos Grunt is scheduled for launch later in 2011. Now, around 100 million of these tiny and very resistant life forms are flying on Endeavour in order to temporarily subject them to the conditions in low Earth orbit. The samples will remain aboard the shuttle and will not be taken onto the ISS," said DLR researcher Waßmann Marko, who grew the bacteria.

The planned duration of mission STS-134 is 16 days and ends with the return of the Endeavour on 1 June 2011. It is the 134th Shuttle flight, the 25th use of the Endeavour and the penultimate flight of the NASA Space Shuttle programme. Four spacewalks are planned – the last ones scheduled in the space shuttle era. Mission specialists Michael Fincke, Greg Chamitoff and Andrew Feustel will be working in teams of two during extravehicular activities on 20, 22, 24 and 26 May, performing maintenance and installing new experiments.

The last space shuttle mission, STS-135 with the shuttle Atlantis, is scheduled for launch on 28 June 2011.

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### **Space Shuttle Endeavour lifted off from the Kennedy Space Center**



On 16 May 2011 at 08:56 EDT (14:56 CEST), Space Shuttle Endeavour lifted off from Launch Pad 39A at Kennedy Space Center in Florida on the penultimate shuttle mission (STS-134) to the International Space Station (ISS). This is Endeavour's final flight and she is carrying the Alpha Magnetic Spectrometer (AMS) to the ISS. DLR's Space Administration is supporting significant participation by German scientists in the AMS experiment. The AMS will study the cosmic radiation; researchers hope to make discoveries about dark matter and antimatter.

Credit: NASA.

## The Space Shuttle Endeavour during rollout in February 2011



Mission STS-134 is the last flight of the NASA Space Shuttle Endeavour. The space shuttle was completed on 25 April 1991 as a replacement for the Space Shuttle Challenger, which was lost in an accident, and completed its maiden flight on 7 May 1992. She has completed 24 flights so far, the last on 8 February 2010 (STS-130). At that time, Endeavour carried the connection node Tranquility and the Cupola observation deck to the International Space Station.

Credit: Thilo Kranz/DLR.

## Crew of the last flight of Endeavour (Mission STS-134)



The crew of the STS-134 mission: Mark Kelly (commander, front centre), Gregory H. Johnson (pilot) and mission specialists Michael Fincke, Greg Chamitoff, Andrew Feustel and ESA astronaut Roberto Vittori (left to right).

Credit: NASA.

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