NASA Mission Summary

National Aeronautics and Space Administration
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STS-134 MISSION SUMMARY **March 2011**

SPACE SHUTTLE ENDEAVOUR

Endeavour's 14-day mission will deliver the Alpha Magnetic Spectrometer-2 (AMS) to the International Space Station. AMS, a particle physics detector, is designed to search for various types of unusual matter by measuring cosmic rays. Its experiments are designed to help researchers study the formation of the universe and search for evidence of dark matter, strange matter and antimatter. Endeavour also will fly the Expedite the Processing of Experiment to Space Station (Express) Logistics Carrier 3 (ELC3), a platform that carries spare parts that will sustain space station operations once the shuttles are retired from service. The mission will feature four spacewalks to do maintenance work and install new components. These are the last scheduled spacewalks by shuttle crew members. Shuttle mission STS-134 is the final flight for Endeavour and the second to last flight for the Space Shuttle Program.

CREW

Mark Kelly
Commander (Captain, U.S. Navy)
- Fourth spaceflight
- Age: 47, Hometown: West Orange, N.J.
- Married with two children
- Logged 5,000+ flight hours; 39 combat missions
- Logged 38 days in space

Greg H. Johnson
Pilot (Colonel, USAF, Ret.)
- Second spaceflight
- Age: 48, Born: South Ruislip, Middlesex, UK
- Married with three children
- Logged 4000+ hours in 40 different aircraft
- Enjoys traveling, biking, and woodworking

Mike Fincke (fink)
Mission Specialist-1 (Colonel, USAF)
- Third spaceflight, first shuttle flight
- Age: 44, Hometown: Emsworth, Pa.
- Married with three children
- Logged 365 days in space
- Logged 26+ hours on six spacewalks

Roberto Vittori (vi-tore-ee) (European Space Agency)
Mission Specialist-2 (Colonel, Italian Air Force)
- Third spaceflight, first shuttle flight
- Age: 46, Hometown: Viterbo, Italy
- Married with three children
- Logged 2,500 hours in over 40 different aircraft
- Enjoys soccer, running, swimming and reading

Drew Feustel (FOYS-tuhl)
Mission Specialist-3 / Lead Spacewalker
- Second spaceflight
- Age: 45, Hometown: Lake Orion, Mich.
- Married; enjoys auto restoration and guitar
- Ph.D. geological sciences, 1995
- Designed land and marine seismic surveys

Greg Chamitoff (SHAM-eh-tawf)
Mission Specialist-4
- Second spaceflight
- Age: 48, Born: Montreal, Canada
- Married with two children
- Ph.D. aeronautics and astronautics, 1992
- Logged 183 days in space on Expedition 17/18

The crew patch is inspired by the atomic symbol and represents the atom with orbiting electrons around the nucleus. The burst near the center refers to the big-bang theory. Endeavour and the space station fly together into the sunrise over the limb of Earth, representing the dawn of a new age, understanding the nature of the universe.

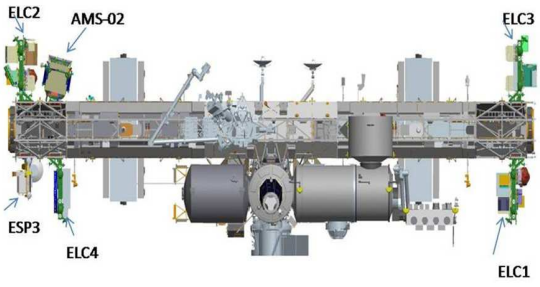
Shuttle Endeavour

Endeavour, the last orbiter built, flew its maiden voyage on May 7, 1992, on mission STS-49. Later missions included the first servicing mission to the Hubble Space Telescope on STS-61 in December 1993; delivery of the first American component of the space station, the Unity Module, on STS-88 in December 1998; and the flight of the first educator astronaut, Barbara Morgan, who flew into space on STS-118 in August 2008. Endeavour is named for the first ship commanded by James Cook, the 18th century British explorer, navigator and astronomer. Cook's voyage on the Endeavour established the usefulness of sending scientists on voyages of exploration.

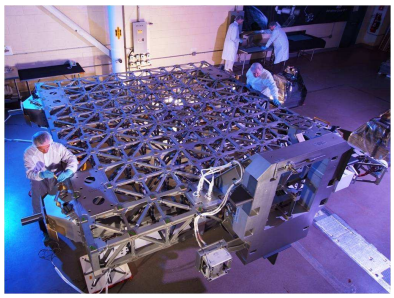
SPACEWALKS Each spacewalk will last about six hours. Feustel will wear a suit with solid red stripes, Fincke will wear an unmarked white suit and Chamitoff will wear one with broken red stripes.

- On flight day 5, Feustel and Chamitoff will retrieve two experiments and install a new package of experiments on ELC2, which is already on the station. They will install jumpers between segments on the left-side truss, or backbone of the station, for ammonia refills; vent nitrogen from an ammonia servicer; and install an external wireless communication antenna on the Destiny laboratory that will provide wireless communication to the Express Logistics Carriers mounted on the station's truss.
- On flight day 7, Feustel and Fincke will refill radiators with ammonia. They also will complete venting the early ammonia system, lubricate a left-side solar joint and parts of Dextre, a two-armed space station robot capable of handling delicate assembly tasks currently performed by spacewalkers.
- On flight day 9, Feustel and Fincke will install a grapple, or handle for the robotic arm on the station to grab, on the Zarya module to support robotic operations based from the Russian segment. They also will install additional cables to provide backup power to the Russian portion of the space station.
- On flight day 11, Fincke and Chamitoff will stow the shuttle's 50-foot boom on the right-side truss on a permanent stowage fixture, retrieve the grapple from the station's left-side truss and use it as a replacement for the grapple currently on the boom. They then will release restraints from one of the arms on Dextre and replace thermal insulation on one of the spare gas tanks for the Quest airlock.

Alpha Magnetic Spectrometer



ISS truss configuration with ELC3 and AMS-02



Express Logistics Carrier

FACTS & FIGURES

- STS-134 is the 134th shuttle mission, the 35th shuttle flight to the space station, and the 25th flight of Endeavour.
- STS-135 will be the final mission of the Space Shuttle Program and is scheduled to launch on June 28. It will deliver supplies and spare parts to the station as well as a system to test refueling existing spacecraft robotically. The crew will return a failed ammonia pump module to help NASA improve designs for future systems.
- Alpha Magnetic Spectrometer-2
  - AMS weighs about 15,000 lbs, consumes over 2,000 watts of power and has 600 microprocessors onboard.
  - AMS involved collaboration from more than 600 people in 56 institutions from 16 countries, as well as subcontractors and suppliers from all over the world.
  - Its mission duration is through the lifetime of the space station, until at least 2020.
- Feustel and Fincke will test the In Suit Light Exercise protocol (ISLE), a new protocol designed to create efficiency in spacewalk preparation. They will perform light exercise while partially suited. They will breathe pure oxygen to facilitate purging of nitrogen from the blood stream. If successful, this could eliminate the need for campouts in the future.
- ELC3 will carry a new Ammonia Tank Assembly, equipment for the Dextre robot and spare parts for the station's antenna sub-systems.
- The shuttle's 50-foot boom, which attaches to the robotic arm, will be transferred from Endeavour to the space station, where it will become a permanent fixture on the station. The boom also connects to Canadarm, the robotic arm on the space station, and can double its reach.
- The Sensor Test for Orion Relative Navigation Risk Mitigation, or STORRM, will test new sensor technologies that could make it easier for future space vehicles to dock to the space station. STORRM will gather data during Endeavour's rendezvous, docking and undocking. Before heading back to Earth, the shuttle will perform a re-rendezvous maneuver, which will mimic rendezvous trajectories of future spacecraft. Endeavour will move to about 1,044 feet below and 300 feet behind the station during this test.