National Aeronautics and Space Administration

NASAfacts

STS-128 (30th Space Station Flight)

Discovery

Pad 39A:

128th shuttle mission
37th flight of OV-103
54th landing at EAFB

Crew:

Rick Sturckow, commander (4th shuttle flight)
Kevin Ford, pilot (1st)
Danny Olivas, mission specialist (2nd)
Patrick Forrester, mission specialist (3rd)
Jose Hernandez, mission specialist (1st)
Christer Fuglesang, mission specialist (2nd), with the European Space Agency
Nicole Stott, mission specialist, up to ISS
Tim Kopra, down from ISS

Orbiter Preps:

OPF – 03/28/09 (return)
VAB – 07/26/09 (rollover from OPF)
Pad 39A – 08/04/09 (rollout)

Launch:

Aug. 28, 2009, at 11:59 p.m. EDT. The first launch attempt on Aug. 25 was scrubbed due to weather conditions. The second attempt on Aug. 26 was postponed during fueling of the shuttle's external tank after an indication that a valve in the shuttle's main propulsion system failed to perform as expected. A third launch attempt was rescheduled for Aug. 28 at 12:20 a.m. EDT but postponed 24 hours to allow engineers more time to develop plans for resolving an issue with a valve in the shuttle's main propulsion system.

Landing:

Sept. 11, 2009, at 8:53 p.m. EDT. Discovery landed on Runway 22 at Edwards Air Force Base in California. Main gear touchdown was 8:53:25 p.m. Nose gear touchdown was at 8:53:34 p.m. Wheelstop was at 8:54:35 p.m.. Mission elapsed time was 13 days, 20 hours, 53 minutes and 45 seconds, covering 5.7 million miles in 219 orbits. Weather concerns prevented the crew from returning to Kennedy on both Sept. 10 and 11.

Mission Highlights:

The mission marks the start of the transition from assembly of the ISS to continuous scientific research.

Discovery carried the Leonardo Multi-Purpose Logistics Module with storage racks, materials and fluids science racks, a freezer for research samples, a new sleeping compartment, an air purification system and a treadmill named after comedian Stephen Colbert, the result of a contest to name station hardware.

Astronauts aboard Discovery conducted a daylong inspection of the shuttle's thermal protection system, checked out spacesuits and prepared to dock with the International Space Station. Pilot Kevin Ford and Mission Specialists Patrick Forrester and Jose Hernandez used the shuttle's robotic arm to inspect Discovery's right wing, nose cap and left wing. Later the crew tested equipment to be used for rendezvous operations.

Prior to docking, Commander Rick Sturckow flew Discovery through a backflip allowing Expediiton 20 Commander Gennady Padalka and Flight Engineer Michael Barratt to take photos that imagery experts

reviewed to assess the health of Discovery's thermal protection system tiles.

After docking, the joint shuttle and station crews swapped crew members: Mission Specialist Nicole Stott for Flight Engineer Tim Kopra, who spent 58 days in space.

One of the first tasks while docked was removing Leonardo from the shuttle's cargo bay and installing it onto the station's Harmony module. Mission Specialists Danny Olivas and Christer Fuglesang then spent the rest of their day preparing the pressurized cargo module for the transfer work that was performed during the next six days. Olivas, Hernandez and Stott moved the tools to be used during the spacewalks into the station's airlock and got them ready for use.

On Sept. 2, shuttle and station crews transferred the Fluids Integrated Rack, Materials Science Research Rack-1 and Minus Eighty-Degree Laboratory Freezer-2 from Leonardo and installed them in the U.S. Destiny Laboratory.

Meanwhile, Barratt installed and outfitted the third of four planned NASA crew quarters.

The 14-day flight included three spacewalks to replace experiments outside the European Space Agency's Columbus laboratory and install a new ammonia storage tank. The mission's three spacewalks totaled 20 hours and 15 minutes:

EVA No. 1 — Sept. 1: 6 hours, 35 minutes.

Olivas and Stott removed a depleted ammonia tank assembly on the Port 1 segment of the truss. Ammonia in the tanks is used to cool the station and expel the heat generated by its residents and systems. They then retrieved two science experiments – the European Technology Exposure Facility and the sixth Materials International Space Station Experiment-6 from the Columbus laboratory. The EuTEF held nine different experiments, most of which collected various types of information on the environment of space. MISSE-6 was housed in two suitcase-sized containers and evaluated the effect of the space environment on various material and coating samples.

Spacewalker Olivas reported seeing what he described as MMOD (micrometeroid and orbital debris) "hits" on a station toolbox and the Quest airlock. He took pictures of the areas, which will be analyzed on the ground. The photos will help determine whether there are any concerns that need to be addressed in the future. MMOD hits are not unexpected.

During 30 minutes of the spacewalk, mission control did not have communication with the station or shuttle. This was due to weather in Guam that affected a TDRSS (Tracking and Data Relay Satellite System) that is relied on for space-to-ground communication.

EVA No. 2 — Sept. 3: 6 hours, 39 minutes.

Olivas and Fuglesang installed a new ammonia tank assembly on the P1 truss segment. They also bolted the previously removed empty ammonia tank assembly inside the shuttle's cargo bay.

The astronauts installed protective lens covers on the cameras of the station's robotic arm, which will shield them from contamination when the arm is used to dock the Japanese H-II Transfer Vehicle to the station later this month. They installed a portable foot restraint on the station's truss system for use during upcoming missions.

Olivas and Fuglesang found that heater cables on the outside of pressurized mating adapter 3 appeared to be in an incorrect configuration to reach properly for relocation. That task was, therefore, deferred.

EVA No. 3 — Sept. 5: 7 hours, 1 minute.

Spacewalkers Olivas and Fuglesang set up a payload attachment system on the station's truss to be called into service on the next mission. They also replaced a rate gyro assembly and a remote power control module, installed two GPS antennas and removed a slide wire on the Unity module. The spacewalkers were not able to connect two avionics cables that eventually will be connected to Tranquility, the final U.S. module to be delivered to the station. Connectors on one of the cables would not mate, and so they were wrapped in insulation and left for a future spacewalk.

At the end of the spacewalk, Fuglesang's helmet-mounted video camera and headlight system became unlatched. Olivas helped Fuglesang connect a tether to the equipment and planned to inspect its latches after they got back inside.

Inside the station, crew members replaced one of 16 common berthing mechanism bolts used to secure the Leonardo cargo carrier to the station. The bolt had not operated as expected early in the mission. The crew also opened an oxygen generation assembly water filter that was replaced before the shuttle arrived, and saw that it was 70 to 80 percent blocked. The inspection increases confidence that the filter replacement has restored the system to full functionality.

During the mission, crew members transferred about 7.5 tons of equipment and supplies out of Leonardo and collected 2,400 pounds for return to Earth. Discovery's middeck transported about 860 pounds of return items. One of the items returned was Disney's toy astronaut Buzz Lightyear, part of NASA's Toys in Space project to encourage students to pursue studies in science, technology and mathematics.

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