

NASA Facts

National Aeronautics and
Space Administration
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(202) 358-1600

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FACT SHEET

SPACE SHUTTLE DISCOVERY (STS-121)

The launch of NASA's Space Shuttle Discovery and its seven-member crew will mark the second mission in the Return to Flight sequence. The mission, designated STS-121, will test shuttle safety improvements to build on findings from Discovery's flight last year. The improvements include a redesign of the shuttle external fuel tank's foam insulation, in-flight inspection of the shuttle's heat shield, improved imagery during launch and the ability to launch a shuttle rescue mission if needed. The STS-121 mission also will bolster the International Space Station, making a key repair and delivering more than 28,000 pounds of equipment and supplies, as well as a third crew member. Two spacewalks are planned during Discovery's 12-day mission. If there is enough electrical power, the mission will be extended by one day and a third spacewalk will be added. Shuttle managers hope to make that decision by flight day 6.

CREW



Steve Lindsey

- (Colonel, USAF), Commander
- Veteran of three spaceflights, mission commander on STS-104 in 2001
 - Age: 45, born in Arcadia, Calif., enjoys camping and mountain/dirt biking



Mark Kelly

- (Commander, USN), Pilot
- Veteran of one spaceflight, will guide spacewalkers
 - Age: 41, born in Orange, N.J., enjoys cycling, weight-lifting and golf



Piers Sellers (Peers)

- (Ph.D.), Mission Specialist
- Veteran of one spaceflight, lead spacewalker
 - Age: 50, born in United Kingdom, enjoys sailing with his son



Mike Fossum (Fös-süm)

- (Lt. Colonel, USAF Reserves), Mission Specialist
- First spaceflight, will perform two or three spacewalks
 - Age: 48, born in Sioux Falls, S.D., enjoys family activities and fishing



Lisa Nowak (Nō-wăc)

- (Commander, USN), Mission Specialist
- First spaceflight, will operate shuttle robotic arm during first spacewalk
 - Age: 42, born in Washington, D.C., enjoys crossword puzzles and playing piano



Stephanie Wilson

- Mission Specialist
- First spaceflight, will use station robotic arm to move cargo from the shuttle to the station
 - Age: 39, born in Boston, enjoys stamp collecting and traveling

Thomas (Toe-mahs') Reiter (Rit-ūr)

- ESA astronaut, Mission Specialist
- Veteran of one spaceflight, will remain aboard the space station for several months
 - Age: 47, born in Germany, enjoys fencing and playing guitar

The STS-121 patch depicts the space shuttle docked with the International Space Station in the foreground, overlaying the astronaut symbol with three gold columns and a gold star. The background shows Earth at nighttime with a dawn breaking over the horizon.

(For more details, see Press Kit p. 12-16)

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MISSION HIGHLIGHTS *(For a day-by-day timeline of the mission, Press Kit p. 5-7)*

- **Shuttle Backflip:** As it nears the station, the shuttle will perform a backflip so the station's crew can photograph its belly to see whether the shuttle's heat shield, known as the thermal protection system, is damaged. This tricky maneuver was first demonstrated on STS-114. *(Press Kit, p. 18-21)*
- **Two/Three Spacewalks:** Each will last approximately 6.5 hours. Astronauts will:
 - Test the 50-foot robotic arm boom extension as a work platform. *(Press Kit, p. 22)*
 - Remove and replace a cable that provides power, command and data and video connections to the station's mobile transporter rail car. The transporter is used to move a platform containing the station's robotic arm along the truss of the complex. *(Press Kit, p. 22-29)*
 - (Tentative) Test techniques for inspecting and repairing the reinforced carbon-carbon segments that protect the shuttle's nose cone and leading edge of the wings. *(Press Kit, p. 29-32)*
- **Improved Imagery:** STS-121 will be NASA's most-photographed mission in shuttle history. More than 100 high definition, digital, video and film cameras will help assess whether any debris comes off the external tank during the shuttle's launch
 - Four new video cameras have been added to the solid rocket boosters. *(Press Kit, p. 60-62)*
- **New Station Crew Member:** With the addition of European Space Agency astronaut Thomas Reiter, the station will have three crew members for the first time since May 2003. *(Press Kit, p. 15)*

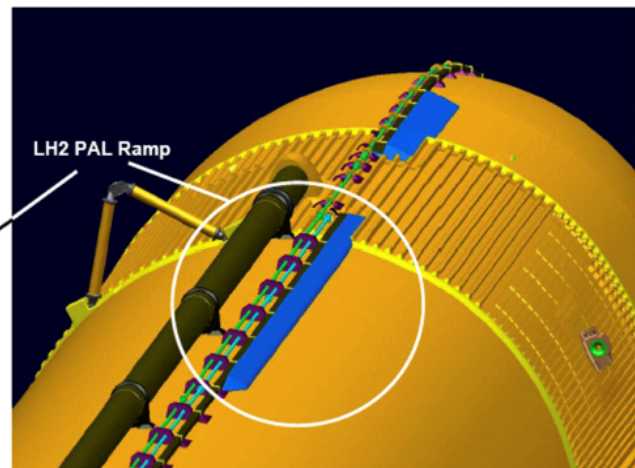
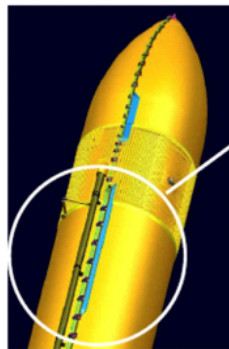
CHANGES & MODIFICATIONS

SHUTTLE

- **Gap Fillers:** NASA developed new procedures to ensure gap fillers between the heat-shielding tiles stay in place and pose no hazard on re-entry. Technicians removed and replaced approximately 5,000 of the shuttle's 16,000 gap fillers prior to launch.
- **New Tile:** Technicians have installed hardened tiles on Discovery's nose landing gear doors, a vulnerable area if it's impacted.
- **Improved Tires:** Discovery's main landing gear now has four larger, smoother tires that can withstand higher loads at landing than the previous tires.

EXTERNAL TANK

- **PAL Ramps:** Discovery's tank, known as ET-119, is the first to fly without the protuberance air load ramps. During last year's shuttle launch, a piece of foam came loose from this area. After detailed inspections, engineering analysis and testing, the Space Shuttle Program determined the PAL ramps were not necessary and it would be a safety improvement to remove the ramps. This is the biggest aerodynamic change to the tank in the shuttle's history. *(Press Kit, p. 54-56)*



This image shows the location of the LH₂ cable tray and the PAL ramp configuration.

- **Ice/Frost Ramps:** Small foam ramps, known as extensions, were added to the ice/frost ramp locations where the PAL ramps used to be. These extensions make the geometry of these ice/frost ramps consistent with the rest of the tank. There are 35 ice/frost ramps on the tank. *(Press Kit, p. 56)*