

# Discovery Milestones Set Stage for Return To Flight

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The pace of preparations for Return to Flight is picking up, with several key milestones in recent weeks marking important progress in readying the [Space Shuttle](#) Discovery for its next mission.

Discovery is progressing after the completion of extensive wiring for Return to Flight, as well as the transition from its modification period to more regular processing at the Kennedy Space Center (KSC), Fla. Meanwhile, the first piece of Discovery's twin Solid Rocket Boosters was moved to a processing facility on site and workers are installing several important components.

Though Discovery appears unchanged from the outside, the orbiter is very different on the inside. The power-up on July 27 follows safety improvements and modifications to enhance vehicle monitoring during flight. Technicians have installed cabling for wing leading-edge sensors and to support a digital camera to document the External Tank as it separates from Discovery. Wiring also has been installed to support a boom extension for the Shuttle's robotic arm that will provide the ability to inspect nearly all the outside areas of the orbiter's Thermal Protection System in detail.

On August 9, the first segment of the Solid Rocket Boosters designated for Discovery's flight was moved to the Rotation Processing and Surge Facility at KSC. The aft skirt -- the bottom, skirt-shaped section of the boosters -- will have two other components installed: an aft motor segment and an External Tank attach ring. Next month, the structure will

move to the Vehicle Assembly Building for stacking operations.

Engineers and technicians have applied many of the modifications laid out in NASA's Implementation Plan for Space Shuttle Return to Flight and Beyond.

"The Vision for Space Exploration begins with safely returning the Shuttle to flight and resuming assembly of the International Space Station," said Michael Kostelnik, Deputy Associate Administrator for International Space Station and Space Shuttle Programs. "These processing milestones show we're moving toward that goal," he added.

Eighty-eight sensors will be installed on each wing. Sixty-six will measure acceleration and impact data and 22 will take temperature data during Discovery's climb to orbit. Ongoing tests have demonstrated these sensors can detect very small impacts.

Wiring has been added to the umbilical well under Discovery to accommodate a digital camera, which will transmit External Tank photos to the ground quickly. When the tank is separated from the Shuttle, an automatic sequence will capture 24 images, at one frame every 1.5 seconds. These images will be downlinked to Mission Control at the Johnson Space Center in Houston for review and analysis.

"The Program's first line of defense was to redesign the External Tank so that debris of a critical size never impacts the orbiters again," said Bill Parsons, Space Shuttle Program Manager. "We have done that. Combined with ground, airborne and onboard cameras and lasers, the addition of sensors will provide more detection and inspection capability than the Program has ever had," Parsons added.

The visible progress in Florida and other locations around the country parallels work by the Space Shuttle Program and its many contractor and

subcontractor teams in response to the Columbia Accident Investigation Board's recommendations. NASA's Space Flight Leadership Council is the internal body reviewing the Shuttle Program's work, and the Stafford-Covey Return to Flight Task Group provides independent, external oversight. NASA is working toward a launch planning window for Discovery that opens in March 2005.

Since September 2002, Discovery has been in a regularly scheduled Orbiter Major Modification period for maintenance and upgrades. In addition to the Return to Flight work, more than 100 modifications have been performed, including the addition of the Multi-functional Electronic Display System, or "glass cockpit."

"Along with the power-up, we have passed several significant milestones during the last few months with the installation of the Forward Reaction Control System, the Reinforced Carbon-Carbon nose cap and wing leading-edge panels," Discovery Vehicle Manager Stephanie Stilson said. "I am very optimistic we are moving toward a launch next spring," she concluded.

### **About Discovery**

Discovery - is the third orbiter to become operational at Kennedy Space Center. Discovery benefited from lessons learned in the construction and testing of Enterprise, Columbia and Challenger. At rollout, its weight was some 6,870 pounds less than Columbia. Two orbiters, Challenger and Discovery, were modified at KSC to enable them to carry the Centaur upper stage in the payload bay. These modifications included extra plumbing to load and vent Centaur's cryogenic (L02/LH2) propellants (other IUS/PAM upper stages use solid propellants), and controls on the aft flight deck for loading and monitoring the Centaur stage. No Centaur flight was ever flown and after the loss of Challenger it was decided that the risk was too great to launch a shuttle with a fueled Centaur upper stage in the payload bay.

All the remaining three space shuttles remain grounded after the loss of Columbia.

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