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# Shuttle rollout under way

## NASA: Crack found in external fuel tank not an issue

By Michael Coren

CNN

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**(CNN) -- Since the loss of Columbia in 2003, thousands of people have spent the past two years working to make the space shuttle into a safer vehicle.**

That labor inched closer to payoff Wednesday afternoon when Discovery, with its two solid rocket boosters and external fuel tank attached to its belly, rolled out of the Vehicle Assembly Building (VAB) at 2:04 pm EDT for an eight-hour, four-mile journey to the launch pad at Kennedy Space Center in Cape Canaveral, Florida.

A crawler transporter will move the shuttle to pad 39B where it will sit until launch -- set for no earlier than May 15.

The rollout was delayed for a little more than two hours when a crack in the fuel tank's insulation was found. NASA concluded the crack, near a non-cryogenic (low temperature) area, was a minor imperfection and did not need repair.

NASA spokeswoman Tracy Young said the engineering staff decided Discovery can safely fly "as is," because of the small size and the location of the crack.

### Heavy burden

As Discovery approaches its May 15 launch date, the shuttle carries a heavy burden.

"We feel very comfortable that this will be a very safe mission, and we would not launch if we didn't feel this would be a very safe launch," NASA spokeswoman Jessica Rye told CNN.com on Monday.

NASA is attempting to regain its footing following the loss of Columbia, which disintegrated over Texas on February 1, 2003. After the accident, NASA was castigated for safety lapses and complacency about risks to the shuttle.

Discovery's launch will be NASA's first manned space flight since Columbia.

"We understand from an engineer's standpoint that [the shuttle] is a developmental vehicle and will be until the last flight," said LeRoy Cain, the NASA flight director who oversaw Columbia's abortive re-entry.

"We have taken a very hard look at ourselves. ... [The mistakes] are very easy to see now, but rather than dwell on that we're moving forward. We understand what it is we're about to go do."

NASA was forced to change its safety



Discovery has had 286 modifications, including 41 recommended by the Columbia Accident Investigation Board.

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culture and re-evaluate the shuttle's flight worthiness after Columbia burned up.

Damaged thermal insulation on Columbia's left wing allowed superheated gases to penetrate and destroy the vehicle with all seven astronauts aboard.

Since then, Discovery has had 286 modifications, including 41 recommended by the Columbia Accident Investigation Board, or CAIB, the independent panel that examined the disaster.

It has also benefited from a suite of new imaging technology.

Discovery can launch from May 15 to June 3. If it misses this period, the next launch opportunity occurs between July 12 and 31 when lighting conditions allow NASA to photograph the shuttle's daylight ascent, another CAIB recommendation.

"We have scheduled the 15th of May as our targeted launch date," said Michael Kostelnik, deputy associate administrator for international space station and space shuttle programs.

"But it should be clearly understood that this is a 'not earlier than' date, which gives us the earliest opportunity we can bring all of the processing elements together and have a credible window to get to the international space station."

Despite their optimism, NASA officials cautioned that the launch date could be pushed back if difficulties crop up -- as they did last week.

Vital paperwork for the shuttle to resume flight was not filed on time, according to the task force monitoring the agency's efforts. NASA said it might require two weeks before the approval process is completed.

### **Mission: Safety**

Discovery's mission, and the one after it, will focus almost exclusively on safety. The space agency will test safety hardware and shuttle maneuvers designed to prevent problems like the one that struck Columbia.

Exquisitely precise radar systems and long-range cameras will be trained on the orbiter. The shuttle will carry a repair kit for its protective thermal tiles and an orbiter boom sensor system on its robotic arm to scan the shuttle with cameras and lasers.

Discovery will even perform a pirouette in view of the international space station to inspect its delicate underbelly. As a last resort, a second shuttle will stand by on the ground in a rescue mission is needed.

All of this is part of NASA's drive to reconstitute a "safety culture" that had eroded since the Challenger accident almost two decades earlier, according to the CAIB report, issued in August 2003.

"NASA's organizational culture had as much to do with this accident as foam did," the CAIB report stated.

Columbia was doomed during launch when a chunk of foam the size of a briefcase and the weight of a typical plastic foam cooler slammed into Columbia's left wing at high speed.

The impact punched a hole in the leading edge, breaching the protective covering of reinforced carbon carbon. When the shuttle re-entered Earth's atmosphere, superheated gases destroyed the craft.

At the time, top shuttle managers were aware of the foam problem but had dismissed it as a threat. Lower-level engineers worried it might endanger the shuttle, but their concerns reportedly never reached mission managers.

The CAIB said NASA's intolerance for dissent, relaxed safety standards, tightened budget and slipshod management all contributed to the disaster.

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