Space Shuttle To Launch Despite Concerns

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(CBS) Senior NASA managers late Tuesday cleared the shuttle Discovery for launch Oct. 23 on a critical space station assembly mission, concluding concern about the integrity of a protective coating on three of 44 wing leading edge panels did not warrant a lengthy delay, reports **CBS News space consultant Bill Harwood**.

While there were no official dissenting opinions, NASA's chief engineer opted to write down his concerns about the decision to proceed with flight and a NASA engineering panel stuck to an earlier recommendation to replace the panels in question.

In a worst-case failure, one in which some unknown mechanism caused the protective coating to somehow come off after the crew's normal heat-shield inspections in orbit and before peak heating during re-entry, the shuttle could suffer a catastrophic leading edge burn through. Replacing the panels in question would eliminate the threat but the work would delay launch for two months or more.

NASA is attempting to complete the international space station and retire the shuttle by the end of fiscal 2010. At a news conference late Tuesday, shuttle program manager Wayne Hale did not address how the prospect of a long delay might have played into the launch decision. But he made it clear he believes it is safe to proceed with Discovery's flight while testing continues, saying there is no engineering data to support the worst-case scenario.

"We certainly explored it in a great deal of depth," Hale said. "Everybody got to ask questions, everybody got to give their understanding of it down to the working-troop level. And at the end of the day, the flight readiness review board decided we were in an acceptable risk posture to go fly. Which is not to say we completely and perfectly understand the problem that's been laid out."

"I really think this was a credit to the lessons that we learned since Challenger and Columbia to be able to listen to all the opinions, to think very clearly about what they mean, apply some critical thought processes and, I trust, come to a good decision that provides us with an acceptable reason to go fly. We have a very important mission ahead of us and the crew is going to have a very intense time on orbit. We need to focus on what they are getting ready to do ... because it's absolutely critical to the next stage of building the international space station which is, after all, the reason for which we're flying the space shuttle."

Discovery's crew - commander Pam Melroy, pilot George Zamka, Scott Parazynski, flight engineer Stephanie Wilson, Doug Wheelock, Italian astronaut Paolo Nespoli and space station crew member Dan Tani - is scheduled to fly to the Kennedy Space Center Friday for the start of the shuttle's countdown Saturday afternoon. Launch is targeted for 11:38 a.m. Tuesday.

Bill Gerstenmaier, NASA's chief of space flight operations, said the crew, represented by the astronaut office at the Johnson Space Center in Houston, agreed with the decision to press ahead with launch. So did NASA's new chief engineer, Michael Ryschkewitsch, although he apparently had reservations. Gerstenmaier said Ryschkewitsch wanted to write down his concerns as part of a process that allows managers to go beyond a simple yes-no vote.

The primary goal of Discovery's mission is to deliver a new multi-hatch module called Harmony that will serve as the connecting point for European and Japanese research modules scheduled for launch in December and early next year. The astronauts also plan to move a stowed set of solar arrays to its permanent mounting point on the far left end of the station's main power truss and stage a recently added spacewalk to test heat shield repair techniques.

Discovery's flight is the first to use a new management approval process, splitting up the traditional flight readiness review into separate program- and headquarters-level meetings. The idea behind the change was to make it easier for mid-level managers and engineers to express their views and opinions, part of NASA's on-going drive to improve communications between engineers and managers.

The program-level review was held Oct. 10 and during that meeting, shuttle project and wing leading edge subsystem engineers recommended launching Discovery on time despite concern raised by the NASA Engineering and Safety Center - NESC - that the coating on three reinforced carbon carbon (RCC) wing leading edge panels might be susceptible to failure.

The issue involves a protective silicon-carbide coating on the shuttle's RCC nose cap and wing leading edge panels. The nose cap and 44 RCC leading edge panels - 22 on each wing - protect the shuttle from the most extreme heating during re-entry when temperatures exceed 3,000 degrees Fahrenheit. A breach in Columbia's left wing leading edge, caused by the impact of foam debris from the ship's external tank, led to the shuttle's destruction in 2003.

Since then, NASA and contractor engineers have paid close attention to the RCC panels and nose cap, devising sophisticated non-destructive tests to assess the health of the critical carbon composite material before each flight. One of

those new techniques is called thermography, which measures how heat dissipates in the carbon composite material. The technique can show areas where the protective coating on the panels might be degrading.

"Before Columbia there were two instances where we landed and some of this coating, visibly little amounts ... was off the vehicle when it landed," Hale said. "Nothing bad had happened, the vehicle survived. There was a theory as to why this happened, we developed a screening technique that we thought would detect the problem before it became critical, before it became a safety-of-flight issue."

After the first post-Columbia mission, however, thermography revealed an area of concern on an RCC panel from the shuttle's right wing. The panel - 8R - was removed and returned to the vendor, Lockheed Martin, for refurbishment. In the course of post-flight inspections, Hale said, engineers discovered "there was more sub-surface damage than we would have expected on that panel."

"That kicked off this whole concern and starting in about May, we have been trying to understand, do we really have a flight safety concern?" Hale said. "Because we don't know that we do. There are some hypothesized, proposed failure modes that would say you potentially could have a safety-of-flight issue. So we're working through that engineering data."

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By Bill Harwood
