

July 16, 2006

Discovery's homecoming

RIGORS OF RE-ENTRY

The space shuttle Discovery will land at Kennedy Space Center in Florida at either 9:14 a.m. EST or 10:50 a.m. EST on Monday, depending on optimal weather conditions, NASA decided today. The landing will conclude a mission that's lasted 13 days and featured 3 spacewalks.



We briefly discussed re-entry with Tim Taylor, a former NASA shuttle engineer who works for the Southern Research Institute, a non-profit scientific study center in Birmingham, Ala.

Q: What are some of the safety concerns of re-entry?

A: There can be "gap fillers" sticking out between the gaps in the protective heat shield tiles. Those fillers can cause turbulence and the buildup of heat. There are three gap fillers exposed on Discovery, but they are not large enough to cause a problem. They're basically threads.

Q: What's the most worrisome part of any shuttle re-entry?

A: Making it through the transition boundary layer, where the orbiter basically goes from being a spacecraft to an aircraft. The boundary layer begins about 190,000 feet above Earth. As it comes passes through this layer, the heat on the underside of the shuttle will rise to about 3,000 degrees. Discovery will pass through the layer when it is roughly above Cancun, Mexico.

Q: How fast will the shuttle be going when it hits the boundary layer?

A: About 12,000 miles per hour. It will slow down by 6,000 mph going through the layer. That takes about a minute. The shuttle will continue on a path that takes it over the Gulf of Mexico and Tampa. It then goes on to Kennedy Space Center.

The shuttle is a really a glider during re-entry. The pilot does a "dead stick" landing in which the shuttle touches down at 300-400 mph, or about 100 mph faster than a commercial jet. This has been one of the cleanest flights yet regarding technical issues involving safety. So I expect a smooth landing.

The Southern Research Institute will videotape the re-entry from a high-altitude aircraft to capture what really happens. It will use a WAVE sensor mounted to the nose of a WB 57 to do the job. The aircraft and sensor are shown here.

