

Air Force report: Ares I crew couldn't survive blast in first minute

July 19 2009, By Mark K. Matthews

The crew of NASA's newest spacecraft "will not survive" an explosion of the Ares I rocket within the first minute of launch because blazing chunks of solid-rocket fuel would melt the parachutes on the crew-escape system, according to a new Air Force report.

The report by the 45th Space Wing at Patrick Air Force Base -- which has safety responsibility for the Cape Canaveral rocket range -- used data from an unmanned Titan IV that was blown up by safety officers when its guidance system malfunctioned soon after leaving the pad at Cape Canaveral in 1998. Like Ares I, the Titan used solid-fuel motors.

The explosion created a cone of red-hot debris that spread across nearly three miles. If a similar safety decision was made to blow up an Ares I, the report said, no escape system could blast the [Orion capsule](#) and its crew away from the flaming debris quickly enough to keep its parachutes from being incinerated.

"The capsule will not survive an abort (in the first minute) . . . as the capsule is engulfed until water-impact by solid propellant fragments radiating heat from 4,000F toward the nylon [parachute](#) material (with a melt-temperature of (about) 400F)," said the 25-page report.

But Jeff Hanley, who manages NASA's Constellation program that includes the Ares I, questioned the validity of the Air Force study because it relied on only one example. He said NASA had done its own study, using supercomputers to replicate the behavior of Ares I, that

predicted a safe outcome.

"We have analysis that tells today that the capsule will fly free of the danger," Hanley said. "Our analysis says . . . the crew capsule will not be exposed to the more severe environments."

He did note, however, that NASA would consider the Air Force study.

Critics countered the new report is the latest reason why Ares needs to be re-examined, or scrapped.

"This is one technical issue among many," said Mike Gold, the Washington director of Bigelow Aerospace, a commercial space company. "What we find disturbing is that any time there is an external organization looking at NASA's plans, they seem to come across an issue, and this is just one example."

The Air Force report, first published by nasawatch.com, is the second safety challenge by the 45th Space Wing to the solid-fuel first stage of Ares I. Air Force officials previously warned NASA they fear that violent shaking on liftoff of the Ares I-X, a rocket that will test the Ares I first stage, would disable the steering and self-destruct mechanisms, meaning it could not be destroyed if it veered off course.

If that problem is not fixed, the Air Force has said, the rocket cannot fly from Kennedy Space Center for fear it could endanger populated areas along the Space Coast.

This warning, and the new report, come at a crucial time for Ares I, a key element of NASA's Constellation program to return humans to the moon. An independent team is reviewing whether the Ares I -- intended to launch astronauts -- and the much larger Ares V cargo rocket are the best choices.

Alternatives include rockets that would use the main engines, boosters and giant fuel tank of the space shuttle, which is slated for retirement next year; commercial rockets now used to launch satellites; or a redesign of the liquid-fueled Ares V.

During a conference call on Friday with reporters, the head of the review team, Norm Augustine, said the panel was aware of the [Air Force](#) report and called it a "legitimate technical question" and that team members were devoting a "great deal of effort to that, among other technical questions."

In the past 18 months, outside critics and internal reports have raised several questions about Ares I, whose first stage is a five-segment stack of solid-rocket boosters like those used on the shuttle. Concerns range from price, which could cost at least \$35 billion before the [rocket](#) is ready for a 2015 mission, to technical problems.

Chief among them: violent shaking caused by the way solid-rocket fuel burns, compounded by the use of a solid-fuel motor as the primary propulsion source rather than as boosters.

The shaking, called "thrust oscillation" by engineers, continues to vex the agency. NASA officials announced this week that it is one of the issues that will delay the first test flight of the Ares I-X -- a single-stage mockup of the Ares I.

The target date of the launch, from Kennedy Space Center, was changed from Aug. 30 to Oct. 31.

"This is still a very aggressive schedule and requires a lot of tasks to complete on or before their planned dates," wrote Robert Ess, the Ares I-X mission manager, in a memo obtained by the Orlando Sentinel.

Despite the problems, Augustine denied that the panel already has declared Ares dead.

"As far as our committee is concerned, it would be completely wrong to say that Ares is dead in the water. We have looked at various versions of Ares, derivatives of Ares and alternatives to Ares, and I think it would be a totally incorrect characterization," said Augustine, former CEO of Lockheed Martin.

"We're looking at a whole bunch of possibilities," he added.

The Augustine panel should present its findings next month.

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