

Re: Man-Rating Atlas V

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- *From:* lou@xxxxxxxxxxxx
 - *Date:* 29 Sep 2006 09:58:46 -0700
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Will McLean wrote:

lou@xxxxxxxxxxxx wrote:

Overall, if you apply any realistic factor for 'unexpected' failures, the better expendables are likely safer alternatives. Of course this is hard to quantify – if you *could* quantify it, they would not be unexpected.

Atlas V hasn't flown nearly enough flights to say whether it has a reliability of 2% or 5%. And the version they'd use to launch the CEV hasn't flown at all. Estimates of its reliability are also educated guessework.

I agree that these are all guesswork (after all, as someone once observed, you get arguments and persecution over religion and politics, not arithmetic). The question is the size of the errors. Suppose Atlas has overestimated the reliability by a factor of 2, so in fact it kills the crew 1 in 500 times, and does not meet the NASA spec. This is certainly possible, and I think likely. However, it is even more likely (in my opinion, of course) that NASA has overestimated the reliability of the stick by a factor of 5 more more. This would result in a fine record, killing the crew only 1 in 400 times, but it would not be as good as the Atlas.

Now of course the size of the overestimates is unknown (otherwise we'd include them in the estimates). But to me the Atlas changes "feel" minor – better monitoring, new trajectory, redundant electronics, and so on. Also, the proof of at least some structural margins by higher performance unmanned launches is comforting. The stick changes seem more intermediate to major – new engines, new solid configuration, and so on. And the closer you get to a new vehicle, the less trustworthy the reliability estimates become (For completely new vehicles the estimates are terrible – Apollo overestimated by 50, the shuttle by 1000.) Thi