

Re: Does NASA save money reusing SRB's?

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- *From:* The Apprentice <Vastness.of.Space@xxxxxxxxxx>
 - *Date:* Sat, 27 Aug 2005 12:56:20 -0500
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Scott Lowther <scottlowther@xxxxxxxxxxxxxxxxxxxxxxxx> wrote in [news:3A%Pe.1005\\$Xo3.748@xxxxxxxxxxxxx](mailto:news:3A%Pe.1005$Xo3.748@xxxxxxxxxxxxx):

>>The other red flag is that solid strap-ons have been used for decades
>>by many other countries (particularly Ariane) and other domestic
>>expendable launch systems, yet nobody else reuses their solids.
>
> Soyuz has launched over 6000 of their strap on liquid boosters, and
> haven't recovered a one. Would they be cheaper recoverable? Dunno. At
> thier flight rate... probably.

If anything your point about Soyuz raises the question whether reuse of strap-ons **in general** saves money. If it did wouldn't **somebody** in the world (besides NASA) have at least tried it, after concluding it had potential during their paper studies? The Soviets spent a staggering amount of money developing the Energia/Buran system from scratch -- why didn't they spend a tiny fraction of that at some point to make Soyuz strap-ons reusable -- amoritized over the **thousands** of Soyuz stage-flights?

If nobody has done something (reusing stages), it's wrong to say we know it's a good idea. This is one thing I've grown tired of hearing from people in the industry as if it's a proven fact (somehow apparently known by everyone except those who choose never to build them). We have two data points on reusable space vehicles that have been built and flown: Shuttle and Buran. While it's true that Buran was cancelled for cost/benefit reasons, since it was such a blatant copy of the Shuttle I think we can say it isn't a second independent data point. So that leaves us with only one data point -- the Shuttle, and we know it was a failure on cost/benefit. All the other talk of reusable systems are simply speculation or at best paper studies. For all we know there are problems common to any reusable system that we haven't identified yet because we haven't built more than one system to see the pattern.

The fact nobody besides NASA has tried to do it suggests others don't believe it's a good idea. That's not to say they can't all be wrong (since nobody tried it), but the fact that many minds from many cultures have looked at the same issue and come to the same decision is something we shouldn't ignore.

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Personally I think there's more potential for reusing strap-ons than any other stage, and I hope that somebody actually builds one to get us more data on their advantages/disadvantages. Odds are it will take several iterations before we get to something that doesn't have unexpected problems and comes out ahead on cost, or it may simply prove that expendables are always cheaper. I hear the Air Force wants to do a demo, though I doubt they'll have the money as long as we're in Iraq.

- > Titan III solids were seriously examined for reusability. Being steel
- > cases, that made sense. However, a lot of modern solids are smaller
- > and made from composites, like the GEM motors, of which something like
- > 800+ have flown; the GEMs static test fired on the pad have shown that
- > they are *not* refurbishable.

Yes, I figured small solids would be less suitable than large ones for reuse. That's why I cited Atlas-V and Ariane-V as examples, because they have large solids. As you point out Titan is also something to look at, though I chose to use examples of recent designs that are currently in production.

- >>Either you save money by recovering/reusing solid strap-ons or you
- >>don't,
- >
- > Same goes with liquid.

Yes, but with liquids there tend to be a lot more differences in terms of engine design & cost, stage size, burn time, etc that make blanket statements about them less appropriate. Strap-on solids have a lot more in common with each other than their liquid counterparts have with each other, so we can draw conclusions about solid strap-ons as a group with greater confidence than we can with their liquid counterparts.

Soyuz, if memory serves, uses peroxide powered turbines to pump storable propellants in a strap-on application. Titan used storables to power their turbines and they were 1st stage engines rather than strap-ons. SSME is a closed-cycle high pressure LOX/LH2 main engine located apart from its tanks. And so on. My point is that there tends to be a lot of factors with liquids that complicate apples-to-apples comparisons and the ability to assess their potential for reusability.

- > One issue would be cranking up the production rate of the case
- > segments. This is non-trivial. I gather the lead time for a new
- > segment is on the order of *years*.

Yes, I wasn't trying to suggest that it would be trivial for NASA to switch. "NASA can't change" = might have cost less if chosen from the start, but future recurring saving don't justify the cost of changing

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now, or it is a political impossibility. "NASA won't change" = would still save money going forward but are too stupid or conservative to make the right decision.

• **Follow-Ups:**

◆ **Re: Does NASA save money reusing SRB's?**

◇ *From:* Scott Lowther

◆ **Re: Does NASA save money reusing SRB's?**

◇ *From:* Rand Simberg

• **References:**

◆ **Does NASA save money reusing SRB's?**

◇ *From:* The Apprentice

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◇ *From:* Scott Lowther

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