

# Re: Deep Impact Kicks Off Fourth of July with Deep Space Fireworks

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*Source:* <http://sci.tech--archive.net/Archive/sci.space.policy/2005-07/msg00279.html>

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- *From:* [spinoza1111@xxxxxxxxxx](mailto:spinoza1111@xxxxxxxxxx)
  - *Date:* 6 Jul 2005 23:58:00 -0700
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George William Herbert wrote:

> <[spinoza1111@xxxxxxxxxx](mailto:spinoza1111@xxxxxxxxxx)> wrote:

> > BigDoug wrote:

> > > I am quite serious, and I've provided references and done my homework.

> > > If that makes me an "extreme leftist wacko", this is more a comment on

> > > the extreme rightard wackos that are in control in Washington, and who,

> > > just like the pols under Reagan that CAUSED the death of heroic

> > > astronauts in 1986, don't care about human life, only public relations.

> > >

> > > <http://redwing.hutman.net/%7Emreed/warriorshtm/furioustyper.htm>

> > >

> > > Part of the problem is that entirely too many clowns on the Web have

> > > been trained to think in comic book images with the result that they

> > > HAVEN'T read the Feynman postscript, they CAN'T read follow up in the

> > > New York Times, and they CANNOT understand Diane Vaughan's book.

> > >

> > > Therefore they confuse public relations releases with science and think

> > > that this clownish image is at all germane.

> > >

> > > Do your homework if you don't want to appear a complete clown,

> > >

> > > I don't know about Big Doug, but Rand, who started arguing with

> > > you earlier, is an industry professional who has also analyzed

> > > NASA and other safety practices. As have several of the rest

> > > of us who are professionals.

The problem is as Vaughan has shown, the borderline between professional and whore is blurred of necessity in the broken safety culture.

Ooh, it's 10 AM and the weekly stab in the back status meeting is at two. I gets to think like an engineer for four hours if I skip lunch.

Oops, time to stab my coworkers in the back for an hour, and suck up to the boss. OK, now I gets to think like an engineer again.

I have no way of knowing whether you are part of the solution space or

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the problem space. Thus, I have no way of knowing whether you source papers written in fear or papers written honestly.

Being a "professional" can UNDECIDABLY mean that you are genuinely objective, that you are genuinely committed to engineering truth and a form of "above all do no harm", or, today, it can mean you have sold out.

Furthermore as a US taxpayer and citizen I retain the right to call your ass to account.

>  
> We don't just read the homework, some of us have written parts  
> of it. Chunks of the Columbia accident report were researched  
> and written by a now former but longtime contributor to sci.space  
> newsgroups.  
>  
> Further, if you think that Feynman, Vaughan, and NYT are all that's  
> significant to read here, it's very dissapointing. There is a whole  
> universe of additional aerospace industry failure and accident  
> and disaster analysis out there. Shayler's "Disasters and Accidents  
> in Manned Spaceflight", anyone? In its own way as profound as the  
> two Shuttle accident reports.

>  
I'll check it out ASAP.

>>especially if Deep Impact results in an Earth strike by an asteroid  
>>unknown to current research.  
>>  
>>Give me the scientific papers that PROVE Deep Impact safe. Odds are  
>>they don't exist any more than papers existed in 1945 that proved that  
>>the Alamogordo chain reaction was self-limiting and thus not in fact a  
>>crime against humanity, in the absence of knowledge.  
>  
> Of course we can't prove that it's safe. But what are you looking for  
> in terms of "safe", anyways?

No, we cannot. The first accident, the fire on the launch pad, occurred in the old safety culture of pushback and, in my view, more respect for engineers as engineers.

But this is no argument for neglect of safety, quite the reverse. IF you are enabling lack of safety, as two independent post-accident committees have concluded, then you are being irresponsible if you, as NASA has, authorize further flights after the two accidents in 1986 and 2003.

You see, NASA has recently (cf. for example International Herald Tribune 7-6) authorized relaunch despite the fact that NASA has declined to implement a third strong recommendation of the independent commission, this being to implement a capability for repair in deep

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space. Instead it appears to me as a citizen, as a taxpayer, that NASA is covering up by staging idiotic and destructive spectacles for the amusement of ignorant, drunken American slobs.

- >
- > Let's talk about what's out there already. For example...
- >
- > The Aten asteroids/minor planets:
- > <http://cfa-www.harvard.edu/cfa/ps/lists/Atens.html>
- >
- > The Apollo asteroids/minor planets:
- > <http://cfa-www.harvard.edu/cfa/ps/lists/Apollos.html>
- >
- > The Amor asteroids/minor planets:
- > <http://cfa-www.harvard.edu/cfa/ps/lists/Amors.html>
- >
- > The inner solar system and main asteroid belt (out to Jupiter),
- > displayed in current and graphical format:
- > <http://cfa-www.harvard.edu/iau/lists/InnerPlot.html>
- >
- > ...and just the portion out to just past Mars (the inner solar
- > system and inner edge of the main asteroid belt):
- > <http://cfa-www.harvard.edu/iau/lists/InnerPlot2.html>
- >
- > The total asteroid presence in this solar system already is
- > estimated to be something in the neighborhood of  $3.5 \times 10^{18}$  tons.
- > That's three and a half billion billion tons of asteroids.
- > A moderately large fraction of that is already in the close
- > vicinity of Earth.
- >
- > Now let's look at the specifics of this impact.
- >
- > Tempel-1 is in an orbit which goes between roughly the distance
- > of Jupiter (nearly) and the distance of Mars (almost exactly).
- > See for example the orbital diagram posted at:
- > <http://deepimpact.jpl.nasa.gov/gallery/orbits2a.html>
- >
- > Blowing a bunch of chunks loose from Tempel-1 doesn't change
- > their basic orbits. They're all still moving around the sun
- > in roughly the same direction and speed, and at that speed
- > they never get closer to the Sun than about Mars.
- >
- > In order to have a chunk of the comet come down and hit Earth,
- > one of two things has to happen. Either it has to get pushed
- > into an earth-crossing trajectory, or it has to get pushed into
- > a flyby of a planet which can push it into an earth-crossing
- > trajectory later on.
- >
- > As it happens, we know pretty much exactly what it takes to
- > go from an earth crossing trajectory to Tempel-1's solar
- > orbit: the same velocity that Tempel-1 whacked the impactor

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- > probe with, about 10 kilometers per second. The Deep Impact
- > probe went out to Tempel-1's orbit on pretty much a minimum
- > energy transfer, which works out to the minimum energy that
- > can be imparted and have the chunk of debris come back in
- > to where earth is.
- >
- > From pure conservation of energy, we can rule out any chunks
- > of comet larger than the probe coming off at the probe's
- > impact velocity. The impactor weighed about 300 kilograms.
- > So the maximum direct transfer risk is about a 300 kilogram
- > rock or ice ball coming back to earth, IF we assumed an impact
- > as perfect as a game of billiards. In fact, most of the
- > energy went into vaporizing and spraying a large fan of
- > low velocity debris out, so very little is available for
- > accelerating a fragment back to 10 km/s relative velocity
- > again.
- >
- > And, as it happens, the probe impact happened on completely
- > the wrong side of the comet for any ejected debris to come
- > in closer to Earth anyways: it happened on the "front side"
- > of the comet, in the direction of its forwards motion.
- > Anything ejected from the Comet has to be moving \*faster\*
- > than the comet, not slower, and therefore is going to go
- > \*further away\* from Earth.
- >
- > Did we add more total small chunks of mass to the existing
- > population of asteroids and comets and other small planets
- > and space debris in the main asteroid belt region? Yep.
- > We increased it from something like three and a half
- > billion billion tons, to three and a half billion billion
- > plus twenty or so tons.
- >
- > On a timescale of a billion billion years, statistically
- > more debris will get perturbed out of the main asteroid
- > belt and hit Earth because of this impact.
- >
- > Fortunately, the pieces coming off are, as far as we can
- > tell, all small chunks of ice and rock which are small
- > enough to burn up completely in Earth's atmosphere.
- >
- > Is Earth perfectly safe? No. It wasn't before.
- > Did we increase the risk in any significant or even
- > reasonably measurable way? No.

OK, this is an excellent argument as far as it goes. But surrounding it I find no penumbra of apriori assumptions that first and foremost you treat deep space (which contains unknown objects, as I'm sure you shall admit) as a deep ecology.

You don't cut down a tree or shoot an animal for sport anymore. Why? Because we have found that in a "deep" ecology, things are

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interconnected in unpredictable ways, and this occurs even (as in the example of software) even in our own artifacts.

OK, you don't cut down a tree or shoot an animal to show what a big, Papa Hemingway sort of man you are. Furthermore, you try to avoid the old-fashioned junk science of killing butterflies or uprooting plants because you understand as a scientist that living things are scientifically different from dead things.

OK, is space full of "dead" things? Perhaps. That's how we thought of space prior to the 1930s discoveries that meteor craters in the American west were the results of impacts. We now have found (courtesy of noninvasive, nondestructive research by Hubble, in part) that deep space is as complex as an organism and may be, for all intents and purposes, an organism.

Yes, Newton's laws seem to mechanistically work as if space were at best a dead mechanism wound up aeons ago by a Creator. But I do hope you are aware of how Newton's laws fail at the quantum and at the macro level. If not I hope that you are aware that surrounding the comet there may be unknown objects and that calculations of the result of DI are thus fraught with unknowns.

But even if you can "prove" the impact safe (where you have cautioned me about failures of proof, to which a corollary happens to be the unreliability of your "proof") the impact violates a principle that should be applied if space is, as it seems to be from meteor impacts, a rather vindictive organism.

- >
- >>What BUGS you is that I can form a complete critique, with grammatical
- >>form and correct spelling, and references whereas you fools have NASA
- >>PR and clownish images.
- >
- > However, you are either unwilling or incapable of doing math before
- > you post to Usenet science and engineering newsgroups, which is a
- > dangerous combination.

What, for my fucking career? I write as a citizen whose taxes pay, it seems, your paycheck who has unlike many respondents here READ Diane Vaughan and Feynman. You're the first respondent who hasn't posted links to idiotic cartoons and engaged in personal insult, and you do so because being on the right side of the PR is a good career move, for you can direct your anger as "mere" engineers to SAFE targets.

- >
- > Science works by numbers. Numbers tell us things which are important,
- > like what risks are real, and which are laughably small.

Underneath the numbers lies logic, coherence and humanity. So let's see, the destruction of humanity is laughable?

The risks of a runaway chain reaction at Alamogordo were according to

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most of the scientists laughably small. And, the chain reaction self-limited.

However, the world was accursed with an unusable weapon which is today leading to a crisis in North Korea, and the United States slaughtered people in the hundreds of millions because the Manhattan Project, on the ethical plane, authorized destruction in the name of patriotism.

You can do science with no-fly zones created by ethics and it certainly appears that this science is better than mindless number-crunching. Newton had the insight before he cranked numbers.

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> -george william herbert

> gherbert@xxxxxxxxxx

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• *Follow-Ups:*

◆ *Re: Deep Impact Kicks Off Fourth of July with Deep Space Fireworks*

◇ *From:* Joe Strout

• *References:*

◆ *Re: Deep Impact Kicks Off Fourth of July with Deep Space Fireworks*

◇ *From:* spinoza1111

◆ *Re: Deep Impact Kicks Off Fourth of July with Deep Space Fireworks*

◇ *From:* BigDoug

◆ *Re: Deep Impact Kicks Off Fourth of July with Deep Space Fireworks*

◇ *From:* spinoza1111

◆ *Re: Deep Impact Kicks Off Fourth of July with Deep Space Fireworks*

◇ *From:* George William Herbert

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