

Re: 100 megaton bombs atop Saturn V rockets

Source: <http://sci.tech-archive.net/Archive/sci.space.history/2004-07/3362.html>

From: Carey Sublette (*careysub_at_earthling.net*)

Date: 07/20/04

Date: Tue, 20 Jul 2004 17:43:08 GMT

"Derek Lyons" <fairwater@gmail.com> wrote in message
news:40ff4b3e.33524344@supernews.seanet.com...

> "Paul F. Dietz" <dietz@dls.net> wrote:

> >Allen Thomson wrote:

> >

> > > FWIW, a while back there was discussion of such matters on

> > > alt.war.nuclear, and the conclusion generally agreed with yours:

> > > a touch more than 10 kt/kg seems to be within the state of the art,

> > > but not more. At least for more or less conventional large two/

> > > multi-stage weapons.

> >

> > >A 'sufficiently large' device should be able to do better, I think,

> > >since it could be made to work without compression.

>

> Without compression? Huh?

There is some evidence that Paul Dietz's remark above is true, though not in a very useful size range.

In the book "Teller's War: the Top-Secret Story Behind the Star Wars Deception" by William Broad (1992) he recounts the story of the "Classical Super" the scheme for a self-sustaining combustion wave in uncompressed liquid deuterium proposed by Teller in the 40s and early 50s, but discredited by Ulam, Everett, Fermi and Von Neumann.

Reportedly supercomputer computations made in the 70s with much improved physics models showed that the scheme could be made to work with devices in the gigaton range (implying a minimum system radius of a few meters). This claim is apparently made in "Energy in Physics, War and Peace: A Festschrift Celebrating Edward Teller's 80th Birthday" by Hans Mark and Lowell Wood (1988), which I have not been able to consult. There is also a footnote about this in Greg Herken's book "Brotherhood of the bomb: The tangled lives and divided loyalties of Robert Oppenheimer, Ernest Lawrence, and Edward Teller" (2002).

> >In the limit of extreme size the device mass would be dominated by

> >the mass of fusion fuel.

>

- > *Probably not, a) because fusion fuel is pretty light, and b) because*
- > *the real yield multiplier is the final fission step of the*
- > *fission–fusion–fission cycle. The third step is often deemphasized in*
- > *order to reduce the weight and volume of a warhead and to make it*
- > *'cleaner' by getting the bulk of it's yield from fusion.*

In the gigaton classical super scheme the device would essentially be a cryotank of liquid deuterium, like the Saturn upper stage or the Shuttle tank. Nearly all of this is fuel. The energy content of deuterium is much higher than fissionable material, by almost 5–to–1 (82.2 kt/kg).

Carey Sublette