

# *Gaiashield Group*



## In Response to the Asteroid Initiative RFI

Re: 6e. What do we need to know with more certainty to expand planetary defense capabilities?

- 1) We Need To Know that asteroid impact events are random: without any recursive pattern, both in their occasion and magnitude.
- 2) We Need To Know that The Next Asteroid on its way to strike Earth is a evergreen existential threat. The next one will always be out there orbiting the sun closing at a million miles a day.

Part 1: Tactically speaking, to be clear and concise and since it includes the prospect for our extinction, the most important thing Mankind will always *need to know* is which asteroid is The Next Asteroid on its way to strike Earth... And the most important thing Mankind will ever need to do is deflect it. Only once we know which asteroid it is can we know when it will strike and how large it is. Even if we choose to evolve our vigilance beyond merely counting rocks in space, and at random are sooner-or-later likely to see it coming and know which asteroid it actually is, before the fact we can never know when we are going to see it coming and know which, when and how large...

And since when we are going to know which/when/how large will determine the size of our detection-to-impact window, it is a principle factor in determining the magnitude of the response required to deflect it and by extension the scale of our standing tested capability before the fact. And since we can never resolve our need to know when we are going to know which/when/how large, strategically speaking, we consequentially need to be forever prepared for anything... including the worst case scenario. Therefore, before the fact, we *need to know* exactly what a capability to effectively respond to a worst case scenario must be.

In that direction, even the most ardent opponents of nukes have ceded to the logic that if the asteroid is large (over 200 meters) and/or the detection-to-impact window is short we would need to employ thermonuclear explosive devices at or near the surface of the target vaporizing a portion of the asteroid's mass, generating thrust to impart some small change in it's velocity.

Problem: there are two 'expert' and professional theoretical studies and schools of thought on just how much yield would be required to generate a given Delta Vee. Specifically, the differential is 2,000 times. In other words, when sooner-or-later at random the day comes when we are faced with deflecting an impending 10,000 meter extinction level impact event, if we design to impart 10 cm/sec of Delta Vee and choose to employ the logic of School A (10,000 Mt/2,000 Atlas Vs) and School A is wrong then we would deflect the target by far too much. Which would not be a problematic outcome. However, if we choose to employ the logic of School B (5 Mt/1 Atlas V) and School B is wrong then we would have little effect and as a consequence... we go extinct.

Even if we only regard Nukes as a Plan B or a backup to a remote or low probability event it would seem that *we need to know* far better than we presently do precisely what to expect when we have to go to nuke an asteroid. What is required here would be a rigorous and diligent well funded formal peer reviewed theoretical study followed up by a series of empirical tests... Nuke a few asteroids. Additionally, the nukes we know and love designed as weapons of war on Earth may not work well in Space at -240C, in hard vacuum, Zero G, outside Earth's magnetosphere after being accelerated to 20 km/sec and suffer such conditions for years. *We need to know* what is required for a space capable NEOMine. Something for the boys at Los Alamos to do.

Part 2: Strategically speaking, as things stand NASA has no business even thinking about deflecting asteroids... yet. Or ever without the strategic security minded input and supervision of DoD, having arguably the second largest space program in the world, the tactical authority for the disposition of Nukes and the suitably fungible budget of the proverbial 800 pound gorilla.

What We ('We' being NASA and We The People and even We The Species) need to know as soon-as-possible would be who in fact will be formally delegated as the US National Planetary Defense Agency and what exactly will their lawful orders be? What Codified National Policy will shape their intentions and manifest our emergent national expression of socio-political will here? How can leaving this much responsibility to a tacit assumption be considered wise? How could we expect such an absence of decision making ever be expected to manifest in any effective level of capability? How can a solicitation for government funding to be prepared and trained and vigilant for a mission be based on a tacit assumption of responsibility? All that NASA has so far is the authority and token funding to detect, track, catalog and characterize 90% of the estimated NEO population down to 140 meters. If we see one coming... then what? We cross that bridge when we come to it? This is little more than a formula for suicide by NEO.

In order of effect, first we need a Codified National Policy that We will endeavor to deflect these objects as they present themselves to be impending Earth impact threats. Second, we need the Executive Office to comply with its own law:

S. 3729: 2010 NASA Authorization Act: SEC. 808. NEAR-EARTH OBJECT SURVEY AND POLICY WITH RESPECT TO THREATS POSED. (b) IMPLEMENTATION.—The Director of the OSTP shall implement, before September 30, 2012, <snip> **assign a Federal agency or agencies to be responsible for protecting the United States** and working with the international community on such threats.

Before any government agency can afford to seriously even think about developing a capability to defend the planet from asteroid impact first they *need to know* what the lawful marching orders are and then they *need to know* that they are in fact lawfully ordered to do the marching.

In 2007 NASA's PA&E determined that Nukes would be 100 times more effective than any of the second best alternatives. By 2009 subsequent research increased that margin to nearly 5,000 times and by 2011 10 million times... From here, the ARM looks like nothing more than NASA scrambling for a make-work mission to justify its existence. Looking at losing the Space Shuttle, it went to Man On The Moon 2.0 then to a Manned Asteroid Mission and now 'let's tow a rock no bigger than a living room into some Earth orbit and call it Planetary Defense!' This is not the mindset or behavior of a National Planetary Defense Agency tasked with the responsibility for defending our nation and planet from asteroid impact and looking for the best way to do it. Even as a typical run-of-the mill, because-we-can, pork-barrel NASA mission ARM is a new low in practical relevance. To try and call this sure-to-fail Rube Goldberg approach a realistic Planetary Defense concept demonstration is just putting lipstick on a pig. *We need to know* the scientists at NASA can become practical and realistic and serious. That they have the mindset and culture to design and execute a mission with dire human consequences if they fail. We should already know we are not going to actually try and defend the planet with some circus act like the ARM.

We need to know that you boys and girls at NASA have more strategic sense than God gave a bucket of frogs... After all, it is your planet... your nation, your city and your children and grandchildren at Ground Zero here. How could you tolerate your National Planetary Defense Agency ever using any second best alternative, by any margin of effectiveness, and call it wise? If you can not take the threat of asteroid impact personally and become exclusively focused: mission-locked, on what is essential to the conduct of engineering and implementing an effective response, then perhaps you are not qualified to even think about Planetary Defense.

If we are to expand planetary defense capabilities:

- A) We need to know which asteroid is The Next Asteroid on its way to strike Earth.
- B) We need to know the capability required to address a Worst Case Scenario.
- C) We need to know how many Nukes it takes to deflect an asteroid.
- D) We need to know how to make Nukes that work in space.
- E) We need to know the National Policy for dealing with asteroid impact threats.
- F) We need to know what federal agencies will be made responsible for Planetary Defense.
- G) We need to know if NASA can ever evolve and learn to think like and become an effective National Planetary Defense Agency.

Part 3: Conceptually speaking,

- 3) We Need To Know that The Universe is a dangerous place and we can not afford to believe it will always suffer the good luck of dilettantes or cowards or fools.
- 4) We Need To Know that the threat of asteroid impact is an existential condition. It is with us now and always will be and we must approach responding to this threat accordingly.
- 5) We Need To Know that unless we want to sooner-or-later go the way of the dinosaurs we have to effectively face this random threat as a perpetual Cosmic Cost of Living.
- 6) We Need To Know that Time is simply not on our side here.
- 7) We Need To Know that Fear defines necessity. And for those responsible for and accustomed to managing fearful things, Fear focuses the mind and reminds us there are dire consequences if we fail. Makes us faster, stronger, smarter. Fear makes us brave. And here, we should be afraid... we should be very afraid. Time to soldier up.

Because We Need To Be prepared and trained and vigilant Forever. And Forever begins... Now!

At your disposal and convenience in this issue,

A Million Miles A Day,

R. Dale Brownfield  
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Note: The above examples of what 'we need to know' should not in any way be considered to be comprehensive or complete... just a few first steps understanding a journey of a thousand miles.