

Gaiashield Group



Leave Nothing To Chance

The Case for a Greater Planetary Defense Effort

Since it will always include the prospect for our random extinction by asteroid impact, all there is... gone, forever... and because we can: Knowing which asteroid is the next asteroid on its way to strike Earth will always be the most important thing Mankind can ever know. Deflecting the next asteroid on its way to strike Earth will always be the most important thing Mankind can ever do. Being prepared to effectively respond to the threat of the next asteroid on its way to strike Earth will always be the most important thing Mankind can ever be.

Risk Management is the art of dealing with uncertainty by engineering a response shaped by rational applied pessimism. Expressed as The Precautionary Principle: "Governments should take action to prevent harm even if it is uncertain if, when and where the harm will occur"... Or, Leave Nothing To Chance. Here, we have three threat paradigms: Existential Threat - potential for loss, Strategic Threat - potential for failure and Optimism Threat - potential for bad luck.

The Existential Threat: What we do know, or at least understand rationally.

Given:

- At random, over the next billion years Earth will be struck by millions of asteroids. Fortunately, Most of these will be only 10 m Window Busters. And 100 to 200 thousand will be only 100 m City Killers. And 1,000 to 2,000 will be only 1,000 m Global Catastrophes. Unfortunately, at random, 20 to 40 of these will be 10,000 m Extinction Level Impact Events.
- We do not know which 10 m asteroid will be the next 10 m asteroid to strike Earth.
- We do not know which 100 m asteroid will be the next 100 m asteroid to strike Earth.
- We do not know which 1,000 m asteroid will be the next 1,000 m asteroid to strike Earth.
- We do not know which 10,000 m asteroid will be the next 10,000 m asteroid to strike Earth.

Since the absence of any rational evidence or information is absolute and complete for all the above categories of this threat, and both the relative size of asteroids and the relative size of their populations are irrelevant noncausal variables in their potential to collide with Earth, we have to consider the conditional probability for the next or any near-term expression of any of these events to be equal. We Do Not Know! Ignorance is a great equalizer. But from the perspective of the Precautionary Principle we do know the 'if' and the 'where' and at least we know what we do not know: the 'when'. Which is strategically relevant: we know what needs to be remedied.

Consequentially, until then our rational expectation for how large The Next Asteroid on its way to strike Earth will be must include the prospect of a 10,000 m Extinction Level Impact Event as equal to any other size asteroid and we must act and become prepared accordingly.

The Strategic Threat: Even though a thermonuclear response, in terms of mission-mass to work, can be shown to be as much as 10,000 times more effective in an ablation/deflection application than any of the second best alternatives, we must still appreciate that in order to impart just 1 cm/sec of velocity to a 10,000 meter/1 trillion ton asteroid would require 1,000 megatons of yield at or near the surface of the target (Holsapple 2004). At 5 tons payload mass and 25 Mt yield per rocket that would require 40 Atlas Vs launched to heliocentric orbit decades before impact. Further, when we factor in the margins of error and contingencies we will need to address (Probability Ellipse, Target Mass, Technological Confidence) in order to have a reasonable expectation of success, we find that we will need to launch at least ten times what the rocket surgery mission would suggest on paper. 400 Atlas Vs payloaded with twice the world's current nuclear arsenal re-crafted into space-capable nuclear NEO Mines.

Suitable Launch Window availability alone would afford such an effort, initiated after detection, only a non-zero probability of success... even with only 40 Atlas Vs. Tactically, we can increase the mass/yield ratio of nukes by orders of magnitude affording us an effective extemporaneous hasty post detection response capability or strategically, do most of what we will need to do, including predeployment to heliocentric orbit, before detection... now.

For the wannabe Martians: Since by heliocentric orbit the best area for such deployment would be Sun/Mars L3, 4 and 5 the pipe dream of Mars would be preserved and NASA would not need to abandon their current core mission. Just dramatically speed things up and take along a few gigatons of nukes to deal with the occasional problematic asteroid. And comet. Until we have strategically projected both our surveillance and deflection capabilities further out into the Solar System the potential for our ever being able to successfully deal with the threat of Long Period Comets is virtually non-existent. In short, Mars is the strategic high ground and the best place from which we can defend Earth against this threat. So... To Mars!

The greatest risk here would be that we fail to find the courage to honestly fear the prospect of extinction by asteroid impact soon enough to develop and deploy a standing, tested Planetary Defense capable of effectively dealing with the worst case scenario... before we need to use it. And not to fool ourselves into thinking that what we are doing now is little more than the first steps on a journey of a thousand miles. After all, The next extinction level asteroid is closing, at A Million Miles A Day... Tic Toc.

The Optimism Threat: In the face of the above we have chosen to shield ourselves with statistical sophistries and hide behind the odds and academic slight-of-minds and trust in unchallenged assorted post hoc logics to make us feel safe. And despite the rational Cosmic reality, all we are doing now is counting rocks in space with the intention of finding 90% of the 'estimated' threat population. We detect, track, catalog and characterize newly discovered Near Earth-orbit Objects long enough to meter their present orbital elements then move on to find another. Survey... not Surveillance. As things stand, when we hit that 90% of the 'estimate' goal, astronomers can just turn off their telescopes, declare victory, and go home. And our response to the threat of asteroid impact will be over.

Unless, by random chance, they discover an impending Earth impact threat in the interim. Then, before the fact, they Hope the asteroid will be small. And Hope the Detection-To Impact Window will be large. And Hope that the untested theoretical estimates for a deflection mission are correct. And Hope that the technology, all supplied by the lowest bidder, we extemporaneously employ will perform as advertised. And Hope that there is a suitable Launch Window when we need one. And Hope it does not rain on the day we need to save the world.

What we have here is nothing more than a Hope based Planetary Defense. Appealing to random chance with an expectation of good luck. In fact, our present Planetary Defense effort appears to assume there is no near-term impact threat at all... Optimism Bias. This is not managing risk. It is taking risk, Gambling. And nothing more than a formula for our sooner-or-later Suicide by NEO.

By far, the greatest threat manifests as a combination of all the above. If we honestly and fully understand the true scope and scale of the Existential Threat, and understand that, Strategically, we are not prepared, we continue to endeavor to correct this condition and engineer an effective response. However, when Optimism allows us to both underestimate the Existential Threat and overestimate of our Strategic capability, we think we are prepared when, in fact... we are not. We become complacent and no longer work to develop and increase our standing tested Strategic capabilities. Which effectively becomes a threat worse than the largest asteroid on its way to strike Earth itself. Turning the threat of asteroid impact into a Man Made threat...

Since the threat of asteroid impact is forever, whatever we decide to do in response must be done forever. And as things stand we do not yet seem to have evolved the intelligence to do this well. It has been six years since the Executive Office was first tasked with just delegating a National Planetary Defense Agency and after missing two deadlines... No Joy. Perhaps our grandchildren will be smart enough or brave enough to get this right. But we sure aren't. Until then, pray for a punctuated equilibrium and that the next asteroid on its way to strike Earth will be small...

Until at least the United States has found the wisdom to take the lead and has codified a National Policy to deflect these objects as they present themselves to be impending Earth Impact threats. And delegated a national agency (ideally a hybrid of NASA and DoD) to become trained and experienced and expert in executing this policy. (Enabled, perhaps, by reappropriating some large portion of the federal budget presently dedicated to maintaining our nuclear weapons arsenal and their delivery systems and retasking these resources to a swords-to-plowshares mission in Space.) Our chance of successfully dealing with any size threat will be next to zero.

Even a caveman can get this: Big Rock Come! Kill All! Not Know When! Must Move Rock!
How is this difficult?

As both engineers of technology and method, We The Species have learned to load the dice, stack the deck, fix the race... game the system. Cheat. And tempered by only capability and value Leave Nothing To Chance.

The Universe is a dangerous place and does not suffer dilettantes or fools gladly.

A Million Miles A Day,

R. Dale Brownfield

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<http://Gaiashield.Com>