

GaiaShield Group

1400 Kra-Nur Drive, Burton, Michigan 48509



An Open Letter to the President of the United States

Re: A US Asteroid Response Agency: NASA v DoD

President Bush: Sir,

Congress may soon be taking up the issue of tasking the responsibility of responding to the threat of asteroid impact and as an issue of both national and global security this should ultimately find its way to your attention as well. Although the proximate cause of this initiative is the categorically small asteroid 2004 MN4 the scope of the mission delegated to this agency will constructively encompass the threat of all future asteroid impacts, small and large, forever. The creation of this agency is about addressing a threat we have known about and all but ignored for 40 years and our finally beginning to meet this unavoidable cosmic cost of living. A cost that, in terms of preparation, training and vigilance should we fail to meet in advance and in full and with sufficient skill, will hold our species and its survival in forfeit.

It has been 40 years Gene Shoemaker first brought the threat of asteroid impact to the attention of the world. In that time the next large whole-earth killing asteroid has been out there and has come 12 billion miles closer to impact and if anything, our technical capability to deal with it has not only not been increased to meet this threat but has actually decreased. Astronomers that have been looking for asteroids will tell you that so far they have not found this asteroid yet their efforts and results can be interpreted to have served to somehow reduce the risk... statistically. But when you consider that this asteroid nonetheless does exist and that it is getting closer all the time, and that we are doing nothing in response, and that we still do not know which large asteroid it is and so have no idea when it will arrive. Isn't the risk in fact increasing and at the rate of A Million Miles A Day? It is past time to make this first strategic step towards this worst case scenario. Nothing can be gained by waiting. How can anything else be wise?

Since responsibility for dealing with this threat will clearly require a vast increase of our capabilities in space the candidates for this role should already have some experience and expertise in space. That would leave us with only two possible domestic choices: NASA and The DoD. However, 'responsible' does not mean so that we can have someone to blame when some asteroid hits Earth here - NASA would do just fine for that. In this, 'responsible' clearly means someone with the 'ability to respond' and see to it that no asteroid does so. Some agency, who understands that because they are able to respond that if they failed to do so successfully, would hold them selves responsible and to blame... which in itself would serve to help ensure that they did not fail. For this crucial characteristic you are going to have to go to your DoD.

The strategic framework for this issue begins 40 years ago when the only powers on Earth with the strategic capability to address this threat were busy waging a cold war that posed a more imminent and global thermonuclear threat. So Shoemaker's cry of falling sky went unattended by To Whom This Should Concern and never gained more than the attention of astronomers. In addressing this problem they crafted ways to look at it scientifically: academically. As a result (once you change the way you think about it) many have come believe this problem to be far easier to resolve than it actually is... Far easier to deflect this threat from Earth with telescopes and statistics than it would be to do it with rockets in space.

We cannot let academics and science dictate strategy here. That would be letting a very small tail wag a very large dog. If we expect to ever respond to this threat with a reasonably certain

expectation of success we need to initiate the process with our best strategic minds. Not only to help us appreciate this threat in its most fundamental tactical terms, but to also slough through the dubious systemic and strategically irrelevant academic insights that have accrued to obfuscate our better judgement. Create a dedicated professional agency to present us with a clear and comprehensive plan to manage this threat based on something more than statistical probabilities and hope and empower them with the ability to successfully respond to the defense of the planet from asteroid impact. The evolved human wisdom still stands: if our species is to continue to survive we can only afford to hope for the best after we have prepared for the worst... not the other way around. That would be no more than gambling.

Implementing our best tactical response will invariably involve a never-ending evolution of our technical expertise in engineering and physics and astronomy, and will likely involve massive but creative surgical thermonuclear options in space - scientists will always be required. However, any agency that is to be responsible for defending the planet from asteroid and comet impact will require a far more strategically evolved element at its core. Given the only two candidates, and all real-world things considered, a hybrid of the two would likely be the more viable option. Then, the question is no longer about the players but authority and a clear chain of Command, Control and Communications.

Merely giving a scientist a big gun will not make him a good soldier anymore than giving a soldier an advanced degree will make him a good scientist. There is a fundamental dichotomy of perspective inherent in the performance of these two professions and their discrete usefulness should be taken into account with the creation of this agency. If it ever was, this issue is no longer about science. That the threat comes from space does not in itself categorically make it a scientific issue. This is not about justifying the existence of NASA or the exploration of our solar system or the commercialization of space. This is not some new vehicle for more pork for anyone. This is about our security: about the survival of our species. Task the right agency for the right role and let the spin-offs land where they may. It falls to your office to recognize the critical nature of this issue and promote it out of academia and national scientific interest up to the responsibility of those who attend to our defense and security. Put it into the hands and minds of those who have developed strategic acuity and responding to threats as a matter of their profession.

Because this threat does come from space, at first glance many do see NASA as the likely agency to protect us. However, in its 40 years NASA has never had to protect anyone from anything. We all know that Job One at NASA today is the redistribution of discretionary federal funds back to the states in direct proportion to their electoral votes - and be interesting in the process - and not to respond to any of our problems or fears. So after 40 years of discretionary pork barrel funding whenever NASA asks for money it is naturally taken to be a matter of more pork. That NASA is even close to the issue of asteroid impact effectively mitigates the perceived credibility of the threat... as if any response is merely make-work discretionary funding for astronomers. On the other hand, the DoD has successfully protected this nation from threats to its citizens and way of life and interests for over 200 years! So when the DoD asks for money it is naturally taken to be a matter of life and death. At 25 times NASA's budget, only the DoD has the credible integrity - and sheer critical mass - to warrant a reasonable expectation of securing the funding that will be required to ever respond to this perpetual threat successfully.

Today, the Battle Cry at NASA is "Safety First"! Engineers and program managers constantly walk a line between the value of the Man and the Machine. The 'Mission' is not even in their equation, and for good reason. There are no dire negative consequences if any NASA mission ever fails or even if NASA fails in its mandate or mission statement altogether. Which is fortunate in that far too many NASA's missions fail in their principal objective, if not altogether. In science, failure is not only an option it is an opportunity to learn. In this, we may not survive a mission failure to learn from our mistakes. At the DoD it is more often the rule that mission failure is unacceptable and 'at any cost' can include both machine and man... as is the case with this issue: mission success will be singularly imperative. So this question can come down to the comparative mindset, focus and the character of the resolve that has become organic conditioning in these two cultures. Should we try and teach scientists at NASA to think like soldiers or task the DoD with a mission in space? After all, the DoD does already have their own space program...

Given the planet wide nature of this threat it will be a natural and rapid evolution of this agency's authority to assume the leadership role in some unified global congress of national planetary defense agencies. The number of space capable nations in the world today can be counted on one hand. Whereas the number of nations with military agencies is virtually total. It would not be

difficult to conceive that these brothers in arms ally and find a level of compatibility under the precept of a 'common enemy' and work in consort to address this threat... aside from any current or historical adversarial postures. In fact, given the right approach by world leaders, this business can conceivably be adequately funded by gradually allocating some portion of standing world military budgets - proportionally reducing our collective capacity to kill each other over political, economic and religious principals... win/win.

Certainly the first task any agency charged with the defense of the planet will undertake will be to appreciate and qualify all the elements in this issue in order to craft a strategic risk and response assessment. Appraising the threat is not difficult: The Next Large Asteroid on its way to strike Earth is out there somewhere and closing at A Million Miles A Day. But more importantly we do not know what tactical capabilities we can reliably employ in response. Since the tactical abilities at our disposal, or lack thereof, are fundamental and deterministic to the formulation of any strategy, a rigorous and diligent analysis of all feasibly executable deflection systems and methods will be the first priority. Such an analysis will likely show that even our most advanced propulsion-based deflection proposals are thousands of times more massive than nuclear deflection tactics. Mass is cost and cost is time. The quicker we can respond the greater the response we can bring to bear and the greater the likelihood of success. So, do you really want to consider authorizing NASA for the disposition of gigatons of nukes?

Perhaps the best argument against NASA as principal agent is simply that they really don't want the job. They know their limitations. They are not stupid. They know that being strategically challenged is a price you pay for objectivity: to be a scientist. They have been aware of this threat for decades - since Gene Shoemaker pointed at a bucket of Moon Rocks and declared them to be impact ejecta. They have had ample time to cast themselves as the unequivocal and clear choice for this responsibility. Instead, their chosen role has been "...to look for asteroids and study them. Not to deflect them or blow them up." They understand that any strategically crucial mission will bring an end to what allows NASA to be NASA. On the other hand, the DoD does not say what it wants or does not want and stands awaiting your orders.

It would be hard to defend a position that NASA should have the general responsibility for the strategic Command, Control and Communication elements of this agency. This is not to say that NASA could not play a crucial role and that they and their sub-contractors would not derive benefit from this agency's funding allocations. NASA has a core of relevant tactical experience and culture that will facilitate the mission of this agency and it would be foolish to simply attempt to reinvent these resources in the DoD.

- Once we begin to think in strategically sound terms and begin looking at worst case scenarios first and appreciating the magnitude of the loss should we fail. Then the wisdom of manned mission interception will afford NASA's current infrastructure a uniquely high value in this agency.
- The heavy lift capability that will be required for responding to anything but the smallest of asteroid threats can be found in NASA's Shuttle C program and needs little more than funding to make it a reality.
- At the heart of NASA is its diverse core of scientists and engineers and as a resource would afford this agency a tactical R&D capability for future generations of NEOSpace Age applicable systems.
- As understanding of all the challenges in executing missions of sufficient capability in time to ensure success evolves, the strategic imperative to pre deploy any tactical response far away from Earth will become evident. NASA's experience in missions beyond LEO, taken with their academic cultural impetus to go to space will be given a strategic justification and energize this necessary projection of power.
- NASA's NEO Observation Program and the orbital processing capabilities at JPL would serve as a rudimentary core from which a fully comprehensive system of asteroid surveillance can be developed.

Strategically directed, as an ancillary and non-responsible component of this agency, NASA and its inherent organic resources can be an effective tool in the defense of the planet.

The DoD already has:

- The Professional Strategic Acuity
- The Credible Funding Integrity
- The Mission Imperative Mindset
- The Space Program and organic Aerospace Infrastructure

- The International Military Compatibility
- The Standing Budget
- The Delegated Nuclear Authority
- The General Mission Flexibility

To successfully meet all the Command, Control and Communication objectives and responsibilities required of this agency and serve the nation both directly and in a subsequent world leadership role.

Precautionary Principle: "Governments shall take action to prevent harm even when it is uncertain if, when, or where the harm will occur." Make no mistake, sooner or later the " Shoemaker Act" (?) now being formulated in Congress, by creating an agency to deal with the threat of asteroid impact, will be proved to be the single most critical piece of human foresight in history.

The initial incarnation of this agency can effectively take the form of an advisory commission providing it has been constituted with a priority mandate to provide a rigorous and subjective assessment of the threat and a strategically sound recommendation for our response. Individually, its members should exemplify the best qualities of the soldier, the scientist and the statesman and the single most important tangible result that this phase can deliver would be a rigorous and comprehensive independent feasibility study of the many diverse tactics now offered to deflect asteroids and comets. So keep in mind, you don't get what you don't pay for.

When you consider that the scope and scale of any mission to deflect a large asteroid or comet may mass millions of tons in LEO and the potential magnitude of the loss should this mission fail. And that taken collectively the operational elements of this issue are far too dense and complex and the consequences of resulting decisions are far too dire for any ad hoc narrowly informed incidental political judgements. The strategic necessity for an agency with a singularly decisive and autonomous authority and the discretion to command tremendous amounts of global treasure becomes manifest. You may very well be creating the progenitor for the single most powerful agency on the planet... so create wisely.

A Million Miles A Day

R. Dale Brownfield

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06/27/05

President George W. Bush
The White House
1600 Pennsylvania Ave NW
Washington, DC 20500

Re: Planetary Defense Agency: NASA vs. DoD

President Bush: Sir,

Congress may soon be taking up the issue of tasking the responsibility of responding to the threat of asteroid impact and as an issue of both national and global security this should ultimately find its way to your attention as well. Although the proximate cause of this initiative is the potential impact of the recently detected and categorically small asteroid MN4 the scope of the mission delegated to this agency will constructively encompass the threat of all future asteroid impacts, small and large, forever. The creation of this agency is about addressing a threat we have known about and all but ignored for 40 years and our finally beginning to meet this unavoidable cosmic cost of living. A cost that, in terms of preparation, training and vigilance should we fail to meet in advance and in full and with sufficient skill, will hold our species and its survival in forfeit.

Since responding to this threat will require a vast increase of our capabilities in space this leaves us only two domestic candidates: NASA and DoD. Taking care not to allow science to dictate strategy, we must create an agency qualified to present us with a cogent perception of this threat and a comprehensive plan founded in something more relevant to the conduct of implementing a response than averaged relative frequency derived statistical probabilities. With such probabilities the only tool available to manage a desirable outcome is hope and hope is simply not a reliable survival tactic. Despite our highly evolved technological state the primal wisdom still stands: if

our species is to continue to survive we can afford to hope for the best only after we have prepared for the worst... not the other way around. That would be no more than gambling.

Implementing our best response will invariably involve a continuous evolution of our technical expertise in areas of engineering and physics and astronomy, and will likely involve massive but relatively surgical nuclear options in space - so scientists will always be required at the tactical level. However, any agency that is to be responsible for defending the planet from asteroid and comet impact will require a far more strategically expert element at its core. All things considered a hybrid agency would appear to be the more viable option. Then, the question is no longer about the players but authority and a clear chain of Command, Control and Communication.

Because this threat must be addressed in space, at first glance many do see NASA as the likely agency to protect us. However, in its 40 years NASA has never protected anyone from anything. Job One at NASA today is the redistribution of discretionary federal funds back to the states in direct proportion to their electoral votes... not to respond to any of our problems or fears. So after decades of discretionary pork barrel funding whenever NASA asks for more money for something it is naturally taken to be just a matter of more pork. When in fact, in terms of our survival, knowing exactly which asteroid is the next large asteroid impactor constitutes the single most crucial piece of knowledge mankind could ever possess... providing we are prepared to deflect it. Yet simply because this presents itself to be the business of NASA mitigates the congressionally expressed public perception of the credibility of this threat and as a result the level of necessity for funding this effort rises to little more than 'academic handout'. On the other hand, because DoD has successfully protected this nation from threats to its citizens and way of life and interests for over 200 years, whenever DoD asks for money it is naturally taken to be a matter of life and death! With 25 times NASA's budget as a reflection of perceived necessity, DoD alone voices the credibility to warrant any reasonable expectation of securing the funding to develop and maintain a response in both technology and expertise equal to the magnitude of this perpetual threat.

If it ever was, this issue is at least no longer about science. It is not about justifying the existence of NASA or the exploration of our solar system or the commercialization of space. This issue is not some new vehicle for more pork for anyone. This is about the prosperity and survival of our species. Task the right agency for the right role and let the spin-offs fall where they may. We must recognize the critical strategic nature of this issue and promote it out the hands of academia and scientific interest up to the responsibility of those who attend to our defense and security and wellbeing. Put it into the hands and minds of those who have diligently developed strategic acuity and expertise in responding to threats as a matter of their profession.

Today, the Battle Cry at NASA is "Safety First"! Engineers and program managers constantly walk a line between the value of the Man and the Machine. The 'Mission' is not even in their equation, and for good reason. There are no dire negative consequences if any NASA mission ever fails or even if NASA fails in its mandate or charter mission statement altogether. Which is fortunate in that far too many NASA missions fail in their principal objective, if not altogether. In science, failure is not only an option it is an opportunity to learn. In this, we may not survive a failure to learn from our mistakes. At DoD it is more often the rule that mission failure is unacceptable and 'at any cost' can include both machine and man, as is the case with this issue. Complete mission success will be the single imperative and only acceptable result. So the question can come down to the comparative mindset, focus and the character of resolve that has become organic in these two cultures. Should we try and teach the scientists at NASA to think like soldiers or task DoD with a new mission in space? DoD does already have a space program.

Given the planet wide nature of this threat it will be a natural and rapid evolution of this agency's authority to assume a leadership role in creating a unified global congress of national planetary defense agencies. The number of space capable nations in the world today can be counted on one hand. Whereas the number of nations with military agencies is virtually total. It would not be difficult to conceive that these brothers-in-arms by profession set aside any adversarial postures to ally and find a level of compatibility under the precept of a 'common enemy' and work in consort to address this threat. At least far easier than their respective political counterparts might. Then, with the right perspective and well-applied statecraft, perhaps an international planetary defense effort could be seen to be readily fundable by the incremental and proportional retasking of standing world military budgets. Essentially, saving mankind from asteroid impact at the cost of reducing our opportunity to kill each other over political, economic and religious principals...

Certainly the first task any agency charged with the defense of the planet will undertake will be to appreciate and qualify all the elements in this issue in order to produce a strategic risk and

response assessment. At this point we do not even know what tactical capabilities we can reliably employ in any response. Since the tactical abilities at our disposal, or lack thereof, are fundamental and deterministic to the formulation of any strategy, a rigorous and diligent analysis of all feasibly executable deflection systems and methods will be the first priority. Such an analysis will likely show that even our most advanced propulsion-based deflection proposals are thousands of times more massive than nuclear deflection tactics. Mass is cost and cost is time. The quicker we can respond and the greater the response we can bring to bear the greater the likelihood of success. Do we really want to be giving NASA gigatons of thermonuclear discretionary authority?

Perhaps the best argument against NASA as principal agent in this is simply that they really do not want the job. They have been aware of this threat since Gene Shoemaker pointed at a fresh bucket of Moon Rocks and declared them to be asteroid impact ejecta. They have had ample time to cast themselves as the unequivocal and clear choice for this responsibility. Yet their chosen role has been "...to look for asteroids and study them. Not to deflect them or blow them up." They know their limitations. They know that being strategically challenged is a price you pay for disinterested objectivity: to be a scientist. They understand that any strategically crucial mission will bring an end to whatever it is that makes NASA, NASA. On the other hand, DoD stands awaiting orders.

It would be hard to effectively defend a position that NASA should have the general strategic responsibility in this agency. This is not to say that NASA could not play a crucial role and that they and their sub-contractors would not derive constructive benefit from this agency's funding allocations. NASA has a core of relevant tactical experience and culture that will facilitate the mission of this agency and it would seem to be unnecessary to reinvent these resources in DoD:

- Manned Mission Experience
- Heavy Lift Capability
- Small Mission Experience Beyond LEO
- Diverse Core of Scientists and Engineers
- NEO Observation Program

Strategically directed, as an ancillary and non-responsible component of this agency, NASA and its inherent resources can be an effective tool in the defense of the planet. But giving a scientist a gun will not make him a soldier anymore than giving a soldier a degree will make him a scientist. There is a fundamental organic dichotomy of perspective that is specific and essential to the effective conduct of both these professions. Their appropriate and discrete usefulness should be a paramount consideration in creating and empowering an agency with the resources necessary to successfully implement a response to this threat.

With DoD we already have:

- Necessary Funding Credibility
- Professional Strategic Acuity
- Mission Imperative Mindset
- Space Program and Aerospace Infrastructure
- International Military Compatibility
- Standing Budget
- Delegated Nuclear Authority
- General Mission Flexibility

To successfully meet all the Command, Control and Communication objectives and inherent responsibilities required of this agency and serve the nation both directly and in a subsequent world leadership role. Since it is far more realistic to consider the material resources and personnel of NASA conveyed to the command and discretion of DoD as needed than it would be to imagine DoD at the discretion of NASA the principal responsible element for this agency should be clear.

Precautionary Principle: "Governments shall take action to prevent harm even when it is uncertain if, when, or where the harm will occur." Make no mistake, sooner or later the legislation now being formulated in Congress to create an agency to deal with the threat of asteroid impact will be proved to be the single most profound and crucial piece of human foresight in history.

When you consider that the scope and scale of any mission to deflect a large asteroid or comet may mass millions of tons and cost trillions of dollars in human endeavor, and the potential magnitude of the loss should this mission fail. And that taken collectively the broad operational elements of this issue are far too dense and complex and the consequences of even basic tactical decisions are potentially far too dire for any ad hoc narrowly informed incidental political

judgements. The strategic necessity to have one expert agency entrusted with a singularly decisive and autonomous authority and the discretion to ultimately command tremendous amounts of global treasure becomes manifestly apparent. You may well be creating the progenitor for the single most powerful agency on the planet here... so create wisely.

At your disposal and convenience in this issue,

A Million Miles A Day

R. Dale Brownfield

cc:

V. President Richard Cheney
Hon. Donald H. Rumsfeld

Gen. Richard B. Myers
Gen. James Cartwright

Dr. John H. Marburger
Dr. Michael Griffin

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Draft Notes:

That the threat comes from space does not in itself categorically make it a scientific issue.

Appraising the threat is not difficult: The Next Large Asteroid on its way to strike Earth is out there somewhere and closing at A Million Miles A Day. But more importantly

If we expect to ever respond to this threat with a reasonably certain expectation of success we need to initiate the process with our best strategic minds. Not only to help us appreciate this threat in its most fundamental tactical terms, but to also slough through the dubious systemic and strategically irrelevant academic insights that have accrued to obfuscate our better judgement.

A soldier will wait until he sees the whites of the eyes of his enemy before he fires his gun. A scientist will wait until he sees the whites of the eyes of his enemy before he invents the gun.

It has been 40 years Gene Shoemaker first brought the threat of asteroid impact to the attention of the world. In that time the next large whole-earth killing asteroid has been out there and has come 12 billion miles closer to impact and if anything, our technical capability to deal with it has not only not been increased to meet this threat but has actually decreased. Astronomers that have been looking for asteroids will tell you that so far they have not found this asteroid yet their efforts and results can be interpreted to have served to somehow reduce the risk... statistically. But when you consider that this asteroid nonetheless does exist and that it is getting closer all the time, and that we are doing nothing in response, and that we still do not know which large asteroid it is and so have no idea when it will arrive. Isn't the

risk in fact increasing and at the rate of A Million Miles A Day? It is past time to make this first strategic step towards this worst case scenario. Nothing can be gained by waiting. How can anything else be wise?

The strategic framework for this issue begins 40 years ago when the only powers on Earth with the strategic capability to address this threat were busy waging a cold war that posed a more imminent and global thermonuclear threat. So Shoemaker's cry of falling sky went unattended by To Whom This Should Concern and never gained more than the attention of astronomers. In addressing this problem they crafted ways to look at it scientifically: academically. As a result (once you change the way you think about it) many have come believe this problem to be far easier to resolve than it actually is... Far easier to deflect this threat from Earth with telescopes and statistics than it would be to do it with rockets in space.

Reasoning from the irrefutable evidence that large asteroids have been striking and forming our planet from the beginning of our solar system, and that this is a continuing process, we can only conclude that The Next Large Asteroid on its way to strike Earth (TNLA) is coming. And has been coming from the beginning. After that there is TNLA 2.0, and so on... forever. There is no shortage of large asteroids. Our solar system has over 2 million of them and some thousand of those (Near Earth Objects) are already lined up to randomly strike our planet sooner and later over the next 500 million years more or less. So if we are to survive as a species we should begin to address this cosmic cost of living... because we can.

Recently this issue was once again brought only to the attention of Congress. However, this time not just to ask for a little more money to look for asteroids but this time far more to actually do something about one! But since this is clearly not something that can be spun as 'science' there is no one there to make the call! So the petition included the far more important plea to PLEASE delegate some discrete authority that can become informed and aware of the complex and dire elements of this issue to actually be responsible for dealing with this threat.

However, 'responsible' does not mean so that we can have someone to blame when some asteroid hits Earth here - NASA would do just fine for that. In this, 'responsible' clearly means someone with the 'ability to respond' and see to it that no asteroid does so. Some agency, who understands that because they are able to respond that if they failed to do so successfully, would hold them selves responsible and to blame... which in itself would serve to help ensure that they did not fail. For this crucial characteristic you are going to have to go to your DoD.

In response to this petition there was a small, positive reaction to bring the issue of a responsible agency not only to the attention of Congress, but to the direct attention of the Executive Office as well.

The problem is, we do not know which large asteroid in our solar system is TNLA therefore we do not know when it will strike or exactly how large it is. But we do know that asteroid impacts are completely aperiodic events so it can strike at anytime. By definition, those involved in the management of this threat have determined that 'large' begins at 1,000 meters in diameter: one billion tons in mass and the equivalent of 100 billion tons of TNT as kinetic energy released on impact. No matter where it strikes, when it does, it will be a very bad day on Earth. At 10,000 meters in diameter we will be looking at a potential extinction level event. deal with this threat. *This* is where the idea of Failure is Not an Option finds its fullest meaning. If we begin now, instead of waiting until we see it coming, we can ensure that we can bring the fullest response to deflect this threat. If we spread this effort over as much time as possible it will feel like little more than a.

This is not about MN4. MN4 is just a little Heads Up, a reminder - a wakeup call, a cosmic warning shot across our bow. This is ultimately about defending against a much greater impact event: TNLA

For this some millions in funding would be required to compensate the engineers, astronomers, economists and sociologists to do this.

Once we begin thinking in strategically sound terms and looking at worst case scenarios first and appreciating the magnitude of the loss should we fail. Then the wisdom of manned mission interception will afford NASA's current infrastructure a uniquely high value in this agency.

The heavy lift capability required for responding to anything but the smallest of asteroid threats is latent in NASA's Shuttle C program and needs little more than funding to make it a reality.

At the heart of NASA is its diverse core of scientists and engineers which would afford this agency a tactical R&D capability for future generations of NEOSpace Age applicable systems.

As understanding of all the challenges in executing missions of sufficient capability in time to ensure success evolves, the strategic imperative to pre deploy any tactical response far away from Earth will become evident. NASA's experience beyond LEO, taken with their cultural impetus to go to space will be given strategic justification and energize this necessary projection of power.

NASA's NEO Observation Program and the orbital processing capabilities at JPL would serve as a core from which a fully comprehensive system of asteroid surveillance can be developed.

The initial incarnation of this agency can effectively take the form of an advisory commission providing it has been constituted with a priority mandate to provide a rigorous and subjective assessment of the threat and a strategically sound recommendation for our response. Individually, its members should exemplify the best qualities of the soldier, the scientist and the statesman and the single most important tangible result that this phase can deliver would be a rigorous and comprehensive independent feasibility study of the many diverse tactics now offered to deflect asteroids and comets. So keep in mind, you don't get what you don't pay for.

Notes:

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