### The Rock – NC

#### My Framework is Avoiding Existential threats of Extinction.

#### Reducing existential risk by even a tiny amount outweighs every other impact — mathematically proven

Bostrom, 2011 – Gannon Award winning Director of the Future of Humanity Institute, (Nicholas “The Concept of Existential Risk,” Draft of a Paper published on ExistentialRisk.com, Available Online at <http://www.existentialrisk.com/concept.html>, Accessed 07-04-2011)

Holding probability constant, risks become more serious as we move toward the upper-right region of figure 2. For any fixed probability, existential risks are thus more serious than other risk categories. But just how much more serious might not be intuitively obvious. One might think we could get a grip on how bad an existential catastrophe would be by considering some of the worst historical disasters we can think of—such as the two world wars, the Spanish flu pandemic, or the Holocaust—and then imagining something just a bit worse. Yet if we look at global population statistics over time, we find that these horrible events of the past century fail to register (figure 3). But even this reflection fails to bring out the seriousness of existential risk. What makes existential catastrophes especially bad is not that they would show up robustly on a plot like the one in figure 3, causing a precipitous drop in world population or average quality of life. Instead, their significance lies primarily in the fact that they would destroy the future. The philosopher Derek Parfit made a similar point with the following thought experiment: I believe that if we destroy mankind, as we now can, this outcome will be much worse than most people think. Compare three outcomes: (1) Peace. (2) A nuclear war that kills 99% of the world’s existing population. (3) A nuclear war that kills 100%. (2) would be worse than (1), and (3) would be worse than (2). Which is the greater of these two differences? Most people believe that the greater difference is between (1) and (2). I believe that the difference between (2) and (3) is very much greater. … The Earth will remain habitable for at least another billion years. Civilization began only a few thousand years ago. If we do not destroy mankind, these few thousand years may be only a tiny fraction of the whole of civilized human history. The difference between (2) and (3) may thus be the difference between this tiny fraction and all of the rest of this history. If we compare this possible history to a day, what has occurred so far is only a fraction of a second. (10: 453-454) To calculate the loss associated with an existential catastrophe, we must consider how much value would come to exist in its absence. It turns out that the ultimate potential for Earth-originating intelligent life is literally astronomical. One gets a large number even if one confines one’s consideration to the potential for biological human beings living on Earth. If we suppose with Parfit that our planet will remain habitable for at least another billion years, and we assume that at least one billion people could live on it sustainably, then the potential exist for at least 1018 human lives. These lives could also be considerably better than the average contemporary human life, which is so often marred by disease, poverty, injustice, and various biological limitations that could be partly overcome through continuing technological and moral progress. However, the relevant figure is not how many people could live on Earth but how many descendants we could have in total. One lower bound of the number of biological human life-years in the future accessible universe (based on current cosmological estimates) is 1034 years.[10] Another estimate, which assumes that future minds will be mainly implemented in computational hardware instead of biological neuronal wetware, produces a lower bound of 1054 human-brain-emulation subjective life-years (or 1071 basic computational operations).(4)[11] If we make the less conservative assumption that future civilizations could eventually press close to the absolute bounds of known physics (using some as yet unimagined technology), we get radically higher estimates of the amount of computation and memory storage that is achievable and thus of the number of years of subjective experience that could be realized.[12] Even if we use the most conservative of these estimates, which entirely ignores the possibility of space colonization and software minds, we find that the expected loss of an existential catastrophe is greater than the value of 1018 human lives. This implies that the expected value of reducing existential risk by a mere one millionth of one percentage point is at least ten times the value of a billion human lives. The more technologically comprehensive estimate of 1054 human-brain-emulation subjective life-years (or 1052 lives of ordinary length) makes the same point even more starkly. Even if we give this allegedly lower bound on the cumulative output potential of a technologically mature civilization a mere 1% chance of being correct, we find that the expected value of reducing existential risk by a mere one billionth of one billionth of one percentage point is worth a hundred billion times as much as a billion human lives. One might consequently argue that even the tiniest reduction of existential risk has an expected value greater than that of the definite provision of any “ordinary” good, such as the direct benefit of saving 1 billion lives. And, further, that the absolute value of the indirect effect of saving 1 billion lives on the total cumulative amount of existential risk—positive or negative—is almost certainly larger than the positive value of the direct benefit of such an action.[13]

#### Asteroids render traditional probability useless – even if the chance is low, the Risk is infinite

Posner, 2004 - Senior Lecturer at the University of Chicago Law School[Richard, Catastrophe: Risk and Response 249-250]

Even if our insouciant reaction to small probabilities of great losses is accepted as an authentic basis for estimating the value of life in most such situations, the reaction may not generalize to ones in which the loss, should it materialize, would be the near or total extinction of the human race. If the annual probability of an asteroid collision that would kill 6 billion people is only 1 in 75 million, the expected number of deaths worldwide is only 80 per year, which may not seem a large enough number to justify the expense of an effective defense against an asteroid collision. (This of course ignores smaller but still lethal collisions; but read on.) But if there is a minute chance that the entire human race, both current and future, would be wiped out, together with all or most of the world’s animal population, we (the ambiguous “we” of policy analysis, but there it may represent dominant public opinion) may think that *something* should be done to eliminate or reduce the risk, slight as it is, beyond what a standard cost-benefit analysis would imply; may be willing, if the risk and the possible responses are explained carefully, to incur some cost in higher taxes or otherwise to reduce the risk.

#### Contention One – Harms

#### 1. Asteroid impacts are inevitable and would threaten humanity – we don’t have enough resources dedicated to this issue despite its importance.

Afrasiabi 2017 – scholar at the Center For Strategic Research, Tehran [Kaveh L. US-Russia And The Asteroid Threat – OpEd, April 13, https://www.eurasiareview.com/13042017-us-russia-and-the-asteroid-threat-oped/]

US Secretary of State Rex Tillerson has just finished his visit in Moscow to discuss Syria and the threat of terrorism and other related issues with the Russian officials, but conspicuously absent from the agenda of his visit is the real and clear danger posed by the threat from space, that is, the asteroids, one of which is due to brush past earth on Wednesday, April 19. In fact, Russia and US have become allies against the asteroid threat since the signing of an anti-asteroid agreement in 2013, initiated by the then energy secretary and scientist Ernst Muniz. This agreement calls for cooperation on research on asteroid defense, raising the prospect of a US-Russia nuclear cooperation, given the potential feasibility of nukes in deflecting or destroying an incoming asteroid — for good reason. The asteroid due for a close flyby next week at a speed of some 60,000 miles per hour is over one mile long and capable of releasing the equivalent of almost 2000 Hiroshima bombs; if it hits the earth, it would cause massive tsunamis and giant fireballs wiping out a good chunk of humanity. In a twist of irony, the NASA officials have reassured us that there is “zero chance” of earth’s collision by this giant asteroid and, yet simultaneously, brand it as a “potentially hazardous object” since it is considered a “near-earth” object and also because of a small uncertainty about its size and orbit, i.e., its path’s trajectory in space, which has its own version of air pockets that can affect an asteroid’s direction, just as its collision with another asteroid can do so, as was the case with the meteor that exploded 27 miles about the ground in Russia in 2014, causing extensive damage and came by undetected from the Sun’s direction; this new one is apparently 60 times bigger, and was detected only 2011. Clearly, humanity is at risk by the asteroid threat and inaction is not an option. World’s scientists including some NASA scientists such as Joseph Nuth have recently lamented our planetary lack of adequate defence against this threat, which has been completely overshadowed by humanity’s other priorities, which pale in comparison when considering the fact that our species survival depends on an effective anti-asteroid defence — that may require the use of nuclear weapons. Yet, despite some feeble initiatives to track and monitor the asteroids, NASA had admitted that some ten percent of the incoming asteroids, i.e., over 10,000, are still not covered by their system, which requires a great deal more funding and human resources, such as increased number of observation points around the world. What is more, the present efforts in asteroid prevention are still in the stage of infancy and initial testing, basically proceeding at snail speed, again mainly due to the woefully inadequate resources committed to these projects, decried by the world’s scientists, some of whom are adamant about the need for nuclear-ready space missions as part of a contingency plan vis-à-vis any asteroid on a collision course with our vulnerable planet. This is one of several options studied at the moment, all of which are still on paper and, on the whole, out of sync with the urgency of the matter that calls for a massive allocation of new resources that, in turn, can even boost the economy by producing new jobs. Hence, it is only logical that US and Russia, which have also collaborated in promoting a UN-based asteroid information network, put aside their present cold war differences and enhance their cooperation for the sake of planetary survival. It is in the vital national interests of both nations to do so, given the common concern about the asteroid threat, that eclipses any human threat such as terrorism by a huge margin. This problem is, unfortunately, sidelined due to the preoccupation with geopolitical considerations, pointing at humanity’s folly.

#### 2. An Asteroid impact dwarfs all other global problems – we must act to avoid it.

Steel 2002 - Joule Physics Laboratory, University of Salford [Duncan October 24, , “Neo Impact Hazard: the Cancer Metaphor” NASA Workshop on Scientific Requirements for Mitigation of Hazardous Comets and Asteroids, <http://www.noao.edu/meetings/mitigation/media/arlington.extended.pdf> ]

The Cancer Metaphor: Why facing up to hazardous asteroids and comets is like dealing with cancer: (1) Early identification is vital Most cancers need to be picked up very early in their development if they are to be treatable. So it is with NEOs. We have no time to lose in identifying any potential Earth impactor: there is no phony war with these objects. (2) Cancer screening (and NEO surveillance) is cheap The cost of screening is smaller than the cost of treatment, and much less than the cost of doing nothing. (3) Everyone can be involved in some way Self-inspection (e.g. for breast, skin or testicular cancer) is simple; but a corollary is that detailed investigations (e.g. for brain tumours) are expensive. Similarly amateur astronomers can provide vital help, although in the end the professionals will need to tackle the job. (4) Identification of a real problem is unlikely Individuals are unlikely to contract specific cancers for which screening is done, but we must aim to check everyone periodically. In the same way we need to seek out all NEOs (non earth objects), and keep tabs on them. (5) False alarms are common Any indicator of a potential problem necessitates careful monitoring, and causes considerable worry. But one should be pleased when the tumour proves benign. Precisely the same applies to NEOs: asteroids and comets discovered and initially flagged to be potential impactors but later shown to be sure to miss our planet represent victories on our part. (6) Tackling any confirmed cancer (NEO impact) is certain to be unpleasant No-one suggests that chemotherapy, radiotherapy or surgical intervention are fun, but they are necessary, as would be the steps employed to divert an NEO, such as the nuclear option. Nor would they be cheap: but the cost would be of no consequence, as with a serious cancer. (7) Just because we don't yet know the cure for cancer does not mean that we should give up looking and trying. Where there is life, there is hope. If we should find an NEO destined by the clockwork of the heavens to impact the Earth in the near future (within the next few decades to a century, say), and using our advanced science and technology we manage to divert it and so save ourselves, this will rank as perhaps the greatest achievement of modern-day civilisation. (8) Just because there are more significant problems facing the world does not mean that we should ignore this one. Having a bad cold or influenza does not mean that you should neglect to have the lump in your breast or the suspicious, dark skin blemish on your neck checked out. Another viewpoint would be that if there is a substantial NEO due to strike our planetary home soon, then we face no greater problem: not terrestrial disasters, not terrorism, not wars, not disease, not global warming, not unemployment nor economic downturns**.** The most likely result of a proper study of the impact hazard is that it will go away, because we will find that no impact is due within the foreseeable future. But the converse is also true: what we now see as a slim chance (low probability of a large impact) may turn into a virtual certainty, which would then supplant our Earthly concerns. (9) Just because we don't yet know a cure for the common cold does not mean that we cannot find the solution for this disease. Some of the greatest dangers we face on a daily basis have quite simple solutions, like imposing speed limits to cut down road fatalities. Conceptually, planetary defense against NEO impact is a far simpler problem than, say, trying to stop major earthquakes or volcanic eruptions, or halting a hurricane in its path.

#### Contention Two - Solvency

#### 1. Privatization is key to planetary defense – private companies can maximize technology and investment

Melamed 2018 - project leader in The Aerospace Corporation’s Vehicle Systems Division [Nahum “Planetary Defense Against Asteroid Strikes: Risks, Options, And Costs” January 2018. *Center for Space Policy and Strategy.* <https://aerospace.org/sites/default/files/2018-05/NEO-Defense_0.pdf>]

Experimental missions involving asteroids include the recently canceled Asteroid Redirect Mission (ARM)17 and Asteroid Retrieval Robotic Mission (ARRM),18 intended to capture a boulder from a distant asteroid and bring it to a stable orbit around the moon. Similarly notable is the proposal of a joint NASA-ESA mission, the Asteroid Impact and Deflection Assessment (AIDA),19 Figure 1: Notional asteroid deflection mission. A NEO with the potential to hit Earth would swing by many times before striking, possibly allowing several opportunities to counter the threat. Intercept Deflected orbit Asteroid Earth Deflector Launch Impact Miss Sun 5 which would attempt to deflect the moon of an asteroid via high-energy kinetic impact. These missions would demonstrate key elements of planetary defense methodology, including the ability to reach and manipulate asteroids.20 Survey data from an ARM/ARRM mission would provide much needed information on the characteristics of threatening bodies.21 An ARM/ARRM mission or a future variant could serve as a precursor to a real NEO deflection effort and demonstrate the capabilities of available assets and identify necessary improvements. The fact remains that no asteroid redirection mission has ever been undertaken; as such, missions such as ARM/ARRM are the only way to assess and advance the capability needed to execute one with precision. Likewise, the proposed AIDA mission could prove invaluable in improving and testing a deflection capability. The kinetic deflector remains one of the simplest, most affordable, and technologically available proposed methods of asteroid deflection,22 and would be tested in depth by an AIDA mission. Alternatively, survey and postmission data from a successful NEO deflection would assist in any future ARM/ARRM or AIDA mission or comparable project. Therefore, the goals of these programs, while distinct, complement each other. Without predecessor missions, ARM/ARRM and AIDA missions depend on each other for practical physical data. Thus, a certain synergy could arise in which the benefits of planetary defense efforts are maximized to justify the inevitable costs and complications. To make up for the distinct difference in funding between national space programs and other budgetary priorities— a condition that exists among all spacefaring nations— the objectives of planetary defense could be tied to those of comparable and related projects to build widespread support. Involving private enterprises in planetary defense could also boost commercial expansion in space. Private sector investment in interplanetary endeavors is needed to further advance technologies and operations applicable to NEO mitigation and, in turn, greatly improve global security. Private enterprises have reason to invest in these endeavors, both as a measure to safeguard their own corporate infrastructure and as an opportunity to pursue government funding and contracts. The growth of companies such as SpaceX demonstrates the possibility of creating an atmosphere for financial success within the aerospace community. Advances in reusable rocketry (such as the Falcon 9 launch vehicle) have shown that private companies can make influential steps to make the future of space investments far more feasible financially and materially. Securing the assistance of such private investors, in combination with government resources, would both further the efforts of the planetary defense program itself and support the growth of public interest and investment in space.

#### 2. Privatization of property on the Moon help develop launch and landing technology which aids asteroid deflection

Augustine, 2009 - Chairman of the Review of U.S. Human Spaceflight Plans Committee [Augustine Commission, “Seeking A Human Spaceflight Program Worthy Of A Great Nation”, October https://www.researchgate.net/publication/290979455\_Seeking\_a\_human\_spaceflight\_program\_worthy\_of\_a\_great\_nation]

Because the Flexible Path option contained a commercially developed lunar lander descent stage, it was evaluated more highly in Economic Expansion as well. The use of a commercial lander is not fundamental to the execution of the Flexible Path, but is more likely in this strategy. The lunar landing would be later, involve a simpler lander, and follow the development by NASA of the in-space re-startable engine, all of which would make a commercial system more viable in the Flexible Path than in the Moon First strategy. Of the evaluation criteria on which the two strategies score equally, there are some distinctions. Under Human Civilization, both lead to better understanding of human adaptation to space, but the Flexible Path aids in the protection of Earth from near-Earth objects. From the viewpoint of Mission Safety Challenges, the two strategies are also about equal. Operations at the Moon are closer and allow return to the Earth more rapidly, but landing on and launching from a surface is a dynamic environment. In contrast, the Flexible Path missions are less dynamic, but occur farther from Earth. There is no reason to believe that the remaining evaluation criteria favor one or the other strategy for exploration. They have more to do with how the strategy is implemented. For example, either the Moon First or Flexible Path could be the basis for a new or extended international partnerships in space.

#### 3. Asteroid deflection would be successful.

Bottke, 2004 - Southwest Research Institute [William F. with Alessandro Morbidelli, and Robert Jedicke; “Mitigation Of Hazardous Comets And Asteroids” https://www.cambridge.org/core/books/mitigation-of-hazardous-comets-and-asteroids/E9C52EFD30EBDDECA63888AEED3FF463]

It is now generally accepted that impacts of large NEOs represent a hazard to human civilization. This issue was brought into focus by the pioneering work of Alvarez et al. (1980), who showed that the extinction of numerous species at the Cretaceous–Tertiary geologic boundary was almost certainly caused by the impact of a massive asteroid (at a site later identified with the Chicxulub crater in the Yucatan peninsula) (Hildebrand et al. 1991). Today, the United Nations, the US Congress, the European Council, the UK Parliament, the IAU, NASA, and ESA have all made official statements that describe the importance of studying and understanding the NEO population. In fact, among all worldwide dangers that threaten humanity, the NEO hazard may be the easiest to cope with, provided adequate resources are allocated to identify all NEOs of relevant size. Once we can forecast potential collisions between dangerous NEOs and Earth, action can be taken to mitigate the potential consequences.