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### 1

OST Cred DA

#### Normal Means requires amending the OST – that causes a runaway amendment convention.

Vedda 18 Jim Vedda May 2018 <https://aerospace.org/sites/default/files/2018-05/OuterSpaceTreaty.pdf> (senior policy analyst, PhD in Political Science at University of Florida)//Elmer

Treaty Amendment. If decisionmakers conclude that the Outer Space Treaty isn’t broken but is just showing its age, targeted changes are an obvious solution—especially in the areas of orbital debris, space salvage, and resource rights, as noted earlier; however, the process of reaching consensus on changes would entail years of diplomatic effort, with no guarantee that the end result would be better than (or as good as) what exists today. The amendment process may not remain limited to the one or two issues that prompted it. The U.N. Committee on the Peaceful Uses of Outer Space has 84 member countries,11 any of which could bring up its own amendments, which could be objectionable to the major stakeholders. Several countries, including China and Russia, have proposed treaty language that would ban all weapons in space,12 a position opposed by the United States. There is a strong possibility that similar language would be submitted as an amendment if the treaty were to be opened for revision. This could bog down the process and derail prospects for achievement in the specific areas originally targeted. In May 2017, the Senate space subcommittee held a hearing on the Outer Space Treaty,13 specifically asking whether it needed amendment to remove roadblocks to space commerce. All seven witnesses—with backgrounds in law, business consulting, and space entrepreneurship—testified that there is no need to amend the treaty, and attempting to do so could leave industry worse off. They described the treaty as minimally burdensome, and emphasized that priority should be given instead to making the U.S. licensing and regulation regime for space commerce more stable, predictable, and transparent. This is not to suggest that amendments should never be attempted, but rather that the amendment process must be undertaken with eyes wide open. The Outer Space Treaty and other space agreements exist in a dynamic environment. Technology continues to advance, and the amount and type of space activity keeps changing— so treaties may need periodic updating. But at present, higher priority should be assigned to development of a well-reasoned and comprehensive national space strategy.

#### That wrecks the OST.

Melroy 17 Pamela Melroy 5-23-2017 “Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space” <https://www.hsdl.org/?abstract&did=807259> (Retired NASA Astronaut)//Elmer

There are many exciting activities and proposals in commercial space. With respect to the Outer Space Treaty, I am deeply concerned that we would be opening a Pandora’s Box by attempting to change it. My concern is that the likely outcome would be a lack of consensus, resulting in no amendments. Instead, we will have a weakened dedication to the Principles of the Treaty and the sustainability of space. Great changes are occurring and many countries are developing capabilities that previously were the purview of only a few nation states. Our ability to compete both economically and technologically in space is crucial. These Principles form the basis for the dialog that we have with other countries about what is appropriate and what is not. Without them, the dialog becomes chaos.

#### Specifically, the auction system shreds the OST- requires removal of the common heritage principle

Landry, 13 -- J.D., The University of Chicago Law School

[Benjamin David Landry, A Tragedy of the Anticommons: The Economic Inefficiencies of Space Law, 38 Brook. J. Int'l L., 2013, <https://brooklynworks.brooklaw.edu/bjil/vol38/iss2/2>, accessed 12-19-21]

E. Multilateral International Auctions (True Property Rights)

Evan Sankey has proposed a similar regime to Dinkin’s. Sankey proposes that we withdraw from the Outer Space Treaty (or amend it to allow property rights) and have an international body auction off real property rights.160 Sankey argues that all extraterrestrial “property would first come under the jurisdiction of an international regime.”161 Then, “[l]ike the [Federal Communications Commission], this international regime could then auction property rights . . . to the highest bidder.”162 And under economic theory, the rights would end up in the hands of those entities who value them most. “This efficient allocation of clear and transferable property rights would . . . provide a much clearer incentive for companies which wish to develop and exploit resources on other celestial bodies to secure funding to do so.”163

An initial question is whether Sankey envisions the amendments to the Outer Space Treaty to remove all sentiments of the common heritage of mankind principle and the prohibition on territorial sovereignty. It seems implicit enough that to add real property rights, the prohibition on national appropriation of property rights must be removed. But whether some portion of the benefit must be allocated to all states is unclear. Due to the lack of discussion, it might be safe to assume that Sankey envisions a complete overhaul of the Outer Space Treaty. If not, many of the same concerns addressed in the analysis of Dinkin’s regime above will plague this proposal—although it seems likely that withdrawing from the Outer Space Treaty is not necessarily a bad thing for Sankey.164

#### Credible OST solves Space War.

Johnson 17 Christopher Johnson 1-23-2017 “The Outer Space Treaty at 50” , <http://thespacereview.com/article/3155/1> (graduate of Leiden University’s International Institute of Air and Space Law and the International Space University)//Elmer

As mentioned, many of the provisions of the Outer Space Treaty were borrowed from previous UN General Assembly resolutions. But as resolutions alone, these documents were non-binding and did not require states to alter their behavior. And while UN General Assembly resolutions are not normally law-making exercises, they do record the commonly-held expression of intentions by the states in the General Assembly, and make political recommendations to UNGA Members (or to the UN Security Council). UNGA Resolutions can also set priorities and mold opinion for inclusion in subsequent treaties. The prohibition on the placement of nuclear weapons and other weapons of mass destruction in outer space or their installation on celestial bodies was taken from UNGA Resolution 1884 of 1963. The resolution: [s]olemnly calls upon all States… [t]o refrain from placing in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, installing such weapons on celestial bodies, or stationing such weapons in outer space in any other manner. This prohibition was transferred to the Outer Space Treaty, and thereby remade into international treaty law. As President Johnson pointed out in his recommendation to Congress to ratify the Outer Space Treaty, “the realms of space should forever remain realms of peace.”5 He continued: We know the gains of cooperation. We know the losses of the failure to cooperate. If we fail now to apply the lessons we have learned, or even if we delay their application, we know that the advances into space may only mean adding a new dimension to warfare. If, however, we proceed along the orderly course of full cooperation we shall, by the very fact of cooperation, make the most substantial contribution toward perfecting peace.6 The agreement contained in Article IV of the Outer Space Treaty reflects an agreement between the US and the USSR, as obligations restricting their freedom of action. Why would a state intentionally place a restriction on itself? Isn’t it better to merely keep outer space as unregulated as possible? Since there were only two states then capable of venturing into outer space, why did either state agree to rules governing its actions? It may seem counterintuitive, but the deeper rationale behind security arrangements like this is that the parties actually benefit in the long-term from placing mutual restrictions on their behavior. Agreeing to restrict your freedom of action has deep links to the usefulness or utility of law itself. Consider driving a car: in order to get a license, you agree to observe certain rules, and the license signals your obligation to obey these rules. However, sometimes adhering to those rules is not only inconvenient (such as stopping at stop signs when there’s nobody else at the intersection), it is also against your short term-interests (you have an appointment or will otherwise suffer from observing the rules.) However, agreeing to operate within a system where your freedoms are sometimes restricted can have the effect of actually increasing your freedom over the long term. Wouldn’t you rather live in a state where traffic laws exist, and other drivers agree to observe them? Isn’t that system preferable to living in a state without traffic rules? Indeed, a system with traffic rules increases not just freedom in general, but overall safety and orderliness. Consequently, because the system with rules is preferable to the system without rules, your willingness to use the roads allows you to travel with greater security and ease. You are better assured of the likelihood that you will get to your intended destination without some other driver crashing into you. Knowing that safe travel is likely, you are more willing to take trips more often, and to farther destinations. Your freedom is actually increased over the long term because you are willing to suffer temporary, short-term restrictions such as inconvenient red lights. Long-term rationality warrants adherence to efficient systems of law. Correctly-balanced rules help increase long-term benefits (like safety and security) that would otherwise be unattainable without a system of rules. It is this rationale that also underpins international treaty-making. Today, the current absence of nuclear weapons or other weapons of mass destruction in outer space attests to the bargain struck in the Outer Space Treaty being a successful one, where security (and the liberty and freedom possible with security) were furthered by the mutual exchange of restrictions that states placed upon themselves. The more than 50 years of peaceful uses of outer space, including cooperation between states who remain rivals elsewhere, are the rich long-term gains resulting from the Outer Space Treaty.

### 2

#### Counterplan: The colonization of outer space is unjust.

#### It competes- the counterplan says the distribution of property rights via an action on other planets or celestial bodies is unjust.

#### Condo counterplans are good- key to test the intrinsicness of aff impacts- winning a straight turn doesn’t prove the aff is a good idea or better than the squo which is the aff burden. They arbitrarily restrict neg options which produces worse debates.

#### Space colonization causes galaxy wars from genetic and ideological diversity- causes drift which undercuts trust, increases incentives to first strike, and causes conflict spirals- results in the use of superweapons like asteroids, sun guns, nanobots, and particle accelerators that end the universe- AND also is an s-risk

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[Phil, founding director of the Project for Future Human Flourishing, "Space colonization and suffering risks: Reassessing the ‘maxipok rule’", Futures, Vol. 100, 2018, p. 74-85, <https://doi.org/10.1016/j.futures.2018.04.008>, accessed 2-11-22, language modified]

1. Introduction

The astronomical value thesis states that the potential value of the future is astronomically large (Author, 2017). This is based in part on calculations of how long our civilization could last in the universe and the vast number of people who could occupy our future light cone. For example, whereas Homo sapiens has so far existed for about 2000 centuries, Earth could remain habitable for another 10 million centuries, or 1 billion years.1 To put this in perspective, if we survive this long, contemporary humans could be a mere 0.0006 percent into writing our story—hardly a word into the prologue.2 Mapping this onto the annual calendar, it means that humanity is slightly more than 3 min into the first hour of January 1. Now consider that the universe will remain habitable for trillions of years—placing us mere nanoseconds past the hour. As for the future population of humanity, Sagan (1983) argued that if our species survives for another 10 million years, we could expect some 500 trillion people to come into existence. A more recent estimate suggests that if Earth’s population remains above 1 billion people with lifespans of “normal duration,” a ten million billion, or 1016 people could inhabit the planet before the sun becomes a bloated red giant. If we colonize space, though, there could be upwards of a hundred thousand billion billion billion, or 1032 people. Even more, if whole-brain emulation (or mind-uploading) becomes feasible, entire planets could be converted into supercomputers that run simulations full of conscious beings. Within a single century, our local supercluster could house some 1038 lives—a truly astronomical figure (Bostrom, 2013).

Based on the astronomical value thesis, Bostrom (2003), following Ćirković (2002), proposes the “astronomical waste argument.” The conclusion of this argument is that, insofar as one accepts a value theory that rejects time discounting of future lives and includes an aggregative evaluation function, we have two primary moral obligations. First, we should make “the objective of reducing existential risks … a dominant consideration whenever we act out of an impersonal concern for humankind as a whole” (Bostrom, 2003). In other words, we are obliged to follow the “maxipok rule,” which instructs us to “maximize the probability of an ‘OK outcome,’ where an OK outcome is any outcome that avoids existential catastrophe” (Bostrom, 2002). An existential catastrophe is then (tacitly) defined as any event that prevents us from reaching a stable state of “technological maturity,” which denotes “the attainment of capabilities affording a level of economic productivity and control over nature that is close to the maximum that could feasibly be achieved.” There are at least four ways that this could happen, according to Bostrom: humanity could go extinct; civilization could permanently stagnate or collapse; civilization could reach technological maturity but in a flawed manner; and civilization could reach technological maturity but subsequently deteriorate (Bostrom, 2013; Torres, 2018a).

The second moral obligation is to colonize our Hubble volume as soon as possible. The reason is that every century of delayed colonization results in 1038 lives lost (as implied above), which equals approximately 1029 lives forever gone every second. Even if mind-uploading is impossible, our local supercluster could house 1023 biological humans, which “corresponds to a loss of potential equal to about 1014 potential human lives per second of delayed colonization” (Bostrom, 2003). While these figures could be off by orders of magnitude, accuracy is largely immaterial to the argument. As Bostrom (2003) writes, “what matters … is not the exact numbers but the fact that they are huge. Even with the most conservative estimate, assuming a biological implementation of all persons, the potential for one hundred trillion potential human beings is lost for every second of postponement of colonization of our supercluster.”

Yet these two obligations are, or could be, in tension, since colonizing space requires the development of advanced technologies and the development of advanced technologies could increase the probability of an existential disaster, which current estimates suggest has a 19 to 50 percent chance of happening this century (see Torres, forthcoming). Thus, the astronomical waste argument also implores humanity to prioritize these desiderata: although the opportunity cost of delaying space colonization is staggering in terms of potential value forever lost, far worse than colonizing space later rather than sooner is failing to colonize it at all, which is why existential risk reduction must be “priority number one, two, three and four” (Bostrom, 2003).3

In this paper, I will argue that space colonization would likely have catastrophically negative outcomes—specifically, it could produce “astronomical amounts” of suffering, or what some theorists have dubbed an “s-risk,” for “suffering risk,” on the model of “xrisk,” for “existential risk” (see Tomasik, 2017a).4 It follows that, insofar as the maxipok rule mandates colonization, we should not abide by this heuristic. Indeed, if the following arguments are sound, then one might even view the maxipok rule as dangerous. Although I won’t explore the issue further in the present paper, perhaps humanity should instead adopt a rule of thumb like the maximin (or leximin) principle, which asserts that one should choose the action with the best worst-case outcome, or the minipnok rule, which states that, paralleling Bostrom’s definition above, whenever we act out of an impersonal concern for humankind as a whole we should try to minimize the probability of a “not-OK outcome,” where a not-OK outcome is any outcome that fails to avoid a suffering catastrophe.5

The following sections explore, in order, technobiological evolution in space, causes of inter-civilizational conflict, mechanisms for enforcing peace, the advanced weaponry that could be available to future civilizations, and finally, what I argue will likely be the default outcome of colonization, namely, the condition of fear and violence that Thomas Hobbes described as “warre.”

2. Descent with modification

As humanity expands into space and our population grows, the human lineage will undergo a process of radical species diversification. The result will be a vast multiplicity of distinct “species.” There are two factors that will drive this process. First, we live in a Darwinian world whereby the mechanism of natural selection is constantly tweaking the genomes of organisms to ensure a satisfactorily good “fit” between the “features” of organisms and the “factors” of their environments.6 The fact is that no planetary milieu, however terraformed, will be identical to that found on Earth, nor will any artificial environment constructed inside spacecraft like O’Neil cylinders. Such environments may be associated with different gravitational properties, atmospheric pressures and chemical compositions, seasonal variations, circadian and tidal patterns, flora and fauna, solar luminosities, and so on. These factors will amalgamate into selective environments that could influence differential reproduction rates, thereby modifying the frequencies of different alleles within spacefaring populations. Interworld transportation may initially result in some degree of gene transfer between civilizations, but as future persons become increasingly spread out, parapatric speciation may yield to allopatric speciation. Although one might surmise that modern civilization (on Earth) has largely neutralized the effects of natural selection, this is probably false. Some geneticists even believe that human evolution by natural selection has accelerated in recent history, with examples being lactose tolerance and perhaps the exceptional intelligence of Ashkenazi Jews (Gibbons, 2007; Pinker, 2011b). Another evolutionary mechanism that could bring about biological evolution is genetic drift, whereby gene frequencies fluctuate randomly. This could be exacerbated by founder effects resulting from single or a small fleet of spacecraft transporting a relatively small number of individuals who ultimately yield a large population; in this case, the spacecraft would induce a “population bottleneck.”7

Second, we live in a Kurzweilian world whereby the trajectory of our evolutionary development is increasingly within our own control.8 In other words, in addition to the unintelligent design of natural mechanisms, we now have the option of intelligently designing our phenotypes to optimize our fit to increasingly artificial environments and realize organismal qualities that we value for positional or intrinsic reasons. The result is a process of cyborgization, or the fusing together of technology and biology, artifact and organism, resulting in posthuman properties like enhanced cognition and morality, indefinite lifespans, expanded emotional ranges, and so on. According to Clark (2003), humans are “natural born cyborgs” who have always used technology to substitute, modify, and enhance our phenotypes. In fact, the archeological record of rudimentary tools—the Oldowan toolkit—roughly coincides with the emergence of Homo habilis, or “man the maker.” But the pace of cyborgization has undergone a rapid increase in recent decades, perhaps following Kurzweil’s Law of Accelerating Returns (Kurzweil, 2005). The contemporary human is not merely fused with artifacts like shoes, clothes, and glasses, but computers, smartphones, automobiles, pacemakers, and neuroprosthesis, to name a few. At the extreme, technology could completely replace biology, an end achievable through whole-brain emulation or the creation of AGI software via direct programming, artificial evolution, or recursive self-improvement (see Bostrom, 2014). These wholly artificial beings could then reside in either the “real” world as embodied androids or simulated worlds like those described by Hanson in The Age of Em (2016). 9

There are a few important consequences of Darwinian and Kurzweilian evolution that relate to the possibility of future species acquiring distinctive and unique cognitive-emotional architectures. First, consider the causal role that emotions play in driving behavior. Happiness, sadness, fear, anger, surprise, and disgust can all motivate us to act in various ways. It follows that posthuman species that develop qualitatively different emotional repertoires could be motivated to act in novel ways, some of which could utterly baffle us.10 Weak analogues can be found among humans: for example, an atheist might find the religious fanatic’s decision to blow himself up in a crowded market deeply perplexing. Yet all humans share the same fundamental neural structures and therefore basic emotional range. Thus, the difference between our emotionality and that of a posthuman species could be more analogous to the differences between, say, mice and chimpanzees, or chimpanzees and humans. A related issue concerns the “orthogonality thesis,” which states that any set of final goals can in principle be combined with any level of intelligence (Bostrom, 2014). It follows that a posthuman species could become superintelligent and still be driven by goals that appear irrational to us (that is, in the value rather than instrumental sense of rationality; see Torres (2017a)).

As for cognition, a being can understand the world only insofar as it can represent the world, and it can represent the world only insofar as it can generate concepts that correspond to features of the world. This is important because a being can intentionally manipulate the world only insofar as it understands the physical laws and causal mechanisms by which it operates. Following Chomsky (1976), we can call puzzles that are in principle knowable relative to a mind-type M, even if not known, “problems” and puzzles that are in principle unknowable to M “mysteries.” The problem-mystery distinction demarcates the cognitive space of M—a space within which are problems (to be) solved and outside of which are mysteries that will forever remain unknown. The point is that the cognitive space of each species is unique to that species, the product of contingent evolution (so far on Earth). It follows that future species with different cognitive architectures could have radically different cognitive spaces. These spaces could subsume, overlap, or entirely diverge from our human cognitive space. In each case, such beings could potentially devise theories that enable them to manipulate the world in ways that we find permanently inscrutable. To use a favorite example of mine, imagine a “chipmunk scientist” trying to figure out how the voice of someone in Tokyo can emerge from a plastic/metal device in Toronto. Since the chipmunk lacks the mental mechanisms needed to generate concepts like microwave frequencies and geostationary satellites, there is no amount of research or schooling that could ever enable the chipmunk to screech “Eureka! So that’s how this works” (Torres, 2017a).

The point is that different species could have fundamentally different models of mind-independent reality, and this could enable them to intervene on the universe in ways that are reciprocally unintelligible to each other. The result could be a rather confusing, unprecedented, and potentially catastrophic sort of “mutually asymmetrical warfare” (MAW), whereby each participant has access to weapons whose underlying causal mechanisms are cognitively closed to the others. Thus, one species might observe something happening—perhaps something harmful—with no way of figuring out how some species on the other side of the galaxy accomplished the feat, or vice versa. Unlike a technologically “advanced” civilization on Earth fighting a technologically “primitive” society—as was the case when Europeans reached the Americas—space wars between posthuman species with different mind-types would be more like a military confrontation between Homo sapiens and bonobos, except that in this terrestrial case the asymmetry is one-sided rather than mutual.11

Yet another kind of diversification that will occur as our descendants propagate through space is cultural or memetic. First, consider that—as discussed below—the cosmic speed limit of light will reduce the efficacy of communication between distantly located civilizations (Deudney, in press). This will, in turn, reduce inter-civilizational meme-flow and enable unique traditions of thought to take shape in quasi-isolated regions of spacetime. Given the possibility of radically different cognitive-emotional architectures, the cultural, political, governmental, religious, linguistic, intellectual, philosophical, scientific, technological, and so on, traditions that arise could be profoundly different from each other, and from the various traditions that have emerged during our own short history on this planet. In a phrase, colonizing space will have the exact opposite effect that globalization has had on Earth. Whereas the latter has homogenized the world in innumerable ways and, indeed, will ultimately yield a single race of brown-skinned humans, space colonization will generate unprecedented phylogenetic and ideological diversity. The global village will fracture into an astronomical number of distinct cosmic settlements.

3. Why would space be peaceful?

Given this snapshot of the far future, the question arises: why would space be peaceful? Here we will propose a theory of cosmic conflict, or an explanatory account of why civilizations might be driven to engage each other in violent confrontations. To begin, consider “an analysis of the incentives for violence that is as good as any today,” as Pinker (2011a) describes it, namely, that proposed by Hobbes. This analysis identifies causes of conflict within a condition of anarchy, i.e., a situation in which there is no ruling power—and hence no hierarchy—that can impose law and order on individuals, a fact that will become relevant in Section 4. Hobbes (1982) writes:

So that in the nature of man, we find three principal causes of quarrel. First, competition; secondly, diffidence; thirdly, glory. The first maketh men invade for gain; the second, for safety; and the third, for reputation. The first use violence, to make themselves masters of other men’s persons, wives, children, and cattle; the second, to defend them; the third, for trifles, as a word, a smile, a different opinion, and any other sign of undervalue, either direct in their persons or by reflection in their kindred, their friends, their nation, their profession, or their name.

Let’s call actors motivated by gain—or, more usefully, “malign intentions”—Machiavellian actors and those motivated by diffidence or fear Tuckerian actors. 12 (We will discuss actors motivated by credibility—Hobbes’s third cause—in Section 5)

But Hobbes’s analysis is incomplete; there are actors whose motivations do not clearly fall within his tripartite framework. Consider religious zealots who pursue an action for the sole reason that they believe God has commanded them to do so. In fact, history is replete with dangerous apocalyptic movements that perpetrated violent acts in accordance with eschatological narratives in which they saw themselves as active participants. The doomsday cult Aum Shinrikyo, for example, released sarin in the Tokyo subway system in an explicit effort to initiate World War III, or Armageddon, and the Islamic State attempted to lure coalition forces to northern Syria—specifically, to a small town called Dabiq—because this is where they believed that Armageddon would occur. Similarly, Christian dispensationalists in the US—sometimes dubbed the “Armageddon lobby” (Haija, 2006; Torres, 2017a)—have shaped US foreign policy in the Middle East based on their particular premillennial beliefs about how the eschaton will unfold. None of these groups were motivated by fear (in Hobbes’s sense), nor were they seeking personal gain, at least not as a final goal. Although intelligence and religiosity are negatively correlated among humans on Earth, the orthogonality thesis reminds us that it is possible for some future posthuman species to acquire exceptionally high levels of instrumental rationality while nonetheless adhering to some religious and/or eschatological theses that would appear—to us—to be epistemically and/or morally absurd (see Torres, 2017b, 2018d; Zuckerman, Silberman, and Hall, 2013).

Borrowing from the “agential risk” framework that I have elsewhere outlined, we can further identify actors who are driven by “pro-mortalist” ethical systems, extreme environmentalist ideologies, or “idiosyncratic” beliefs/desires about how the world is and ought to be (Torres, 2017a). For example, “radical negative utilitarians” (RNUs) believe that one’s behavior is morally good only insofar as it reduces the suffering of sentient beings. Since the ultimate way to reduce suffering is to eliminate that which can suffer—preferably through some painless, instantaneous process, which may become possible, as we will see below—it follows that the annihilation of all life in the universe constitutes the best possible outcome. The point is that radical NUs exist today on Earth, and there’s no reason to believe that this moral stance couldn’t spread to or spontaneously emerge within other civilizations, thereby posing an existential threat to everyone. One can similarly imagine some form of “cosmic environmentalism” that sees the colonization of space by descendants of Homo sapiens as destroying the “natural beauty” of the universe—especially if destructive conflicts become the norm. There could arise sentiments according to which our progeny (their contemporaries) are “Posthumanpox” that have spread like a virus, destroying everything that it comes into contact with.13 As a virus, this Posthumanpox must be eliminated in toto, just as some radical environmentalist groups have advocated the complete extermination of human beings on Earth through the use of advanced technologies. Given the potentially vast number of future civilizations, it stands to reason that at least some will develop contrarian views that cast our descendants’ collective exploitation of negentropy in a negative light.

And finally, there could be civilizations led by individuals who harbor a death wish for posthumanity, as it were, due to some pathological quirk in their psychological make-up. This is also not implausible given that, as I have elsewhere documented (Torres, 2018), there have been numerous people—often of high intelligence—throughout history who have both (a) engaged in horrific violence, and (b) expressed omnicidal fantasies in either public or private. There is, indeed, strong evidence that if such individuals were to gain access to a “doomsday machine” of some sort they would have sadistically, suicidally, and gleefully used it to annihilate their conspecifics. As Sagan (1994) notes, referring to the menacing possibility of redirecting asteroids toward Earth, there really are madmen in the world:

We are sometimes told that this or that invention would of course not be misused. No sane person would be so reckless. This is the “only a madman” argument. Whenever I hear it (and it’s often trotted out in such debates), I remind myself that madmen really exist. Sometimes they achieve the highest levels of political power in modern industrial nations. This is the century of Hitler and Stalin, tyrants who posed the gravest dangers not just to the rest of the human family, but to their own people as well. In the winter and spring of 1945, Hitler ordered Germany to be destroyed—even “what the people need for elementary survival”—because the surviving Germans had “betrayed” him, and at any rate were “inferior” to those who had already died. If Hitler had had nuclear weapons, the threat of a counterstrike by Allied nuclear weapons, had there been any, is unlikely to have dissuaded him. It might have encouraged him. Can we humans be trusted with civilization-threatening technologies?

The very same question can and must be asked about our posthuman descendants—indeed, it may be all the more urgent given the cognitive-emotional diversification of lifeforms during the deep space diaspora. The picture that emerges from such considerations is one in which there will exist at least some, and potentially many, civilizations that are inclined toward violence. Some will engage in violence for imperialistic reasons—for gain—while the impetus for others will be religious, apocalyptic, pro-mortalist, antiposthumanist, environmentalist, or “psychopathological” in nature. The existence of Machiavellian actors will, in turn, give others a strong incentive to engage in preventive or preemptive strikes against potential predators. To quote Levy and Thompson in Causes of War (2010), “a preventive war is motivated by the perception of a rising adversary, a shift in power, and by the fear that once the adversary is stronger it will attempt to exploit its advantage through coercion or war … and is driven by ‘better-now-than-later’ logic.” In contrast, “preemption involves a military attack in response to the virtual certainty that the adversary is about to strike and by the motivation of gaining the advantages of striking first.”

Even more, the motivation to strike first need not involve a Machiavellian actor at all; it could involve two or more Tuckerian actors with no malicious inclinations whatsoever. The crucial idea here is what international relations scholars refer to as the security dilemma, whereby, in sum: anarchy generates uncertainty about the present and future intentions of other actors; this leads to fear, resulting in the accumulation of weapons arsenals, etc. for “defensive” purposes; this increases the fear of other actors uncertain of one’s true intentions, thereby producing a spiral effect, or vicious positive feedback cycle, that can foment conflict, as other actors increase their own arsenals for “defensive” purposes as well (see Tang, 2009). In other words, two peaceable civilizations could end up warring due merely to a spiral of escalating militarization given a lack of mutual trust. A related concept is Schelling’s dilemma, also known as the “Hobbesian trap,” whereby one actor engages in a first strike against a second actor due to a fear of being imminently attacked by the first actor. Again, neither might harbor malign goals (although one could), yet they engage in war for purely game theoretic reasons. The classic illustration of this involves a robber with a gun who breaks into a house intending only to steal jewelry; the owner wakes up and confronts the robber with a gun. Neither wishes to shoot the other, yet each fear that they will be shot if they don’t shoot first. The result is tragedy.

There is another version of this situation that doesn’t pertain to each actor’s intentions with respect to others. Rather, it arises from a combination of (a) fallibility, and (b) technological capability. For example, civilization A might decide, after sufficient deliberation, that civilization B poses no malign threat; yet it might also worry that B is not responsible enough to possess its technological power. Perhaps B is conducting high-powered physics experiments that could produce a dangerous black hole or some other catastrophic phenomenon that would affect A. If efforts by A to convince B not to run such experiments fail, it could be in A’s preservational self-interest to invade, conquer, and/or destroy B. Thinking about this situation in the context of a galaxy of potentially billions of civilizations, it could be in any given civilization’s best interest to annihilate all other civilizations in the universe, just in case they were to cause a galactic- or cosmic-scale disaster by accident. Put differently, error as well as terror could fuel intercivilizational conflicts.

Even more, the security dilemma/Hobbesian trap predicaments could be exacerbated by potential difficulties in interspecies communication, which would further vitiate the trust needed for civilizations not to attack each other. First, the Quinian “indeterminacy of translation” suggests that contact between civilizations could fail to convey the intended meaning, possibly leading to trouble (see Jebari & Olsson-Yaouzis, in press). Second, if two species come to have different cognitive spaces or emotional repertoires, this could make understanding the other fundamentally impossible, thereby fueling suspicions about the beliefs, desires, and capacity for deception of the proverbial “Other.” Indeed, the lack of common “ontological ground” could also lead to breakdowns of empathy: trying to understand how an action X makes another species “feel” would be like a human trying to understand “what it’s like to be a bat.” More dangerously, it might not even be clear to species A that species B can have conscious experiences of pain in the first place. “So,” A might reason, “why would it be unethical to harm species B?” Species in such situations are not merely aliens to each other but, more significantly, alienated from each other.

Yet another issue worth mentioning is that future space weapons could not only enable civilizations to obliterate each other, but phenomena like mind-uploading and life-extension could enable captors to inflict “eternal punishment”—that is, until the entropic death of the universe14—on those captured, thus greatly increasing the stakes of conflict. For example, civilization A might not only worry about the aggressive, expansionist proclivities of civilization B, but fear that if it were to resist B’s demands and subsequently succumb to its military advances, the surviving individuals of A would be cast into an artificial perdition of interminable suffering. This could give A an even greater incentive to launch a first strike against B—to eliminate the dual threats of dying in war and living in hell.15

To summarize so far: expansion into space will generate phylogenetic and ideological diversity that could yield profoundly disparate types of civilizations. The species who comprise these civilizations could have entirely different normative preferences, moral tendencies, and even scientific institutions. Some will almost certainly be violence-inclined, thus giving others an incentive to strike first. Even more, diversity with respect to cognition, emotionality, and language will undercut the mutual trust needed for otherwise irenic civilizations to avoid spirals of militarization or defect in prisoner’s dilemma predicaments. Thus, a colonized cosmos would be an arena poised and spring-loaded for violence. But is there a way to prevent conflict from breaking out?

4. How could space be peaceful?

In Leviathan, Hobbes argues that when instrumentally rational, self-interested individuals find themselves in anarchic conditions, they will band together through a “social contract” to establish a supreme governing body that has a “monopoly of the legitimate use of physical force within a given territory” (to quote Weber, 1919). In exchange for giving up some personal liberties, this governing body—which Hobbes called “the Leviathan”—will provide the citizens with security. Consequently, war is replaced with law, anarchy with hierarchy. Moving up a level of organization from the state to the international system, one finds an isomorphic situation with respect to Hobbes’s “state of nature.” Here governments (and their institutions) can be seen as “individuals” in an anarchic realm that consists of all other states. It follows that one way to establish peace among states is to implement a global Leviathan that takes the form of a “world government,” “singleton,” or “supersingleton” (see Bostrom, 2005; Torres, 2018b). Moving yet another level up from the geopolitical to the cosmopolitical realm, the same conclusion follows: to replace war with law, civilizations should band together and establish a cosmic Leviathan that provides security at the minor cost of some civilizational freedoms.

Unfortunately, this appears unpromising. Let’s begin by reflecting on the inscrutable vastitude of space and how this would affect a cosmic Leviathan’s ability to coordinate, regulate, and punish the actions of Machiavellian and Tuckerian actors. While potentially habitable exoplanets cluster around common solar bodies, the distance between solar systems can be immense. The super-Earth Gliese 581d, for example, is approximately 20 light-years from Earth, meaning that an electromagnetic signal sent as of this writing, in 2018, wouldn’t reach it until 2038. A spaceship traveling at one-quarter the cosmic speed limit—perhaps employing some form of nuclear pulse propulsion—wouldn’t arrive until 2098, and a message to simply affirm that it had arrived safely wouldn’t return to Earth until 2118. And Gliese 581 is relatively close as far as exoplanets go: the Andromeda Galaxy is some 2.5 million light-years away and the Triangulum Galaxy about 3 million light-years. Even more, there are some 54 galaxies in our Local Group, which is about 10 million light-years wide, within a universe that stretches some 93 billion light-years across; and recall that the universe is metrically expanding at an accelerating rate. (See Fig. 1.)

The point is that the laws of physics, as we know them, impose significant constraints on the travel of spacecraft and informationcarrying beams, which would make a cosmic Leviathan extremely dissimilar to the Leviathans under which we live on Earth.16 Timeliness is necessary for states to satisfy their half of the social contract, and the hard limits to travel and communication would render attempts to provide civilizational security across galaxy clusters, superclusters, and so on, untimely. Imagine the futility of the state if one has to wait two weeks for an emergency 911 call to reach the operator or for the police to show up at the scene of a bank robbery. The social contract would fall apart, and for this very reason it is unlikely to ever be “signed” by a large number of spacefaring civilizations to begin with. Another problem with the cosmic Leviathan proposal is that it would require the approval of its member civilizations for its legitimacy, and approval would require the government to adequately represent the interests, beliefs, desires, and so on, of not only trillions and trillions and trillions of different individuals, but upwards of billions and billions and billions of different species. It is difficult to imagine how a single, centralized entity could do this, especially if some of the interests, etc. of member species are in tension or outright contradictory, as will no doubt be the case.

The discussion so far has largely assumed a neorealist framework—the most dominant theory among international relations scholars—with respect to the cosmopolitical realm. Yet some scholars in the liberal tradition emphasize other possibilities for peace. For example, there is robust evidence that democracies almost never fight each other, an idea dubbed the “democratic peace theory.” The two primary reasons proposed for this finding are, first, that democracies share a special “trust” and adhere to similar norms; this is the normative explanation. And second, that democratic leaders are more accountable to their citizens than autocratic states; this is the institutional explanation. Note here that democracies aren’t necessarily less warlike, only that in dyadic configurations where both actors are democratic, war is improbable. A related idea goes by the name “capitalist peace theory,” according to which states with capitalist economies rarely go to war. One reason is trade interdependence: it might not pay to invade another country if that country is supplying the invading force with useful commodities. Along these lines, Friedman (2005) has offered the “Dell Theory of Conflict Prevention,” which states that “no two countries that are both part of a major global supply chain, like Dell’s, will ever fight a war against each other as long as they are both part of the same global supply chain.”

The question is whether such theories offer hope that inter-civilizational war will be rare, and the answer appears to be negative. For one, there is no particular reason to believe that future civilizations will be democratic, although even if all of them are, at the extreme, the differences between species—their cognitive spaces; emotional repertoires; cultural, political, religious, etc. traditions; and so on—would surely overwhelm the common value that “electing political leaders through popular vote” is the best form of government. Second, the political fallout of launching a war provides leaders an incentive not to fight only if there exists the possibility of injurious retaliation or engagement; as we will see below, though, some futuristic weapons would very likely preclude both. And third, the (i) distances between solar systems, (ii) ability to mine asteroids, and (iii) development of artifacts like nanofactories would make material trade between civilizations unnecessary. Thus, it appears unlikely that two or more civilizations would become part of a major cosmic supply chain, to echo Friedman’s phrasing. This suggests that establishing a “Kantian-type peace” within the cosmopolitical realm will be unworkable. The liberal tradition offers no more hope than a cosmic Leviathan.

5. Space-Age weaponry and the balance of terror

Yet there is another strategy for neutralizing the Hobbesian trap, namely, a policy of deterrence, also known as a “balance of terror” or, during the Cold War, “mutually-assured destruction” (MAD). This asserts that “if you strike me, I will most assuredly strike back with equal or greater force, and if I strike you it will only be because you struck me first.”17 Deterrence is only effective when one’s adversaries genuinely believe the statement, “I will most assuredly strike back.” This returns us to Hobbes’s third cause of conflict from Section 3: glory, honor, or credibility. To establish credibility and, therefore, dissuade potential attackers, one has reason to engage in confrontations with others and, in doing so, to demonstrate one’s capacity for violence. The question is whether policies of deterrence implemented by civilizations throughout the cosmos would be sufficient to obviate war. To answer this question, let’s begin by considering the unsettling range of weapons that will likely be available to our spacefaring progeny; we will then explore how these weapons could enhance or mitigate the effectiveness of deterrence.

5.1. Weapons of total destruction (WTDs)

There are a variety of “kill mechanisms” that one civilization could use to obliterate another. In relatively close propinquity, chemical and biological weapons could offer a means of targeted violence, since the deleterious effects of such weapons might be limited to a particular species (Deudney, in press). For example, the toxicity of a chemical X might be low for a species A but lethal to a species B. This could enable A to use X on B without fear of X harming A—a concern that has dissuaded some terrorists from employing chemical weapons. The same goes for a pathogenic germ Y: since pathogens often only harm single species, biological weapons could be used without the perpetrators worrying about becoming sick. With respect to artificial intelligences, there could be viral malware that affects only certain types of software; in this case, such viruses could be transferred not at the velocity of a sneeze but at the speed of light, traversing astronomically large stretches of space to devastate colonies of artificial-substrate beings.

Another possibility involves weaponizing “minor planets” like asteroids. This hints at the deflection dilemma discussed by Sagan (1994), among others, whereby the very same technology that could deflect an asteroid away from Earth could also be used to redirect one toward it. The resultant “planetoid bombs” could be launched in the direction of target civilizations at extremely high velocities and inflict far greater destruction than all the nuclear arsenals on Earth combined (see Cole & Cox, 1965; Deudney, in press). Even more, asteroids are extremely numerous in the solar system and have a wide range of sizes, with estimates of 1.1 to 1.9 million that have greater-than-1-kilometer diameters in the asteroid belt between Mars and Jupiter. (A 1-kilometer impactor striking Earth would likely annihilate humanity by causing an impact winter.) Thus, asteroids constitute an abundant source of easily obtainable, civilization-ending weaponry—a particularly worrisome fact given that the technological capabilities to redirect asteroids will likely emerge at an early stage in our diaspora “out of Earth,” as it were (see Deudney, in press).

Other futuristic space weapons include military drones that either initiate attacks or engage in clandestine surveillance of other civilizations. Such drones could hide themselves from counter-surveillance detectors by employing metamaterial invisibility cloaks and propagate themselves through the von Neumann process of self-replication, that is, by converting raw materials into clones of themselves. There is also the possibility of using “heliobeams,” or “sun guns,” to destroy targets by concentrating large amounts of solar radiation via a concave mirror on a satellite. Even more catastrophic are direct-energy weapons (DEWs) like lasers and particlebeams that use highly focused energy to superheat their targets. In fact, the US government has already developed weapons of this sort—they are science fact rather than fiction—although future breakthroughs could enable them to become immensely more destructive. If this is the case, they will offer yet another mechanism for wreaking unprecedented harm (see Deudney, in press). Along these lines, Sandberg (in press) and Sandberg, Armstrong, and Cirkovic (2016) suggests that technologically advanced civilizations could potentially use gravitational waves to create black holes. Generating waves of sufficient intensity would be energetically inefficient, according to current physics, but they have the advantage that they can interact with dark matter objects, unlike electromagnetic-energy weapons.

Even more, the universe appears to be in a “metastable” energy state. This suggests that one could tip it into a more stable, lowerenergy state, perhaps by concentrating huge quantities of energy in tiny regions of spacetime, as occurs in some high-powered physics experiments. In other words, a particle collider could be weaponized to intentionally nucleate a “vacuum bubble,” or sphere of “true vacuum” spreading in all directions at the speed of light and destroying everything with which it comes into contact. Who might weaponize a particle collider? First, there could be actors who use the threat of a vacuum bubble for blackmail purposes. Second, there could be madmen (like Hitler) who create a vacuum bubble to avoid defeat. That is to say, a predatory actor could hold the following preference ordering: (i) triumphant victory over, say, its Local Group, (ii) total annihilation of the universe, and (iii) defeat. Third, particle colliders would also be the ideal WTD for RNUs, since it would enable them to obliterate not only all extant life in the universe but the very potential for life to arise—and it would do this without inflicting any suffering whatsoever.18 Another possibility is that Tuckerian actors create a vacuum bubble for the purely defensive reason of eliminating all potential attackers in the universe. As Sandberg (2017) speculates, it might be possible for “certain configurations of matter, energy, black holes, etc. [to] induce a posttransition structure that can act as an assembler.” This “assembler” would enable “some information [to] be transmitted into the new state,” thus making it possible for a civilization to “survive,” in some sense, the universe settling into a lower-energy configuration. On the other side of this transition, the “structure” can recrudesce into a new daughter civilization with the certitude that it is completely alone and, therefore, safe.

Finally, it is crucial to note that future beings—some of whom may have hugely augmented cognitive capacities—will almost certainly invent new weapons that are more powerful and effective than anything we could imagine. Such weapons could enable civilizations—or perhaps lone wolves, of which there could be, once again, trillions and trillions and trillions—to cause unprecedented injury to other civilizations. Consider the following passage from Bostrom (2013):

One can readily imagine a class of existential-catastrophe scenarios in which some technology is discovered that puts immense destructive power into the hands of a large number of individuals. If there is no effective defense against this destructive power, and no way to prevent individuals from having access to it, then civilization cannot last, since in a sufficiently large population there are bound to be some individuals who will use any destructive power available to them.

Scale this up from the individual level to the cosmopolitical level and the same conclusion follows: Life in the universe cannot last.

5.2. Policies of deterrence

With this brief sketch of space weaponry in mind, let’s consider the deterrence predicament beginning with the colonization of Mars and expanding outward from there. As colonies on the fourth rock from the sun become increasingly Earth-independent, they will begin to develop their own culture, political systems, religious traditions, and perhaps even technologies. The Darwinian and Kurzweilian mechanisms will also engender new forms of martian posthumans that nontrivially differ from Earth-bound (post) humans. If “morphological freedom” is granted to martian citizens, then there could emerge a general phylogenetic trajectory of the entire population in addition to more specific ontogenetic trajectories resulting from individual phenotype modifications. (The same goes for populations on Earth.) As Deudney (in press) notes, geopolitical theory predicts that groups exhibiting greater differences are more likely to engage in conflict, and since differences are likely to evolve between the populations of Earth and Mars, one should expect tensions to rise. There could, for example, be competition for astronomical resources (such as asteroids and comets), leading to disagreements about inter-planetary policies and practices. Domestic affairs that one side sees as worrisome—e.g., the election of a demagogic strongman with xenophobic tendencies, or the collapse of some global regulatory organization—could also lead each to question the trustworthiness of the other, thus planting the seeds for a security dilemma whereby each militarizes space, for “defensive” reasons, in response to the other militarizing space, and so on.

One might surmise here that a balance of terror could establish bipolar stability, just as MAD did during the Cold War. Yet this appears implausible given the weapons mentioned above. For example, if one side could release self-replicating nanobots that ~~cripple~~ the target civilization before it can retaliate, the result would be a terror imbalance that, under certain circumstances, would make a first strike game theoretically rational. In fact, Kurzweil outlines a scenario in which ecophages destroy the entire biosphere of Earth within ∼90 min. This would involve a two-stage attack: first, a small population of nanobots would spread around the globe, and second, at an “optimal” time this population would begin to self-replicate at an exponential pace. To put this in perspective, signal delays between Earth and Mars range from 4 to 24 min, depending on where each planet is in its orbit, and travel times range from 150 to 300 days. Add to this the inevitable lag of bureaucracies and the outcome is a serious credibility-of-deterrence problem. Even more, some future genius could invent a far more effective way of weaponizing nanobots in the next 100 years, at which point humanity will probably have established martian colonies.19 Related scenarios involving designer pathogens that initiate “engineered global pandemics” or planetoid bombs capable of obliterating whole metropolises—or perhaps an entire ecumenopolis, if one exists—could also be imagined, although I will leave this task for the reader.

But the situation is far worse than this, because ecophages, pathogens, and asteroids won’t pose the greatest risks to interplanetary peace: heliobeams, DEWs, and gravity waves not only could inflict catastrophic damage on their targets but they could do this at or near lightspeed. In a flash, one civilization could ~~cripple~~ [destroy] the other’s key military and/or civilian infrastructure, thus rendering it unable to effectively respond to an attack. Furthermore, since the speed of light imposes an upper bound on information transfer, there could be, in principle, no early-warning systems to alert the target civilization that an attack has commenced, which would severely compromise its ability to initiate defensive measures. One might here wonder: perhaps the attackee could overcome this defensive vulnerability by stationing counterstrike military drones throughout the solar system. They could be programmed to launch a coordinated attack if they fail to receive a “no-strike” signal that is ordinarily sent to them every few minutes. Thus, the destruction of key military infrastructure would result in the cessation of this signal and therefore the initiation of a counterstrike. But this too appears otiose since a first strike using, say, DEWs could simply target these drones as well. The result is that threats of retaliation from each civilization would be literally in-credible and the balance of terror would collapse.

Here we should also not overlook the potential for accidents to cause conflicts when inter-civilizational tensions are sufficiently high. The disturbing historical fact is that “pure dumb luck” played a critical role in preventing nuclear war from occurring during the Cold War. Individuals like Vasili Arkhipov and Stanislav Petrov more or less single-handedly averted nuclear holocausts, and an interpretation error in 1995 led Boris Yeltsin to become “the first Russian president to ever have the ‘nuclear suitcase’ open in front of him” (Cirincione, 2013). Although intelligence is negatively correlated with accident proneness, and presumably our (post)human descendants will be cognitively enhanced to some extent, even a small probability of error could make disaster almost certain (see Torres, forthcoming). For example, imagine that a mere 500 people have access to a “button” that, if pushed, would initiate a catastrophic first strike against the other civilization. If each of these individuals has a mere 0.01 chance per decade of accidentally pushing this button, the result is a staggering 99.3 percent probability that, within 10 years, the strike will occur. So, perhaps Earth and Mars—whose civilizations could potentially coexist for another 10 million centuries, until the sun burns out—won’t be quite as lucky as the US and Soviet Union were for the slightly more than four decades between 1947 and 1991.

The final step in the present argument is to project this bi-planetary predicament into the vast reaches of outer space. Consider the billions and billions and billions of populations that could come to occupy a universe with 10 trillion galaxies and 1024 stars, each with its own traditions, boasting of weapons that could destroy entire galaxies or even the entire universe, and embedded in a cosmopolitical system of lawless anarchy. There is no supreme governing system to provide security and no policies of deterrence to reliably prevent first strikes. It is hard to imagine how such a predicament could avoid constant and catastrophic wars between civilizations both near and far. Indeed, theorists like Waltz (1979) have argued that multipolar state configurations are less stable and more prone to conflict than bipolar configurations. The reason is that uncertainty increases with the number of actors, and as uncertainty increases, so does distrust of everyone else’s intentions. Hence, the more civilizations there are in the universe, the greater the incentive for Tuckerian actors to preventively or preemptively strike their neighbors—or to induce a vacuum bubble in the hope that an “assembler” on the “other side” can enable some form of post-transition survival. The point is that the future will be marked by radical multipolarity, and this will greatly increase the probability of violence. Yet the difficulty of establishing Earth-independent colonies on Mars without catastrophic wars—as outlined above—suggests that our descendants might not make it beyond the solar system. In fact, Deudney (in press) argues that attempts to colonize space could constitute the Great Filter that explains why we see no evidence of intelligent aliens crying out for cosmic companionship in a universe slowly sinking into thermodynamic equilibrium.20

6. Additional considerations

Before concluding, let’s consider three additional issues that are relevant to the present thesis. First, this paper focuses on one of a few foreseeable space-colonization scenarios. Another possibility, which is endorsed by some scholars at the Future of Humanity Institute (FHI), is that humanity creates a singleton controlled by a friendly superintelligence before we propagate beyond the solar system.21 I see two problems with this: (i) we will almost certainly establish martian colonies before we leave the solar system and, as subsection 5.2 notes, tensions will likely emerge between martian and earthian civilizations as they become increasingly independent; this could make a joint martian-earthian singleton difficult to establish.22 And (ii) it is unclear why a superintelligence that facilitates the posthuman colonization of space wouldn’t encounter the same insurmountable challenges that led us to dismiss, in Section 4, the feasibility of a “cosmic Leviathan.” How exactly could a superintelligence enforce law and order when physical limitations like the speed of light severely problematize the coordination of far-away entities? One might try to circumvent this issue by arguing that a singleton could take the form of some immutable software that governs the behavior of all future beings and must be embedded within every technological civilization, spacecraft, and so on. This would overcome the communication challenge associated with the spatial vastness of the universe, since no communication between instances of the program would be necessary. Yet this too seems problematic. Consider that if humanity spreads beyond the solar system in 100 years, then we will need to have this software in its final form within a century. Doing this would require solving the philosophical problem of determining which values should guide all future beings for the rest of time (since the software is immutable, a necessary condition to overcome the communication challenge), as well as the technical problem of ensuring with virtual certainty that this software will remain regulatorily efficacious even after millions of years of unimaginable future development (i.e., it can’t be the case that future breakthroughs enable hackers to disable the software). Perhaps there could be periodic software updates, but this brings us back to the formidable question of what central decision-making body would decide which updates to make, how this body could represent the interests of so many diverse species, and so on. In my view, this proposal does not offer a promising solution to the security problems outlined above.

Second, a shortcoming of the present analysis that we should flag concerns the immense uncertainty about what future technology might look like. There are, obviously, epistemic limitations to anticipating the kinds of defensive technologies that could be invented centuries, millennia, or billions of years from today. Perhaps some distant civilizations develop highly effective and “invincible” counterstrike weapons that, as such, can deter all preemptive attacks. Just as Bostrom (2013) asks us to imagine a ball that, once removed from the urn of innovation, cannot be placed back into that urn and that brings with it almost certain doom, so too could there be “eucatastrophic” inventions that greatly increase inter-civilizational and inter-species peace (see Cotton-Barratt & Ord, 2015). Still, I would push back against this point. On the one hand, the historical fact (on Earth) is that offensive technologies have typically antedated defensive technologies, thus resulting in periods of excessive vulnerability. This chronology of offensive followed by defensive technologies is likely to occur in space as well, especially given that distant civilizations could develop completely novel forms of weaponry in secret, thereby making it impossible for target civilizations to develop effective defenses in time. The resulting window of vulnerability, however short, would pose an unacceptable threat if the relevant offensive technologies have the capacity to annihilate their targets. An existential catastrophe can, by definition, only occur once in a species’ lifetime.23

Finally, we should note that the present paper compliments the conclusions of several other scholars who have approached the topic from different angles. Perhaps most notably, Brian Tomasik worries that terraforming Earth-like planets or spreading life via “directed panspermia” (as Claudius Gros, who founded the Genesis Project, advocates) could significantly increase the total amount of suffering in the universe—an especially bad outcome if one espouses a “suffering-focused” ethics (Tomasik 2016, 2017a, 2017b). There could also be massive simulations running on exoplanets that have been converted into computronium in which billions of sentient simulants suffer immense agony. Given the huge number of future beings who could exist if we do colonize space, it stands to reason that someone somewhere would run such simulations (perhaps from within a simulation), create new biospheres in which wild animals are subject to Darwinian misery, and so on. As Tomasik (2017a) speculates, “if I had to make an estimate now, I would give ∼70% probability that if humans choose to colonize space, this will cause more suffering than it reduces on intrinsic grounds.” The result could be an s-risk. Thus, the present paper offers a complimentary reason for rejecting the normative ideology of space expansionism

7. Conclusion

Let’s now return to the topic of Section 1, i.e., the astronomical waste argument. According to Bostrom, our first priority is to reduce existential risk, because an existential catastrophe would prevent us from reaching a stable state of technological maturity and technological maturity is necessary to realize astronomical value. Furthermore, to reach technological maturity, we will need to colonize space. It follows that utilitarians (in particular) should prioritize existential risk reduction while also advocating for the colonization of space as soon as possible. Baum (2016) echos this sentiment when he argues that, if one accepts consequentialism, “space colonization should proceed with caution, but ultimately should proceed at immense scale.”

Yet a closer look at what I have argued are the most probable results of colonizing the “last great frontier” suggests that doing so would yield a state of Hobbesian “warre” in which civilizations wallow in perpetual anxiety—existential anxiety—when they aren’t actively engaged in confrontations with their neighbors. The argument that I present thus invites a Gestalt switch: rather than peering up at the firmament and pondering how much of our cosmic endowment of negentropy is being lost that could realize some form of positive “value,” one should instead ponder how much negentropy is being lost that could realize an s-risk, or a condition marked by astronomical amounts of pain, misery, dread, fear, and suffering. In a phrase, every second of delayed colonization should be seen as immensely desirable, and the longer the delay, the better. This is not a conclusion that I find particularly appealing, yet I see no obvious flaws in the above arguments.

### 3

#### Counterplan: Commercial space mining is unjust.

#### It competes- the counterplan says the distribution of property rights via an auction for commercial space mining, including on asteroids, is unjust.

#### Commercialized proximity mining operations create dual-use deflection risks – inherent interoperability makes dangerous repurposing easy and likely

Howe 15 [Jim Howe is a writer and policy analyst who focuses on space and national security issues. He works in the nuclear power industry. COMMON GROUND: Asteroid Mining and Planetary Defense. Summer 2015. https://space.nss.org/media/Asteroid-Mining-And-Planetary-Defense.pdf]

Extensive and prolonged proximity operations will be an essential element of most types of planetary defense mitigation missions. The most technologically mature method for fragmentation or deflection of a hazardous object is through a surface, subsurface, or stand-off nuclear explosion: The tremendous impulsive force of the blast and resulting surface ablation could, in one moment, deliver the necessary velocity change to the body to miss its future collision with Earth. Time permitting, to assure exact positioning and maximum deflective or fragmentation effect, the nuclear device would be buried, anchored to the surface, or orbiting just above the asteroid, an effort that would involve precise proximity operations.

On the opposite end of the spectrum for deflecting an inbound body are the “slow push" methods, which would deliver a minute but steady deflective force to the asteroid or comet, over time providing a cumulative change in velocity. With few exceptions, every proposed slow push technique would be dependent on extended operations in close proximity to the body. Gravity tractors would hover a spacecraft near the asteroid for years or decades, slowly imparting a deflective gravitational force; an enhanced gravity tractor would first collect boulders or regolith from the threatening body, to increase the mass and gravitational pull of the spacecraft. Laser or solar ablation methods would require the stationing of a spacecraft near the asteroid to direct the ablative beam. Using thrusters or a space tug would require direct physical contact with the body for years on end, nudging it to alter its velocity. Mass driver systems would land and anchor a robotic mining apparatus on the asteroid’s surface, to cast a steady stream of regolith into space and produce a minute but steady deflective counterforce.

Similarly, asteroid or comet mining would rely entirely on the ability to conduct reliable, long-term, repetitive proximity operations. Several mining concepts have been analyzed. The most common concept would land and anchor robotic mining and support systems on the asteroid or comet; these systems would methodically drill, scrape, crush, lift, or scoop the desired minerals or ice from the body. Support systems would discard unwanted tailings and transport the ore to a processing station or collection facility. The mining operation could occur on the surface, in pits, or in caverns cut into the interior of the asteroid or comet.

Alternative mining methods include leaching minerals through the injection of high pressure steam, fully encapsulating a small asteroid or comet and capturing the escaping water as the container is heated by the Sun, and collecting water vapor from a passing comet using a spacecraft stationed in a trailing position behind it. Each of these activities would require the ability to operate on and near the surface of the body for long periods.

The commonalities between planetary defense and asteroid mining are extensive for the wide range of proximity operations. For both endeavors, hovering, orbiting, landing, and anchoring on the space body are essential competencies. The same base technologies that can be used to mine metals could be employed in burying a nuclear device to fragment an asteroid, or as a mass driver apparatus used in deflection. The technologies that could be employed to secure thrusters or a solar sail to a tumbling asteroid to change its orbit could be adapted to anchor a full suite of mining equipment to the surface of a resource-rich body.

#### That increases the risk of accidental collisions, astro-terror, and space weaponization

Mares 15 [Miroslav Mares, Professor, at the Division of Security and Strategic Studies, Masaryk University, Czech Republic. Jakub Drmola PhD student, at the Divison of Security and Strategic Studies, Masaryk University, Czech Republic. Revisiting the deflection dilemma. October 1, 2015. https://academic.oup.com/astrogeo/article/56/5/5.15/235650]

Sooner or later, in order to avoid the fate of the dinosaurs, humanity needs to develop scientific and technological capabilities to prevent extinction-level impact events. But most solutions bring about new challenges, because new technologies rarely have only one application. Here lies the dilemma: any technology allowing us to deflect asteroids from a collision trajectory with the Earth could also be used to direct them towards the Earth. This means we could potentially turn any future near-miss into an impact, with all its devastating consequences.

Sagan & Ostro (1994b) concluded that this is a risk not worth taking. Considering the very low probabilities of impacts with objects larger than 1 km (generally less than 1 in 5000 for a given century), they were more worried about the misuse of such trajectory-altering technology than the undiverted asteroids themselves. Humans visited a great deal of violence upon each other during the 20th century; war has been prevalent and increasingly technological. The beginning of the 21st century does not seem overly promising either. The risk that one of humanity's irrational totalitarian powers decides to have some nearby asteroid steered towards Earth might simply be too high. Many people still see the default cosmic odds as preferable to the lessons of recent history.

Later on, a modification of sorts to the deflection dilemma appeared, positing that the “real” dilemma (Schweickart 2004, Morrison 2010) lies in putting various parts of the Earth and its population in harm's way during a deflection attempt. Inevitably, any mission to deflect an object that is on a collision course with the Earth will involve moving its supposed point of impact across the surface until it misses the planet entirely. Should such a deflection attempt fail to modify the trajectory sufficiently, the impact would still occur, albeit in a different area. This could expose to risk countries that were not originally threatened by the asteroid (depending on its size and path), while diminishing the risk to those living near the original point of impact. The damage and casualties around this new and modified point of impact would then, to some extent, be caused by those who tried but failed to deflect the asteroid. The repercussions of such an event would certainly be grave.

Privatization and industry

Both of these versions of the deflection dilemma are essentially state-centric and neither presumes that this technology might be wielded by private companies and non-state actors. But the current trend of greater involvement of private companies in space suggests that states might be unable (or unwilling) to maintain their exclusive hold on the advanced space technologies. The private sector is currently hot on the heels of national and international space agencies in exploring feasible and economically viable options. At the moment, private companies are already in the business (or at least in the process of making it a profitable business) of resupplying the International Space Station, taking tourists to the edge of space and operating communication satellites. And, recently, a new area of potential commercialization of space, asteroid mining, has received increased attention and investment. It has already spawned private companies (such as Deep Space Industries and Planetary Resources, Inc.); this industry is highly relevant to the deflection dilemma (Ostro 1999).

While the idea of mining asteroids carries with it an air of science fiction (as all space-based endeavours do, at some stage), it is based on science fact. One of the most significant facts on which to base a space mining industry is the apparent abundance of highly valued raw materials in asteroids. Platinum, rhodium and other precious metals are extremely useful because of their catalytic and electrical properties, but are also exceedingly rare in the Earth's crust. While such metals sank deep into the planet during core formation, asteroids retained their original composition and even delivered much of the accessible reserves to our planet in the form of meteorite bombardment (Willbold et al. 2011). Some of the largest known deposits of these metals on Earth are found within ancient impact craters. Platinum-group metals are deemed critical to our modern technology-based civilization, without substitutes in many applications, and their supply is at risk of “geopolitical machinations” (Graedel 2013). The combination of natural scarcity and industrial demand leads to their high price, which easily rivals that of gold. Because space missions are inherently expensive, these precious metals are prime high-value candidates for economically viable asteroid mining. Since the projected market value of these metals within an asteroid is in the order of billions or even hundreds of billions of US dollars (depending on the size of the asteroid), the success of the industry comes down to developing technically feasible and cost-effective methods of mining them and retrieving them (Blair 2000, Gerlach 2005). The other interesting and potentially worthwhile resource we could harvest from asteroids is water. Not only is liquid water required by astronauts to survive, but it can also be broken down into oxygen and hydrogen to be used as fuel. And, while water is abundant and cheap here on Earth, it is very expensive to transport it to orbit. It costs $3000–$10 000 per kilogramme to launch water (or anything else) to low Earth orbit and about two or three times more for geostationary transfer orbit (Jain & Trost 2013). It is not the prospect of procuring something we covet here on the surface of the Earth that makes this venture attractive, but rather the idea of not having to wage an expensive battle with Earth's gravity each time we want to make use of something as mundane as water in space. If the costs associated with mining water from asteroids can be brought below the cost of launching water from Earth, this seemingly counter-intuitive industry might take off and become profitable. Additionally, through the use of some form of refuelling depots, it would probably in turn make space endeavours more affordable and sustainable. The same would apply if some of the more common metals found in asteroids (such as iron or nickel) were used to build structures directly in orbit instead of launching them from the Earth. The risks of mining asteroids There are two basic ways to go about moving the resources contained within a given asteroid to the Earth. They can be extracted from the asteroid during its natural orbit and then transported to the Earth, or the entire asteroid might be moved closer to a more convenient location before starting mining. Thus repositioned, it might even be used as a shielded habitat, once hollowed out (Ostro 1999). There are different speculative costs and benefits associated with either option, which would vary with the size, orbit and composition of the asteroid. But, crucially, the second option would entail putting asteroids into orbit around the Earth, the Moon or possibly at one of the Earth's Lagrangian points. Indeed, NASA has already planned a mission to capture a small asteroid and place it in a high cislunar orbit, where it would serve as a destination for future manned missions and experiments. This “Asteroid Redirect Mission” is to take place in the next decade and is being pitched mainly as a stepping stone towards a future mission to Mars (see box “NASA's Asteroid Redirect Mission”; Brophy et al. 2012, Burchell 2014, Gates et al. 2015).

Programmes to redirect asteroids and, especially, plans to mine asteroids on an industrial scale essentially resurrect the deflection dilemma. But it is no longer a matter of superpowers intentionally misusing technology designed to prevent dangerous impacts. It becomes an issue of proliferation among private entities. Once private mining companies acquire the technical ability to redirect suitable NEOs (Baoyin et al. 2011) in order to extract platinum or water from them, perilous inflections become more likely.

The probability of accidents will rise with the number of asteroids whose trajectories we decide to manipulate. Such accidents might be very unlikely, but even a tiny technical or human error in the execution of an inflection meant to place an asteroid into the lunar or geocentric orbit might send it crashing into the Earth with potentially devastating consequences. And while we might find solace in the low probabilities associated with such an accident, even contemporary industries which are considered very safe suffer from unlikely tragedies. Despite being dependable and reliable, airliners do crash; there are a lot of them flying and very improbable accidents do happen if the dice are rolled often enough. Undoubtedly, we will not be steering as many asteroids as we steer planes any time soon, but industries tend to be more accident-prone during their infancy. Furthermore, a single asteroid can do a lot more damage than a single plane. And who is to say how much metal or water we are going to need in space over the course of the 21st century, or the next?

The second source of risk is the intentional misuse, similar to the original deflection dilemma. But the entry barrier for asteroid weaponization gets much lower if mining them and moving them around becomes a common industrial activity. This is in stark contrast to the original scenario which envisioned this technology to be used solely for planetary defence and under control of a very small number of the most powerful countries (Morrison 2010). If such a powerful technology becomes widely and commercially available, even rogue states and well-funded terrorist groups might be tempted to use it for an unexpected and devastating attack. In addition, an active asteroid mining industry would make it more difficult to detect any hostile inflection attempts among the number of legitimate and benign ones.

#### Dilemma causes the most power WMD ever – it’s more likely than natural hits and structurally outweighs

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While asteroids loom large in the horizons of habitat and some military expansionists, they receive little attention from arms controllers and most global security thinkers. As a planetary defense project, diverting asteroids seems a logical part of a Whole Earth Security program and international space infrastructure security cooperation, but opponents of military space expansion are sharply divided about asteroidal diversion. In part these disputes carry over from Cold War nuclear debates, with Edward Teller, Darth Vader for arms controllers, pushing nuclear solutions to the asteroid threat, and arms controllers raising alarms.

An important analysis of the dangers inherent in the deflection of asteroidal bodies is provided by Carl Sagan and Stephen Ostro.67 Few figures of the Space Age have been as productive and prominent as Sagan, a planetary astronomer, science educator, and SF author.68 Over the later decades of the twentieth century Sagan’s work on planetary science, particularly Mars, his television series Cosmos, and his science fiction, most notably Contact (coauthored with Ann Druyan), made him an international celebrity and influential voice for science and space exploration. Unlike virtually all other space scientists and engineers of his era, Sagan also was active in advancing nuclear arms control, studying— and publicizing—the “nuclear winter” hypothesis and promoting cooperation in space to improve Soviet-American relations.69 Although a strong supporter of the larger habitat expansionist vision, Sagan insists large-scale space activities should occur only after nuclear disarmament and planetary habitat stability have been achieved because of an ominous asteroid “deflection dilemma.”70

The essence of the deflection dilemma is simple: species and civilizational survival inevitably will eventually require the development of the ability to deflect asteroids and comets away from Earth, but this technology also inherently creates the possibility that such objects could be directed toward the Earth. The existential stakes are clear: “the destructive energy latent in a large near-Earth asteroid dwarfs anything else the human species can get its hands on,” making them potentially “the most powerful weapon of mass destruction ever devised”71 (see Table 7.4. A and B).72 Once the population of these bodies is fully mapped, and technologies to deflect them are developed, Sagan argues, the prospects for collision increase over the natural rate due to the possibility of intentional bombardment. Given these possibilities, perhaps the reason the dinosaurs lasted for nearly two hundred million years is because they did not have a space program.

In his major book on the human space future, Pale Blue Dot, Sagan lays out several scenarios for intentional collisions. His arguments are essentially the arguments of nuclear arms controllers. Madmen exist, and some “achieve the highest levels of political power in modern industrial nations.”'3 Recalling the extreme destruction caused by Hitler and Stalin, Sagan posits the possibility that a “misanthropic psychopath” or a “megalomaniac lusting after ‘greatness’ or glory, a victim of ethnic violence bent on revenge, someone in the grip of severe testosterone poisoning, some religious fanatic hastening the Day of Judgment, or just some technicians incompetent or insufficiently vigilant” will bring about a catastrophic collision.74 Earth-approaching asteroids amount to “30,000 swords of Damocles hanging over our heads,” for which “there is no acceptable national solution.”75 And, like Cole and Salkeld (not mentioned), Sagan points to the possibilities of clandestine use of this technology.

#### Even limited deflection failures cause nuke war because they look like preemptive strikes and the risk is inversely proportion to size

Lovett 19, [Richard Lovett is a Cosmos contributor, The biggest danger about an asteroid strike? Lawyers, Blasting away at incoming space rock raises real risks of nuclear war, experts say. Richard A Lovett reports, May 7, https://cosmosmagazine.com/space/the-biggest-danger-about-an-asteroid-strike-lawyers]

Governments and space agencies seeking to protect the Earth by changing the courses of potentially hazardous asteroids might face major legal hurdles, even if our planet is in the crosshairs of a bolide big enough to kill millions, experts say. One problem is what would happen if one country, worried about protecting its own citizens, attempted to deflect the asteroid, screwed up, and accidentally dumped it on a neighbour. Space law, says David Koplow of Georgetown University Law Centre, Washington DC, is based on the principle of strict liability. “The concept is that space activities are hazardous and therefore the harm should not fall on an innocent bystander,” Koplow says. Another problem stems from the fact that only a few countries have the technological ability to deflect an incoming asteroid, and there is, at present, no international authority tasked with making sure everyone else is represented in the decision-making process. In fact, says Cordula Steinkogler, a space law expert at the University of Vienna, Austria, current treaties don’t even require nations to share information about such hazards, let alone act to protect each other. She notes, however, that the United Nations charter does establish a “very general” duty for them to act toward solving international problems that affect economic, social, cultural, educational, and health wellbeing. Failure to share information can be more than just an inconvenience. To start with, says Petr Boháček, of Charles University in Prague in the Czech Republic, it could make countries wonder if, instead of international cooperation, the rule is actually everyone for themselves. It’s a particularly important problem, he says, because the nations at risk of being hit by an asteroid may not be the ones with the greatest geopolitical power. “Asteroids do not discriminate,” he notes. The nation-state concept of sovereignty, he adds, dates back several hundred years. “I’m not sure how many concepts from the seventeenth century you use in your decision-making,” he says, “but making decisions for planetary defence based on this dinosaur method of decision-making may not be the best choice.” Another problem is that the nation hit by an asteroid might see it as an attack by a foe, and retaliate. “[It] could look like the damage of a nuclear attack,” says Seth Baum, executive director of the Global Catastrophic Risk Institute, a US-based think tank, “so the prospect [of] a counterattack seems like something worth taking very seriously.” Ironically, the risk of this is probably inversely proportional to the size of asteroid. A big asteroid, capable of wiping out an enormous swath of territory, would be seen coming well in advance, and have generated a media frenzy (assuming people didn’t brand it as “fake news”).

### If Time

#### The mining itself increases the risk of asteroid collisions

Byers and Boley 19 [Michael Byers, Professor of Political Science at the University of British Columbia, BA in Political Studies and Phd in International Law from Cambridge, Byers has written a number of op-ed articles on space issues. Relax: An asteroid will just miss hitting Earth. But our actions could still have a deep impact. March 19, 2019. https://www.theglobeandmail.com/opinion/article-relax-an-asteroid-will-just-miss-hitting-earth-but-our-actions-could/]

Beyond the battle over resource extraction lies a more existential threat: the act of removing large quantities of mass from an asteroid could change its trajectory, potentially leading to a human-caused Earth impact. For this reason, any asteroid mining will have to be fully informed by astrodynamics, and closely regulated under international rules. And while the U.S., Luxembourg and Russia might regulate asteroid-mining companies closely with the involvement of planetary scientists, what would happen if a mining company were to incorporate a “flag of convenience state” such as Panama or Liberia? Would the same respect be paid to science and safety?

#### They cause nuke war, miscalc, and extinction

Baum 19 (Executive director of the Global Catastrophic Risk Institute,“Risk-Risk Tradeoff Analysis of Nuclear Explosives for Asteroid Deflection,” May 31, 2019, https://onlinelibrary.wiley.com/doi/epdf/10.1111/risa.13339.)

The most severe asteroid collisions and nuclear wars can cause global environmental effects. The core mechanism is the transport of particulate matter into the stratosphere, where it can spread worldwide and remain aloft for years or decades. Large asteroid collisions create large quantities of dust and large fireballs; the fire heats the dust so that some portion of it rises into the stratosphere. The largest collisions, such as the 10km Chicxulub impactor, can also eject debris from the collision site into space; upon reentry into the atmosphere, the debris heats up enough to spark global fires (Toon, Zahnle, Morrison, Turco, & Covey, 1997). The fires are a major impact in their own right and can send additional smoke into the stratosphere. For nuclear explosions, there is also a fireball and smoke, in this case from the burning of cities or other military targets.

While in the stratosphere, the particulate matter blocks sunlight and destroys ozone (Toon et al., 2007). The ozone loss increases the amount of ultraviolet radiation reaching the surface, causing skin cancer and other harms (Mills, Toon, Turco, Kinnison, & Garcia, 2008). The blocked sunlight causes abrupt cooling of Earth’s surface and in turn reduced precipitation due to a weakened hydrological cycle. The cool, dry, and dark conditions reduce plant growth. Recent studies use modern climate and crop models to examine the effects for a hypothetical IndiaPakistan nuclear war scenario with 100 weapons (50 per side) each of 15KT yield. The studies find agriculture declines in the range of approximately 2% to 50% depending on the crop and location.11 Another study compares the crop data to existing poverty and malnourishment and estimates that the crop declines could threaten starvation for two billion people (Helfand, 2013). However, the aforementioned studies do not account for new nuclear explosion fire simulations that find approximately five times less particulate matter reaching the stratosphere, and correspondingly weaker global environmental effects (Reisner et al., 2018). Note also that the 100 weapon scenario used in these studies is not the largest potential scenario. Larger nuclear wars and large asteroid collisions could cause greater harm. The largest asteroid collisions could even reduce sunlight below the minimum needed for vision (Toon et al., 1997). Asteroid risk analyses have proposed that the global environmental disruption from large collisions could cause one billion deaths (NRC, 2010) or the death of 25% of all humans (Chapman, 2004; Chapman & Morrison, 1994; Morrison, 1992), though these figures have not been rigorously justified (Baum, 2018a).

The harms from asteroid collisions and nuclear wars can also include important secondary effects. The food shortages from severe global environmental disruption could lead to infectious disease outbreaks as public health conditions deteriorate (Helfand, 2013). Law and order could be lost in at least some locations as people struggle for survival (Maher & Baum, 2013). Today’s complex global political-economic system already shows fragility to shocks such as the 2007- 2008 financial crisis (Centeno, Nag, Patterson, Shaver, & Windawi, 2015); an asteroid collision or nuclear war could be an extremely large shock. The systemic consequences of a nuclear war would be further worsened by the likely loss of major world cities that serve as important hubs in the global economy. Even a single detonation in nuclear terrorism would have ripple effects across the global political-economic system (similar to, but likely larger than, the response prompted by the terrorist attacks of 11 September 2001).

It is possible for asteroid collisions to cause nuclear war. An asteroid explosion could be misinterpreted as a nuclear attack, prompting nuclear attack that is believed to be retaliation. For example, the 2013 Chelyabinsk event occurred near an important Russian military installation, prompting concerns about the event’s interpretation (Harris et al., 2015).

The ultimate severity of an asteroid collision or violent nuclear conflict use would depend on how human society reacts. Would the reaction be disciplined and constructive: bury the dead, heal the sick, feed the hungry, and rebuild all that has fallen? Or would the reaction be disorderly and destructive: leave the rubble in place, fight for scarce resources, and descend into minimalist tribalism or worse? Prior studies have identified some key issues, including the viability of trade (Cantor, Henry, & Rayner, 1989) and the self-sufficiency of local communities (Maher & Baum, 2013). However, the issue has received little research attention and remains poorly understood. This leaves considerable uncertainty in the total human harm from an asteroid collision or nuclear weapons use. Previously published point estimates of the human consequences of asteroid collisions12 and nuclear wars (Helfand, 2013) do not account for this uncertainty and are likely to be inaccurate.

Of particular importance are the consequences for future generations, which could vastly outnumber the present generation. If an asteroid collision or nuclear war would cause human extinction, then there would be no future generations. Alternatively, if survivors fail to recover a large population and advanced technological civilization, then future generations would be permanently diminished. The largest long-term factor is whether future generations would colonize space and benefit from its astronomically large amount of resources (Tonn, 1999). However, it is not presently known which asteroid collisions or nuclear wars (if any) would cause the permanent collapse of human civilization and thus the loss of the large future benefits (Baum et al., 2019). Given the enormous stakes, prudent risk management would aim for very low probabilities of permanent collapse (Tonn, 2009).

## Case

### Util FW

#### The standard is maximizing wellbeing.

#### 1] Only it can explain degrees of wrongness- it is worse to break a promise to meet a friend for lunch than to take a dying friend to the hospital.

#### 2] Use util – it’s impartial, specific to public actors, and resolves infinite regress which explains all value. Reject flawed calc indicts that misunderstand happiness and rely on problematic intuitions.

Greene 15 — (Joshua Greene, Professor of Psychology @ Harvard, being interviewed by Russ Roberts, “Joshua Greene on Moral Tribes, Moral Dilemmas, and Utilitarianism”, The Library of Economics and Liberty, 1-5-15, Available Online at <https://www.econtalk.org/joshua-greene-on-moral-tribes-moral-dilemmas-and-utilitarianism/#audio-highlights>, accessed 5-17-20, HKR-AM) \*\*NB: Guest = Greene, and only his lines are highlighted/underlined

Guest: Okay. So, I think utilitarianism is very much misunderstood. And this is part of the reason why we shouldn't even call it utilitarianism at all. We should call it what I call 'deep pragmatism', which I think better captures what I think utilitarianism is really like, if you really apply it in real life, in light of an understanding of human nature. But, we can come back to that. The idea, going back to the tragedy of common-sense morality is you've got all these different tribes with all of these different values based on their different ways of life. What can they do to get along? And I think that the best answer that we have is--well, let's back up. In order to resolve any kind of tradeoff, you have to have some kind of common metric. You have to have some kind of common currency. And I think that what utilitarianism, whether it's the moral truth or not, is provide a kind of common currency. So, what is utilitarianism? It's basically the idea that--it's really two ideas put together. One is the idea of impartiality. That is, at least as social decision makers, we should regard everybody's interests as of equal worth. Everybody counts the same. And then you might say, 'Well, but okay, what does it mean to count everybody the same? What is it that really matters for you and for me and for everybody else?' And there the utilitarian's answer is what is sometimes called, somewhat accurately and somewhat misleadingly, happiness. But it's not really happiness in the sense of cherries on sundaes, things that make you smile. It's really the quality of conscious experience. So, the idea is that if you start with anything that you value, and say, 'Why do you care about that?' and keep asking, 'Why do you care about that?' or 'Why do you care about that?' you ultimately come down to the quality of someone's conscious experience. So if I were to say, 'Why did you go to work today?' you'd say, 'Well, I need to make money; and I also enjoy my work.' 'Well, what do you need your money for?' 'Well, I need to have a place to live; it costs money.' 'Well, why can't you just live outside?' 'Well, I need a place to sleep; it's cold at night.' 'Well, what's wrong with being cold?' 'Well, it's uncomfortable.' 'What's wrong with being uncomfortable?' 'It's just bad.' Right? At some point if you keep asking why, why, why, it's going to come down to the conscious experience--in Bentham's terms, again somewhat misleading, the pleasure and pain of either you or somebody else that you care about. So the utilitarian idea is to say, Okay, we all have our pleasures and pains, and as a moral philosophy we should all count equally. And so a good standard for resolving public disagreements is to say we should go with whatever option is going to produce the best overall experience for the people who are affected. Which you can think of as shorthand as maximizing happiness--although I think that that's somewhat misleading. And the solution has a lot of merit to it. But it also has endured a couple of centuries of legitimate criticism. And one of the biggest criticisms--and now we're getting back to the Trolley cases, is that utilitarianism doesn't adequately account for people's rights. So, take the footbridge case. It seems that it's wrong to push that guy off the footbridge. Even if you stipulate that you can save more people's lives. And so anyone who is going to defend utilitarianism as a meta-morality--that is, a solution to the tragedy of common sense morality, as a moral system to adjudicate among competing tribal moral systems--if you are going to defend it in that way, as I do, you have to face up to these philosophical challenges: is it okay to kill on person to save five people in this kind of situation? So I spend a lot of the book trying to understand the psychology of cases like the footbridge case. And you mention these being kind of unrealistic and weird cases. That's actually part of my defense.

Russ: Yeah, there's some plus to it, I agree.

Guest: Right. And the idea is that your amygdala is responding to an act of violence. And most acts of violence are bad. And so it is good for us to have a gut reaction, which is really a reaction in your amygdala that's then sending a signal to your ventromedial prefrontal cortex and so on and so forth, and we can talk about that. It's good to have that reaction that says, 'Don't push people off of footbridges.' But if you construct a case in which you stipulate that committing this act of violence is going to lead to the greater good, and it still feels wrong, I think it's a mistake to interpret that gut reaction as a challenge to the theory that says we should do whatever in general is going to promote the greater good. That is, our gut reactions are somewhat limited. They are good for everyday life. It's good that you have a gut reaction that says, 'Don't go shoving people off of high places.' But that shouldn't be a veto against a general idea that otherwise makes a lot of sense. Which is that in the modern world, we have a lot of different competing value systems, and that the way to resolve disagreements among those different competing value systems is to say, 'What's going to actually produce the best consequences?' And best consequences measured in terms of the quality of people's experience. So, that's kind of completing or partially completing the circle between the tragedy of the commons, that discussion, and how do we get to the Trolleys.

#### 3] Existential threats outweigh under any framework- moral uncertainty and future gens

Pummer 15 — (Theron Pummer, Junior Research Fellow in Philosophy at St. Anne's College, University of Oxford, “Moral Agreement on Saving the World“, Practical Ethics University of Oxford, 5-18-2015, Available Online at http://blog.practicalethics.ox.ac.uk/2015/05/moral-agreement-on-saving-the-world/, accessed 7-2-2018, HKR-AM) \*\*we do not endorse ableist language=

There appears to be lot of disagreement in moral philosophy. Whether these many apparent disagreements are deep and irresolvable, I believe there is at least one thing it is reasonable to agree on right now, whatever general moral view we adopt: that it is very important to reduce the risk that all intelligent beings on this planet are eliminated by an enormous catastrophe, such as a nuclear war. How we might in fact try to reduce such existential risks is discussed elsewhere. My claim here is only that we – whether we’re consequentialists, deontologists, or virtue ethicists – should all agree that we should try to save the world. According to consequentialism, we should maximize the good, where this is taken to be the goodness, from an impartial perspective, of outcomes. Clearly one thing that makes an outcome good is that the people in it are doing well. There is little disagreement here. If the happiness or well-being of possible future people is just as important as that of people who already exist, and if they would have good lives, it is not hard to see how reducing existential risk is easily the most important thing in the whole world. This is for the familiar reason that there are so many people who could exist in the future – there are trillions upon trillions… upon trillions. There are so many possible future people that reducing existential risk is arguably the most important thing in the world, even if the well-being of these possible people were given only 0.001% as much weight as that of existing people. Even on a wholly person-affecting view – according to which there’s nothing (apart from effects on existing people) to be said in favor of creating happy people – the case for reducing existential risk is very strong. As noted in this seminal paper, this case is strengthened by the fact that there’s a good chance that many existing people will, with the aid of life-extension technology, live very long and very high quality lives. You might think what I have just argued applies to consequentialists only. There is a tendency to assume that, if an argument appeals to consequentialist considerations (the goodness of outcomes), it is irrelevant to non-consequentialists. But that is a huge mistake. Non-consequentialism is the view that there’s more that determines rightness than the goodness of consequences or outcomes; it is not the view that the latter don’t matter. Even John Rawls wrote, “All ethical doctrines worth our attention take consequences into account in judging rightness. One which did not would simply be irrational, crazy.” Minimally plausible versions of deontology and virtue ethics must be concerned in part with promoting the good, from an impartial point of view. They’d thus imply very strong reasons to reduce existential risk, at least when this doesn’t significantly involve doing harm to others or damaging one’s character. What’s even more surprising, perhaps, is that even if our own good (or that of those near and dear to us) has much greater weight than goodness from the impartial “point of view of the universe,” indeed even if the latter is entirely morally irrelevant, we may nonetheless have very strong reasons to reduce existential risk. Even egoism, the view that each agent should maximize her own good, might imply strong reasons to reduce existential risk. It will depend, among other things, on what one’s own good consists in. If well-being consisted in pleasure only, it is somewhat harder to argue that egoism would imply strong reasons to reduce existential risk – perhaps we could argue that one would maximize her expected hedonic well-being by funding life extension technology or by having herself cryogenically frozen at the time of her bodily death as well as giving money to reduce existential risk (so that there is a world for her to live in!). I am not sure, however, how strong the reasons to do this would be. But views which imply that, if I don’t care about other people, I have no or very little reason to help them are not even minimally plausible views (in addition to hedonistic egoism, I here have in mind views that imply that one has no reason to perform an act unless one actually desires to do that act). To be minimally plausible, egoism will need to be paired with a more sophisticated account of well-being. To see this, it is enough to consider, as Plato did, the possibility of a ring of invisibility – suppose that, while wearing it, Ayn could derive some pleasure by helping the poor, but instead could derive just a bit more by severely harming them. Hedonistic egoism would absurdly imply she should do the latter. To avoid this implication, egoists would need to build something like the meaningfulness of a life into well-being, in some robust way, where this would to a significant extent be a function of other-regarding concerns (see chapter 12 of this classic intro to ethics). But once these elements are included, we can (roughly, as above) argue that this sort of egoism will imply strong reasons to reduce existential risk. Add to all of this Samuel Scheffler’s recent intriguing arguments (quick podcast version available here) that most of what makes our lives go well would be undermined if there were no future generations of intelligent persons. On his view, my life would contain vastly less well-being if (say) a year after my death the world came to an end. So obviously if Scheffler were right I’d have very strong reason to reduce existential risk. We should also take into account moral uncertainty. What is it reasonable for one to do, when one is uncertain not (only) about the empirical facts, but also about the moral facts? I’ve just argued that there’s agreement among minimally plausible ethical views that we have strong reason to reduce existential risk – not only consequentialists, but also deontologists, virtue ethicists, and sophisticated egoists should agree. But even those (hedonistic egoists) who disagree should have a significant level of confidence that they are mistaken, and that one of the above views is correct. Even if they were 90% sure that their view is the correct one (and 10% sure that one of these other ones is correct), they would have pretty strong reason, from the standpoint of moral uncertainty, to reduce existential risk. Perhaps most disturbingly still, even if we are only 1% sure that the well-being of possible future people matters, it is at least arguable that, from the standpoint of moral uncertainty, reducing existential risk is the most important thing in the world. Again, this is largely for the reason that there are so many people who could exist in the future – there are trillions upon trillions… upon trillions. (For more on this and other related issues, see this excellent dissertation). Of course, it is uncertain whether these untold trillions would, in general, have good lives. It’s possible they’ll be miserable. It is enough for my claim that there is moral agreement in the relevant sense if, at least given certain empirical claims about what future lives would most likely be like, all minimally plausible moral views would converge on the conclusion that we should try to save the world. While there are some non-crazy views that place significantly greater moral weight on avoiding suffering than on promoting happiness, for reasons others have offered (and for independent reasons I won’t get into here unless requested to), they nonetheless seem to be fairly implausible views. And even if things did not go well for our ancestors, I am optimistic that they will overall go fantastically well for our descendants, if we allow them to. I suspect that most of us alive today – at least those of us not suffering from extreme illness or poverty – have lives that are well worth living, and that things will continue to improve. Derek Parfit, whose work has emphasized future generations as well as agreement in ethics, described our situation clearly and accurately: “We live during the hinge of history. Given the scientific and technological discoveries of the last two centuries, the world has never changed as fast. We shall soon have even greater powers to transform, not only our surroundings, but ourselves and our successors. If we act wisely in the next few centuries, humanity will survive its most dangerous and decisive period. Our descendants could, if necessary, go elsewhere, spreading through this galaxy…. Our descendants might, I believe, make the further future very good. But that good future may also depend in part on us. If our selfish recklessness ends human history, we would be acting very wrongly.” (From chapter 36 of On What Matters)

#### All collapses to consequences

### ADV 1

#### 1. Every DA outweighs on sheer magnitude- they have no terminal impact to redistribution being good.

#### 2. None of this offense is intrinsic to auctions or appropriation bad- you could just tax private space activities. If they extend this as independent offense, that proves abuse.

#### 3. It doesn’t solve- poorer nations are still excluded from accessing space.

### ADV 2

#### I’m conceding this entire contention- it proves the link to all my DAs because it demonstrates that the affirmative uniquely incentivizes property rights in mining and space colonization