### 1NC – OFF

30 speaks – judge bias

#### Interp: The affirmative must define “outer space” in a delimited text in the 1AC.

#### “Outer Space” is flexible and has too many interps – normal means shows no consensus and makes the round irresolvable since the judge doesn’t know how to compare between types of offense and o/w since it’s a side constraint on decision making – independently turns judicial application.

Leepuengtham 17 [Tosaporn Leepuengtham (Research Judge, Intellectual Property and International Trade Division, Supreme Court of Thailand). "International space law and its implications for outer space activities." 01-27-2017, Accessed 12-9-2021. https://www.elgaronline.com/view/9781785369612/06\_chapter1.xhtml // duongie

Those states which favor the precise demarcation of outer space support the spatial approach, whereas those who oppose to such demarcation prefer the functional approach, as the latter allows more flexibility in terms of the development of space technology.34 This lack of a definition and delimitation of outer space is problematic, since certain particular areas are neither explicitly defined as ‘air space’ or ‘outer space’. For example, it is vague whether an area located between 80 km and 120 km above sea level would be classified as either air space or outer space in the absence of demarcation, since 80 km is the maximum attitude for convention aircraft, and 120 km is the lowest attitude in which space activities could be carried out.35 Satellites which are stationed in a geostationary orbit are a good example of this ambiguity. Owing to this lack of any internationally recognized delimitation, equatorial states claim sovereignty over that part of the geostationary orbit which is located over their respective territories;36 whereas technologically developed countries believe that the geostationary orbit is an integral part of outer space.37 This uncertain status of areas leads to legal jurisdictional problems. According to international law, a state has sovereignty over the airspace above its territory.38 However, national sovereignty does not extend into outer space.39 Thus, it is necessary to determine where a state’s airspace ends to ensure that the appropriate legal regime is applied. One possible scenario which might occur and which is relevant to the subject of this book is the creation or infringement of an intellectual work is in just such an ambiguous location. This would cast doubt on the ‘legal’ location of creation or infringement, and the question of which applicable legal regime arises. Should we apply the law of the underlying state or is there no law to apply? For example, would satellite signals transmitted from a satellite stationed in a geostationary orbit located over equatorial countries be considered as works created or, if intercepted, be infringed, in outer space or in the sovereign air space of those respective countries? These hypothetical examples highlight why a boundary is necessary if unpredictability arising from different legal application is to be avoided. While it might be argued that this issue is being overemphasized at this stage, given increasing use of space technology, this problem is worth considering now rather than later.

appropriation[[1]](#footnote-1) is “a sum of money or total of assets devoted to a special purpose” but the rez doesn’t spec a purpose

#### Violation – you don’t.

#### Prefer –

#### 1] Stable Advocacy – they can redefine in the 1AR to wriggle out of DA’s which kills high-quality engagement and becomes two ships passing in the night – triggers presumption since the aff wasn’t subject to well researched scrutiny. We lose access to Tech Race DA’s, Asteroid DA’s, basic case turns, and core process counter plans that have different definitions and 1NC pre-round prep. CX can’t resolve this and is independently bad- A] Not flowed B] Skews prep during the 1AC C] They can lie and no way to check D] Debaters can be shady.

#### 2] Real World – Policy makers will always define the entity that they are recognizing. It also means zero solvency, absent spec, private entities can circumvent since there is no delineated way to enforce the aff and means their solvency can’t actualize.

#### OSspec isn’t regressive or arbitrary – its core topic lit for what happens when the aff is implemented and cannot be discounted from policies that require enforcement to function.

#### Fairness – it’s a prereq to judge evaluation

#### Education – it’s the only portable impact

#### CI – a) brightlines are arbitrary and self-serving which doesn’t set good norms b) it collapses since weighing between brightlines rely on offense defense

#### DTD – its key to deter future abuse

#### No RVI’s- a) chilling effect – people will be too scared to read theory because RVI’s encourage baiting theory b) clash – people go all in on theory which decks substance engagement c) illogical – you don’t win for being fair – outweighs since it constrains argumentation d) baiting – encourages being abusive to bait theory and go fo the rvi

#### 1NC theory first – 1] abuse was self inflcuetd 2] I have more time to develop args which o/w cuz we have better norms and is a seqeucing to theory

#### Neg abuse outweighs Aff abuse – 1] Infinite prep time before round to frontline 2] 2AR judge psychology and 1st and last speech 3] Infinite perms and uplayering in the 1AR.

#### No new 1ar theory paradigm issues- A] the 1NC has already occurred with current paradigm issues in mind so new 1ar paradigms moot any theoretical offense B] introducing them in the aff allows for them to be more rigorously tested which o/w’s on time frame since we can set higher quality norms.

#### Reasonability on 1AR shells – 1AR theory is aff-biased because the 2AR gets to line-by-line every 2NR standard with new answers that don’t get responded to

#### DTA on 1AR shells – they can blow up blippy shells in the 2AR but I have to split time and can’t preempt the 2AR which causes intervention and makes it irresolvable so don’t stake the round on it

#### RVIs on 1AR theory – 1AR being able to spend 20 seconds on a shell and still win forces at least 2:30 on the shell so RVIs check time skew

### 1NC – OFF

#### The ROB is to determine the truth of falsity of the resolution –

#### 1] Textuality – five dictionaries[[2]](#footnote-2) define to negate as to deny the truth of and affirm[[3]](#footnote-3) as to prove true.

#### That OW –

#### a] Jurisdiction – judges are constrained through their constitutive purpose and proves it’s a side constraint on what arguments they can vote on.

#### b] Predictability – people base prep off the pregiven terms in the resolution.

#### 2] Isomorphism – alternative ROBs aren’t binary truth/false because of topic lit biases which increases intervention and takes the debate out of the hands of debaters.

#### 3] Inclusion – any offense functions under it as long as debaters implicate their positions to prove the truth or falsity of the resolution which maximizes substantive clash through ground and is a sequencing question for engaging in debate.

#### 4] Logic – any statement relies on a conception of truth to function – for example, I’m hungry is the same as its true that I’m hungry – logic is a litmus test for any argument and proves your ROB collapse since it relies on truth.

#### I negate –

#### 1] the[[4]](#footnote-4) is “denoting a disease or affliction” but appropriation isn’t a disease

#### 2] of[[5]](#footnote-5) is to “expressing an age” but the rez doesn’t delineate a length of time

#### 3] private[[6]](#footnote-6) describes “belonging to or for the use of one particular person or group of people only” and an entity[[7]](#footnote-7) is “independent, separate, or self-contained existence”

#### They don’t exist – circumvention.

Martinez 21 [Katherine Latimer Martinez (Seattle University School of Law). “Lost in Space: An Exploration of the Current Gaps in Space Law”. Seattle Journal of Technology, Environmental & Innovation Law: Vol. 11 : Iss. 2 , Article 4. 5-7-2021. Accessed 12/18/21. <https://digitalcommons.law.seattleu.edu/cgi/viewcontent.cgi?article=1022&context=sjteil> //Xu]

No company is able to operate in a purely private capacity and without State partnerships because of a need for government funding and the government’s need for additional research due to decreases in funding and resources.138 Private companies fall into two categories: (1) those focused on commercial space travel and (2) those focused on mining and space resources.

### 1NC – OFF

#### Interpretation: Debaters must disclose all previously read positions before the debate on their NDCA wiki page under their own name open source with round reports.

#### Violation: You didn’t – you got to the BID ROUND at a bid tournament and have disclosed nothing

Graphical user interface, text, application, email

Description automatically generated

Graphical user interface, application

Description automatically generated

#### Standards:

#### 1. Evidence Quality – Disclosure generates an information database that encourages debaters to find the best evidence on the topic.

**Nails 13** [(Jacob, NDT Policy Debater at Georgia State University), “A Defense of Disclosure (Including Third Party Disclosure)”,NSDUpdate,10/10/2013EM] I fall squarely on the side of disclosure. I find that the largest advantage of widespread disclosure is the educational value it provides. First, **disclosure streamlines research.** Rather than every team and every lone wolf researching completely in the dark, **the wiki provides a public body of knowledge that everyone can** contribute to and **build off of. Students can look through** the **different studies** on the topic **and choose the best ones** on an informed basis without the prohibitively large burden of personally surveying all of the literature. The best arguments are identified and replicated, which is a natural result of an open marketplace of ideas. **Quality of evidence increases across the board.**

#### 2. Quality engagement --- disclosure allows in-depth preparation before the round which checks back against unpredictable positions and allows debaters to effectively write case negs and blocks. Quality engagement is an independent voter because the constitutive reason we debate is to engage and clash otherwise we would just be doing oratory. Independent voter for on inclusion since debaters of lower skill level can have a chance to engage with better debaters which makes debate less centered towards those with larger coaching staffs.

#### 3. Academic Ethics --- disclosure deters mis-cutting, power-tagging, abuse of brackets and ellipses, and plagiarism. This is an independent reason to vote you down because it promotes better norms about academic engagement---debate is an academic environment and must ensure that we become fair scholars.

### 1NC – OFF

#### Interpretation: Debaters must disclose affirmative frameworks, advocacy texts, and advantage areas thirty minutes before round if they haven’t read the affirmative before

#### Violation: They didn’t

A screenshot of a cell phone

Description automatically generated with medium confidence

#### Standards:

#### 1] Clash- Not disclosing incentivizes surprise tactics and poorly refined positions that rely on artificial and vague negative engagement to win debates. Their interpretation discourages third- and fourth-line testing by limiting the amount of time we have to prepare and forcing us to enter the debate with zero idea of what the affirmative is. Negatives are forced to rely on generics instead of smart contextual strategies destroying nuanced argumentation.

#### 2] Shiftiness- Not knowing enough about the affirmative coming into round incentivizes 1ar shiftiness about what the aff is and what their framework/advocacy entails. That means even if we could read generics or find prep, they’d just find ways to recontextualize their obscure advocacy in the 1ar.

### 1NC – Bioweapons

#### OST solves space CBWs

Johnson 17 [Chris Johnson is the Space Law Advisor for Secure World Foundation and has nine years of professional experience in international space law and policy. Mr. Johnson worked as an attorney in New York City and entered the space field in 2010 as an intern at the United Nations Office for Outer Space Affairs (OOSA) in Vienna, Austria during the 53rd Committee on the Peaceful Uses of Outer Space. He has also served as an intern in the Office of International and Interagency Relations (OIIR) at NASA Headquarters. Mr. Johnson serves as a Professor of Law at the Georgetown University Law Center in Washington D.C., where he co-teaches the spring Space Law Seminar. Insight - 2017 and the Fiftieth Anniversary of the Outer Space Treaty. January 16, 2017. https://swfound.org/news/all-news/2017/01/insight-2017-and-the-fiftieth-anniversary-of-the-outer-space-treaty]

Borrowing from the purely political commitments in UNGA Resolution 1884 of 1963, Article IV of the Outer Space Treaty requires that states “not place in orbit around the Earth objects carrying nuclear weapons or any other weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.” The article further requires that the “Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes.”

These mutually-exchanged obligations to refrain from action significantly curtail and formally restrict activities that both sides were exploring for military advantage. The restrictions took the most provocative and potentially threatening military activities “off the table,” while still permitting space activities such as remote sensing, communications, and space exploration. The rationale behind this is that limiting one’s potential actions can actually increase one’s security, as it ensures that these activities are formally prohibited by international law and that parties to the treaty have publicly signalled to others that they will refrain from performing them. In this manner, rather than restricting a state’s freedom and liberty, agreeing to refrain from certain actions actually increases liberty and freedom by increasing the reliable and known domains where peace is ensured by law. Over the years, these specific restrictions on military activity have had the effect of increasing the freedom to explore and utilize space for peaceful purposes. This approach underpins the very concept of the rule of law: the idea that we actually benefit from operating with systems of rules that sometimes restrict certain behavior. To date, Earth orbit is free from weapons of mass destruction, and no physical conflict in space has occurred. It is reasonable to believe that the Outer Space Treaty helped this to happen.

#### Biological weapon attacks are too complex --- terrorists will choose not to pursue or will fail

---at: anthrax

---at: crispr

Revill ‘17 [Dr. James Revill, Research Fellow with the Harvard Sussex Program at SPRU, Past as Prologue? The Risk of Adoption of Chemical and Biological Weapons by Non-State Actors in the EU, European Journal of Risk Regulation, 8 (2017), pp. 626–642, https://www.cambridge.org/core/services/aop-cambridge-core/content/view/6B824CDE0E25FD86AC3D0BD07822A743/S1867299X17000356a.pdf/div-class-title-past-as-prologue-the-risk-of-adoption-of-chemical-and-biological-weapons-by-non-state-actors-in-the-eu-div.pdf]

The second factor is “the perceived complexity of the innovation in terms of adoption and use”.40 This is important in the innovation literature, as Rogers remarked, “[t]he complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption”.41 Several scholars of terrorist innovation have also highlighted the issue of complexity;42 or, as Cragin et al have stated, “[h]ow simple or complex a technology appears affects perceptions of how risky it will be to adopt.”43 In most cases terrorist groups appear to have largely opted for the simplest pathway towards the achievement of their goals and the weapons used tend to be vernacular, functional devices drawing on local and readily-available materials, rather than sophisticated, “baroque” technologies. This is certainly the case with IEDs, the history of which is characterised largely by incremental innovations – although nevertheless frequently effective ones – with many means of delivery recycled from the past.44 Complexity can therefore be seen as important in the adoption of technology by terrorists generally, but is perhaps particularly acute in the case of CBW technology. Some CBW can be relatively simple: “chlorine-augmented, vehicle-borne IEDs,” as employed by Al-Qaeda in Iraq (AQI) from 2006 to 2007 are not sophisticated weapons.45 Attacks on chemical production facilities, an apparent tactic of Serbian forces in the early to mid-1990s,46 employed relatively simple technologies – specifically explosives – with toxicity a secondary by-product. Direct contamination of food,47 drink48 or healthcare products49 does not require particularly sophisticated technology for the purposes of delivery – although may require some considerable skill to culture and scale-up a biological agent – and has been a common approach in European CBW incidents.50 Similarly, the contamination of water systems, something familiar to Europe,51 can also be relatively easily attempted. However, in most cases such methods of dissemination have generated results that are far short of the “mass destruction” that CBW are associated with, although this does not mean such a possibility can be ignored by those working on public health preparedness. Although some relatively simple approaches could cause significant harm, mass casualty attacks still require considerable expertise, something particularly acute in the context of biological weapons.52 The most effective route to weaponising biology is arguably through the process of aerosolising agents, something recognised mid-way through the last century as opening up the theoretical possibility of using biological weapons on a gigantic scale.53 However, realising such theoretical potential is difficult and it took states decades to develop more predictable biological weapons,54 and even then such weapons were acutely vulnerable to environmental factors.55 For non-state groups such complexity has proven a significant barrier to CBW development. By means of an example, one of the best-resourced biological weapons programs, that of Aum Shinrikyo, failed variously because the group acquired the wrong strain, contaminated fermenters and were faced with insurmountable production and dissemination difficulties.56 There are of course exceptions, such as the 2001 anthrax Letter Attacks in the US. However, if one accepts the conclusions of the FBI that this sophisticated attack with aerosolised anthrax in the US postal system was perpetrated by a US biodefence researcher, Dr Bruce Ivins,57 it is an exception that proves the rule. To circumvent the difficulties with aerosolisation, arguably one could use human-to-human transmissible biological agents as part of a suicide bioterror operation. There are good reasons for concern over how crude suicide bioterrorists could employ such a tactic. However, the use of highly contagious agents is also poorly predictable and would have to deal with social factors, such as the “spatial contact process among individuals”, which can spell “out the difference between large-scale epidemics and abortive ones”.58 The counter to this argument is the growing access to data and the changing human geography of the life sciences. Some 83% of European households reportedly are online, effectively allowing access to what is a growing body of available data on CBW, including so-called bioterrorist “recipes” and “blueprints” that are available in both mainstream scientific as well as more subversive literatures online. It is also clear that there is a changing human geography in European life sciences (for peaceful purposes), with the emergence of 30 DIY-bio groups located in Europe59 and some 80 European teams in the international Genetically Engineered Machines (IGEM) competition in 2016.60 This is compounded by reports that groups such as Daesh have deliberately sought to recruit foreign fighters “including some with degrees in physics, chemistry, and computer science, who experts believe have the ability to manufacture lethal weapons from raw substances”.61 Whilst it would be unwise to ignore such developments, there is a need for caution in looking at the extent to which new technologies and geographies will facilitate the adoption of chemical and biological weapons by groups seeking to target European countries. First, data is not information, and information is not knowledge, let alone the tacit knowledge required for CBW.62 In many cases a degree of determination and dedication will be required merely to separate online fantasy from fact and identify operationally useful information (of relevance to the European context) from nonsense (or information pertinent to contexts other than Europe). Second, with new technologies there is the potential for such tools to enable some, but certainly not all, actors, and even then new technologies bring new challenges. CRISPR, gene editing technology is currently seen as a particular source of promise and peril, which purportedly enables “even largely untrained people to manipulate the very essence of life”.63 As much may be technically true, yet “untrained people” would nonetheless require some guidance in identifying suitable areas of genetic structures to manipulate. Moreover, CRISPR would only get aspiring weaponeers so far, with the process of culturing, scaling-up and weaponisation still requiring considerable attention and interdisciplinary skills, typically generated through “large interdisciplinary teams of scientists, engineers, and technicians”,64 in order to be effective. Indeed, for all the progress in science and technology, biological weapons are still not used, in part, because of the complexity of such weapons; and the chemical weapons that are used today are largely the same as the chemical weapons of 100 years ago. As Robinson noted “It remains the case today that, in the design of CBW, increasingly severe technological constraint sets in as the mass-destruction end of the spectrum is approached: the greater and more assured the area-effectiveness sought for the weapon, the greater the practical difficulties of achieving it”.65

#### Won’t get close to extinction

Farquhar et al. 17 – \*director of the Global Priorities Project, M.A in Physics and Philosophy from the University of Oxford, \*\*Global Priorities Project, \*\*\*Research Associate in the FHI at the University of Oxford, Lecturer in Mathematics at St. Hugh’s College, \*\*\*\*PhD in philosophy, Researcher at the Centre for Effective Altruism, \*\*\*\*\*Academic Project Manager, Centre for the Study of Existential Risk, \*\*\*\*\*\*Director of Research at FHI [Sebastian Farquhar\*, John Halstead\*\*, Owen Cotton-Barratt\*\*\*, Stefan Schubert\*\*\*\*, Haydn Belfield\*\*\*\*\*, Andrew Snyder-Beattie\*\*\*\*\*\*, 2017, Global Priorities Project 2017, “Existential Risk Diplomacy and Governance”, <https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf>] AMarb

Recent developments in biotechnology may, however, give people the capability to design pathogens which overcome this trade-off. Some gain-of-function research has demonstrated the feasibility of altering pathogens to create strains with dangerous new features, such as vaccine-resistant smallpox40 and human-transmissible avian flu,41 with the potential to kill millions or even billions of people. For an engineered pathogen to derail humanity’s long-term future, it would probably have to have extremely high fatality rates or destroy reproductive capability (so that it killed or prevented reproduction by all or nearly all of its victims), be extremely infectious (so that it had global reach), and have delayed onset of symptoms (so that we would fail to notice the problem and mount a response in time).42 Making such a pathogen would be close to impossible at present. However, the cost of the technology is falling rapidly,43 and adequate expertise and modern laboratories are becoming more available. Consequently, states and perhaps even terrorist groups could eventually gain the capacity to create pathogens which could deliberately or accidentally cause an existential catastrophe.

### 1NC – Nuclear War

#### Nuclear war now spurs political will for disarmament without causing extinction.

Deudney 18 [Associate Professor of Political Science at Johns Hopkins University. 03/15/2018. “The Great Debate.” The Oxford Handbook of International Security. www.oxfordhandbooks.com, doi:10.1093/oxfordhb/9780198777854.013.22] Recut Justin

Although nuclear war is the oldest of these technogenic threats to civilization and human survival, and although important steps to restraint, particularly at the end of the Cold War, have been achieved, the nuclear world is increasingly changing in major ways, and in almost entirely dangerous directions. The third “bombs away” phase of the great debate on the nuclear-political question is more consequentially divided than in the first two phases. Even more ominously, most of the momentum lies with the forces that are pulling states toward nuclear-use, and with the radical actors bent on inflicting catastrophic damage on the leading states in the international system, particularly the United States. In contrast, the arms control project, although intellectually vibrant, is largely in retreat on the world political stage. The arms control settlement of the Cold War is unraveling, and the world public is more divided and distracted than ever. With the recent election of President Donald Trump, the United States, which has played such a dominant role in nuclear politics since its scientists invented these fiendish engines, now has an impulsive and uninformed leader, boding ill for nuclear restraint and effective crisis management. Given current trends, it is prudent to assume that sooner or later, and probably sooner, nuclear weapons will again be the used in war. But this bad news may contain a “silver lining” of good news. Unlike a general nuclear war that might have occurred during the Cold War, such a nuclear event now would probably not mark the end of civilization (or of humanity), due to the great reductions in nuclear forces achieved at the end of the Cold War. Furthermore, politics on “the day after” could have immense potential for positive change. The survivors would not be likely to envy the dead, but would surely have a greatly renewed resolution for “never again.” Such an event, completely unpredictable in its particulars, would unambiguously put the nuclear-political question back at the top of the world political agenda. It would unmistakeably remind leading states of their vulnerability It might also trigger more robust efforts to achieve the global regulation of nuclear capability. Like the bombings of Hiroshima and Nagasaki that did so much to catalyze the elevated concern for nuclear security in the early Cold War, and like the experience “at the brink” in the Cuban Missile Crisis of 1962, the now bubbling nuclear caldron holds the possibility of inaugurating a major period of institutional innovation and adjustment toward a fully “bombs away” future.

#### Can’t rebuild industrial civilization.

John Jacobi 17. [Leads an environmentalist research institute and collective, citing Fred Hoyle, British astronomer, formulated the theory of stellar nucleosynthesis, coined the term “big bang,” recipient of the Gold Medal of the Royal Astronomical Society, professor at the Institute of Astronomy, Cambridge University. 05-27-17. “Industrial Civilization Could Not Be Rebuilt.” The Wild Will Project. <https://www.wildwill.net/blog/2017/05/27/industrial-civilization-not-rebuilt/>] Recut Justin

A suggestion, for the sake of thought: If industrial civilization collapsed, it probably could not be rebuilt. Civilization would exist again, of course, but industry appears to be a one-time experiment. The astronomist Fred Hoyle, exaggerating slightly, writes: It has often been said that, if the human species fails to make a go of it here on Earth, some other species will take over the running. In the sense of developing high intelligence this is not correct. We have, or soon will have, exhausted the necessary physical prerequisites so far as this planet is concerned. With coal gone, oil gone, high-grade metallic ores gone, no species however competent can make the long climb from primitive conditions to high-level technology. This is a one-shot affair. If we fail, this planetary system fails so far as intelligence is concerned. The same will be true of other planetary systems. On each of them there will be one chance, and one chance only. Hoyle overstates all the limits we actually have to worry about, but there are enough to affirm his belief that industry is a “one-shot affair.” In other words, if industry collapsed then no matter how quickly scientific knowledge allows societies to progress, technical development will hit a wall because the builders will not have the needed materials. For example, much of the world’s land is not arable, and some of the land in use today is only productive because of industrial technics developed during the agricultural revolution in the 60s, technics heavily dependent on oil. Without the systems that sustain industrial agriculture much current farm land could not be farmed; agricultural civilizations cannot exist there, at least until the soil replenishes, if it replenishes. And some resources required for industrial progress, like coal, simply are not feasibly accessible anymore. Tainter writes: . . . major jumps in population, at around A.D. 1300, 1600, and in the late eighteenth century, each led to intensification in agriculture and industry. As the land in the late Middle Ages was increasingly deforested to provide fuel and agricultural space for a growing population, basic heating, cooking, and manufacturing needs could no longer be met by burning wood. A shift to reliance on coal began, gradually and with apparent reluctance. Coal was definitely a fuel source of secondary desirability, being more costly to obtain and distribute than wood, as well as being dirty and polluting. Coal was more restricted in its spatial distribution than wood, so that a whole new, costly distribution system had to be developed. Mining of coal from the ground was more costly than obtaining a quantity of wood equivalent in heating value, and became even more costly as the 54 most accessible reserves of this fuel were depleted. Mines had to be sunk ever deeper, until groundwater flooding became a serious problem. Today, most easily accessible natural coal reserves are completely depleted. Thus, societies in the wake of our imagined collapse would not be able to develop fast enough to reach the underground coal. As a result of these limits, rebuilding industry would take at least thousands of years — it took 10,000 years the first time around. By the time a civilization reached the point where it could do something about industrial scientific knowledge it probably would not have the knowledge anymore. It would have to develop its sciences and technologies on its own, resulting in patterns of development that would probably look similar to historical patterns. Technology today depends on levels of complexity that must proceed in chronological stages. Solar panels, for example, rely on transportation infrastructure, mining, and a regulated division of labor. And historically the process of developing into a global civilization includes numerous instances of technical regression. The natives of Tasmania, for example, went from a maritime society to one that didn’t fish, build boats, or make bows and arrows. Rebuilding civilization would also be a bad idea. Most, who are exploited by rather than benefit from industry, would probably not view a rebuilding project as desirable. Even today, though citizens of first-world nations live physically comfortable lives, their lives are sustained by the worse off lives of the rest of the world. “Civilization . . . has operated two ways,” Paine writes, “to make one part of society more affluent, and the other more wretched, than would have been the lot of either in a natural state.” Consider the case of two societies in New Zealand, the Maori and the Moriori. Both are now believed to have originated out of the same mainland society. Most stayed and became the Maori we know, and some who became the Moriori people settled on the Chatham Islands in the 16th century. Largely due to a chief named Nunuku-whenua, the Moriori had a strict tradition of solving inter-tribal conflict peacefully and advocating a variant of passive resistance; war, cannibalism, and killing were completely outlawed. They also renounced their parent society’s agricultural mode of subsistence, relying heavily on hunting and gathering, and they controlled their population growth by castrating some male infants, so their impact on the non-human environment around them was minimal. In the meantime, the Maori continued to live agriculturally and developed into a populated, complex, hierarchical, and violent society. Eventually an Australian seal-hunting ship informed the Maori of the Moriori’s existence, and the Maori sailed to the Chathams to explore: . . . over the course of the next few days, they killed hundreds of Moriori, cooked and ate many of the bodies, and enslaved all the others, killing most of them too over the next few years as it suited their whim. A Moriori survivor recalled, “[The Maori] commenced to kill us like sheep . . . [We] were terrified, fled to the bush, concealed ourselves in holes underground, and in any place to escape our enemies. It was of no avail; we were discovered and eaten – men, women, and children indiscriminately.” A Maori conqueror explains, “We took possession . . . in accordance with our customs and we caught all the people. Not one escaped. Some ran away from us, these we killed, and others we killed – but what of that? It was in accordance with our custom.” Furthermore, we can deduce from the ubiquitous slavery in all the so-called “great civilizations” like Rome or Egypt that any attempt to rebuild a similar civilization will involve slavery. And to rebuild industry, something similar to colonization and the Trans-Atlantic Slave Trade would probably have to occur once again. After all, global chattel slavery enabled the industrial revolution by financing it, extracting resources to be accumulated at sites of production, and exporting products through infrastructure that slavery helped sustain. So, if industrial society collapsed, who would be doing the rebuilding? Not anyone most people like. It is hard to get a man to willingly change his traditional way of life; even harder when his new life is going into mines. And though history demonstrates that acts like those of the Maori or slave traders are not beyond man’s will or ability, certainly most in industrial society today would not advocate going through the phases required to reach the industrial stage of development.

#### Empirics and worse disasters disprove their impact.

Eken 17 [Mattias Eken – PhD student in Modern History at the University of St Andrews. “The understandable fear of nuclear weapons doesn’t match reality”. 3/14/17. <https://theconversation.com/the-understandable-fear-of-nuclear-weapons-doesnt-match-reality-73563>] Recut Justin

Nuclear weapons are unambiguously the most destructive weapons on the planet. Pound for pound, they are the most lethal weapons ever created, capable of killing millions. Millions live in fear that these weapons will be used again, with all the potential consequences. However, the destructive power of these weapons **has been vastly exaggerated**, albeit for good reasons. Public fear of nuclear weapons being used in anger, whether by terrorists or nuclear-armed nations, has risen once again in recent years. **This is** in no small part **thanks to the current political climate** between states such as the US and Russia and the various nuclear tests conducted by North Korea. But whenever we talk about nuclear weapons, it’s easy to get carried away with doomsday scenarios and apocalyptic language. As the historian Spencer Weart once argued: “**You say ‘nuclear bomb’ and everybody immediately thinks of the end of the world.**” Yet the means necessary to produce a nuclear bomb, let alone set one off, remain incredibly complex – and while the damage that would be done if someone did in fact detonate one might be very serious indeed, **the chances that it would mean “the end of the world” are vanishingly small**. In his 2013 book Command and Control, the author Eric Schlosser tried to scare us into perpetual fear of nuclear weapons by recounting stories of near misses and accidents involving nuclear weapons. One such event, the 1980 Damascus incident, saw a Titan II intercontinental ballistic missile explode at its remote Arkansas launch facility after a maintenance crew accidentally ruptured its fuel tank. Although the warhead involved in the incident didn’t detonate, Schlosser claims that “if it had, much of Arkansas would be gone”. But that’s not quite the case. The nine-megaton thermonuclear warhead on the **Titan II** missile had a blast radius of 10km, or an area of about 315km². The state of Arkansas spreads over 133,733km², meaning the weapon **would have caused destruction across 0.2% of the state.** That would naturally have been a terrible outcome, but certainly not the catastrophe that Schlosser evokes. Claims exaggerating the effects of nuclear weapons have become commonplace, especially after the September 11 terrorist attacks in 2001. In the early War on Terror years, Richard Lugar, a former US senator and chair of the Senate Foreign Relations Committee, argued that terrorists armed with nuclear weapons pose an existential threat to the Western way of life. What he failed to explain is how. It is by no means certain that a single nuclear detonation **(or even several)** would do away with our current way of life. Indeed, **we’re still here despite having nuked our own planet more than 2,000 times** – a tally expressed beautifully in this video by Japanese artist Isao Hashimoto). While the 1963 Limited Test Ban Treaty forced nuclear tests underground, **around 500 of** all **the nuclear weapons detonated were unleashed in the Earth’s atmosphere**. This includes the world’s largest ever nuclear detonation, the 57-megaton bomb known as **Tsar Bomba**, detonated by the Soviet Union on October 30 1961. Tsar Bomba was more than 3,000 times more powerful than the bomb dropped on Hiroshima. That is immense destructive power – but as one physicist explained, **it’s only “one-thousandth the force of an earthquake, one-thousandth the force of a hurricane”.** The Damascus incident proved how incredibly hard it is to set off a nuclear bomb and the limited effect that would have come from just one warhead detonating. Despite this, some scientists have controversially argued that an even limited all-out nuclear war might lead to a so-called nuclear winter, since the smoke and debris created by very large bombs could block out the sun’s rays for a considerable amount of time. To inflict such ecological societal annihilation with weapons alone, we would have to detonate hundreds if not thousands of thermonuclear devices in a short time. Even in such extreme conditions, the area actually devastated by the bombs would be limited: for example, **2,000 one-megaton explosions with a destructive radius of five miles each would directly destroy less than 5% of the territory of the US**. Of course, if the effects of nuclear weapons have been greatly exaggerated, there is a very good reason: since these weapons are indeed extremely dangerous, any posturing and exaggerating which intensifies our fear of them makes us less likely to use them. But it’s important, however, to understand why people have come to fear these weapons the way we do. After all, nuclear weapons are here to stay; they can’t be “un-invented”. If we want to live with them and mitigate the very real risks they pose, we must be honest about what those risks really are. Overegging them to frighten ourselves more than we need to keeps nobody safe.

#### Err negative on impact weighing – their evidence is unwarranted pessimism – updated models.

Rodriguez 20 [Luisa Rodriguez is research fellow at the Forethought Foundation for Global Priorities Research. Previously, she researched nuclear war at Rethink Priorities and as a visiting researcher at the Future of Humanity Institute, "What is the likelihood that civilizational collapse would directly lead to human extinction (within decades)? - EA Forum", 24th Dec 2020, <https://forum.effectivealtruism.org/posts/GsjmufaebreiaivF7/what-is-the-likelihood-that-civilizational-collapse-would#Concrete_example__A_large_nuclear_war_that_causes_a_nuclear_winter//imp>]

Case 2: 90% population loss, infrastructure damage, and extreme climate change (e.g. nuclear war that caused nuclear winter) In a scenario in which a catastrophe causes the deaths of 90% of the population (800 million survivors), major infrastructure damage, and climate change — for example, a severe, global nuclear war that caused a nuclear winter — I believe the question of whether humans would be able to meet their basic needs becomes more difficult.[14] The questions I consider for this scenario are: What is the likelihood that survivors are able to continue to survive using traditional forms of agriculture, given a catastrophe that causes severe infrastructure damage and climate change? What is the likelihood that radiation causes extinction? What is the likelihood that humanity would survive in the event of conflict immediately following the catastrophe? What is the likelihood that survivors are able to continue to survive using traditional forms of agriculture? Time spent on this section: 2–3 hours Types of sources: Academic literature, non-academic reports, and expert interviews Expert judgment: Several experts, including ALLFED director David Denkenberger, have affirmed this conclusion — they do not expect humanity to dip below the minimum viable population even in relatively extreme sun-blocking scenarios. Literature review: The nature of all of the catastrophes we know of that would cause extreme global cooling (e.g. nuclear winter, asteroid impacts) **would have unevenly distributed impacts** — causing extreme global cooling in some parts of the world, but more moderate cooling in others. For example, in the case of a nuclear war between the US and Russia, nuclear winter models suggest that the most **severe climate effects would be limited** to the Northern Hemisphere, where temperatures would fall by 10–30 degrees C. But in the Southern Hemisphere, and especially at the equator, those effects would be much less severe: between 5–10 degrees Celsius. With heterogeneous impacts like this, it’s likely that agriculture would still be possible in some regions — especially in New Zealand and Australia, and possibly in South America and Central Africa.[15] To be clear, I’m describing a very grim scenario, in which basically everyone in the Northern Hemisphere — and in many parts of the Southern Hemisphere — would be unable to grow food using standard agricultural techniques. Given this, I expect there would be mass starvation and violent competition and conflict until a new equilibrium was reached, one where the remaining survivors didn’t exceed the Earth’s carrying capacity. While I expect this would be a truly terrible period of widespread suffering, I believe this equilibrium would be reached long before the population got anywhere near the minimum viable population. My best guess is the population would fall to hundreds of thousands to tens of millions, but not much lower. While I haven’t looked into this much, I feel fairly convinced that hundreds of thousands or **millions** of people **could survive** using traditional approaches to agriculture in parts of the world with more moderate climate effects (and basic mitigation strategies, like switching to crop types that are more resilient to temperature and precipitation fluctuations). And as with Case 1, at least some of the survivors in a Case 2 scenario would probably be able to survive the immediate aftermath of a catastrophe that caused civilizational collapse by exploiting food and other supplies in stores and larger stockpiles. This would give survivors some buffer time to learn additional skills required to survive once those supplies run out (e.g. fishing) or develop the techniques necessary to produce food using methods that don’t rely on climate factors like warm temperatures and regular precipitation. BOTEC: The longer the buffer time, the more likely humanity would be to subsequently survive. But there are a number of different considerations (relative to Case 1) that affect the calculus of just how long such a grace period would be in the context of a catastrophic event like a nuclear war that killed 90% of people and caused a nuclear winter. So I’ve done a similar exercise to the one above where I try to account for some of those differences. Note: As above, the following BOTEC relies on particularly poor sources, makes a bunch of dubious assumptions (discussed more below), and I’m not confident I’ve thought of all of the most important supplies. It should be considered very rough. TABLE5 See table note here.[16] Bottom line: I think it’s extremely likely that these supplies would last somewhere between around a year and a decade or more. I expect it would be closer to the lower end, given that competition and violence could lead to the depletion of supplies more quickly than if the population were reduced to a smaller number by the catastrophe directly. All this in mind, I think it is very likely that the survivors would be able to learn enough during the grace period to be able to feed and shelter themselves ~indefinitely. What is the likelihood that radiation causes extinction? Time spent on this section: 2–3 hours Types of sources: Academic papers, Wikipedia, and interviews with experts Literature review: In the aftermath of a nuclear war, radioactive fallout from the nuclear detonations would have long-lasting health impacts. In **the most extreme** nuclear war **scenario**s considered by academics (a nuclear war between the US and Russia and their allies, using 10,000 megatons (MT) of nuclear bombs), approximately 30% of the geographic area in the Northern Hemisphere would have enough fallout to be lethal to any adult in the area (Ehrlich et al., 1983). The current US and Russian nuclear arsenals don’t currently have that kind of megatonnage (they currently have closer to 2,500 MT). If we naively assume that radiation scales linearly, we might expect a modern day US-Russia nuclear war to contaminate up to 7.5% of the land area of the Northern Hemisphere. This may not sound like much, but consider that 95% of the world’s population lives on just 10% of its land area — meaning that 7.5% of land area could be home to millions or even billions of people. What’s more, tens to hundreds of millions more might be exposed to enough radiation to be more susceptible to cancer for the rest of their lives. On top of this, there are currently around 440 civilian nuclear power reactors scattered around the world, and likely tens or hundreds more military reactors. These have fail-safes and automatic shut down measures that are designed to ensure that all of the nuclear material in these reactors would be safely contained in the event of a global catastrophe that meant people stopped attending to them. Concretely, these fail safes make sure that water continues to be circulated around the nuclear fuel to ensure it doesn’t get so hot it causes a meltdown — i.e., an event where the nuclear core partially or completely melts, which might allow the nuclear fuel to breach its multiple layers of containment and leak out into the environment. If fuel did reach the environment, the radioactive fallout could spread across continents, creating exposure levels ranging from immediately fatal (in areas ranging from tens to thousands of square kilometers) to non-lethal but causing potential higher rates of cancer and infertility. But some of these fail-safes could plausibly fail during a catastrophe that caused infrastructure damage (or afterward, if any components of the fail system degraded). For example, some nuclear reactors rely on backup generators to power the pumps that keep water circulating in the core of the reactor. If those backup generators eventually all broke down, the reactor might melt down. I currently don’t have a good sense of how likely these failures would be. Newer nuclear reactors rely on more robust safety systems, with parts that wouldn’t break down as easily. And all nuclear reactor safety systems are designed to account for infrastructure damage caused by earthquakes and other physical shocks. But in a large-scale nuclear war, it seems very plausible that at least some nuclear reactors would melt down. My best guess is that this wouldn’t happen at a large scale, but even if it did, some areas would likely be far enough away from reactors to be spared the radioactive contamination. For example, Australia has just one nuclear reactor. Even if that reactor were to melt down, much of Australia would likely remain uncontaminated (Australia is just under 3 million square miles, and the Chernobyl meltdown is estimated to have contaminated under 60,000 square miles; and only a much smaller fraction of that area was sufficiently contaminated as to be lethal to humans). Bottom line: While radioactive fallout from nuclear detonations and power plant meltdowns would increase the death toll in the years following the collapse, I expect it **wouldn’t be** widespread enough to be immediately **fatal to everyone**, nor would it cause fertility rates or life expectancy to decrease enough to threaten extinction. And at the very least, **some** areas **are sufficiently far away as to be** relatively **safe** from radioactive fallout. What is the likelihood that humanity would survive in the event of conflict immediately following the catastrophe? Time spent on this section: 1–2 hours Types of sources: Academic literature, expert interviews, and speculation Historical base rate: In Case 2, it seems slightly more plausible to me that violence would lead to human extinction than in Case 1, but still fairly unlikely. I don’t think human extinction could be caused by a conflict fought with conventional weapons; **there would** just **be** **too many survivors (~800 million)** to be killed in conventional warfare (compare this to WWI and WWII, during which ~20 million and ~75 million people were killed, respectively). Weapons of mass destruction: My best guess is that the only way violence in the wake of a Case 2 civilizational collapse could directly lead to human extinction is if one group of **survivors** had access to and deployed weapons of mass destruction. This seems unlikely to me, first because it seems hard to imagine a group of survivors incapable of recovering critical infrastructure — and barely capable of meeting even their basic needs — would be able to successfully deploy weapons of mass destruction (though I’m not very confident about this). Second, it’s hard to imagine a scenario where the use of weapons of mass destruction kills millions of survivors, spread all over the world, without modern technologies like transportation. For example, with potentially many survivor groups, it seems hard to imagine how nuclear detonations would kill ~everyone despite the fact that the groups would likely be spread out all over the world, potentially in small bands that can’t each be individually targeted. Similarly, it’s hard to imagine how a pathogen could spread ~everywhere when survivors would likely have greatly reduced mobility (the latter isn’t obviously impossible, but it at least seems exceedingly difficult to me). There’s one counterargument I find somewhat persuasive, which is that it seems possible that all of the survivors might be confined to a relatively small area (for example, if only a small fraction of the Earth’s land area is habitable), making them more vulnerable to a single, large attack. If this were the case, it’s easier for me to imagine that the use of weapons of mass destruction could kill all of the remaining survivors. This would presumably mean the aggressors would be killing themselves, which makes it seem even less likely to me. But we’ve seen humans come dangerously close to threatening their own survival before, often because human aggressors aren’t always good at predicting how cascading effects could threaten their survival as well. A random example to make this concrete: If all of the survivors of a nuclear war were confined to Australia, which might be less impacted by a nuclear winter, one group might choose to use nuclear weapons against another group, not realizing that the radioactive fallout or further climate change could make Australia uninhabitable, even for them. Bottom line: I expect the survivors in Case 2 would not deploy weapons of mass destruction against their competitors, as it would likely pose a pretty big risk to the aggressor as well as the target. But I’m uncertain about this — humans have come close to making similarly self-destructive choices before. Thankfully, even if one group did use weapons of mass destruction against their competitors, I still think it’s very unlikely that their use would cause human extinction. This is because except in a few very specific and very strange scenarios, I expect the survivors would be too geographically distributed and disconnected to be wiped out by a single act of aggression. I therefore expect the result would be a much higher death toll, but not extinction. Concrete example: A large nuclear war that causes a nuclear winter So what, concretely, do I think would happen in the event of a catastrophe like a nuclear war that led to the death of 90% of the population, and caused severe infrastructure damage and significant global cooling? I expect that, in addition to the billions of people killed in the initial catastrophe, hundreds of millions or more would likely die in the famines and violent competition that followed. But my best guess is that hundreds of thousands to hundreds of millions of the survivors of the initial catastrophe would survive this violent period. I think it’s extremely likely these survivors would be able to support themselves using leftover food stocks and supplies, before eventually working out how to feed themselves through traditional agriculture and fishing and/or modified agriculture (using methods that don’t rely on climate factors like warm temperatures and regular precipitation). **All of the catastrophes** we know of **that would lead to extreme cooling** would only do so **for** 1–**10 years, and agriculture would become possible again once the climate began to return to normal**. At that point, it seems even more likely that the surviving humans would be able to meet their own basic needs by returning to traditional forms of agriculture. My key uncertainties are around whether I’m putting too much weight on the idea that humans would figure out how to subsist without traditional agriculture just because it’s technically possible, and whether conflict could lead to extinction through channels I haven’t foreseen. Another toy calculation suggests that these **uncertainties** probably **aren’t troubling enough to change my bottom line**. Note: I again assume each group’s fate is independent of the fates of other groups. I actually think this is a pretty reasonable assumption in this case. I expect that the **survivors** of a catastrophe like a severe nuclear war **would end up somewhat spread out** (at least across the Southern Hemisphere), as doing so would create less competition for resources within a smaller area (I discuss this more later). The farther apart the surviving groups are, the less likely they are to be affected by the same shocks (natural disasters, disease outbreaks, conflict). Additionally, in the event of a catastrophe like a nuclear war, transportation, communication, and other technologies that facilitate contact between geographically distributed groups would be enormously limited. This would further limit the extent to which each group’s fate ended up relating to another’s. There would be other sources of variation between groups that made their fates less correlated: Some groups might be made up mostly of farmers, while others will be made up of lawyers, some groups will tend toward cooperation, while others toward conflict, plus pure randomness (e.g. some groups might have a high proportion of survivors with genetic immunity to a particular disease). But there are also factors that point in the other direction — factors that suggest the surviving groups would be at least somewhat correlated. For example, nuclear winter climate conditions, while nonuniform, would nonetheless impact all surviving groups. Similarly, more severe natural disasters might affect large regions, meaning that at least all of the survivor groups at the regional level might end up experiencing very similar challenges to survival simultaneously. Likewise, there might be things about "human nature" that would be shared amongst all survivors. For example, it’s possible that all of the survivors, having witnessed the initial catastrophe, would have similar psychological experiences — like shock, stress, and social distrust, among others — that would make it more difficult to survive and cooperate. As above, the higher the true correlation between survivor groups, the more my toy calculations will cause me to underestimate the probability that all of the survivor groups would be wiped out. TABLE6 With 800 million survivors, the degree of pessimism you have to have about their ability to survive to end up believing that no groups would survive indefinitely is actually kind of extreme. The exact beliefs you’d have to have would depend on whether survivors were concentrated into a few big groups, or distributed in many smaller ones. Specifically: Even if you thought any given group of 100, 1,000, or 10,000 survivors had a 99% chance of being wiped out, it would still be virtually guaranteed that at least one group would survive. If you thought there was a 99% chance that any one of 800 groups of 100,000 people would be wiped out, there would still only be a 1 in 3,000 chance of extinction. The probability of extinction is higher (45%) if you believe that larger groups of 10 million would also have a 99% chance of being wiped out. But, again, to hold that view, you’d have to think that out of a group of 10 million people (again, bigger than the largest US city), not even a few hundred of those people would overcome the obstacles of the post-collapse environment (how to fish, how to farm despite global cooling, avoiding being killed by a hurricane or drought). I do not find this view very plausible. Similarly, the probability of extinction is very high indeed if you think that any given group of 100 million survivors has a 99% chance of being wiped out. Again, to believe extinction risk was that high, you’d have to think that there would be a 99% chance that none of the 100 million people would work out how to survive (for reference, only 14 countries have a population of 100 million or higher). Given all of this, my subjective judgment is that **it’s very unlikely that this scenario would more or less directly lead to human extinction.**

#### Isolated island populations repopulate.

Turchin and Green 18 [Alexey Turchin – Scientist for the Foundation Science for Life Extension in Moscow, Russia, Founder of Digital Immortality Now, author of several books and articles on the topics of existential risks and life extension. Brian Patrick Green – Director of technology ethics at the Markkula Center for Applied Ethics, teaches AI ethics in the Graduate School of Engineering at Santa Clara University. <MKIM> “Islands as refuges for surviving global catastrophes”. September 2018. DOA: 7/20/19. <https://www.emerald.com/insight/content/doi/10.1108/FS-04-2018-0031/full/html?fullSc=1&mbSc=1&fullSc=1>] Recut Justin

Different types of possible catastrophes suggest different scenarios for how survival could happen on an island. What is important is that the island should have properties which protect against the specific dangers of particular global catastrophic risks. Specifically, different islands will provide protection against different risks, and their natural diversity will contribute to a higher total level of protection: **Quarantined island survives pandemic**. An island could impose effective quarantine if it is sufficiently remote and simultaneously able to protect itself, possibly using military ships and air defense. **Far northern aboriginal people survive an ice age**. Many far northern people have adapted to survive in extremely cold and dangerous environments, and under the right circumstances could potentially survive the return of an ice age. However, their cultures are endangered by globalization. If these people become dependent on the products of modern civilization, such as rifles and motor boats, and lose their native survival skills, then their likelihood of surviving the collapse of the outside world would decrease. Therefore, preservation of their survival skills may be important as a defense against the risks connected with **extreme cooling**. Remote polar island with high mountains survives brief global warming of median surface temperatures, up to 50˚C. There is a theory that the climates of planets similar to the Earth could have several semi-stable temperature levels (Popp et al., 2016). If so, because of climate change, the Earth could transition to a second semi-stable state with a median global temperature of around 330 K, about 60˚C, or about 45˚C above current global mean temperatures. But even in this climate, **some regions of Earth could still be survivable for humans**, such as the Himalayan plateau at elevations above 4,000 m, but below 6,000 (where oxygen deficiency becomes a problem), or on polar islands with mountains (however, global warming affects polar regions more than equatorial regions, and northern island will experience more effects of climate change, including thawing permafrost and possible landslides because of wetter weather). In the tropics, the combination of increased humidity and temperature may increase the wet bulb temperature above 36˚C, especially on islands, where sea moisture is readily available. In such conditions, proper human perspiration becomes impossible (Sherwood and Huber, 2010), and there will likely be increased mortality and morbidity because of tropical diseases. If temperatures later returned to normal – either naturally or through climate engineering – **the rest of the Earth could be repopulated**. ‘‘Swiss Family Robinsons’’ survive on a tropical island, unnoticed by a military robot ‘‘mutiny’’. Most AI researchers ignore medium-term AI risks, which are neither near-term risks, like unemployment, nor remote risks, like AI superintelligence. But a large drone army – if one were produced – could receive a wrong command or be infected by a computer virus, leading it to attack people indiscriminately. Remote islands without robots could provide protection in this case, allowing survival until such a drone army ran out of batteries, fuel, ammunition or other supplies: Primitive tribe survives civilizational collapse. The inhabitants of **North Sentinel Island**, near the Andaman Islands in the Indian Ocean, are hostile and uncontacted. **The Sentinelese survived the 2004 Indian Ocean tsunami apparently unaffected** (Voanews, 2009), and if the rest of humanity disappear, **they might well continue their existence without change.** Tropical Island survives extreme global nuclear winter and glaciation event. Were a **nuclear**, bolide impactor or volcanic “**winter**” scenario to unfold, these islands would remain surrounded by Warm Ocean, and local volcanism or other energy sources might provide heat, energy and food. Such island refuges may have helped life on Earth survive during the **“Snowball Earth”** event in Earth’s distant past (Hoffman et al., 1998). Remote island base for project “Yellow submarine”. Some catastrophic risks such as a gamma ray burst, a global nuclear war with high radiological contamination or multiple pandemics might be best survived **underwater in nuclear submarines** (Turchin and Green, 2017). However, after a catastrophe, the submarine with survivors would eventually need a place to dock, and an island with some prepared amenities would be a reasonable starting point for rebuilding civilization. Bunker on remote island. For risks which include multiple or complex catastrophes, such as a bolide impact, extreme volcanism, tsunamis, multiple pandemics and nuclear war with radiological contamination, **island refuges could be strengthened with bunkers**. Richard Branson survived hurricane Irma on his own island in 2017 by seeking refuge in his concrete wine cellar (Clifford, 2017). Bunkers on islands would have higher survivability compared to those close to population centers, as they will be neither a military target nor as accessible to looters or unintentionally dangerous (e.g. infected) refugees. These bunkers could potentially be connected to water sources by underwater pipes, and passages could provide cooling, access and even oxygen and food sources.

#### No nuclear winter – conservative models prove rainout.

Reisner et al. 18 [Jon, Atmospheric researcher at LANL Climate and Atmospheric Sciences; Gennaro D'Angelo, UKAFF Fellow and member of the Astrophysics Group at the School of Physics of the University of Exeter, Research Scientist with the Carl Sagan Center at the SETI Institute, currently works for the Los Alamos National Laboratory Theoretical Division; Eunmo Koo, scientist in the Computational Earth Science Group at LANL, recipient of the NNSA Defense Program Stockpile Stewardship Program award of excellence; Wesley Even, R&D Scientist at CCS-2, LANL, specialist in computational physics and astrophysics; Matthew Hecht is a member of the Computational Physics and Methods Group in the Climate, Ocean and Sea Ice Modelling program (COSIM) at LANL, who works on modeling high-latitude atmospheric effects in climate models as part of the HiLAT project; Elizabeth Hunke, Lead developer for the Los Alamos Sea Ice Model, Deputy Group Leader of the T-3 Fluid Dynamics and Solid Mechanics Group at LANL; Darin Comeau, Scientist at the CCS-2 COSIM program, specializes in high dimensional data analysis, statistical and predictive modeling, and uncertainty quantification, with particular applications to climate science; Randall Bos is a research scientist at LANL specializing in urban EMP simulations; James Cooley is a Group Leader within CCS-2. 3/16/18 “Climate Impact of a Regional Nuclear Weapons Exchange: An Improved Assessment Based On Detailed Source Calculations.” Journal of Geophysical Research: Atmospheres, vol. 123, no. 5] Recut Justin

The no-rubble simulation produces a significantly more intense fire, with more fire spread, and consequently a significantly stronger plume with larger amounts of BC reaching into the upper atmosphere than the simulation with rubble, illustrated in Figure 5. While the no-rubble simulation **represents the worst-case scenario** involving vigorous fire activity, **only a relatively small amount of carbon makes its way into the stratosphere** during the course of the simulation. But while small compared to the surface BC mass, stratospheric BC amounts from the current simulations are significantly higher than what would be expected from burning vegetation such as trees (Heilman et al., 2014), e.g., the higher energy density of the building fuels and the initial fluence from the weapon produce an intense response within HIGRAD with initial updrafts of order 100 m/s in the lower troposphere. Or, in comparison to a mass fire, wildfires will burn only a small amount of fuel in the corresponding time period (roughly 10 minutes) that a nuclear weapon fluence can effectively ignite a large area of fuel producing an impressive atmospheric response. Figure 6 shows vertical profiles of BC multiplied by 100 (number of cities involved in the exchange) from the two simulations. The total amount of BC produced is in line with previous estimates (about 3.69 Tg from no-rubble simulation); however, the majority of BC resides **below the stratosphere** (3.46 Tg below 12 km) and can be **readily impacted by scavenging from precipitation** either via pyro-cumulonimbus produced by the fire itself (not modeled) or other synoptic weather systems. While the impact on climate of these more realistic profiles will be explored in the next section, it should be mentioned that **these estimates are** still **at the high end**, considering the inherent simplifications in the combustion model that lead to **overestimating BC production**. 3.3 Climate Results Long-term climatic effects critically depend on the initial injection height of the soot, with larger quantities reaching the upper troposphere/lower stratosphere inducing a greater cooling impact because of longer residence times (Robock et al., 2007a). Absorption of solar radiation by the BC aerosol and its subsequent radiative cooling tends to heat the surrounding air, driving an initial upward diffusion of the soot plumes, an effect that depends on the initial aerosol concentrations. **Mixing and sedimentation** tend to **reduce this process**, and low altitude emissions are also significantly impacted by precipitation if aging of the BC aerosol occurs on sufficiently rapid timescales. But once at stratospheric altitudes, aerosol dilution via coagulation is hindered by low particulate concentrations (e.g., Robock et al., 2007a) and lofting to much higher altitudes is inhibited by gravitational settling in the low-density air (Stenke et al., 2013), resulting in more stable BC concentrations over long times. Of the initial BC mass released in the atmosphere, most of which is emitted below 9 km, **70% rains out within the first month** and 78%, or about 2.9 Tg, is removed within the first two months (Figure 7, solid line), with the remainder (about 0.8 Tg, dashed line) being transported above about 12 km (200 hPa) within the first week. This outcome differs from the findings of, e.g., Stenke et al. (2013, their high BC-load cases) and Mills et al. (2014), who found that most of the BC mass (between 60 and 70%) is lifted in the stratosphere within the first couple of weeks. This can also be seen in Figure 8 (red lines) and in Figure 9, which include results from our calculation with the initial BC distribution from Mills et al. (2014). In that case, only 30% of the initial BC mass rains out in the troposphere during the first two weeks after the exchange, with the remainder rising to the stratosphere. In the study of Mills et al. (2008) this percentage is somewhat smaller, about 20%, and smaller still in the experiments of Robock et al. (2007a) in which the soot is initially emitted in the upper troposphere or higher. In Figure 7, the e-folding timescale for the removal of tropospheric soot, here interpreted as the time required for an initial drop of a factor e, is about one week. This result compares favorably with the “LT” experiment of Robock et al. (2007a), considering 5 Tg of BC released in the lower troposphere, in which 50% of the aerosols are removed within two weeks. By contrast, the initial e-folding timescale for the removal of stratospheric soot in Figure 8 is about 4.2 years (blue solid line), compared to about 8.4 years for the calculation using Mills et al. (2014) initial BC emission (red solid line). The removal timescale from our forced ensemble simulations is close to those obtained by Mills et al. (2008) in their 1 Tg experiment, by Robock et al. (2007a) in their experiment “UT 1 Tg”, and © 2018 American Geophysical Union. All rights reserved. by Stenke et al. (2013) in their experiment “Exp1”, in all of which 1 Tg of soot was emitted in the atmosphere in the aftermath of the exchange. Notably, the e-folding timescale for the decline of the BC mass in Figure 8 (blue solid line) is also close to the value of about 4 years quoted by Pausata et al. (2016) for their long-term “intermediate” scenario. In that scenario, which is also based on 5 Tg of soot initially distributed as in Mills et al. (2014), the factor-of2 shorter residence time of the aerosols is caused by particle growth via coagulation of BC with organic carbon. Figure 9 shows the BC mass-mixing ratio, horizontally averaged over the globe, as a function of atmospheric pressure (height) and time. The BC distributions used in our simulations imply that the upward transport of particles is substantially less efficient compared to the case in which 5 Tg of BC is directly injected into the upper troposphere. The semiannual cycle of lofting and sinking of the aerosols is associated with atmospheric heating and cooling during the solstice in each hemisphere (Robock et al., 2007a). During the first year, the oscillation amplitude in our forced ensemble simulations is particularly large during the summer solstice, compared to that during the winter solstice (see bottom panel of Figure 9), because of the higher soot concentrations in the Northern Hemisphere, as can be seen in Figure 11 (see also left panel of Figure 12). Comparing the top and bottom panels of Figure 9, the BC reaches the highest altitudes during the first year in both cases, but the concentrations at 0.1 hPa in the top panel can be 200 times as large. Qualitatively, the difference can be understood in terms of the air temperature increase caused by BC radiation emission, which is several tens of kelvin degrees in the simulations of Robock et al. (2007a, see their Figure 4), Mills et al. (2008, see their Figure 5), Stenke et al. (2013, see high-load cases in their Figure 4), Mills et al. (2014, see their Figure 7), and Pausata et al. (2016, see one-day emission cases in their Figure 1), due to high BC concentrations, but it amounts to only about 10 K in our forced ensemble simulations, as illustrated in Figure 10. Results similar to those presented in Figure 10 were obtained from the experiment “Exp1” performed by Stenke et al. (2013, see their Figure 4). **In that scenario as well, somewhat less than 1 Tg of BC remained in the atmosphere after the initial rainout**. As mentioned before, the BC aerosol that remains in the atmosphere, lifted to stratospheric heights by the rising soot plumes, undergoes sedimentation over a timescale of several years (Figures 8 and 9). This mass represents the effective amount of BC that can force climatic changes over multi-year timescales. In the forced ensemble simulations, it is about 0.8 Tg after the initial rainout, whereas it is about 3.4 Tg in the simulation with an initial soot distribution as in Mills et al. (2014). Our more realistic source simulation involves the worstcase assumption of no-rubble (along with other assumptions) and hence serves as an upper bound for the impact on climate. As mentioned above and further discussed below, our scenario induces perturbations on the climate system similar to those found in previous studies in which the climatic response was driven by roughly 1 Tg of soot rising to stratospheric heights following the exchange. Figure 11 illustrates the vertically integrated mass-mixing ratio of BC over the globe, at various times after the exchange for the simulation using the initial BC distribution of Mills et al. (2014, upper panels) and as an average from the forced ensemble members (lower panels). All simulations predict enhanced concentrations at high latitudes during the first year after the exchange. In the cases shown in the top panels, however, these high concentrations persist for several years (see also Figure 1 of Mills et al., 2014), whereas the forced ensemble simulations indicate that the BC concentration starts to decline after the first year. In fact, in the simulation represented in the top panels, mass-mixing ratios larger than about 1 kg of BC © 2018 American Geophysical Union. All rights reserved. per Tg of air persist for well over 10 years after the exchange, whereas they only last for 3 years in our forced simulations (compare top and middle panels of Figure 9). After the first year, values drop below 3 kg BC/Tg air, whereas it takes about 8 years to reach these values in the simulation in the top panels (see also Robock et al., 2007a). Over crop-producing, midlatitude regions in the Northern Hemisphere, the BC loading is reduced from more than 0.8 kg BC/Tg air in the simulation in the top panels to 0.2-0.4 kg BC/Tg air in our forced simulations (see middle and right panels). The more rapid clearing of the atmosphere in the forced ensemble is also signaled by the soot optical depth in the visible radiation spectrum, which drops below values of 0.03 toward the second half of the first year at mid latitudes in the Northern Hemisphere, and everywhere on the globe after about 2.5 years (without never attaining this value in the Southern Hemisphere). In contrast, the soot optical depth in the calculation shown in the top panels of Figure 11 becomes smaller than 0.03 everywhere only after about 10 years. The two cases show a similar tendency, in that the BC optical depth is typically lower between latitudes 30º S-30º N than it is at other latitudes. This behavior is associated to the persistence of stratospheric soot toward high-latitudes and the Arctic/Antarctic regions, as illustrated by the zonally-averaged, column-integrated mass-mixing ratio of the BC in Figure 12 for both the forced ensemble simulations (left panel) and the simulation with an initial 5 Tg BC emission in the upper troposphere (right panel). The spread in the globally averaged (near) surface temperature of the atmosphere, from the control (left panel) and forced (right panel) ensembles, is displayed in Figure 13. For each month, the plots show the largest variations (i.e., maximum and minimum values), within each ensemble of values obtained for that month, relative to the mean value of that month. The plot also shows yearly-averaged data (thinner lines). The spread is comparable in the control and forced ensembles, with average values calculated over the 33-years run length of 0.4-0.5 K. This spread is also similar to the internal variability of the globally averaged surface temperature quoted for the NCAR Large Ensemble Community Project (Kay et al., 2015). These results imply that surface air temperature differences, between forced and control simulations, which lie within the spread may not be distinguished from effects due to internal variability of the two simulation ensembles. Figure 14 shows the difference in the globally averaged surface temperature of the atmosphere (top panel), net solar radiation flux at surface (middle panel), and precipitation rate (bottom panel), computed as the (forced minus control) difference in ensemble mean values. The sum of standard deviations from each ensemble is shaded. Differences are qualitatively significant over the first few years, when the anomalies lie near or outside the total standard deviation. Inside the shaded region, differences may not be distinguished from those arising from the internal variability of one or both ensembles. The surface solar flux (middle panel) is the quantity that appears most affected by the BC emission, with qualitatively significant differences persisting for about 5 years. The precipitation rate (bottom panel) is instead affected only at the very beginning of the simulations. The red lines in all panels show the results from the simulation applying the initial BC distribution of Mills et al. (2014), where the period of significant impact is much longer owing to the higher altitude of the initial soot distribution that results in longer residence times of the BC aerosol in the atmosphere. When yearly averages of the same quantities are performed over the IndiaPakistan region, the differences in ensemble mean values lie within the total standard deviations of the two ensembles. The results in Figure 14 can also be compared to the outcomes of other previous studies. In their experiment “UT 1 Tg”, Robock et al. (2007a) found that, when only 1 Tg of soot © 2018 American Geophysical Union. All rights reserved. remains in the atmosphere after the initial rainout, temperature and precipitation anomalies are about 20% of those obtained from their standard 5 Tg BC emission case. Therefore, the largest differences they observed, during the first few years after the exchange, were about - 0.3 K and -0.06 mm/day, respectively, comparable to the anomalies in the top and bottom panels of Figure 14. Their standard 5 Tg emission case resulted in a solar radiation flux anomaly at surface of -12 W/m2 after the second year (see their Figure 3), between 5 and 6 time as large as the corresponding anomalies from our ensembles shown in the middle panel. In their experiment “Exp1”, Stenke et al. (2013) reported global mean surface temperature anomalies not exceeding about 0.3 K in magnitude and precipitation anomalies hovering around -0.07 mm/day during the first few years, again consistent with the results of Figure 14. In a recent study, Pausata et al. (2016) considered the effects of an admixture of BC and organic carbon aerosols, both of which would be emitted in the atmosphere in the aftermath of a nuclear exchange. In particular, they concentrated on the effects of coagulation of these aerosol species and examined their climatic impacts. The initial BC distribution was as in Mills et al. (2014), although the soot burden was released in the atmosphere over time periods of various lengths. Most relevant to our and other previous work are their one-day emission scenarios. They found that, during the first year, the largest values of the atmospheric surface temperature anomalies ranged between about -0.5 and -1.3 K, those of the sea surface temperature anomalies ranged between -0.2 and -0.55 K, and those of the precipitation anomalies varied between -0.15 and -0.2 mm/day. All these ranges are compatible with our results shown in Figure 14 as red lines and with those of Mills et al. (2014, see their Figures 3 and 6). As already mentioned in Section 2.3, the net solar flux anomalies at surface are also consistent. This overall agreement suggests that the **inclusion of organic carbon aerosols, and** ensuing **coagulation** with BC, **should not dramatically alter the climatic effects** resulting from our forced ensemble simulations. Moreover, aerosol growth would likely **shorten the residence time of the BC particulate in the atmosphere** (Pausata et al., 2016), possibly **reducing the duration of these effects.**

#### Volcano activities prove.

Reisner et al. 18 [Jon, Atmospheric researcher at LANL Climate and Atmospheric Sciences; Gennaro D'Angelo, UKAFF Fellow and member of the Astrophysics Group at the School of Physics of the University of Exeter, Research Scientist with the Carl Sagan Center at the SETI Institute, currently works for the Los Alamos National Laboratory Theoretical Division; Eunmo Koo, scientist in the Computational Earth Science Group at LANL, recipient of the NNSA Defense Program Stockpile Stewardship Program award of excellence; Wesley Even, R&D Scientist at CCS-2, LANL, specialist in computational physics and astrophysics; Matthew Hecht is a member of the Computational Physics and Methods Group in the Climate, Ocean and Sea Ice Modelling program (COSIM) at LANL, who works on modeling high-latitude atmospheric effects in climate models as part of the HiLAT project; Elizabeth Hunke, Lead developer for the Los Alamos Sea Ice Model, Deputy Group Leader of the T-3 Fluid Dynamics and Solid Mechanics Group at LANL; Darin Comeau, Scientist at the CCS-2 COSIM program, specializes in high dimensional data analysis, statistical and predictive modeling, and uncertainty quantification, with particular applications to climate science; Randall Bos is a research scientist at LANL specializing in urban EMP simulations; James Cooley is a Group Leader within CCS-2. 3/16/18 “Climate Impact of a Regional Nuclear Weapons Exchange: An Improved Assessment Based On Detailed Source Calculations.” Journal of Geophysical Research: Atmospheres, vol. 123, no. 5] Recut Justin

To quantitatively account for natural and forced variability in the climate system, we created two ensembles, one for the natural, unforced system and a second ensemble using a range of realistic vertical profiles for the BC aerosol forcing, consistent with our detailed fire simulation. The control ensemble was generated using small atmospheric temperature perturbations (Kay et al., 2015). Notably, the overall spread of anomalies in both ensembles is very similar. These ensembles were then used to create “super ensembles” using a statistical emulator, which allows a robust statistical comparison of our simulated results with and without the carbon forcing. Our primary result is the **decreased impact on global climate indices**, such as global average surface temperature and precipitation, relative to standard scenarios considered in previous work (e.g., Robock et al., 2007a; Stenke et al., 2013; Mills et al., 2014; Pausata et al., 2016). With our finding of **substantially less BC aerosol being lofted to stratospheric heights** (e.g., over a factor of four less than in most of the scenarios considered by previous studies), these globally averaged anomalies drop to **statistically insignificant levels** after the first several years (Figures 14 and 16). Our results are generally comparable to those predicted by other studies that considered exchange scenarios in which only about 1 Tg of soot is emitted in the upper troposphere (Robock et al., 2007a; Mills et al., 2008; Stenke et al., 2013). There are more subtle suggestions of regional effects, notably in the extent of the region over which sea surface temperature differences between ensembles remain significant in the final years of simulation (Figure 17). Further work is required to adequately analyze these and other potential regional effects. Historical analysis of several large volcanic eruptions and a recent large fire also supports this result. For example, Timmreck et al. (2010) claim that nonlinear aerosol effects of the Toba Tuff eruption 74,000 years ago helped **limit significant global cooling** impacts to a **two-year time period** and that any cooling beyond this time period could be due to other effects. It should be noted that this eruption was estimated to have produced **106 Tg** of ash and comparable amounts of other gases, such as sulfur dioxide (SO2), while the estimated amount of soot produced by a regional exchange is on the order of **10 Tg**, or **5 orders of magnitude smaller than the ash** (not including gases) **produced by the Toba eruption**. Noting that a nuclear exchange is not identical to volcanic events, it has been asserted that BC particles produced by fires should have a **greater impact on absorbing solar radiation** than even has the significantly larger amounts of ash and various gases produced by large eruptions (e.g., Robock and Toon 2010). Likewise, recent work in analyzing BC emissions from large fires suggests that in such fires, similar to large volcanic eruptions, **coating of soot particles with other particles** in convective eddies **tends to increase their size and hence increase their subsequent rainout** (China et al., 2013) before they can reach the stratosphere. In fact, the recent study of Pausata et al. (2016) found that growth of BC aerosol via coagulation with organic carbon significantly reduce the particles’ lifetime in the atmosphere

#### The mini-nuclear winter solves warming without causing extinction.

Sorin Adam Matei 12. – Ph.D., Associate Dean of Research and Professor of Communication, College of Liberal Arts and Brian Lamb School of Communication, Purdue University. 3-26-2012. ["A modest proposal for solving global warming: nuclear war – Sorin Adam Matei." Matei. <https://matei.org/ithink/2012/03/26/a-modest-proposal-for-solving-global-warming-nuclear-war/>] Recut Justin

We finally have a solution for global warming. A discussion on the board [The Straight Dope](http://boards.straightdope.com/sdmb/showthread.php?t=646285) about the likely effect of a nuclear war brought up the hypothesis that a nuclear war on a large scale could produce a mini-nuclear winter. Why? Well, the dust and debris sent into the atmosphere by the conflagrations, plus the smoke produced by the fires started by the explosions would cover the sun for a period long enough to lower the temperature by as much as 40 degrees Celsius for a few months and by up to 2-6 degree Celsius for a few years. One on top of the other, according to this [Weather Wunderground contributor](http://www.wunderground.com/blog/JeffMasters/comment.html?entrynum=1208), who cites a[bona fide research paper on nuclear winter](http://www.atmos-chem-phys.org/7/2003/2007/acp-7-2003-2007.pdf), after everything would settle down we would be back to 1970s temperatures. Add to this the decline in industrial production and global oil consumption due to industrial denuding of most large nations and global warming simply goes away. I wonder what [Jonathan Swift would have thought about this proposal?](http://www.gutenberg.org/files/1080/1080-h/1080-h.htm)

#### Extinction

Ng 19 [Yew-Kwang; May 2019; Professor of Economics at Nanyang Technology University, Fellow of the Academy of Social Sciences in Australia and Member of the Advisory Board at the Global Priorities Institute at Oxford University, Ph.D. in Economics from Sydney University; Global Policy, “Keynote: Global Extinction and Animal Welfare: Two Priorities for Effective Altruism,” vol. 10, no. 2, p. 258-266; RP]

Catastrophic climate change

Though by no means certain, CCC causing global extinction is possible due to interrelated factors of non‐linearity, cascading effects, positive feedbacks, multiplicative factors, critical thresholds and tipping points (e.g. Barnosky and Hadly, [2016](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0005); Belaia et al., [2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0008); Buldyrev et al., [2010](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0016); Grainger, [2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0027); Hansen and Sato, [2012](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0029); IPCC [2014](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0031); Kareiva and Carranza, [2018](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0033); Osmond and Klausmeier, [2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0056); Rothman, [2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0066); Schuur et al., [2015](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0069); Sims and Finnoff, [2016](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0072); Van Aalst, [2006](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0079)).[7](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-note-1009_67)

A possibly imminent tipping point could be in the form of ‘an abrupt ice sheet collapse [that] could cause a rapid sea level rise’ (Baum et al., [2011](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0006), p. 399). There are many avenues for positive feedback in global warming, including:

* the replacement of an ice sea by a liquid ocean surface from melting reduces the reflection and increases the absorption of sunlight, leading to faster warming;
* the drying of forests from warming increases forest fires and the release of more carbon; and
* higher ocean temperatures may lead to the release of methane trapped under the ocean floor, producing runaway global warming.

Though there are also avenues for negative feedback, the scientific consensus is for an overall net positive feedback (Roe and Baker, [2007](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0065)). Thus, the Global Challenges Foundation ([2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0026), p. 25) concludes, ‘The world is currently completely unprepared to envisage, and even less deal with, the consequences of CCC’.

The threat of sea‐level rising from global warming is well known, but there are also other likely and more imminent threats to the survivability of mankind and other living things. For example, Sherwood and Huber ([2010](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0071)) emphasize the adaptability limit to climate change due to heat stress from high environmental wet‐bulb temperature. They show that ‘even modest global warming could … expose large fractions of the [world] population to unprecedented heat stress’ p. 9552 and that with substantial global warming, ‘the area of land rendered uninhabitable by heat stress would dwarf that affected by rising sea level’ p. 9555, making extinction much more likely and the relatively moderate damages estimated by most integrated assessment models unreliably low.

While imminent extinction is very unlikely and may not come for a long time even under business as usual, the main point is that we cannot rule it out. Annan and Hargreaves ([2011](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0004), pp. 434–435) may be right that there is ‘an upper 95 per cent probability limit for S [temperature increase] … to lie close to 4°C, and certainly well below 6°C’. However, probabilities of 5 per cent, 0.5 per cent, 0.05 per cent or even 0.005 per cent of excessive warming and the resulting extinction probabilities cannot be ruled out and are unacceptable. Even if there is only a 1 per cent probability that there is a time bomb in the airplane, you probably want to change your flight. Extinction of the whole world is more important to avoid by literally a trillion times.

#### Host of tech risks destroy the universe – which outweighs.

Joe Packer 7 – MA in Communication from Wake Forest University, PhD in Communication from the University of Pittsburgh and Professor of Communication at Central Michigan University, Alien Life in Search of Acknowledgment, p. 62-63 Recut Justin

Once we hold alien interests as equal to our own we can begin to revaluate areas previously believed to hold no relevance to life beyond this planet. A diverse group of scholars including Richard Posner, Senior Lecturer in Law at the University of Chicago, Nick Bostrom, philosophy professor at Oxford University, John Leslie philosophy professor at Guelph University and Martin Rees, Britain’s Astronomer Royal, have written on the emerging technologies that threaten life beyond the planet Earth. Particle accelerators labs are colliding matter together, reaching energies that have not been seen since the Big Bang. These experiments threaten a phase transition that would create a bubble of altered space that would expand at the speed of light killing all life in its path. Nanotechnology and other machines may soon reach the ability to self replicate. A mistake in design or programming could unleash an endless quantity of machines converting all matter in the universe into copies of themselves. Despite detailing the potential of these technologies to destroy the entire universe, Posner, Bostrom, Leslie, and Ree’s only mention of alien life in their works is in reference to the threat aliens post to humanity. The rhetorical construction of otherness only in terms of the threats it poses, but never in terms of the threat one poses to it, has been at the center of humanity’s history of genocide, colonization, and environmental destruction. Although humanity certainly has its own interests in reducing the threat of these technologies evaluating them without taking into account the danger they pose to alien life is neither appropriate nor just. It is not appropriate because framing the issue only in terms of human interests will result in priorities designed to minimize the risks and maximize the benefits to humanity, not all life. Even if humanity dealt with the threats effectively without referencing their obligation to aliens, Posner, Bostrom, Leslie, and Ree’s rhetoric would not be “just,” because it arbitrarily declares other life forms unworthy of consideration. A framework of acknowledgement would allow humanity to address the risks of these new technologies, while being cognizant of humanity’s obligations to other life within the universe. Applying the lens of acknowledgment to the issue of existential threats moves the problem from one of self destruction to universal genocide. This may be the most dramatic example of how refusing to extend acknowledgment to potential alien life can mask humanity’s obligations to life beyond this planet.

#### The military is developing isomer bombs – testing destroys the universe.

Gary S. Bekkum 4, Founder of Spacetime Threat Assessment Report Research, Founder of STARstream Research, Futurist, “American Military is Pursuing New Types of Exotic Weapons”, Pravda, 8-30, <https://www.pravdareport.com/science/5527-weapons/>

In recent years it has been discovered that our universe is being blown apart by a mysterious anti-gravity effect called "dark energy". Mainstream physicists are scrambling to explain this mysterious acceleration in the expansion of the universe. Some physicists even believe that the expansion will lead to "The Big Rip" when all of the matter in the universe is torn asunder - from clusters of galaxies in deep space down to the tiniest atomic particles. The universe now appears to be made of two unknowns - roughly 23% is "dark matter", an invisible source of gravity, and roughly 73% is "dark energy", an invisible anti-gravity force. Ordinary matter constitutes perhaps 4 percent of the universe. Recently the British science news journal "New Scientist" revealed that the American military is pursuing new types of exotic bombs - including a new class of isomeric gamma ray weapons. Unlike conventional atomic and hydrogen bombs, the new weapons would trigger the release of energy by absorbing radiation, and respond by re-emitting a far more powerful radiation. In this new category of gamma-ray weapons, a nuclear isomer absorbs x-rays and re-emits higher frequency gamma rays. The emitted gamma radiation has been reported to release 60 times the energy of the x-rays that trigger the effect. The discovery of this isomer triggering is fairly recent, and was first reported in a 1999 paper by an international group of scientists. Although this controversial development has remained fairly obscure, it has not been hidden from the public. Beyond the visible part of defense research is an immense underground of secret projects considered so sensitive that their very existence is denied. These so-called "black budget programs" are deliberately kept from the public eye and from most political leaders. CNN recently reported that in the United States the black budget projects for 2004 are being funded at a level of more than 20 billion dollars per year. In the summer of 2000 I contacted Nick Cook, the former aviation editor and aerospace consultant to Jane's Defence Weekly, the international military affairs journal. Cook had been investigating black budget super-secret research into exotic physics for advanced propulsion technologies. I had been monitoring electronic discussions between various American and Russian scientists theorizing about rectifying the quantum vacuum for advanced space drive. Several groups of scientists, partitioned into various research organizations, were exploring what NASA calls "Breakthrough Propulsion Physics" - exotic technologies for advanced space travel to traverse the vast distances between stars. Partly inspired by the pulp science fiction stories of their youth, and partly by recent reports of multiple radar tracking tapes of unidentified objects performing impossible maneuvers in the sky, these scientists were on a quest to uncover the most likely new physics for star travel. The NASA program was run by Marc Millis, financed under the Advanced Space Transportation Program Office (ASTP). Joe Firmage, then the 28-year-old Silicon Valley CEO of the three billion dollar Internet firm US Web, began to fund research in parallel with NASA. Firmage hired a NASA Ames nano-technology scientist, Creon Levit, to run the "International Space Sciences Organization", a move which apparently alarmed the management at NASA. The San Francisco based Hearst Examiner reported that NASA's Office of Inspector General assigned Special Agent Keith Tate to investigate whether any proprietary NASA technology might have been leaking into the private sector. Cook was intrigued when I pointed out the apparent connections between various private investors, defense contractors, NASA, INSCOM (American military intelligence), and the CIA. While researching exotic propulsion technologies Cook had heard rumors of a new kind of weapon, a "sub-quantum atomic bomb", being whispered about in what he called ⌠the dark halls of defense research. Sub-quantum physics is a controversial re-interpretation of quantum theory, based on so-called pilot wave theories, where an information field controls quantum particles. The late Professor David Bohm showed that the predictions of ordinary quantum mechanics could be recast into a pilot wave information theory. Recently Anthony Valentini of the Perimeter Institute has suggested that ordinary quantum theory may be a special case of pilot wave theories, leaving open the possibility of new and exotic non-quantum technologies. Some French, Serbian and Ukrainian physicists have been working on new theories of extended electrons and solitons, so perhaps a sub-quantum bomb is not entirely out of the question. Even if the rumors of a sub-quantum bomb are pure fantasy, there is no question that mainstream physicists seriouslycontemplate a phase transition in the quantum vacuum as a real possibility. The quantum vacuum defies common sense, because empty space in quantum field theory is actually filled with virtual particles. These virtual particles appear and disappear far too quickly to be detected directly, but their existence has been confirmed by experiments that demonstrate their influence on ordinary matter.

"Such research should be forbidden!"

In the early 1970's Soviet physicists were concerned that the vacuum of our universe was only one possible state of empty space. The fundamental state of empty space is called the "true vacuum". Our universe was thought to reside in a "false vacuum", protected from the true vacuum by "the wall of our world". A change from one vacuum state to another is known as a phase transition. This is analogous to the transition between frozen and liquid water. Lev Okun, a Russian physicist and historian recalls Andrei Sakharov, the father of the Soviet hydrogen bomb, expressing his concern about research into the phase transitions of the vacuum. If the wall between vacuum states was to be breached, calculations showed that an unstoppable expanding bubble would continue to grow until it destroyed our entire universe! Sakharov declared that "Such research should be forbidden!" According to Okun, Sakharov feared that an experiment might accidentally trigger a vacuum phase transition.

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3. *Dictionary.com – maintain as true, Merriam Webster – to say that something is true, Vocabulary.com – to affirm something is to confirm that it is true, Oxford dictionaries – accept the validity of, Thefreedictionary – assert to be true* [↑](#footnote-ref-3)
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5. <https://www.google.com/search?q=of+definition&rlz=1C1CHBF_enUS877US877&oq=of+definition&aqs=chrome.0.69i59j69i61l3.1473j0j7&sourceid=chrome&ie=UTF-8> //Xu [↑](#footnote-ref-5)
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7. <https://www.merriam-webster.com/dictionary/entity> //Xu [↑](#footnote-ref-7)