### 1NC

#### Interpretation: “the appropriation of outer space” is a generic indefinite singular. The aff may not defend a subset of appropriation of outer space by private entities being unjust.

#### The definite article “the” makes the rez a definite singular – it’s generic

CCC n.d. [Capital Community College, a nonprofit 501 c-3 organization that supports scholarships, faculty development, and curriculum innovation.] “Articles, Determiners, and Quantifiers.” Capital Community College. <http://grammar.ccc.commnet.edu/grammar/determiners/determiners.htm#articles> TG

The three articles — a, an, the — are a kind of adjective. The is called the definite article because it usually precedes a specific or previously mentioned noun; a and an are called indefinite articles because they are used to refer to something in a less specific manner (an unspecified count noun). These words are also listed among the noun markers or determiners because they are almost invariably followed by a noun (or something else acting as a noun). caution CAUTION! Even after you learn all the principles behind the use of these articles, you will find an abundance of situations where choosing the correct article or choosing whether to use one or not will prove chancy. Icy highways are dangerous. The icy highways are dangerous. And both are correct. The is used with specific nouns. The is required when the noun it refers to represents something that is one of a kind: The moon circles the earth. The is required when the noun it refers to represents something in the abstract: The United States has encouraged the use of the private automobile as opposed to the use of public transit. The is required when the noun it refers to represents something named earlier in the text. (See below..) If you would like help with the distinction between count and non-count nouns, please refer to Count and Non-Count Nouns. We use a before singular count-nouns that begin with consonants (a cow, a barn, a sheep); we use an before singular count-nouns that begin with vowels or vowel-like sounds (an apple, an urban blight, an open door). Words that begin with an h sound often require an a (as in a horse, a history book, a hotel), but if an h-word begins with an actual vowel sound, use an an (as in an hour, an honor). We would say a useful device and a union matter because the u of those words actually sounds like yoo (as opposed, say, to the u of an ugly incident). The same is true of a European and a Euro (because of that consonantal "Yoo" sound). We would say a once-in-a-lifetime experience or a one-time hero because the words once and one begin with a w sound (as if they were spelled wuntz and won). Merriam-Webster's Dictionary says that we can use an before an h- word that begins with an unstressed syllable. Thus, we might say an hisTORical moment, but we would say a HIStory book. Many writers would call that an affectation and prefer that we say a historical, but apparently, this choice is a matter of personal taste. For help on using articles with abbreviations and acronyms (a or an FBI agent?), see the section on Abbreviations. First and subsequent reference: When we first refer to something in written text, we often use an indefinite article to modify it. A newspaper has an obligation to seek out and tell the truth. In a subsequent reference to this newspaper, however, we will use the definite article: There are situations, however, when the newspaper must determine whether the public's safety is jeopardized by knowing the truth. Another example: "I'd like a glass of orange juice, please," John said. "I put the glass of juice on the counter already," Sheila replied. Exception: When a modifier appears between the article and the noun, the subsequent article will continue to be indefinite: "I'd like a big glass of orange juice, please," John said. "I put a big glass of juice on the counter already," Sheila replied. Generic reference: We can refer to something in a generic way by using any of the three articles. We can do the same thing by omitting the article altogether. A beagle makes a great hunting dog and family companion. An airedale is sometimes a rather skittish animal. The golden retriever is a marvelous pet for children. Irish setters are not the highly intelligent animals they used to be. The difference between the generic indefinite pronoun and the normal indefinite pronoun is that the latter refers to any of that class ("I want to buy a beagle, and any old beagle will do.") whereas the former (see beagle sentence) refers to all members of that class.

#### Violation – they only defend \_\_\_\_

#### Vote neg:

#### 1] Limits – they can pick any form of appropriation from internet satellites to asteroid mining to moon basing to Mars colonization and there’s no universal disad since they’re all different and require different uses space – explodes neg prep and leads to random appropriation of the week affs which makes cutting stable neg links impossible. PICs don’t solve – it’s absurd to say neg potential abuse justifies the aff being flat out not T, which leads to a race towards abuse. Limits key to reciprocal engagement since they create a caselist for neg prep. DTD on topicality, it’s a constitutve burden

### 1NC

#### CP: States ought to give significant subsidies to private entities to create terrestrially accessible blockchain verification computing centers and cryptocurrency mining centers on lunar heritage sites. Private entities ought to appropriate lunar heritage sites for the purposes of terrestrially accessible blockchain verification computing centers and cryptocurrency mining centers and end all other measures of appropriation. Spacefaring nations should establish and fully fund a program to cover 4.5 million square kilometers around the L1 Lagrange point with 16 trillion structures, one foot in diameter, of one micron-thick glass mirrors.

#### A sunshade at the L1 lagrange point solves warming

Siegel 20 (Ethan Siegel, theoretical astrophysics and science writer, former professor at Lewis and Clark, B.A. in physics from Northwestern University, Ph.D. in astrophysics from the University of Florida, “Ask Ethan: Could We Just Build A 'Space Sunshade' To Counteract Global Warming?,” 1-4-20, *Forbes*, <https://www.forbes.com/sites/startswithabang/2020/01/04/ask-ethan-could-we-just-build-a-space-shade-to-counteract-global-warming/?sh=688381ce43bc>)

It's 2020, and not only is the Earth warmer than it has been in over 100,000 years, but the concentration of greenhouse gases that drives this warming continues to increase unabated. If we want to cool the Earth down, perhaps it's time to look beyond simply advocating for clean, green energy and an end to reliance on fossil fuels. Perhaps, instead, we should be thinking about geoengineering solutions, like going to space and intercepting some of the Sun's light before it ever reaches us. That's Dan Goerke's idea, as he asks: [A]s a fan of terraforming options in the solar system, especially Mars, I thought that I would leverage my knowledge to assuage the fears of innocents. In this case, I thought to myself "If global warming is such a critical issue, why don't we do something 'cheap' and 'simple' like building a solar shade at a Lagrange point?" It's a clever idea with a lot of potential. Let's take a closer look. Earth energy budget diagram, with incoming and outgoing radiation (values are shown in W/m^2).... [+] Satellite instruments (CERES) measure the reflected solar, aend emitted infrared radiation fluxes. The energy balance determines Earth's climate. Earth energy budget diagram, with incoming and outgoing radiation (values are shown in W/m^2).... [+] NASA The first step is to understand why Earth's temperature is what it is. You might think that it's the Sun that gives us our warmth, but that's only mostly correct. If you were to apply the most straightforward method for estimating Earth's average temperature, you would: determine the total average solar irrandiance produced by the Sun, measure the Earth-Sun distance to determine the amount of sunlight arriving at Earth, figure out the albedo, or reflectivity, of the Earth in order to determine how much energy is absorbed vs. reflected, and then put all of these components together to calculate Earth's average temperature. That calculation is pretty straightforward from a physics perspective, and gives an answer of 255 K, which works out to either -18 °C or 0 °F in more familiar units. Although various components of the Earth's surface display huge variable ranges in the amount of... [+] light they absorb or reflect, the global average reflectance/absorption of Earth, known as albedo, has remained constant at ~31%. Although various components of the Earth's surface display huge variable ranges in the amount of... [+] KEN GOULD, NEW YORK STATE REGENTS EARTH SCIENCE This value, unfortunately, doesn't even come close to matching reality. The mean temperature of Earth is much warmer than that ⁠— by 33 °C or 59 °F, in familiar terms ⁠— and it's for reasons that have nothing to do with the Sun at all. Instead, this extra bump in temperature is due to the insulating effects of Earth's atmosphere, which doesn't just reflect or transmit incoming radiation from the Sun, but outgoing radiation emanating from Earth's surface. Without an atmosphere, sunlight comes in, gets either reflected or absorbed, and then the absorbed heat gets re-radiated as infrared light. But with an atmosphere, some of that infrared light gets absorbed or re-reflected back down to Earth's surface, particularly due to the presence of water vapor, carbon dioxide, and methane. All three of these gases act like a blanket for the entire planet: they restrict the ability of Earth's heat to escape into space. The concentration of carbon dioxide in Earth's atmosphere can be determined from both ice core... [+] measurements, which easily go back hundreds of thousands of years, and by atmospheric monitoring stations, like those atop Mauna Loa. The increase in atmospheric CO2 since the mid-1700s is staggering, and continues unabated. The concentration of carbon dioxide in Earth's atmosphere can be determined from both ice core... [+] NASA / NOAA Since the dawn of the industrial revolution, humanity has caused Earth's carbon dioxide concentration to skyrocket; it is currently just over 50% higher than it was in the mid-18th century. While many other complex effects are also at play in determining Earth's temperature, these two basic ones ⁠— the Sun's energy arriving at Earth and the Earth's ability to retain it due (mostly) to its atmosphere ⁠— are by far the most important. For more than 40 years, scientists have understood that human-caused increased concentrations of greenhouse gases are what's driving global warming and climate change, but efforts to curtail these emissions have not been successful. It's now 2020, and our collective climate inaction is leading many to consider geoengineering solutions. While most geoengineering ideas involve altering Earth's atmosphere or surface, the option with the least risk is what Dan proposes: to intercept a portion of the Sun's light before it ever arrives on Earth. Normally, structures like IKAROS, shown here, are viewed as potential sails in space. However, if a... [+] large-area object were placed between the Earth and the Sun, it could reduce the total irradiance received at the top of our atmosphere, potentially combating global warming. The simplest way to do this is to launch something up into space, far from Earth but in between our planet and the Sun, that prevents a portion of the incoming sunlight from impacting the Earth. With a lower solar irradiance on our world, temperatures can be controlled, even with the currently elevated (and still rising) greenhouse gas concentrations. Sure, Earth's atmosphere will continue to trap more heat as time goes on, acting like a progressively thicker and thicker blanket as our greenhouse gas emissions continue unabated. But just as you need more/thicker blankets to maintain the same comfortable temperature when the ambient temperature is colder, it stands to reason that if we know what the blanket situation is but can control the ambient temperature, maybe we should. Solar eclipses are possible on Earth, and occur whenever the Moon aligns with the Earth-Sun plane... [+] during a new Moon. This is perhaps the most famous instance of an astronomical object blocking sunlight from reaching Earth. However, an object could be either smaller or more distant, where it would cast no shadow onto our planet, yet still it would reduce the amount of sunlight striking our world. If we wanted to completely counteract the cumulative effects of human-caused global warming to date, we'd only need to block out approximately 2% of the Sun's light that would normally arrive at Earth on a continuous basis. While that sounds like (and, in actuality, is) an enormous amount of energy, there's some help that the Universe gives us — for free — in implementing either a blocking or deflecting of sunlight as a climate solution. In between the Earth and the Sun, there's a gravitationally quasi-stable point where the combined gravitational forces of the Earth and the Sun cause any object located there to remain at the same relative Earth-Sun position all year round: a Lagrange point. While there are 5 total Lagrange points in practice, the L1 point is most interesting, as an object placed at L1 will always remain between the Earth and Sun, intercepting a portion of the emitted sunlight that would otherwise arrive at Earth. A contour plot of the effective potential of the Earth-Sun system. Objects can be in a stable,... [+] lunar-like orbit around the Earth or a quasi-stable orbit leading-or-trailing (or alternating between both both) the Earth. The L1, L2, and L3 points are points of unstable equilibrium, but an object in orbit around the L4 or L5 point can remain stable indefinitely. A contour plot of the effective potential of the Earth-Sun system. Objects can be in a stable,... [+] NASA The physical location of L1 is quite distant: 1,500,000 kilometers away from the Earth. This is approximately four times the average Earth-Moon distance, meaning you'd need a physical object larger than the size of our planet to cast a shadow on Earth and block out the Sun's light completely. But even a series of small objects that either blocked or deflected the incoming sunlight, so long as the total reduction added up to 2%, would do the job. How practical is this? In order to reduce the sunlight we receive at Earth's surface by 2%, we'd have to stop approximately 2% of the sunlight headed towards Earth at or near the L1 Lagrange point. That corresponds to about 1 million square kilometers, or an area comparable to the disk of the full Moon: an enormous amount to cover. However, there are two brilliant ideas that could accomplish exactly this. This graphic shows an illustration of Angel's 2 foot-diameter flyers at L1. They are transparent,... [+] but blur out transmitted light into a donut, as shown for the background stars. The transmitted sunlight is also spread out, so it misses the Earth. This way of removing the light avoids radiation pressure, which would otherwise degrade the L1 orbit quite rapidly. This graphic shows an illustration of Angel's 2 foot-diameter flyers at L1. They are transparent,... [+] UNIVERSITY OF ARIZONA / STEWARD OBSERVATORY 1.) Place an enormous constellation of small spacecrafts at L1. Proposed by astronomer Roger Angel, an array of lightweight, thin circles approximately 1 foot (30 cm) in radius could significantly reduce the amount of sunlight reaching Earth, if there were enough of them. Instead of reflecting light like a mirror (where they'd experience significant radiation pressure) or absorbing the sunlight directly (which would degrade the quasi-stable orbit at L1), these circles would simply blur any sunlight that was transmitted through it. Most of the transmitted light would then miss the Earth, reducing the total irradiance proportionally. The big downside is that we'd need a lot of them: 16 trillion, to be specific, to achieve the reduction that we'd want, which would require covering 4.5 million square kilometers (4.5 × 1012 m2). However, if we wanted to require less surface area, we could go with an alternate proposal. This illustration, with wildly incorrect distance scales, shows the principle of a space lens. The... [+] basic function of a space lens is to mitigate global warming, refracting sunlight away from the Earth. The actual lens needed would be smaller and thinner than what's shown here, and could be accomplished with a large array of small lenses instead of one enormous one. This illustration, with wildly incorrect distance scales, shows the principle of a space lens. The... [+] MIKAEL HÄGGSTRÖM / WIKIMEDIA COMMONS 2.) Place a large space lens (or a series of smaller lenses) in orbit at L1. Proposed way back in 1989 by James Early, a device as simple as a glass shield a few millimeters thick could act as a lens, which would diffuse a large amount of sunlight away from the Earth. Because of how efficiently lenses can cause the Sun's parallel rays to diverge (or converge for a brief while and then diverge), only about 1 million square kilometers (1 × 1012 m2) of coverage would do the job. It wouldn't have to be one single lens, either, as an array of smaller space lenses could accomplish the same goal. The smaller the lenses, the more of them you'd need, but it's a low-risk, high-reward option, as the danger to Earth from anything going awry is practically nil. The very first launch of the Falcon Heavy, on February 6, 2018, was a tremendous success. The rocket... [+] reached low-Earth-orbit, deployed its payload successfully, and the main boosters returned to Cape Kennedy, where they landed successfully. The promise of a reusable heavy-lift vehicle is now a reality, and could lower launch costs to ~$1000/pound. As costs continue to drop, extensive space infrastructure becomes a more realistic possibility. The very first launch of the Falcon Heavy, on February 6, 2018, was a tremendous success. The rocket... [+] JIM WATSON/AFP/GETTY IMAGES However, both of these potential solutions have some drawbacks: they're very expensive and the solution is temporary. We have experience launching objects to L1, as the majority of our Sun-observing satellites are located there. But it's very difficult to send large quantities of mass to space, and that's what would be required here. If we considered the lighter proposal of a series of thin film circles, with each one just 1/5000th of an inch this and weighing just 1 gram, that would still add up to ~20 million tonnes of mass. With present-day launch costs, we'd be spending trillions of dollars to launch an array to L1. There are reasons to hope that as reusable launch technology becomes more reliable, this might decrease launch costs to under a trillion by the end of the 2020s, making it more feasible than many of the current proposals to combat climate change terrestrially. Once we get these spacecraft to L1, however, there's another problem: their orbits will decay. NASA conceived of a Solar Power Satellite back in the 1970s. If a series of solar power satellites... [+] were placed at L1, they could not only block some of the sunlight, but could provide usable power for other purposes. L1, however, is not a stable point, and satellites placed there must either be continuously boosted or will see their orbits chaotically decay. NASA conceived of a Solar Power Satellite back in the 1970s. If a series of solar power satellites... [+] NASA Whereas satellites launched to L4 or L5 will be in stable orbits that can last for aeons, satellites launched to L1, L2 or L3 are in quasi-stable orbits. Without any intervention, even with ideal orbital insertion, they will drift away and out of their ideal positions on timescales of just a few years. The only way to maintain them is to either: boost them, which requires outfitting them with self-propulsion technologies, service them, requiring maintenance launches to go up and re-adjust their orbits, or to simply replace them, meaning that we'd need to continuously launch new ones to replace the ones that drift away. It would be a remarkable feat if we could counteract global climate change with a one-time investment in space, but due to the way gravitation works, even the idea of blocking sunlight before it arrives will require enormous ongoing investments in maintenance. At an average warming rate of 0.07º C per decade for as long as temperature records exist, the... [+] Earth's temperature has not only increased, but continues to increase without any relief in sight. Unless we significantly and rapidly curtail our emissions of greenhouse gases, we may be forced to adopt geoengineering solutions to climate change. At an average warming rate of 0.07º C per decade for as long as temperature records exist, the... [+] NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION, CLIMATE AT A GLANCE: GLOBAL TIME SERIES And yet still, for all of it, this might be the most economical solution to the problem of global warming. As launch costs continue to drop, as we get better at placing our satellites in their ideal orbits on the first try, and as we develop artificial intelligence and new in-space technologies like ion drives and solar sails, we could conceivably mitigate the ill effects of global warming for just a few trillion dollars per decade. Moreover, the solution of intercepting and deflecting incoming sunlight is the one geoengineering idea that would have no long-term negative environmental effects for Earth. Unlike adding chemicals to the atmosphere, strategically injecting particulates or cloud nucleation sites into the skies or oceans, or placing satellites in low-Earth orbit, this won't alter the Earth itself, just the incoming sunlight before it arrives. As the planet continues to warm and greenhouse gas levels continue to rise, many are lamenting the lack of effective strategies to combat the effects of climate change. While ocean acidification and other problems arising from the increased greenhouse gases won't be helped, a solution to the warming problem may lie with a Space Sunshade, an idea whose costs are literally astronomical but continue to drop with time. The longer we wait to act, the more compelling the case becomes for this unique geoengineering solution.

#### Colonizing part of moon = appropriation

Futurism 16 "Making a Lunar Colony: Can You Own Land on The Moon?" Futurism, 10. 12. 16, futurism.com/can-your-own-land-on-the-moon.

Despite clearly saying that Outer Space is the property of all humanity, and can only be used for the good of all, the language is specific to national ownership. As a result, there is no legal consensus on whether or not the treaty’s prohibition are also valid as far as private appropriation is concerned. However, Article II addresses only the issue of national ownership, and contains no specific language about the rights of private individuals or bodies in owning anything in outer space. Because of this, there are some who have argued that property rights should be recognized on the basis of jurisdiction rather than territorial sovereignty. Looking to Article VI though, it states that governments are responsible for the actions of any party therein. So it is clear that the spirit of the treaty is meant to apply to all entities, be they public or private. As it states: “States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty.The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty.” In other words, any person, organization or company operating in space is answerable to their respective government. But since no specific mention is made of private ownership, there are those who claim that this represents a “loophole” in the treaty which allows them to claim and sell land on the Moon at this time. Because of this ambiguity, there have been attempts to augment the Outer Space Treaty.

#### Appropriation means use, exploitation, or occupation that is permanent and to the exclusion of others

Babcock 19 Professor of Law, Georgetown University Law Cente. Babcock, Hope M. "The Public Trust Doctrine, Outer Space, and the Global Commons: Time to Call Home ET." Syracuse L. Rev. 69 (2019): 191.

Article II is one of those succeeding provisions that curtails “the freedom of use outlined in Article [I] by declaring that outer space, including the [m]oon and other celestial bodies, is not subject to national appropriation.”147 It flatly prohibits national appropriation of any celestial body in outer space “by means of use or occupation, or by any other means.”148 However, “many types of ‘use’ or ‘exploitation’. . . are inconceivable without appropriation of some degree at least of any materials taken,” like ore or water.149 If this view of Article II’s prohibitory language is correct, then “it is not at all farfetched to say that the OST actually installs a blanket prohibition on many beneficial forms of development.”150 However, the OST only prohibits an appropriation that constitutes a “long-term use and permanent occupation, to the exclusion of all others.”151

#### Moon computing center is that – all resources in the land of the computer would be excluded to other actors – and water usage which is required to cool the centers

#### Climate-motivated terrestrial mining regulations kill crypto now – those don’t get applied to space because of unique environments – that saves crypto with sufficient private investment

Greene 21 Greene, Tristan. Tristan covers human-centric artificial intelligence advances, quantum computing, STEM, Spiderman, physics, and space stuff. As far as I can tell his highest level of education was that he was in the Navy for a while. "What happens to Bitcoin when billionaires build cryptocurrency miners on the Moon?" TNW | Hardfork, 8 June 2021, thenextweb.com/news/bitcoin-billionaires-build-cryptocurrency-miners-on-moon-bitcoin.

Space exploration and exploitation have traditionally been nationalist endeavors. But the rise of the 12-digit billionaire has suddenly made outer space look like open territory. The players Jeff Bezos is stepping down from his position as the CEO of Amazon after 25 years ahead of his imminent launch into space aboard one of his own Blue Origin spaceships. This will be the future of fintech 6 trends that will dominate fintech in 2022 While it’s easy to imagine the long-time leader retiring to live out a childhood fantasy, there’s nothing in Bezos’ history as an incredibly ambitious person and businessman to indicate his he’ll just blast off into the sunset to live a life of quiet leisure. Simply put, Bezos’ interest in the space sector likely won’t end with offering consumer thrill rides. While it’s impossible to know where the soon-to-be-former CEO might take his ambition, it’s likely Amazon and/or Blue Origin is already looking for ways to exploit the space sector for profit. But, obviously, Bezos isn’t the only private citizen with a spaceship company. Elon Musk’s SpaceX has spent the last decade becoming the belle of NASA’s ball and he’s already all-in on the idea of sending humans to Mars. And we can’t forget Richard Branson. He may only be worth a paltry $5 billion (lol), but his Virgin Galactic company’s been banking on making some money in space tourism for a long time. Let’s also not forget that Virgin’s dabbled in everything from railroad technology to record labels. And the list goes on. Anyone with a few billion dollars has business options and opportunities that extend beyond our planet’s surface. Space for profit In the past, we’ve discussed the idea of mining space asteroids for profit. Some experts believe there are unimaginable fortunes floating around in space in the form of resource-rich asteroids. In fact, you can even get a degree in asteroid mining. And even Goldman Sachs has considered getting in on the action. But, at the end of the day, we still have to figure out where these resources are, build machines capable of extracting them, and get them safely to somewhere they can be useful. Right now, there’s not much value in investing in asteroid mining futures because the technology either doesn’t exist or isn’t ready yet. However, there’s more than one kind of mining you can do in space. Enter cryptocurrency and the future Elon Musk recently got involved in a friendly space race, but this time it has nothing to do with competition over rockets or government contracts. He’s racing against BitMEX, a cryptocurrency exchange and derivative platform, to see who can get a cryptocurrency on the Moon first. If you’re curious about how that works, here’s a snippet from BitMEX’s official announcement: BitMEX will mint a one-of-a-kind physical bitcoin, similar to the Casascius coins of 2013, which will be delivered to the Moon by Astrobotic. The coin will hold one bitcoin at an address to be publicly released, underneath a tamper-evident hologram covering. The coin will proudly display the BitMEX name, the mission name, the date it was minted and the bitcoin price at the time of minting. According to BitMEX, this isn’t just a ceremonial or token delivery. The coin itself is a hardware wallet containing an actual Bitcoin, so its value will change with the value of the BTC here on Earth. In other words, BitMEX is sending a literal treasure to the Moon for anyone brave (or rich) enough to retrieve it. Per the company’s blog post: A moon surface background with text superimposed, quote below Credit: BitMEX Come and Get It. When the physical coin lands, it will remain on the Moon until anyone deems it worthy of retrieval. Decades from now, what will it be worth? It’s a great question. Some experts have predicted a single bitcoin will one day be worth $100K, $1M, or even more. But an even better question is this: What’s the end game for cryptocurrency in space? Billionaires want to be trillionaires Back in 1999 Wired ran a feature about the imminent rise of the world’s first trillionaire. At the time, everyone assumed the richest man in the world, Microsoft CEO Bill Gates, would be the first trillionaire by a long shot. Here’s a quote from that article: The value of Bill’s Microsoft stake has grown from $233.9 million at the time of Microsoft’s 1986 IPO to $72.2 billion as of June 15, 1999 (disregarding stock sales). At this rate – 58.2 percent a year – he will become a trillionaire in March 2005, at age 49, and his Microsoft holdings will be valued at $1 quadrillion in March 2020, when he is 64. Of course, we still haven’t seen a trillionaire in modern history. As of the time of this writing, the richest person in the world is France’s Bernard Arnault, whose $193.6 billion empire edges out Jeff Bezos’ $189 billion. At some point, if Bezos wants to pull away with it or Elon Musk wants to close the widening gap between his $151.4 billion and a first place finish, the world’s richest people are going to have to do more than squeeze terrestrial markets for every last drop of profit. That’s why many experts view Elon Musk’s heavy involvement in cryptocurrency as the potential difference maker. On any given day the Tesla, SpaceX, and Neuralink founder’s total worth can skyrocket or plummet by tens of billions of dollars based on how his cryptocurrency holdings are performing. When you consider that market movements can be directly tied to Musk’s social media statements, the power proposition for billionaires holding cryptocurrency is unbridled. Simply put: Elon Musk has more control over the so-called “volatile” world of cryptocurrency than most. Putting a cryptocurrency in space, much like firing a Tesla off into the galaxy, is a PR move meant to generate interest in the burgeoning cryptomarket. But that’s not the only purpose they serve. These acts remind us that people like Musk and Bezos can do anything they want. If they want to put a coin on the Moon, they have the means to do it. And, for example, if Musk or Bezos suddenly wanted to solve the biggest problems with cryptocurrency mining – power consumption, carbon footprint, developing powerful-enough hardware – they’re in a unique position to do so. In space, no one can hear you mine Arguably, one of the biggest things stopping an apex whale like Elon Musk from spending a fair portion of his billions on cryptomining centers is the fact that such an operation would almost certainly draw universal condemnation for its potential effect on the global climate crisis. But the Moon’s atmosphere isn’t necessarily as fragile as the Earth’s. Hypothetically speaking, there’s nothing to stop a billionaire from building a facility on the Moon to mine cryptocurrency. They would, of course, need to be able to build their own batteries, have experience with artificial intelligence and supercomputers, and already have their own satellite network set up in space – all boxes Elon Musk can tick today. And, in the near-future, as we perfect deep space transmission technology, what’s to stop a billionaire from putting a supercomputer on a satellite and sending it somewhere in deep space to mine cryptocurrency 24/7 at near absolute-zero temperatures? All of this is conjecture, but the writing is on the wall. Cryptocurrency enthusiasts fear what the experts are consistently warning: regulation is coming. Eventually, it’s possible cryptocurrency mining could become regulated with harsh policies designed to keep mining operations from further damaging the environment. This could seriously hinder the market. If humanity walks away from terrestrial mining to save the planet, we’ll be leaving unfathomable amounts of money on table. Billionaires don’t become billionaires by doing that. The only logical path forward, barring some unknown new green mining technology, may be moving the cryptocurrency industry to space.

#### Mining reach a wide rollout---that builds resilience to survive inevitable existential filters.

Alex McShane 21, Writer and Head of Video for Bitcoin Magazine, BA from the University of Iowa, Degree from the University College Dublin, Degree from Kirkwood Community College, “Bitcoin and Existential Risk”, Bitcoin Magazine, 9/5/2021, https://bitcoinmagazine.com/culture/bitcoin-and-existential-risk-alex-mcshane

TL;DR - An existential risk is the possibility of an event or series of events that could drastically curtail humanity’s potential. A hypothetical global catastrophe could be anthropogenic or non-anthropogenic and internal or external in nature. The adoption of Bitcoin will better position us to address these risks as a society.

EXTERNAL NON-ANTHROPOGENIC

A catastrophic collision with an astronomical object, such as an asteroid impact would be an external non-anthropogenic risk. This has already occurred here several times. During the Permian Triassic period (ending 250 million years ago) an astronomical impact killed 90 percent of the species on Earth. It took tens of millions of years for life on Earth to repopulate and Earth’s intelligence potential to recover.

One interesting external non-anthropogenic risk is Earth’s reflected light, which could be measured by an external intelligence who then come to extinguish us. (The topic of our own signal bringing about this death by misadventure is discussed further below.)

What does this have to do with Bitcoin?

Generally, hard money facilitates greater innovation and technological process. At this point one might argue that if we do not migrate to some degree from Earth as a species, and are subsequently wiped out by an astronomical object impact or a super-volcanic event, the risk becomes anthropogenic in nature. We are a centralized species on a grand scale, and at this point one could say we have through consensus chosen to remain vulnerable to a single vector of attack by staying here.

Bitcoin is not only the hardest money known to man, it is the most responsible from this standpoint. Bitcoin as it currently operates is currency that can provide a monetary framework on which humans can achieve greater capital growth, collaboration, resource allocation, and therefore technological progress. Because the terminal supply of Bitcoin is capped, we can store value in it indefinitely as a society.

66 Million years ago the Cretaceous-Paleogene Extinction Event extinguished the life and intelligence potential of the non-avian dinosaurs. This series of events was external, and broadly non-anthropogenic in the sense that no form of life on Earth at the time contributed to its own demise, but more specifically, at the time of those astronomical impacts the first humans hadn’t split from chimpanzee lineages. This split is thought to have occurred between between 4 and 8 million years ago.

An important distinction between astronomical impacts or super-volcanic events of the past and such events if they were to happen today is that one could argue that our intelligence potential is now mature enough to tackle certain of the external existential risks. Today, the risk posed by an asteroid impact or something similar would still be external in its origin, but at what point does the burden of responsibility to migrate off of the planet fall upon our population? We can surely solve for some external existential risks, and in any case, no one is going to do it for us. You could say that failing to collectively pursue a solution when technically we could have would recategorize a civilization-extinguishing asteroid impact as an external but anthropogenic risk.

At what point do innovation dampening authoritarian states and their mandated broken money cause society to stall at a local optimum? Surely the government has already caused this. It’s only a matter of time before another object strikes the Earth with devastating consequence. I would argue it is irresponsible to continue life here with government money. Government money is an existential risk. Bitcoin is not only a solution, it is a societal responsibility.

INTERNAL ANTHROPOGENIC

Nuclear war is one example of an internal anthropogenic risk. That is, should nuclear war arise, it would be both self destructive, and relatively self contained on a cosmic scale. It follows that biological warfare is an internal anthropogenic risk, the reality of which we as a species can surely understand now. If I were to hazard a guess I would say virtual emergencies and cyber pandemics are next. These self constructed catastrophes are the government’s misguided attempts at proof of work. This is a topic for another time. Do not surrender your ability to think and speak freely.

The second law of thermodynamics can summed thus, processes that involve the transfer or conversion of heat energy are irreversible. The law indicates we have not observed a spontaneous transfer of energy from cold to hot. Another way to think of this is that there is no such thing as cold, only lesser degrees of hot. Nothing cannot transfer. So broadly, within a closed system, the second law of thermodynamics would indicate that all differences tend to level out.

So what has this got to do with Bitcoin?

Well firstly, all hardware is subject to entropy. The distributed nature of the blockchain increases the probability that it will survive centralized entropy. At Bitcoin’s inception, imagine a failure because Satoshi’s computer randomly crashed. Distributed networks are inherently hedged against this particular centralized form of existential risk.

The second law of thermodynamics also suggests that on a grander scale, relatively isolated (centralized) systems will degenerate more and more into disordered states. Proof of work, and network growth are two ways Bitcoin fights against falling into disrepair.

Bitcoin uses proof of work to stave off entropy. The system cannot stay dormant. It must continue to use proof of work to advance the state of the chain, and to fight entropy to secure the monetary value all of the users have stored in the network. The U.S. dollar, as many have pointed out, relies on proof of war, or distributed political energies to maintain dominance. Its methodology can be described as haphazard at best.

INTERNAL NON-ANTHROPOGENIC

One internal non-anthropogenic risk is that of a super-volcanic eruption, provided it wasn’t humans who brought about the eruption. Just like with external non-anthropogenic risks, Bitcoin alone cannot prevent them, but it can help humans prepare for them such that we may survive these relatively small intelligence filters the universe throws our way.

Bitcoin allows for fundamental capital accumulation and human innovation, and promotes collaboration to such a degree that we will find an increased collective problem solving power as humans the further Bitcoin adoption spreads. It is worth mentioning that Bitcoin also maintains and appreciates wealth to such a degree that often those of us to chose to live our lives on a Bitcoin standard will experience relatively greater freedoms, and vastly greater amounts of free time than our peers who chose to continue their lives on a fiat standard, and are perpetually working to outpace their chronic debt. Many Bitcoiners will likely forego that newfound free time to work and continue to provide value to others in whatever area interests them, because Bitcoin incentivizes the collaborative accumulation of capital but also the responsible reallocation of it.

EXTERNAL ANTHROPOGENIC

An external anthropogenic risk has the least probability of occurring. This is a problem of reach. Imagine human intelligence being sent into the cosmos and signaling or generally causing an external intelligence or astronomical object to come back to extinguish us. This is a most improbable extinction by misadventure.

The probability that we send messages of consequence into the cosmos that in turn cause some other far-flung intelligence, with knowledge enough to reach us, to come and bring about our own destruction is next to zero, but it isn’t zero.

I would posit that the probability increases every day that Bitcoin survives, with each person that chooses to hold Bitcoin over fiat, because on a fiat standard we are again, stuck at a local optimum at best, and each day the global monetary system devolves further into chaos. The fiat world may continue to be habitable chaos, but our technological progress and our greatest capacity for innovation cannot be achieved on a fiat standard.

A Bitcoin standard is not only our current best bet, it is the only monetary vehicle that will take us from here, or enable us to build technology that can effectively communicate with places in the universe where other intelligence has emerged. The other reason this fatal miscommunication is unlikely to occur is that once through a Bitcoin standard we have manage to build a society that can effectively reach and communicate at greater depths of the cosmos we will at that time have already become a multi-planetary, if not transitory, if not multi-solar system species. The topic of Bitcoin in space and planetary interoperability will be discussed in a later essay.

The most distant human made object from the earth is the Voyager 1, which is over 13 billion miles away. (For perspective, Apha Centuri, the nearest star system to Earth, is 25 trillion miles away.) Human radio signals have announced our presence and our intelligence to the cosmos since around 1900. The first human radio signals have all ready traveled 114 light years, that is 681,920,540,000,000 miles. Although the reach of our radio signals is very great, the probability of us being heard and subsequently extinguished is negligible. External anthropogenic risks are the least of our concerns at the moment.

As Bitcoin adoption grows, it serves to promote advances in artificial intelligence and nanotechnology. External anthropogenic risks will become more relevant to human intelligence at a much later time. External non-anthropogenic risks are similarly out of our hands for the time being. That is, at the moment there is nothing we can do to prevent the Sun from becoming a red giant star and subsuming the Earth.

But we do already have the monetary technology upon which to engineer solutions to some of these problems. We have the potential as humans to prevent internal global catastrophes, both those set on by us and not. Survival and longevity is arguably our greatest task as a species. Adopting Bitcoin, and protecting this network is proceeding with diligence and a long eye toward the future in all of our political and scientific affairs. The existential risks of living are great, though it is human nature for our ambitions to out pace our current abilities. The only evidence of life is change. To change is to exit fiat currency, it is to use Bitcoin instead.

#### secures missile siloes and radar facilities from malware---that stops nuclear war

Matt **Culbertson 18**, Vice President at BCW Global, BA from Arizona State University, “Blockchain, Nuclear War, and Artificial Intelligence: 2018’s Most Extreme Cybersecurity Forecasts”, LinkedIn, 3/13/2018, https://www.linkedin.com/pulse/blockchain-nuclear-war-artificial-intelligence-2018s-most-culbertson/

Start with the hype around **blockchain** this year, and why Wall Street has been so excited around these emerging technologies. A major reason for the hype is **security**. Imagine blockchain as a giant **tower of math**, with any transaction affecting the entire system. The idea of committing fraud for many cryptocurrencies and other blockchain applications, such as supply chain management, would require fooling the **entire ecosystem**. It’s as if you tried to insert an oversized Jenga block into a **virtually unshakable 30,000 foot Jenga tower**—there’s **no way** to make the block fit without the entire system rejecting it. We’ve simplified this example obviously. (Of note: In the lead-up to last year’s Black Report, Chris Pogue broke the news that many U.S. law firms have stockpiled bitcoin in order to pay off clients’ ransomware attackers.)

For years, there’s been far-fetched talk in Silicon Valley of starting over and re-inventing the internet. Blockchain technology is perhaps the most dominant proof of concept for this. As the theory goes, the internet was designed by naïve academics and never built for security. Right now, computer networks are like the human immune system: You can eat well and exercise (patch your software), but you’ll never be completely immune to viruses or breaches—for example, all it takes is a rogue employee. Research suggests half of data losses are due to insider threats.

Expect things to get worse before they get better. According to our research, most hackers could completely compromise a system in less than 15 hours, yet the average time to discover a breach is 250–300 days. In some cases, an organization can be years behind an attacker before they discover a beach.

Could Cybersecurity Flaws Lead to an Extinction-level Event?

There’s no shortage of highly funded think tanks **predict**ing the biggest **threats to humanity** and the world order: war, **nanotech**nology, **super-viruses**, and **a**rtificial **i**ntelligence. For years, major tech executives and scientists like Elon Musk, Stephen Hawking, and Bill Gates have been raising public attention to the risk of the latter.

Some experts estimate 50-50 chances of a conflict with North Korea in 2018—though many similar claims are purposefully overhyped. More grounded estimates show the extraordinary difficulty of predicting a nuclear event. For instance, the Global Catastrophic Risk Institute cites research with a probability of nuclear conflict ranging from “once per 14 years to once per 100,000 years.” For perspective: during the Cuban Missile Crisis, President John F. Kennedy saw the chances of nuclear war as being as high as 50 percent—considerably worse than Russian Roulette.

In **most** of the think tanks’ **scenarios** for **extinction-level** scenarios, poor **cybersecurity** hygiene or failure of imagination around risks is a **leading probability** for **sparking** the event. Consider the risk of a **nuclear incident** from any number of scenarios when malware attacks a nuclear missile **silo** or **radar facility**.

In 19**83**, Soviet Lieutenant Colonel Stanislav Petrov may have prevented a **nuc**lear **war** between the US and USSR by simply ignoring false computer warnings of a US nuclear strike. The radar readings of an imminent attack were the result of a malfunction. Picture an **alternate** version of history where it was a **hack** instead: In January, international policy think tank Chatham House reported US, UK, and other **nuc**lear weapon**s** programs are **increasingly vulnerable** to **cyberthreats**.

#### They get theory but it’s not DTD- 1ar time advantage- that was above, abuse is self-imposed b/c they could always better develop the shell in the 1ar, over-punishment- reading theory cancels out the abuse, and no reason short speech means drop the debater- just get more efficient, short shells already force 2n split. Evaluate the theory debate after the 2NR – if the aff didn’t include weighing in the 1AR, that’s their fault B] dropping the argument minimizes the chance the round is decided unfairly C] if intervention will happen on theory debates, then judges should intervene in a way that decreases the asinine nature of LD theory

### 1NC

#### Counterplan: Private entities, with the exception of Chinese private entities, ought not appropriate lunar heritage sites.

#### CCP legitimacy high now

Yvonne Murray 22, “2021 saw China's Xi Jinping tighten grip on power,” 1/4/22, RTE (Ireland's National Public Service Media), https://www.rte.ie/news/2021/1231/1269202-china-year-in-review/

In 2021, while most of the world struggled to contain the virus, China kept its borders sealed, stamped out outbreaks with ruthless efficiency and in its zero-Covid bubble, set about turbo charging internal reforms.

It was the year, the Chinese leader, Xi Jinping, declared "the east is rising and the west is in decline". But his confidence was cautious, warning officials not to write off their main rival, the United States.

And as this superpower rivalry deepened, taking on what other countries feared was a distinctly Cold War hue, Taiwan took centre stage.

The US President Joe Biden appeared to break with Washington's long-held policy of "strategic ambiguity" (which is meant to keep everyone in the dark as to whether the US would defend Taiwan) by stating the US would indeed come to the island’s defence. His aides later back-pedalled on his comments.

When an unprecedented number of Chinese warplanes flew past Taiwan amid Beijing’s threats to take the island, many speculated the invasion was nigh.

And while China continued to look for parity of esteem for its authoritarian form of governance, especially in international institutions built on democratic norms, Taiwan became the touchstone in a global clash of values.

Democracy versus authoritarianism

The clashes came thick and fast. In the Spring, politicians in Europe, who had criticised human rights abuses in Xinjiang, were hit with sanctions by Beijing. The shelving of the China Investment Agreement as a result, was a clear sign that Sino-European relations had taken a nosedive. In the autumn, Beijing lost a good friend with the exit of Germany’s Chancellor, Angela Merkel.

Then the decision by an EU country, Lithuania, to allow Taiwan to open a representative office under its own name, drew fury from Beijing, culminating in the sudden flight of Lithuanian diplomats out of China.

In another dramatic diplomatic incident, Huawei’s senior executive, Meng Wanzhou, reached a deal with US prosecutors in her extradition case, allowing her to return to China.

Within hours, the two Canadian citizens, Michael Kovrig and Michael Spavor, detained on spying charges in China were suddenly released - Beijing appearing to make no secret of its hostage diplomacy. Irish businessman Richard O’Halloran, meanwhile, remained detained without charge in Shanghai.

At the same time, the number of foreign journalists inside China, dwindled further. Reporters who tried to hold the one-party state government to account on issues like the re-education camps in Xinjiang, the ongoing erosion of democracy in Hong Kong or the virus origins were frequently called "fake news" and "hostile foreign forces" by a regime now entirely intolerant of scrutiny.

When I fled Beijing with my family in March after years of intimidation and harassment by the authorities, there were no Irish journalists, reporting for Irish outlets, left in China.

In our Taipei exile, we joined a burgeoning number of China correspondents forced to cover the superpower from a distance.

In 2021, it seemed the chasm between China and much of the rest of the world - or to use Chairman Xi’s framing "east and west" - yawned wider.

The home front

But despite the chilly geopolitical atmosphere, on home turf this year the leadership was in a celebratory mood. Pomp and pageantry marked 100 years of the Communist Party in July and the party leader, Xi Jinping, used the moment to deliver a colourful message to his own people and more pointedly to the outside world.

"We will never allow anyone to bully, oppress or subjugate China," he said, to whoops and cheers in Tiananmen Square.

"Anyone who dares try to do that will have their heads bashed bloody against the Great Wall of Steel forged by over 1.4 billion Chinese people," he said.

Domestically, there is no doubt that the pandemic delivered a massive boost for the leadership. The Chinese public, looking at the infection and death rates in advanced democracies, felt a sense of national pride that China had to a large extent remained Covid-free, and the downsides of the policies, such as impact on mental health, received little attention.

However, those Chinese people who tried to document the chaos of the early response to the virus were forgotten. One citizen journalist, Zhang Zhan, is now dying in prison for attempting to report the reality of the Wuhan lockdown, countering the official propaganda. Others simply disappeared.

The government continued to push their own narratives on the origins of the virus, suggesting, alternately, that it came in on frozen food imports from Europe or it was manufactured in a US laboratory - both widely accepted by Chinese citizens and promoted by officials on international social media platforms.

The WHO's heavily choreographed mission to Wuhan resulting in the verdict that a leak from a Wuhan lab was "extremely unlikely" was another victory for the Communist Party. (Although the WHO chief, Tedros Adhanom, swiftly put the lab leak theory back on the table as soon as the team left China.)

Common prosperity

But behind the outward confidence, China’s leaders spoke of major internal challenges: a demographic crisis, pressing energy and food security issues as well as an unsustainable wealth gap which makes China one of the most unequal societies in the world.

They know that the Party’s social contract with its citizens (to stay out of politics while leaders deliver growth and jobs) could suffer in a slowing economy, damaging their legitimacy.

2021 was in many ways a dress rehearsal for 2022

And so, under the banner of "common prosperity," the government enacted a series of crackdowns on technology companies, brought wealthy entrepreneurs to heel, banned expensive online education platforms and reined in the overheated real estate sector.

The government also went after the online gaming industry, which state media labelled "spiritual opium," limiting playing time for teenagers and prompting the American makers of the game Fortnite to pull the plug on their China venture.

With all this set to continue, 2021 was in many ways a dress rehearsal for 2022 - the year in which Xi, often compared to Mao, is expected to enter an unprecedented third term as leader of an unapologetically authoritarian, deeply nationalistic and increasingly powerful regime.

#### The plan alienates the PLA – they view space dominance as the linchpin of China’s legitimacy – specifically, public-private tech development is key

Economic Times 20 [(Economic Times, Indian daily newspaper, internally cites Dean Cheng, Senior Research Fellow at the Heritage Foundation and the Davis Institute for National Security and Foreign Policy, former analyst in the International Security and Space Program at the Office of Technology Assessment, BA in Politics from Princeton University) “China attempting to militarize space as it seeks to modernize its military power,” 8/31/2020] JL

The Jamestown Foundation, a US think-tank, hosted a webinar on August 19 entitled "China's Space Ambitions: Emerging Dimensions of Competition." One presenter, Dean Cheng, Senior Research Fellow at The Heritage Foundation, noted that Beijing's space programme is linked to China's central concept of comprehensive national power. "This is basically how the Chinese think about how they rack and stack, how they compare with other countries."

China recognises that military power is important, but it is not the only factor in being a great power. Cheng drew a parallel with the former USSR, where military power alone did not ensure survival of that communist state. Other comprehensive national power factors are political unity, economic power, diplomatic strength, science and technology, and even culture. "Space touches every one of these aspects in comprehensive national power, and that is a part of why Chinese see space as so important."

Indeed, a strong space industrial complex will generate benefits that ripple through the rest of China's economy. Furthermore, he said space achievements "promote pride within China, especially for the Chinese Communist Party (CCP) ... It's symbolic of how far China has come," he said, and "it gives the CCP legitimacy".

China is pushing into space services, including satellite launches, satellite applications and Earth observation/satellite imagery for others. Satellite customers include Belarus, Laos, Pakistan and Venezuela, for example, attracting hard currency and influence. Cheng said most underestimate the impact this has, as such countries grow almost totally dependent on Chinese equipment, assets and training over time. Incidentally, China could have manufactured back doors into these systems for foreigners to allow it access.

Mark Stokes, Executive Director at the US-based Project 2049 Institute think-tank, said in the same webinar that PLA requirements have always been fundamental to development of Chinese space capabilities. Potential PLA space missions in support of joint warfighting in a crisis include targeting (battlefield surveillance, electronic reconnaissance and ocean surveillance), communications, PNT services (obtaining target data, navigation information, navigation support and timing services), space jamming (encompassing space communications, radar, electro-optical and PNT) and space protection.

Stokes said the end of 2015 was "significant" for Chinese space efforts because consolidation of end-users under the PLA's Strategic Support Force (PLASSF) occurred, specifically within the Space Systems Department. In terms of developing and meeting requirements, the PLASSF is now "much more efficient," the American analyst posited.

Indeed, China created its space force in 2015, just a few months after Russia. After formally establishing its Space Force in December 2019, the US is still getting its equivalent off the ground. Cheng said both China and Russia have been pushing to militarise space, even though such a term is probably meaningless given that 95 per cent of space technology has dual applications for both military and civilian use. Certainly, outer space can no longer be viewed as a sanctuary.

Stokes said that "not much has changed really in terms of the space launch infrastructure and the launch, tracking and control of space ... but they are now integrated with end-users, and that is going to have an effect on making the whole system more efficient."

China has freedom of action in space, and the creation of the PLASSF and consolidation of space/counter-space research, development and acquisition, as well as training and operations, have benefitted from a single integrated command. The PLA's ability to interfere with American military operations in places like Taiwan will continue to grow yearly.

Cheng said, "The Chinese see future war as revolving around joint operations, which are not just land, air and sea forces." They also include the outer space and electronic warfare domains, which are necessary for information dominance." China, therefore, wishes to deny an adversary like the US the use of space, plus it needs to give the Chinese military every advantage.

China has therefore developed the ability to target hostile space-based assets (from the ground or space) and their all-important data-links. Indeed, jamming and electronic warfare complement anti-satellite weapons (which China has already tested), any of which can achieve effective mission kills against US and allied satellites. Stokes has not yet ascertained which agency is responsible for satellite kinetic kills, but it could well be the PLA Rocket Force, which is traditionally very tightly controlled by the Central Military Commission.

A detailed report entitled China's Space and Counter-space Capabilities and Activities, prepared for the US-China Economic and Security Review Commission, was published on March 30. Its authors, Mark Stokes, Gabriel Alvarado, Emily Weinstein and Ian Easton, summarised China's counter-space capabilities as follows.

"China has an operational counter-space capability that will evolve through 2020 and out to 2035. These capabilities include anti-satellite kinetic kill vehicles (KKV) and space electronic countermeasures ... On the non-kinetic side, the PLA has an operational ground-based satellite electronic countermeasures capability designed to disrupt adversary use of satellite communications, navigation, search and rescue, missile early warning and other satellites through use of jamming."

China obtained its first ground-based satellite jammers from Ukraine in the late 1990s, but it has developed its own solutions since then. "The PLA is capable of carrying out electronic countermeasures to disrupt, deny, deceive or degrade space services. Jamming prevents users from receiving intended signals and can be accomplished by attacking uplinks and downlinks.

The PLA and defence industry are developing and deploying jammers capable of targeting satellite communications over a large range of frequencies, including dedicated military communication bands. The PLASSF also has advanced cyber capabilities that could be applied in parallel with counter-space operations."

Nonetheless, the report asserted that the US still assumed a technological lead in space.

"China also is carrying out research, development and testing on potential space-based counter-space systems. The PLASSF and defense industry have carried out advanced satellite maneuvers and are likely testing orbital technologies that could be applied to counter-space operations." The PLASSF Network Systems Department probably oversees satellite jamming operations.

#### The plan is perceived as a Kumbaya multilateral action with US with private entities dissolving themselves together – PLA hates that

Yawei Liu 14, director of the China Program at the Carter Center, adjunct professor of political science at Emory University and associate director of the China Research Center in Atlanta; and Justine Zheng Ren, Ph.D. in Political Science from the London School of Economics, March 2014, “An Emerging Consensus on the US Threat: the United States according to PLA officers,” Journal of Contemporary China, Vol. 23, No. 86

Though the PLA elite perceptions of the United States have fluctuated over time, there has been some regularity in the evolution of their perceptions. Comparing the dominant perceptions of the United States among different generations of Chinese military elites in the PRC, we find that the PLA elite perceptions of US intentions have been foremost influenced by China's strategic interest in a certain period, rather than the level and intensity of bilateral exchanges at the time. Using the case of US arms sales to Taiwan and the case of the South China Sea and the Diaoyu Islands, we try to assess how consistent and persistent PLA elite perceptions of the US have been in recent years. While we agree that these outspoken military men cannot be taken on the surface as indicative of China's national policies, we will also point out several important dimensions that are likely to allow the PLA to play a more influential role in setting the agenda for China's strategic interest in the era of Xi Jinping.

China's top civilian leadership, when talking about Sino–US relations in the era of Jiang Zemin and Hu Jintao, always seems to be consolatory, emphasizing the importance and mutual benefits of the bilateral relations. While they do not like certain aspects of US policies, such as selling arms to Taiwan, even their repudiation of Washington is always couched in very dry and non-inflammatory language. The approach taken by the People's Liberation Army (PLA) of lashing out at the United States, however, is vivid and vehement. In the first four years since President Obama came into office in 2009, Washington and Beijing have been trying to manage their volatile bilateral relations, but the rhetorical interventions by these PLA officers have made it hard for the Chinese leadership to present a coherent and cohesive policy towards the United States.[ 1]

At the beginning of Xi Jinping's era, one of the first things this new secretary general of the Chinese Communist Party (CCP) did was to impose tighter control of the PLA and build his personal network of protégés in the military. On 23 November 2012, just eight days after he became chairman of the Central Military Commission (CMC), Xi presided over a ceremony to add a third star to General Wei Fenghe, the new commander-in-chief of China's Second Artillery. All such ceremonies in the past were held in June or July of the year regardless of when a general was eligible. Xi's decision to convene this ceremony at this time appears to be a symbolic gesture. During his tour of Guangdong in December 2012, Xi inspected military units there and called upon the PLA to be prepared for wars.[ 2] In fact, since the Bo Xilai scandal and the assumption of power by Xi Jinping, a critical moment when new leadership needs to consolidate power, the Chinese military has been actively called upon to curtail internal corruption and prepare for war over the rising tensions of the East China Sea and the South China Sea. ThePLA Daily has also published editorials calling for absolute CCP control of the military. All these attempts to have tighter control over the military reflect the fact that, to the top leadership of the CCP, the PLA is not a uniformed and subordinate organization that unconditionally complies with the will of the leadership. Instead, the top leadership needs to use all available resources to keep the military in check. Against this backdrop, we see it as an interesting and beneficial exercise to explore the changing perceptions of the US among the PLA elite and to examine their influence on the evolving relationship between China and the United States at the beginning of the Xi Jinping era, through their perceptions, statements and strategic ambitions towards the US.

#### That factionalizes the CCP and emboldens challenges to Xi – the PLA is increasingly powerful and not unconditionally subservient

Simpson 16 [(Kurtis, Centre Director with Defence Research and Development Canada, has been conducting research on China’s leadership, Communist Party politics, the People’s Liberation Army and foreign policy for over 30 years,Master’s Degree and a Ph.D from York University, previously served as an intelligence analyst at the Privy Council Office and leader of the Asia Research Section at the Department of National Defence’s Chief Defence Intelligence (CDI) organization) “China’s Re-Emergence: Assessing Civilian-Military Relations In Contemporary Era – Analysis,” Eurasia Review, 12/21/2016] JL

Paralleling divided loyalties between Chinese Party, military and government bodies, one must also recognize that within each, factions exist, based upon generational, personal, professional, geographic, or institutional allegiances.19 These minor fault lines are most pronounced during crises, and they continue independent of professionalization.20 As was demonstrated by the civil-military dynamics of the Chinese government’s suppression of student demonstrators, both divisions and allegiances of interests emerged with respect to how to contain this situation and factional interests largely determined which troops would carry out the orders, who commanded them, what civilian Party leaders supported the actions, and who would be sanctioned following the mêlée. A consequence of factionalism within the PLA is that the Party’s control mechanisms (particularly because rule of law and constitutional restraints on the military are weak) needs to be robust to control not only a single military chain of command but (particularly during crises) perhaps more than one. This is not likely the case. A review of the evidence indicates the military’s influence, on the whole, is increasing, and the Party’s control decreasing.

On one level, the Party clearly controls the military as the Central Military Commission or CMC (the highest military oversight body in the PRC) is chaired by a civilian, President Xi Jinping. Moreover, the PLAs representation on formal political decision-making bodies (such as the Politburo Standing Committee, the Politburo, the Central Committee, and the NPC) has decreased over the years, but this does not necessary equate to a reduced level of influence. For example, the two Vice-Chairman of the CMC are now military generals, as are the remaining other eight members. Irrespective of institutional membership, military leaders retain considerable say. Personal interactions and informal meetings with senior party elites provide venues to sway decisions. They do, also, hold important places on leading small groups dedicated to issues like Taiwan and other security questions, such as the South China Seas.21

In a similar vein, other methods of Party influence, as exercised through political commissars, party committees, and discipline inspection commissions are no longer empowered to enforce the ideological dictates of a paramount leader. In the face of diffuse reporting chains, competing allegiances, and often effective socialization by the military units they are supposed to be watching over, most do not provide the Party guardian and guidance function once so pervasive.

While perhaps overstated, Paltiel’s observation that “…China’s energies over the past century and half have given the military a prominent and even dominant role in the state, preempting civilian control and inhibiting the exercise of constitutional authority” is likely now truer than ever before in history.22 While still loyal to the party as an institution, the PLA is not unconditionally subservient to a particular leader and retains the resources to enter the political arena if (at the highest levels) a decision is made to do so.

The civilian-military trend lines evident in China since the end of the Cultural Revolution affirm that the symbiotic nature of the Party-PLA relationship has morphed in important respects since the late 1960s. The promotion of professionalism, a reduced role for ideological indoctrination, an increasing bifurcation of civil-military elites, and growing state powers (complete with divided loyalties and continued factionalism) has complicated the political landscape informing how the CCP interacts with the PLA. If, as postulated, we have moved from a fused, ‘dual role elite’ model to one of ‘conditional compliance’ in which the military actually holds a preponderance of the power capabilities and where its interests are satisfied through concessions, bargaining, and pay-offs, empirical evidence should reflect this. A review of China’s three major leadership changes since the transition from the revolutionary ‘Old Guard’ to the modern technocrats confirms this.

Formally anointed and legitimized by Deng in 1989, Jiang assumed leadership without military credentials and few allies, viewed by many as a ‘caretaker’ Party Secretary in the wake of the Tiananmen Massacre. Despite his limitations, Jiang was well versed in the vicissitudes of palace politics. Informed by a high political acumen, he immediately promoted an image as an involved Commander-in-Chief, personally visiting all seven military regions, a sign of commitment not made by either the likes of Mao or Deng. Symbolic gestures like this were bolstered by his providing incentives to the PLA, such as: consistent raises in the defence budget; funds for military modernization; as well as equipment, logistics, and augmented R&D.23

Referred to as the ‘silk-wrapped needle,’ Jiang marshalled Party resources to not only reward, but to punish.24 His institutional authority over appointments enabled him to manipulate factions, dismiss those who opposed him, enforce new rigid retirement standards, and promote loyalists. A delicate equilibrium was established during the early-1990s until his semi-retirement in 2004,25 where Jiang guaranteed military priorities such as supporting ‘mechanization’ and an ‘information-based military’ (promoting the concept of RMA with Chinese characteristics) in exchange for the PLA backing of his legacy contributions to Marxist Leninist Mao Zedong thought with the enshrinement of his “Three Represents” doctrine.

Like Jiang, Hu Jintao’s succession was the product of negotiation, compromise, and concessions. While neither opposed by the PLA, nor supported by the military ‘brass,’ Hu was a known commodity, having served as Vice-President (1998) and CMC Vice-Chairman since 1999. He was deemed acceptable until proven otherwise. In the shadow of Jiang (who retained the position of CMC Chair until 2004), Hu did not exert the same kind of influence in, nor engender the same kind of deference from, China’s military, but equally proved capable of fostering a pragmatic relationship with the army which ensured its interests, and in so doing, legitimized his leadership position.

Ceding much of the military planning and operational decisions to the PLA directly, Hu played to his strengths and focused upon national security issues (such as the successful resolution of SARs in China), which bolstered his credibility as a populist leader among the masses, indirectly increasing his power within both the military and the Party. Additionally, he focused upon foreign military security affairs (most notably, North Korea-US negotiations), which enabled him to link his personal political agenda with the military’s latest ambitions.

In according the military a distinct place in China’s national development plan, supporting China’s rise, and ensuring its vital interests, Hu recognized the military’s evolving requirement to ‘go global’ and its worldwide interests in non-combat operations, such as peacekeeping and disaster relief, as well as stakes in the open seas, outer space, and cyberspace as interest frontiers with no geographic boundaries.26 Under the slogan of ‘China’s historical mission in the new phase of the new century’ and his acquiescence to the PLA’s stated requirements ‘to win local wars under modern conditions’ by funding new technology acquisition, Hu received the army’s formal recognition for his contributions to military thought based upon “scientific development” which informed a “strategic guiding theory,” resulting in a new operational orientation for China’s military. Emulating his predecessor, Hu won ‘conditional compliance’ from the PLA by successfully bartering military needs and wants for the army’s support and endorsement of his political tenure. This was not done outside of self-interest. Hu, as did Jiang, skillfully coopted, fired, and promoted select Generals to serve his greater ends, and he did this through varied means. Ultimately, however, it was done in a manner acceptable to the military.

Xi Jinping’s rise to power in 2012, while replicating the ‘horse-trading’ of Jiang and Hu, marks a fundamental departure in leadership style. Often described as a transformative leader, Xi is openly critical of his predecessors and rails against earlier periods where reform stalled and corruption grew.27 An advocate of ‘top-level design,’ incrementalism is being supplanted by a massive attempt to centralize all aspects of the CCP’s power, which includes a major restructuring of the economy, government, administration, and military.

Nicknamed “the gun and the knife” as a slight for his attempts to simultaneously control the army, police, spies, and the ‘graft busters,’ Xi’s power appears uncontested at present. Nevertheless, he is also viewed as ‘pushing the envelope too far’ and endangering the equilibrium which has been established between the Party and PLA over the past 25 years. For example, only two years into his mandate, he fostered a Cult of Personality, “the Spirit of Xi Jinping” which was officially elevated to the same standing as that of Mao and Deng, by comparison, foundational figures in Chinese history. His open attacks of political ‘enemies’ (most notably Zhou Yongkang, a Politburo Standing Committee member and former security czar) breeds fear among almost every senior official, all of whom are vulnerable on some point. Equally true, an unprecedented anti-corruption campaign is inciting comrades to turn on comrades, not unlike a massive game of prisoner’s dilemma.

Nowhere is the pressure for reform greater than in the PLA. Xi advocates administering the army with strictness and austerity, promoting frugality and obedience. At his direction, “mass-line educational campaigns” designed to “rectify work style” through criticism and self-criticism are being implemented.28 Ideological and political building is now equated with army building, as a means of ensuring the Party’s uncontested grip over the troops ideologically, politically, and organizationally. Select military regions (those opposite Taiwan and adjacent to the South China Seas) and commanders from those regions are witnessing favoritism and promotion at the expense of others. Moreover, a new “CMC Chairmanship Responsibility System” has been instituted, which directly calls into question the support of some of Xi’s senior-most generals.

A ‘hardliner’ by nature, Xi recognizes that he must earn the support of the PLA. New military priorities he supports include: accelerating modernization; Joint Command and C4ISR; training; talent management, as well as equipment and force modernization. That said, his goal of achieving the Chinese dream of building a “wealthy, powerful, democratic, civilized, and harmonious socialist modernized nation” by 2021, the 100th anniversary of the founding of the CCP, is exceptionally ambitious. It will require endless commitments to competing interests in a period of economic stagnation and global economic downturn. Should the PLA come to believe they are not first in line for government largess, support for Xi could erode very quickly.29

#### CCP instability collapses the international order – extinction

Perkinson 12 [(Jessica, MA in international affairs from American University) “The Potential for Instability in the PRC: How the Doomsday Theory Misses the Mark,” American University School of International Service, 2012] JL

Should the CCP undergo some sort of dramatic transformation – whether that be significant reform or complete collapse, as some radical China scholars predict2 – the implications for international and US national security are vast. Not only does China and the stability of the CCP play a significant role in the maintenance of peace in the East Asian region, but China is also relied upon by many members of the international community for foreign direct investment, economic stability and trade. China plays a key role in maintaining stability on the Korean Peninsula as one of North Korea’s only allies, and it is argued that instability within the Chinese government could also lead to instability in the already sensitive military and political situation across the Taiwan Strait. For the United States, the effect of instability within the CCP would be widespread and dramatic. As the United States’ largest holder of US treasury securities, instability or collapse of the CCP could threaten the stability of the already volatile economic situation in the US. In addition, China is the largest trading partner of a number of countries, including the US, and the US is reliant upon its market of inexpensive goods to feed demand within the US.

It is with this in mind that China scholars within the United States and around the world should be studying this phenomenon, because the potential for reform, instability or even collapse of the CCP is of critical importance to the stability of the international order as a whole. For the United States specifically, the potential - or lack thereof - forreform of the CCP should dictate its foreign policy toward China. If the body of knowledge on the stability of the Chinese government reveals that the Chinese market is not a stable one, it is in the best interests of the United States to look for investors and trade markets elsewhere to lessen its serious dependence on China for its economic stability, particularly in a time of such uncertain economic conditions within the US.

#### Independently, Xi will lash out to preserve cred in the SCS – US draw-in ensures extinction

Mastro 20 [(Oriana Skylar, Assistant Professor of Security Studies at Georgetown University's Edmund A. Walsh School of Foreign Service, Resident Scholar at the American Enterprise Institute) “Military Confrontation in the South China Sea,” Council on Foreign Relations, 5/21/2020] JL

The risk of a military confrontation in the South China Sea involving the United States and China could rise significantly in the next eighteen months, particularly if their relationship continues to deteriorate as a result of ongoing trade frictions and recriminations over the novel coronavirus pandemic. Since 2009, China has advanced its territorial claims in this region through a variety of tactics—such as reclaiming land, militarizing islands it controls, and using legal arguments and diplomatic influence—without triggering a serious confrontation with the United States or causing a regional backlash. Most recently, China announced the creation of two new municipal districts that govern the Paracel and Spratly Islands, an attempt to strengthen its claims in the South China Sea by projecting an image of administrative control. It would be wrong to assume that China is satisfied with the gains it has made or that it would refrain from using more aggressive tactics in the future. Plausible changes to China’s domestic situation or to the international environment could create incentives for China’s leadership to adopt a more provocative strategy in the South China Sea that would increase the risk of a military confrontation.

The United States has a strong interest in preventing China from asserting control over the South China Sea. Maintaining free and open access to this waterway is not only important for economic reasons, but also to uphold the global norm of freedom of navigation. The United States is also at risk of being drawn into a military conflict with China in this region as a result of U.S. defense treaty obligations to at least one of the claimants to the contested territory, the Philippines. China’s ability to control this waterway would be a significant step toward displacing the United States from the Indo-Pacific region, expanding its economic influence, and generally reordering the region in its favor. Preventing China from doing so is the central objective of the U.S. National Security Strategy and the reason the Indo-Pacific is the U.S. military’s main theater of operations. For these reasons, the United States should seek ways to prevent Chinese expansion, ideally while avoiding a dangerous confrontation and being prepared to deftly manage any crises should they arise.

China considers the majority of the South China Sea to be an inalienable part of its territory. Exercising full sovereignty over this area is a core component of President Xi Jinping’s “China Dream.” China does not accept or respect the sovereignty claims of Brunei, Indonesia, Malaysia, the Philippines, Taiwan, or Vietnam in this region. Although China has been cautious in pressing its claims thus far, three developments could convince Xi that China should be more assertive.

Xi could feel compelled to accelerate his timeline in the South China Sea to maintain his consolidated position within the Chinese Communist Party (CCP), particularly if the political situation in Hong Kong worsens, peaceful reunification with Taiwan becomes less likely, or domestic criticism of his management of the novel coronavirus outbreak increases. With China’s economic growth for 2020 projected to hit only 1.2 percent—the lowest since the mid-1970s—Xi could find it necessary to demonstrate strength while Beijing deals with internal fallout from the pandemic. China has already declared two new administrative districts in the South China Sea in April 2020 and has escalated its criticism of U.S. freedom of navigation operations (FONOPs) in the area. Moreover, with expectations that the first stage of China’s military modernization efforts will be completed in 2020, Xi could become more confident that China would succeed in pressing its claims militarily, especially if the United States is distracted internally with managing the coronavirus pandemic or its aftermath.

### 1NC -- Prolif

#### Nuclear prolif solves peace – studies

Suzuki 15 [June 2015, Akisato, Researcher, Institute for International Conflict Resolution and Reconstruction, School of Law and Government, Dublin City University, MA in Violence, Terrorism and Security at Queen's University, “Is more better or worse? New empirics on nuclear proliferation and interstate conflict by Random Forests,” Research and Politics, SagePub]

Random Forests has three attractive and distinctive characteristics for the purposes of this paper: first, the estimation of conditional variable importance and partial dependence plots enable conventional applied researchers to interpret non-parametric analysis in an intuitive way; second, Random Forests can examine non-linearity (Strobl et al., 2009: 339–341), which is desirable because, as already noted, some theories expect non-linearity between nuclear proliferation and a systemic propensity for conflict; and finally, it can cope with potential interactions and multicollinearity between regressors (Strobl et al., 2009: 339–341; Strobl et al., 2008). As noted before, most of the regressors here are highly correlated, and also it is plausible to anticipate some interaction effect between them (e.g. the number of democratic states and the gross world product). The specific capabilities of Random Forests are therefore essential. The estimation of conditional variable importance shows that the nuclear year counter has a negative importance score.7 Thus, the nuclear year counter is not important in explaining the dispute–state ratio. This suggests that the optimist theory is supported. The remaining regressors have an importance score higher than the absolute value of the importance score of the nuclear year counter, meaning that they are all important. Controlling for democratic peace, capitalist peace, and polarity, the number of nuclear states is still a significant predictor in explaining a systemic propensity for interstate conflict. Figure 1 presents the partial dependence plots of the model.8 First, on average, a larger number of nuclear states is associated with a lower dispute–state ratio, although the changes from two nuclear states to three and from six to seven increase the ratio instead. Thus, the relationship is empirically non-linear, as Bueno de Mesquita and Riker (1982) and Intriligator and Brito (1981) expected in part. Overall, however, the optimist theory is supported, and the change from two nuclear states to nine nuclear states decreases the dispute–state ratio approximately from 0.228 to 0.18. This means that, if there are 194 states in the system (as there were in 2009), the number of militarized interstate dispute onsets per system-year decreases approximately from 44 to 35. This is a substantively significant decline. Second, the nuclear year counter shows a concave relationship with the dispute–state ratio, suggesting that new nuclear states are less prone to conflict than middle-aged nuclear states. Thus, the pessimist theory finds no support from either the variable importance estimation or the partial dependence plot. Finally, as for the control variables, the number of democratic states and the gross world product have a complex non-linear relationship with the dispute–state ratio, but if the number of democratic states and the gross world product are sufficiently large, they tend to decrease the dispute–state ratio. Their substantive effects are also significant, though not as much as the number of nuclear states. When comparing the effect of their lowest and highest values (23 and 94 in the number of democratic states and 7 and 71.2 in the gross world product), the number of democratic states decreases the number of militarized interstate dispute onsets per system-year approximately from 40 to 37, and the gross world product from 44 to 37. Unipolarity is also associated with a decline in the dispute–state ratio, suggesting that unipolarity is better than bipolarity in terms of a systemic propensity for interstate conflict; however, its effect is negligible, as it reduces the number of militarized interstate dispute onsets per system-year from 39 to 38. One caveat is, as explained in the online appendix, that the results of the number of democratic states and unipolarity are significantly sensitive to a parameter setting. Thus, these predictors are less robust, and the aforementioned points about them should be treated with caution. Discussion and concluding remarks The main findings reveal that the optimist expectation of the relationship between nuclear proliferation and interstate conflict is empirically supported:9 first, a larger number of nuclear states on average decreases the systemic propensity for interstate conflict; and second, there is no clear evidence that the emergence of new nuclear states increases the systemic propensity for interstate conflict. Gartzke and Jo (2009) argue that nuclear weapons themselves have no exogenous effect on the probability of conflict, because when a state is engaged in or expects to engage in conflict, it may develop nuclear weapons to keep fighting, or to prepare for, that conflict. If this selection effect existed, the analysis should overestimate the conflict-provoking effect of nuclear proliferation in the above model. Still, the results indicate that a larger number of nuclear states are associated with fewer disputes in the system. This conclusion, however, raises questions about how to reconcile this study’s findings with those of a recent quantitative dyadic-level study (Bell and Miller, 2015). The current paper finds that nuclear proliferation decreases the systemic propensity for interstate conflict, while Bell and Miller (2015) find that nuclear symmetry has no significant effect on dyadic conflict, but that nuclear asymmetry is associated with a higher probability of dyadic conflict. It is possible that nuclear proliferation decreases conflict through the conflict-mitigating effects of extended nuclear deterrence and/or fear of nuclear states’ intervention, to the extent that these effects overwhelm the conflict-provoking effect of nuclear–asymmetrical dyads. Thus, dyadic-level empirics cannot solely be relied on to infer causal links between nuclear proliferation and a systemic propensity for conflict. The systemic-level empirics deserve attention.

#### Even if we are wrong about specific instances, the net effect is more peace – that outweighs even a 99% risk of their impact

Sechser 5 [Todd, Assistant Prof. Politics specializing in International Security—Stanford U., “How Organizational Pathologies Could Make Nuclear Proliferation Safer”, Presented at the annual conference of the Midwest Political Science Association, 4-7]

A second counterargument to the optimist position is the claim that even if proliferation optimism enjoys greater theoretical tenability than previously thought, this does not make its position practically viable. Betts (1999: 65-66) writes that policy makers “do not marvel at all the cases where nuclear weapons will make the world safer, but worry about the exceptions where things will go wrong. . . one exception to the rule may be too many.”13 Likewise, Feaver (1993: 162) argues that even 99.5% prognostic accuracy would be insufficient for proliferation optimism to mount a persuasive case: “At best, rational deterrence theory can predict that nuclear deterrence should assure peace most of the time. Most is not all.” And Sagan (2003b: 184) contends that until military organizations are “perfect,” there is sufficient reason to be pessimistic about the effects of proliferation.14 As long as there is a chance that proliferation might entail some negative effects, the argument holds, then why not play it safe? This staggering burden of proof is flawed for two reasons. First, obscures the cost-benefit analysis inherent in any policy deliberation. The appropriate question is not whether the spread of nuclear weapons will result in any nuclear disasters, but whether a world with proliferation would on balance be more peaceful and more stable than a world without it. The issue is whether the benefits are likely to outweigh the costs. If one believes, for example, that nuclear proliferation would eventually result in a preventive war somewhere but that it would also deter numerous conventional wars, then the net overall benefit might justify a more relaxed nonproliferation policy. Second, the argument obscures the fact that proliferation pessimism to date does not possess a “99.5%” record of accuracy—rather, its record stands at 100%. Of course, the absence of nuclear catastrophe in the past does not assure its absence in the future. But theories ultimately aim to predict outcomes, and despite unearthing a trove of nuclear near-misses, the theory of proliferation pessimism has not succeeded in accomplishing this task. Existing research has successfully shown that the theory’s predicted causal mechanisms have operated in organizations that handle nu-clear weapons, but this is not the same as showing that these mechanisms generate the theory’s predicted outcomes. Even a major counterforce strike against a new nuclear power would not immediately vindicate pessimism—at least not until case study researchers were able to show that the causal mechanisms they specified (that is, preventive war pressures triggered by military biases) were indeed in operation.

#### But, stopping prolif causes chemical and bio weapons

Narang 16 [Neil Narang, Assistant Professor in the Department of Political Science at the University of California, Santa Barbara, Senior Advisor in the Office of the Secretary of Defense for Policy on a Council on Foreign Relations International Affairs Fellowship, 4/6/2016 “All Together Now? Questioning WMDs as a Useful Analytical Unit for Understanding Chemical and Biological Weapons Proliferation,” The Nonproliferation Review. Volume 22. Issue 3-4. pp. 457-468. Taylor and Francis]

The first inference that one may be tempted to draw from past findings is that a policy focused on achieving reductions in the global nuclear stockpile could cause a rise in chemical and biological weapons proliferation as more states view them as a “poor man's atomic bomb.” As noted above, our findings suggested that states appear to seek chemical and biological weapons for many of the same reasons as they pursue nuclear weapons. Furthermore, our findings also indicate that states that do not possess nuclear weapons appear to be systematically more likely to pursue chemical and biological weapons than states that do possess them. When combined, it may seem reasonable to suppose that, conditional on some level of demand for one of these types of weapons, reductions in the global supply of nuclear weapons could cause some states to pursue chemical and biological weapons as “imperfect substitutes” for the deterrence and compellence benefits of nuclear weapons. A second inference that one may be tempted to draw is that a strengthened NPT may increase the risk of chemical and biological weapons proliferation. Understood in the terms of our study, policies and institutions designed to monitor and sanction the unilateral pursuit or dissemination of nuclear weapons material and technical expertise—like the NPT or the Nuclear Suppliers Group—might be understood as supply constraints that effectively increase the transaction costs of nuclear weapons acquisition. Furthermore, previous research has shown that the supply of sensitive nuclear assistance and civilian nuclear assistance are both positively associated with the risk of nuclear weapons pursuit and acquisition across states and over time.17 When combined, it may seem reasonable to suppose that, given some demand for a “weapon of mass destruction,” chemical and biological weapons could seem like relatively cheaper pursuits under a more robust global nuclear nonproliferation regime that further regulates the supply of nuclear weapons. A third inference that one may be tempted to draw is that reductions in the global supply of nuclear weapons and a strengthening of the nuclear nonproliferation regime could increase the risk of chemical and biological weapons pursuit by terrorist groups. If one is willing to assume terrorist groups aim to influence governments by threatening to impose costs in order to achieve concessions— whether this be through strategies like coercion, provocation, spoiling, or outbidding—then it may seem reasonable to suppose that limiting the availability of nuclear weapons might shift the demand to other coercive instruments such as chemical and biological weapons.18

#### The shift is especially relevant in the Middle East – data proves

Rozsa November 18 [Erzsébet N. Rózsa is an external member of the Institute of Foreign Affairs and Trade (IFAT), Senior Research Fellow at the Institute of World Economics of the Hungarian Academy of Sciences, and Professor at the National University of Public Service, Budapest. WEAPONS OF MASS DESTRUCTION IN THE MIDDLE EAST AND NORTH AFRICA. November 2018. https://www.iai.it/sites/default/files/menara\_wp\_24.pdf]

Strategists and the WMD non-proliferation and disarmament community have frequently debated whether there was a causative link between the inability (for any reason) to acquire nuclear weapons and the decision to go for chemical (and eventually biological) weapons, with some claiming that chemical weapons were “the poor’s atomic bomb”. While this question has subsided with the universalizing norm (and pressure) of adhering to the multilateral WMD treaties, such considerations cannot simply be set aside, especially in the Middle East and North Africa. Nevertheless, data regarding the different WMD programmes in the region show that those (Arab) states that considered but failed to develop a military nuclear programme did develop chemical (and biological) programmes, in an attempt to achieve parity with Israel (i.e., the Israeli nuclear capability). Although it cannot be said that this was their only aim (e.g., Iraq used chemical weapons in the Iraq–Iran War against Iran), the fact that it could serve as an “excuse” for such WMD programmes and was at times considered as potential leverage was manifest in the ACRS negotiations.

#### They’re more dangerous that nuke war

Kortunov 18 [Director General of the Russian International Affairs Council, RIAC member. Why Chemical Weapon Is More Dangerous Than Nuclear. May 11, 2018. russiancouncil.ru/en/analytics-and-comments/analytics/why-chemical-weapon-is-more-dangerous-than-nuclear/] **\*\*Added a bracketed term to fix an obvious translation issue – MMG**

Nevertheless, there is a popular opinion today that chemical agents are less dangerous and under greater control than nuclear weapons. This view results from the obvious fact that the world reached a breakthrough in chemical disarmament for last 25 years. Almost 200 countries joined the 1993 Chemical Weapons Convention, which is about 98 percent of the planet. The Organization for the Prohibition of the Chemical Weapons (OPCW) was based on this convention and has already become a watchdog for the liquidation of more than 92 percent of chemical agents and inspected almost five thousands chemical facilities globally. It seemed that the world should make one more decisive step forward to finish the full and overall chemical disarmament. In 2013, the OPCW was fairly awarded the Nobel Peace Prize.

However, recent events in the UK’s Salisbury (the poisoning of the ex-Russia spy Sergei Skripal and his daughter as well as the following accusations of the Kremlin of committing the crime) and Syrian city of Duma (another use of chemical weapons against Syrian citizens) make one reassess the problem of chemical weapons. The full and overall disarmament is postponed to an uncertain term. On the contrary, the problem of chemical weapons seems to be aggravating. There is a reason to believe that chemical weapons pose a more obvious and potentially more dangerous threat to the humanity than even nuclear weapons. There are at lest four reasons for these concerns.

Four reasons

First, poor groups use chemical weapons. Those who possess nuclear arsenal are belonged to the privileged club in the global politics. All of them are technologically advanced countries. Every member of the nuclear club had to invest a great deal of energy, resources and time to create nuclear weapons. The nuclear powers are highly reluctant to accept new members in their club, and the entire global community supports this reluctance. In contrast, chemical weapons can be created within the shortest terms, in the countries with very limited financial, economic and technological opportunities. Most importantly, unlike a nuclear weapon, a chemical one could be more available to non-state actors (terrorists), provided enough desire and minimal material resources. That’s why chemical agents could be seen as an ideal weapon for terrorist acts (such as the one, conducted by the cult movement Aum Shinrikyo in the Tokyo subway in March 1995) or separate campaigns during a civil war (such as the Syrian war).

Second, the fact of the possession of chemical weapons (as well as it annihilation) is much more [difficult] to verify than in the case of nuclear weapons. One could remember the beginning of the American invasion in Iraq in March 2003, which eventually destabilized the entire Middle Eastern region for years. Before the invasion, then-U.S. State Secretary Collin Powell accused the regime of the Iraqi President Saddam Hussein of producing chemical weapons secretly and refusing from chemical disarmament. These accusations turn out to have been false. Ten years later, in September 2013, Russia, the U.S. and Syria signed an agreement on the liquidation of chemical weapons, and its stores were moved from Syria and subsequently liquidated under the OPCW control.

Third, nuclear weapons were initially created and deployed to intimidate, not to use during a battlefield. Seventy years after the Hiroshima and Nagasaki bombing, none of nuclear powers were insane to start a nuclear war. Even during the most critical moments of history (such as the 1962 Cuban Missile Crisis), the opponents were patient and reasonable enough not to cross the line, which separated the humanity from a nuclear apocalypse. Yet chemical weapons have never been viewed as a weapon of the Judgment Day, which was capable to destroy the life on our planet. Nobody knows exactly how many times chemical agents have been used in a battlefield or against the civilian population throughout the last century, yet everybody knows that it was used hundreds or even thousands of times. One can safely say that there have been much more victims from chemical attacks historically than it was in the case of the 1945 Hiroshima and Nagasaki bombings.

#### Prolif solves conventional war, which is worse because it’s easier to start and escalates to great powers which are already nuclear

Leah & Lowther 17 [Christine Leah, Former Chauncey Postdoctoral Fellow in Grand Strategy at Yale University and Adam B Lowther, Director, School of Advanced Nuclear Deterrence Studies Spring 2017. “Conventional Arms and Nuclear Peace,” Strategic Studies Quarterly. Volume 11. Issue 1. pg. 14-24. http://www.airuniversity.af.mil/Portals/10/SSQ/documents/Volume-11\_Issue-1/Leah.pdf]

The acquisition of nuclear weapons by a weaker state significantly complicates the decision-making calculus of a militarily superior state. For these reasons, power-projecting states fear nuclear proliferation to both allied and enemy states.5 This is a point worth underscoring and one that is often overlooked when nonproliferation is discussed and its rationale and purposes debated. These factors demonstrate that the “more may be better” view of nuclear weapons proffered by political scientist Kenneth Waltz is entirely relevant and accurate.6 Waltz famously argued that more nuclear weapons in the world would tend to increase deterrence among states. That logic is turned on its head in a world with far fewer nuclear weapons and a greater reliance on conventional systems, which may actually be destabilizing. This was true even before the advent of the atomic bomb. The awesome destructive power of nuclear weapons tended to overshadow the failure of conventional deterrence in the decades and centuries preceding the first use of nuclear weapons.7 Thomas Schelling, an economist and foreign policy scholar, also argued very specifically that more nuclear weapons might enhance strategic stability by increasing the survivability of a nation’s nuclear forces.8 Because states might be more risk acceptant with conventional forces and concepts of first and second strikes are much less well defined in the conventional realm, stability was much more fragile in the pre-nuclear age and would likely prove fragile in a world with fewer, or zero, nuclear weapons. Advocates of a world free of nuclear weapons often overlook this point. A world with fewer nuclear, but more conventional, forces is likely to bring forth new dynamics for arms races, which increase the likelihood of disputes and wars.9 Reducing or eliminating nuclear weapons does not remove proliferation problems from the agenda. Might we fear arms races in the second conventional age less because of the subnuclear consequences of an advanced conventional missile system, or should we fear it more because of the lower threshold to the use of armed force that might be involved? A world not anxious about nuclear proliferation is more likely to be anxious about the proliferation of advanced conventional systems. In that world, the knowledge that war might escalate to the use of an immediate and devastating nuclear strike is gone. This also raises new issues influencing the extent to which a conventional war may be more controllable than a nuclear one. As Lawrence Freedman, the doyen of British strategic studies, writes, “In principle, denial is a more reliable strategy than punishment because, if the threats have to be implemented, it offers control rather than continuing coercion. With punishment, the [adversary] is left to decide how much more to take. With denial, the choice is removed.”10 Nuclear Reductions, Nonproliferation, and Disarmament Nuclear abolitionists have very different views on the nature of deterrence. Their efforts are based largely on a fundamental ideological dislike of nuclear weapons rather than a deep understanding or appreciation of them. Global nuclear disarmament, if considered in a vacuum, would make the world safer for US conventional power projection but would not necessarily promote strategic stability. This observation is made repeatedly by Russian and Chinese analysts, who clearly understand American conventional superiority. On this basis an argument can indeed be made that global disarmament disproportionately benefits the United States, not regional or global competitors like Russia and China. The effects of conventional capabilities are certainly a neglected topic when compared to the focus on nuclear arms control over the past seven years. They are generally said to bear, or lack, significance in comparison to WMDs. But does this argument still hold in a world with no nuclear weapons? A great deal of analysis is still needed to assess whether and how reductions could be managed to the point that no nuclear-armed state has more than a minimum deterrent. For even further reductions to occur, the process would necessarily have to be multilateral, including China, India, and Pakistan. While China and other states have indicated that they would potentially be willing to enter into negotiations once the United States and Russia reduce their arsenals, they have not specified at what level of forces this might conceivably take place. In any case, the process would involve complex calculations of deterrence equations involving changing sets of multiple actors as well as conventional imbalances that are, again, a major source of concern for many countries that may find themselves at odds with the United States. For the “P5” nuclear weapons states (those with permanent seats on the United Nations’ Security Council) such as Russia and China who are members of the Nuclear Nonproliferation Treaty (NPT), the issue of conventional imbalance compounds the difficulty they face in shaping the perception of some states who suggest that the P5 failed to take significant steps toward nuclear disarmament. Pakistan, for instance, has recently accused the United States and other countries of nuclear hypocrisy, with the Pakistani ambassador to the United Nations saying that a handful of nuclear-weapon states advocate abstinence for others but are unwilling to give up their large inventories of nuclear weapons or cease modernization efforts. The ambassador also stressed that double standards were not only evident on nuclear issues but also in the area of conventional arms: “While professing strict adherence to responsible arms transfers, some powerful states continue to supply increasing numbers of conventional weapons in our region, thereby aggravating instability in South Asia.”11 Indeed, from the Pakistani perspective, the international community does not give enough attention to the issue of vertical proliferation (arms buildup). Certainly, it should come as no surprise that Pakistan continues to stress the importance of nuclear weapons in acting as a deterrent to perceived Indian conventional military superiority.12 Pakistan has made efforts at addressing issues of conventional force imbalances with India in the past, but New Delhi has traditionally dismissed these efforts, instead focusing on its larger regional competitor, China.13 The problem in South Asia is therefore at least a trilateral one. However, the issue speaks to a much larger problem, and that is multilateral conventional arms control. If the India-Pakistan strategic situation offers any lesson, it is that weaker states (such as Pakistan) may desire to develop a “great equalizer” to achieve the security that they cannot find through traditional (conventional) means. With the United States and Russia undertaking a 90 percent reduction in their nuclear arsenals since the end of the Cold War, it is fair to say that these efforts have promoted neither goodwill nor a peaceful posture in countries like China or North Korea. We are not suggesting that American nuclear force reductions have pushed Beijing to expand its antiship ballistic missile inventory, place multiple warheads on its DF-41 ballistic missiles, build artificial islands with deployed military capabilities, or build bases in northern Africa. Nevertheless, it does show that there is little evidence to suggest that nuclear cuts necessarily lead to a more peaceful security environment. If anything, regional and global security evolve independently of the size and shape of one country’s nuclear arsenal. North Korea, in particular, has pursued a nuclear weapons program as a means of countering American conventional superiority, paying little or no attention to the United States’ declining nuclear arsenal. Conventional Arsenals, Crisis Stability, and Arms Race Stability Nuclear reductions have important consequences for both crisis stability and arms race stability. Conventional forces differ tremendously from nuclear forces in the way they are organized and operate and in their destructiveness. These distinctions influence the way in which arms-control arrangements aimed at conventional arms-race stability and crisis stability must be conceptualized in a world free of nuclear weapons but safe for conventional conflict. To be highly destructive, conventional forces need to be used en masse. Their successful application requires well-organized cooperation between many military units, often between different types of military forces (land, air, naval, cyber, and space), and, due to the globalization of conflict, also the participation of several allied states granting military support and access. Conventional forces most often seek military victory, which requires they first defeat adversarial forces before the political objectives of the conflict can be achieved. Also, to be militarily effective, conventional forces need upto-date technology and well-trained troops that are capable of effectively employing weapons of war. Crisis stability is a term that was perfected in its use during the nuclear age. Crisis stability aims at developing incentives for using the lowest level of military force possible—all while seeking to prevent escalation. It also seeks to control the emotions that are prevalent in conflict, providing procedures to cope with a crisis. Nuclear reductions and disarmament may make a paradoxical and undesired contribution; reducing expected levels of death and destruction if war comes might actually increase the probability of the onset of war. Even if two states went to war, one would expect the nuclear sword of Damocles to incentivize them to end the conflict as soon as possible. In addition, the historical record clearly shows there is not the same taboo or norm against using conventional missiles and bombers as there is against using an atomic version.14 Not a single nuclear warhead has been delivered by any delivery system since 1945. By contrast, over the past 45 years, ballistic missiles were employed in at least six different conflicts: the Egyptian and Syrian missile attacks on Israel in the 1973 Yom Kippur War, the 1980–88 war between Iraq and Iran, the Afghan civil war of 1988–91, the 1991 Persian Gulf War, the Yemen civil war of 1994, and the 2003 US-led invasion of Iraq. Indeed the duration and controllability of a war becomes important here. As antinuclear advocate Randall Forsberg admits, The main role of nuclear weapons has always been to deter conventional war among the world’s “big powers” (the USA, the USSR, the UK, France, West Germany, China, and Japan) by posing a clear risk that such a war would escalate to nuclear war. If ballistic missiles were abolished, raising again the prime strategic question of the 1950s—could a conventional war be fought without going nuclear, and if it went nuclear, could it be won?—it would diminish nuclear deterrence of conventional war.15 (emphasis in original) The fog of war could become much thicker. Even if lower-yield nuclear weapons were used, they could still significantly disrupt command, control, communication, and intelligence. In the conventional world this would be less of an issue because of the smaller level of destruction, over a much more protracted amount of time, thus enabling more time to react. In the nuclear age, time becomes much more compressed. Moreover, assuming that deterrence was still desirable, states would have to rethink how to reorient their forces toward achieving a conventional second-strike capability. This might lead to a different type of arms race. This concept was already present before the advent of the bomb, in discussions about the importance of airpower and having enough aircraft to deter aggression among European states.16 All these issues raise the importance of focusing on conventional arms control as much as nuclear reductions, especially in the Asia-Pacific. Arms race stability aims at lowering incentives to further build up military forces. Thus we might conceivably ask: if the United States and Russia reduce their nuclear arsenals to a few hundred warheads each— and other nations to a few dozen—might we see a nonnuclear arms race to fill a nuclear void?17 As the 2010 Nuclear Posture Review states, “fundamental changes in the international security environment in recent years—including the growth of unrivaled US conventional military capabilities [and] major improvements in missile defenses . . . enable us to fulfill . . . objectives at significantly lower nuclear force levels and with reduced reliance on nuclear weapons . . . without jeopardizing our traditional deterrence and reassurance goals.18 If one accepts this statement, and if opponents of nuclear modernization are truly concerned about reducing global instability, they should be urging the administration to cancel and eliminate a number of conventional capabilities that are far more concerning to our adversaries. Granted, such a position is irrational, but if stability is the key then this is the logical position to hold. Indeed, even with successful elimination of nuclear weapons, the tasks of strategic deterrence, extended deterrence, and arms control do not go away. Instead, they become more difficult to manage. This is especially true for conventional arms control, because nuclear weapons tend to make deterrence much easier, or so the historical record would seem to indicate. If one argues for further nuclear reductions and nuclear disarmament, then one needs to be responsible and also think seriously about conventional arms control. Conventional imbalances and any remaining system of deterrence would increasingly become the focus of deterrence and would serve as the source of instability.19 This is especially true because, in many instances, the imbalance and insecurity of a conventional-only world have remained obscured during the nuclear age.20 With Article VI of the NPT obliging nuclear-weapon states to work toward general and complete disarmament of nuclear weapons, would such a treaty be required or feasible in a conventional world? This possibility raises an important question: to what extent should nuclearweapon states focus on reducing their arsenals as a precondition for conventional disarmament? We have tended to think that it would first be a good idea to reduce nuclear weapons before reducing conventional forces. However, nuclear weapons are but one component of the overall military balance among states. In an age without nuclear weapons, it is also conceivable that deterrence relationships will simply not work without boosting some aspects of conventional arsenals. The more-maybe-better logic that Schelling (and others) applied to nuclear weapons may also carry into an entirely conventional era. That is, fewer nuclear weapons in the world would likely entail more conventional forces to compensate, which would not necessarily be a stabilizing development. For advocates of “global zero,” the implications of a world free of nuclear weapons are assumed to be inherently positive. However, the reality of such a world may be far less positive because the psychological effect achieved by the understood destructive power of nuclear weapons will no longer push risk-acceptant national leaders to allow caution to prevail. Given that no current leader of a nuclear-weapon state was even alive prior to the development of the atomic bomb, the security and stability of a nuclear-free world should not be taken for granted. Instead, much more work is required to understand the implications of such a fundamental change to a proven and stable approach to constraining great-power conflict. Conclusion If the past offers any lessons for the future, it is not unreasonable to believe that a world free of nuclear weapons is a world in which standing armies grow larger, defense expenditures (as a percentage of gross domestic product) increase, and conflict becomes more frequent as the perceived risks to a nation and its leaders decline. National leaders are not always rational, because they do not effectively weigh costs and benefits or risks and rewards, which would lead them to overvalue the prospect of a loss and undervalue the prospect of a gain. The certain loss caused by any prospective use of nuclear weapons has caused decision makers to exercise great restraint when contemplating the prospective use of force.21 History appears to suggest that, to some degree, nuclear weapons do cause decision makers to see the use of nuclear weapons as ensuring losses, with few gains—causing restraint. Thus, eliminating nuclear weapons may well reduce perceived risks and increase perceived gains from fighting—making the world safe for conventional conflict. Such a state of affairs would not have the same absolute risk associated with it that nuclear warfare poses (that of total annihilation), but it would increase the risks of proliferating conflict, which may lead to a dramatic increase in conflict-related casualties.

#### Conventional conflict escalates because of AI and non-nuclear emerging technologies – independently extinction but also turns nuke war

Klare 18 [Michael T. Klare, professor emeritus of peace and world security studies at Hampshire College and senior visiting fellow at the Arms Control Association (“The Challenges of Emerging Technologies,” *Arms Control Association*, December 2018, https://www.armscontrol.org/act/2018-12/features/challenges-emerging-technologies]

Today, a whole new array of technologies—artificial intelligence (AI), robotics, hypersonics, and cybertechnology, among others—is being applied to military use, with potentially far-ranging consequences. Although the risks and ramifications of these weapons are not yet widely recognized, policymakers will be compelled to address the dangers posed by innovative weapons technologies and to devise international arrangements to regulate or curb their use. Although some early efforts have been undertaken in this direction, most notably, in attempting to prohibit the deployment of fully autonomous weapons systems, far more work is needed to gauge the impacts of these technologies and to forge new or revised control mechanisms as deemed appropriate. Tackling the arms control implications of emerging technologies now is becoming a matter of ever-increasing urgency as the pace of their development is accelerating and their potential applications to warfare are multiplying. Many analysts believe that the utilization of AI and robotics will utterly revolutionize warfare, much as the introduction of tanks, airplanes, and nuclear weapons transformed the battlefields of each world war. “We are in the midst of an ever accelerating and expanding global revolution in [AI] and machine learning, with enormous implications for future economic and military competitiveness,” declared former U.S. Deputy Secretary of Defense Robert Work, a prominent advocate for Pentagon utilization of the new technologies.1 The Department of Defense is spending billions of dollars on AI, robotics, and other cutting-edge technologies, contending that the United States must maintain leadership in the development and utilization of those technologies lest its rivals use them to secure a future military advantage. China and Russia are assumed to be spending equivalent sums, indicating the initiation of a vigorous arms race in emerging technologies. “Our adversaries are presenting us today with a renewed challenge of a sophisticated, evolving threat,” Michael Griffin, U.S. undersecretary of defense for research and engineering, told Congress in April. “We are in turn preparing to meet that challenge and to restore the technical overmatch of the United States armed forces that we have traditionally held.”2 In accordance with this dynamic, the United States and its rivals are pursuing multiple weapons systems employing various combinations of AI, autonomy, and other emerging technologies. These include, for example, unmanned aerial vehicles (UAVs) and unmanned surface and subsurface naval vessels capable of being assembled in swarms, or “wolfpacks,” to locate enemy assets such as tanks, missile launchers, submarines and, if communications are lost with their human operators, decide to strike them on their own. The Defense Department also has funded the development of two advanced weapons systems employing hypersonic technology: a hypersonic air-launched cruise missile and the Tactical Boost Glide (TBG) system, encompassing a hypersonic rocket for initial momentum and an unpowered payload that glides to its destination. In the cyberspace realm, a variety of offensive and retaliatory cyberweapons are being developed by the U.S. Cyber Command for use against hostile states found to be using cyberspace to endanger U.S. national security. The introduction of these and other such weapons on future battlefields will transform every aspect of combat and raise a host of challenges for advocates of responsible arms control. The use of fully autonomous weapons in combat, for example, automatically raises questions about the military’s ability to comply with the laws of war and international humanitarian law, which require belligerents to distinguish between enemy combatants and civilian bystanders. It is on this basis that opponents of such systems are seeking to negotiate a binding international ban on their deployment. Even more worrisome, some of the weapons now in development, such as unmanned anti-submarine wolfpacks and the TBG system, could theoretically endanger the current equilibrium in nuclear relations among the major powers, which rests on the threat of assured retaliation by invulnerable second-strike forces, by opening or seeming to open various first-strike options. Warfare in cyberspace could also threaten nuclear stability by exposing critical early-warning and communications systems to paralyzing attacks and prompting anxious leaders to authorize the early launch of nuclear weapons. These are only some of the challenges to global security and arms control that are likely to be posed by the weaponization of new technologies. Observers of these developments, including many who have studied them closely, warn that the development and weaponization of AI and other emerging technologies is occurring faster than efforts to understand their impacts or devise appropriate safeguards. “Unfortunately,” said former U.S. Secretary of the Navy Richard Danzig, “the uncertainties surrounding the use and interaction of new military technologies are not subject to confident calculation or control.”3 Given the enormity of the risks involved, this lack of attention and oversight must be overcome. Mapping out the implications of the new technologies for warfare and arms control and devising effective mechanisms for their control are a mammoth undertaking that requires the efforts of many analysts and policymakers around the world. This piece, an overview of the issues, is the first in a series for Arms Control Today (ACT) that will assess some of the most disruptive emerging technologies and their war-fighting and arms control implications. Future installments will look in greater depth at four especially problematic technologies: AI, autonomous weaponry, hypersonics, and cyberwarfare. These four have been chosen for close examination because, at this time, they appear to be the furthest along in terms of conversion into military systems and pose immediate challenges for international peace and stability. Artificial Intelligence AI is a generic term used to describe a variety of techniques for investing machines with an ability to monitor their surroundings in the physical world or cyberspace and to take independent action in response to various stimuli. To invest machines with these capacities, engineers have developed complex algorithms, or computer-based sets of rules, to govern their operations. An AI-equipped aerial drone, for example, could be equipped with sensors to distinguish enemy tanks from other vehicles on a crowded battlefield and, when some are spotted, choose on its own to fire at them with its onboard missiles. AI can also be employed in cyberspace, for example to watch for enemy cyberattacks and counter them with a barrage of counterstrikes. In the future, AI-invested machines may be empowered to determine if a nuclear attack is underway and, if so, initiate a retaliatory strike.4 In this sense, AI is an “omni-use” technology, with multiple implications for war-fighting and arms control.5 Many analysts believe that AI will revolutionize warfare by allowing military commanders to bolster or, in some cases, replace their personnel with a wide variety of “smart” machines. Intelligent systems are prized for the speed with which they can detect a potential threat and their ability to calculate the best course of action to neutralize that peril. As warfare among the major powers grows increasingly rapid and multidimensional, including in the cyberspace and outer space domains, commanders may choose to place ever-greater reliance on intelligent machines for monitoring enemy actions and initiating appropriate countermeasures. This could provide an advantage on the battlefield, where rapid and informed action could prove the key to success, but also raises numerous concerns, especially regarding nuclear “crisis stability.” Analysts worry that machines will accelerate the pace of fighting beyond human comprehension and possibly take actions that result in the unintended escalation of hostilities, even leading to use of nuclear weapons. Not only are AI-equipped machines vulnerable to error and sabotage, they lack an ability to assess the context of events and may initiate inappropriate or unjustified escalatory steps that occur too rapidly for humans to correct. “Even if everything functioned properly, policymakers could nevertheless effectively lose the ability to control escalation as the speed of action on the battlefield begins to eclipse their speed of decision-making,” writes Paul Scharre, who is director of the technology and national security program at the Center for a New American Security.6 As AI-equipped machines assume an ever-growing number and range of military functions, policymakers will have to determine what safeguards are needed to prevent unintended, possibly catastrophic consequences of the sort suggested by Scharre and many others. Conceivably, AI could bolster nuclear stability by providing enhanced intelligence about enemy intentions and reducing the risk of misperception and miscalculation; such options also deserve attention. In the near term, however, control efforts will largely be focused on one particular application of AI: fully autonomous weapons systems. Autonomous Weapons Systems Autonomous weapons systems, sometimes called lethal autonomous weapons systems, or “killer robots,” combine AI and drone technology in machines equipped to identify, track, and attack enemy assets on their own. As defined by the U.S. Defense Department, such a device is “a weapons system that, once activated, can select and engage targets without further intervention by a human operator.”7 Some such systems have already been put to military use. The Navy’s Aegis air defense system, for example, is empowered to track enemy planes and missiles within a certain radius of a ship at sea and, if it identifies an imminent threat, to fire missiles against it. Similarly, Israel’s Harpy UAV can search for enemy radar systems over a designated area and, when it locates one, strike it on its own. Many other such munitions are now in development, including undersea drones intended for anti-submarine warfare and entire fleets of UAVs designed for use in “swarms,” or flocks of armed drones that twist and turn above the battlefield in coordinated maneuvers that are difficult to follow.8 The deployment of fully autonomous weapons systems poses numerous challenges to international security and arms control, beginning with a potentially insuperable threat to the laws of war and international humanitarian law. Under these norms, armed belligerents are obligated to distinguish between enemy combatants and civilians on the battlefield and to avoid unnecessary harm to the latter. In addition, any civilian casualties that do occur in battle should not be disproportionate to the military necessity of attacking that position. Opponents of lethal autonomous weapons systems argue that only humans possess the necessary judgment to make such fine distinctions in the heat of battle and that machines will never be made intelligent enough to do so and thus should be banned from deployment.9 At this point, some 25 countries have endorsed steps to enact such a ban in the form of a protocol to the Convention on Certain Conventional Weapons (CCW). Several other nations, including the United States and Russia, oppose a ban on lethal autonomous weapons systems, saying they can be made compliant with international humanitarian law.10 Looking further into the future, autonomous weapons systems could pose a potential threat to nuclear stability by investing their owners with a capacity to detect, track, and destroy enemy submarines and mobile missile launchers. Today’s stability, which can be seen as an uneasy nuclear balance of terror, rests on the belief that each major power possesses at least some devastating second-strike, or retaliatory, capability, whether mobile launchers for intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), or both, that are immune to real-time detection and safe from a first strike. Yet, a nuclear-armed belligerent might someday undermine the deterrence equation by employing undersea drones to pursue and destroy enemy ballistic missile submarines along with swarms of UAVs to hunt and attack enemy mobile ICBM launchers. Even the mere existence of such weapons could jeopardize stability by encouraging an opponent in a crisis to launch a nuclear first strike rather than risk losing its deterrent capability to an enemy attack. Such an environment would erode the underlying logic of today’s strategic nuclear arms control measures, that is, the preservation of deterrence and stability with ever-diminishing numbers of warheads and launchers, and would require new or revised approaches to war prevention and disarmament.11 Hypersonic Weapons Proposed hypersonic weapons, which can travel at a speed of more than five time the speed of sound, or more than 5,000 kilometers per hour, generally fall into two categories: hypersonic glide vehicles and hypersonic cruise missiles, either of which could be armed with nuclear or conventional warheads. With hypersonic glide vehicle systems, a rocket carries the unpowered glide vehicle into space, where it detaches and flies to its target by gliding along the upper atmosphere. Hypersonic cruise missiles are self-powered missiles, utilizing advanced rocket technology to achieve extraordinary speed and maneuverability. No such munitions currently exist, but China, Russia, and the United States are developing hypersonic weapons of various types. The U.S. Defense Department, for example, is testing the components of a hypersonic glide vehicle system under its Tactical Boost Glide project and recently awarded a $928 million contract to Lockheed Martin Corp. for the full-scale development of a hypersonic air-launched cruise missile, tentatively called the Hypersonic Conventional Strike Weapon.12 Russia, for its part, is developing a hypersonic glide vehicle it calls the Avangard, which it claims will be ready for deployment by the end of 2019, and China in August announced a successful test of the Starry Sky-2 hypersonic glide vehicle described as capable of carrying a nuclear weapon.13 Whether armed with conventional or nuclear warheads, hypersonic weapons pose a variety of challenges to international stability and arms control. At the heart of such concerns is these weapons’ exceptional speed and agility. Anti-missile systems that may work against existing threats might not be able to track and engage hypersonic vehicles, potentially allowing an aggressor to contemplate first-strike disarming attacks on nuclear or conventional forces while impelling vulnerable defenders to adopt a launch-on-warning policy.14 Some analysts warn that the mere acquisition of such weapons could “increase the expectation of a disarming attack.” Such expectations “encourage the threatened nations to take such actions as devolution of command-and-control of strategic forces, wider dispersion of such forces, a launch-on-warning posture, or a policy of preemption during a crisis.” In short, “hypersonic threats encourage hair-trigger tactics that would increase crisis instability.”15 The development of hypersonic weaponry poses a significant threat to the core principle of assured retaliation, on which today’s nuclear strategies and arms control measures largely rest. Overcoming that danger will require commitments on the part of the major powers jointly to consider the risks posed by such weapons and what steps might be necessary to curb their destabilizing effects. The development of hypersonic munitions also introduces added problems of proliferation. Although the bulk of research on such weapons is now being conducted by China, Russia, and the United States, other nations are exploring the technologies involved and eventually could produce such munitions on their own eventually. In a world of widely disseminated hypersonic weapons, vulnerable states would fear being attacked with little or no warning time, possibly impelling them to conduct pre-emptive strikes on enemy capabilities or to commence hostilities at the earliest indication of an incoming missile. Accordingly, the adoption of fresh nonproliferation measures also belongs on the agenda of major world leaders.16 Cyberattack Secure operations in cyberspace, the global web of information streams tied to the internet, has become essential for the continued functioning of the international economy and much else besides. An extraordinary tool for many purposes, the internet is also vulnerable to attack by hostile intruders, whether to spread misinformation, disrupt vital infrastructure, or steal valuable data. Most of those malicious activities are conducted by individuals or groups of individuals seeking to enrich themselves or sway public opinion. It is increasingly evident, however, that governmental bodies, often working in conjunction with some of those individuals, are employing cyberweapons to weaken their enemies by sowing distrust or sabotaging key institutions or to bolster their own defenses by stealing militarily relevant technological know-how. Moreover, in the event of a crisis or approaching hostilities, cyberattacks could be launched on an adversary’s early-warning, communications, and command and control systems, significantly impairing its response capabilities.17 For all these reasons, cybersecurity, or the protection of cyberspace from malicious attack, has become a major national security priority.18

#### Use or lose relies on a false dichotomy. Nuclear war is never guaranteed, and they’d always have more to lose

Kroenig 18

Matthew Kroenig, Associate Professor in the Department of Government and the Edmund A. Walsh School of Foreign Service at Georgetown, The Logic of American Nuclear Strategy: Why Strategic Superiority Matters, Oxford UPress, pp. 137-142

Furthermore, UELE arguments are unpersuasive for a second reason. These arguments overlook the fact that the inferior state has a more attractive option at each stage of the crisis: backing down and living to fight another day. A state in a position of inferiority involved in a high-stakes crisis always has a choice between three options: (1) intentionally launching a nuclear first strike in a devastating nuclear war that it will almost certainly lose; (2) playing brinkmanship, escalating the crisis, and raising the risk of nuclear war in a contest that it is also likely to lose; or (3) simply de-escalating the crisis and avoiding any further danger. Faced with this menu, option 1 is by far the least attractive, but this is precisely the option we must believe leaders will purposely choose in order for the UELE logic to hold. This is untenable. Indeed, much of nuclear deterrence theory and strategy as it has developed over the past 70 years is based on the premise that option 1 is simply unacceptable. Contrary to the claims of strategic stability theorists, therefore, UELE does not pose a problem to strategic stability.

To be sure, if a nuclear war were preordained to occur with 100% certainty, then an inferior state might have good reason to go first, but the risk of nuclear war is never certain. Indeed, the risk of nuclear war is in the control of both states. To avoid any risk of nuclear conflict, all they must do is capitulate. While an unattractive option, it is more desirable than intentionally launching a devastating nuclear war that it is bound to lose. Indeed, even the highly stylized game theoretic model in chapter 1, which relies on a spontaneous risk of nuclear war, assumes that states can avoid any further risk of catastrophe by submitting at any stage of the crisis.

**No nuke terror impact – no country will give them a bomb and carrying out an attack would be too complex.**

John **Mueller, PhD, 18** [PhD Political Science, Political Science @ THE Ohio State University, Woody Hayes Senior Research Scientist @ Mershon Center for International, Security Studies @ OSU], "Nuclear Weapons Don’t Matter," Foreign Affairs, 10-15-2018, <https://www.foreignaffairs.com/articles/2018-10-15/nuclear-weapons-dont-matter> C.VC

As for nuclear terrorism, ever since al Qaeda operatives used box cutters so effectively to hijack commercial airplanes, **alarmists have warned that radical Islamist terrorists would soon apply equal talents in science and engineering to make and deliver nuclear weapons so as to destroy various so-called infidels**. In practice, however, **terrorist groups have exhibited only a limited desire to go nuclear and even less progress in doing so**. Why? Probably because **developing one’s own bomb from scratch requires a series of risky actions, all of which have to go right for the scheme to work. This includes trusting foreign collaborators and other criminals; acquiring and transporting highly guarded fissile material; establishing a sophisticated, professional machine shop; and moving a cumbersome, untested weapon into position for detonation. And all of this has to be done while hiding from a vast global surveillance net** looking for and trying to disrupt such activities.

**Terrorists are unlikely to get a bomb from a generous, like-minded nuclear patron, because no country wants to run the risk of being blamed** (and punished) **for a terrorist’s nuclear crimes. Nor are they likely to be able to steal one**. Notes Stephen Younger, the former head of nuclear weapons research and development at Los Alamos National Laboratory: “**All nuclear nations take the security of their weapons very seriously**.”

#### No nuke terror impact

McIntosh, PhD, and Storey, PhD, 18 – Christopher McIntosh [PhD Political Science from University of Chicago (Go Maroons!), Assistant Professor of Political Studies @ Bard] and Ian Storey [PhD Political Science from University of Chicago (Go Maroons!), Associate Fellow @ the Hannah Arendt Center for Politics and Humanities, Bard College], “Between Acquisition and Use: Assessing the Likelihood of Nuclear Terrorism,” International Studies Quarterly, Vol 62, 2018, <https://academic.oup.com/isq/article-abstract/62/2/289/4976557> C.VC

Our approach offers a point of departure for strategically assessing the options, likely responses, and potential outcomes that could arise from the different paths available to a nuclear-armed non-state group. Too often analysts treat the decision by such groups to use nuclear weapons as if it occurs in a vacuum. In practice, terrorist groups face many short-term and long-term considerations. They are influenced by factors both external and internal to their organization. These include the potential for backlash among supporters, internal factionalization over nuclear strategy and doctrine, and an overwhelming response by the target state and the international community.

Moreover, we suggest a way to bring the recursivity of strategic choice into the account of terrorist organizational decision-making. These organizations must consider the long-term effects of a nuclear attack. An attack occurs in the context of an ongoing campaign by a well-established organization. Opportunity costs exist because escalating to nuclear attack forecloses future options. As well, conducting an attack may not only preclude other strategies, but the continued existence of the group itself. This changes the game significantly. In most cases, a nuclear attack must present not just an effective option for the moment, but the only strategic option worth pursuing going forward.

Once we take these considerations into account, the detonation of a nuclear weapon generally appears the least strategically advantageous option for non-state groups. Indeed, the factors presented here are analytically independent, adaptable, and scalable to particular threat contexts. We can therefore use our framework to study the opportunities and constraints faced by specific future groups. It should therefore assist in the process of planning responses to potential nuclear acquisition by terrorist groups.

Successive governments have now identified nuclear terrorism as a critical concern in the formulation of security policy. This line of thinking systematically underspecifies, or simply misunderstands, key considerations that terrorist organizations take into account. These include the group’s organizational survival, opportunity costs, and the conflation of victory with the end of hostilities. Each factor presents strong disincentives to immediate nuclear attack. A nuclear-armed terrorist group is exceedingly dangerous, but for different reasons than normally assumed. The options available to the group that fall short of detonation or attack remain considerable, albeit less spectacular and immediate.

Just as scholars like Bunn et al. (2015) are careful to do, political actors and analysts should resist uncritically deploying the term “nuclear terrorism” in an umbrella fashion. This point goes beyond even the attempts at disaggregating “use” presented here. The threat of an attack involving an improvised nuclear device is vastly different than that of a “dirty bomb,” and both have little in common with the threat posed by an attack on a nuclear facility. Each deserves separate consideration when formulating policy, even if measures taken to address these concerns, such as controlling nuclear leakage, ultimately overlap. If any of the acquisition or threat scenarios we explore come to fruition, then potential target states will need strategies that potentially employ positive, as well as negative, incentives to lessen the attractiveness of nuclear attack. As we argue, a crisis involving a nuclear-armed terrorist group will be a negotiation— regardless of what the target state chooses to label it. Far from demonstrating weakness, employing threats while dangling the possibility of political concessions can widen internal divisions, heightening the overall organizational costs of escalating violence (Toros 2008; Cronin 2009).

Finally, efforts designed to improve intelligence capabilities both prior to and post-attack remain vital. Signature analysis as a forensic measure has shown promise as a way of identifying the origin of nuclear material—in some cases it can identify whether or not it was provided by a state (Kristo and Tumey 2013). These efforts would be improved with a more widespread international commitment via the IAEA to placing signature markers in weapons and weaponizable material (Korbatov et al. 2015, 70; Findlay 2014, 6).

Ultimately, when it comes to the threat of a nuclear attack by a terrorist, presumption should lie squarely on the side of skepticism rather than inevitability. While some terrorist organizations have some incentives for nuclear acquisition, paradoxically and thankfully, the most strategic uses of a nuclear weapon fall well short of actual nuclear attack. From a scholarly perspective, as well as a political one, we need to start to think through how states would act in a world with nuclear-armed non-state actors. In doing so, we should avoid assumptions that fit neither with known nuclear strategy nor the empirical behavior of non-state organizations. Like most clichés, the post–Cold War trope that the threat of attack is higher now than it was during the US-USSR arms race (Litwak 2016) obscures much more than it reveals.

#### Nukes are weapons of the weak that prevent conflict – aff evidence has an imperial bias that is short-sighted

Shellenberger 18 [Michael Shellenberger is an American author, environmental policy writer, cofounder of Breakthrough Institute and founder of Environmental Progress. Who Are We To Deny Weak Nations The Nuclear Weapons They Need For Self-Defense? August 6, 2018. https://www.forbes.com/sites/michaelshellenberger/2018/08/06/who-are-we-to-deny-weak-nations-the-nuclear-weapons-they-need-for-self-defense/#40381393522f]

Nuclear Bombs As Weapons of the Weak How does a weak nation-state like France level the playing field with a more powerful adversary like Germany? By obtaining a weapon capable of wiping out its major cities. Twice victimized and humiliated by its neighbor, France after World War II set off to build a nuclear bomb that, had it been available before 1940, would have deterred the German invasion. Can anyone blame France for getting the bomb? Of course not. After all, Germany’s war upon its neighbors resulted in the deaths of 50 million people. But that didn’t stop the U.S. government from trying to prevent France from building a nuclear weapon. Senior Kennedy administration officials in 1962 described France’s nuclear program as “foolish, or diabolical — or both.” How could the U.S. deny France the means with which to defend herself? By promising to protect France with its own nuclear weapons through what is called “extended deterrence.” French President Charles de Gaulle didn’t buy it. He felt that “the United States would not risk New York or Detroit to save Hamburg or Lyons,” noted the New York Times, “if faced with a choice between the destruction of Western Europe and a Soviet-American missile exchange.” A nuclear-armed France, U.S. officials warned, “could lead to a proliferation of nuclear powers,” reported Ronald Steel in Commentary, “that is, to demands by other allies, especially Germany, for nuclear status.” The identical argument was later made against China, India and Pakistan, and is now being made against allowing North Korea and Iran to possess nuclear weapons. The widespread assumption is that the more nations have nuclear weapons, the more dangerous the world will be. But is that really the case? I don’t ask this question lightly. I come from a long line of Christian pacifists and conscientious objectors and earned a degree in peace studies from a Quaker college. I have had nightmares about nuclear war since I was a boy and today live in California, which is more vulnerable to a North Korean missile than Washington, D.C. — at least for now. But it is impossible not to be struck by these facts: No nation with a nuclear weapon has ever been invaded by another nation. The number of deaths in battle worldwide has declined 95 percent in the 70 years since the invention and spread of nuclear weapons; The number of Indian and Pakistani civilian and security forces’ deaths in two disputed territories declined 90 percent after Pakistan’s first nuclear weapons test in 1998. In 1981, the late political scientist Kenneth Waltz published an essay titled, “The Spread of Nuclear Weapons: More May Be Better.” In it he argued that nuclear weapons are revolutionary in allowing weaker nations to protect themselves from more powerful ones. International relations is “a realm of anarchy as opposed to hierarchy… of self-help… you’re on your own,” Waltz explained. How do nuclear weapons work? Not “through the ability to defend but through the ability to punish...The message of a deterrent strategy is this,” explained Waltz. “‘Although we are defenceless, if you attack we will punish you to an extent that more than cancels your gains.’” Does anybody believe France should give up its nuclear weapons? Certainly not the French. After President Barack Obama in 2009 called for eliminating nuclear weapons, not a single other nuclear nation endorsed the idea. All of this raises the question: if nuclear weapons protect weak nations from foreign invasion, why shouldn’t North Korea and Iran get them? Why Nuclear Weapons Make Us Peaceful On January 29, 2002, President George W. Bush denounced Iraq, Iran, and North Korea as an “axis of evil.” North Korea was “arming with missiles,” he said. Iran “aggressively pursues these weapons” and the “Iraqi regime has plotted to develop...nuclear weapons for over a decade.” One year later, the U.S. invaded and occupied Iraq. The ensuing conflict resulted in the deaths of over 450,000 people — about four times as many as were killed at Hiroshima — and a five-fold increase in terrorist killings in the Middle East and Africa. It all came at a cost of $2.4 trillion dollars. Now, 16 years later, U.S. officials insist that North Korea and Iran need not fear a U.S. invasion. But why would any nation — particularly North Korea and Iran — believe them? Not only did the U.S. overthrow Iraqi leader Saddam Hussein after he gave up his nuclear weapons program, it also helped overthrow Libyan President Muammar Gaddafi in 2011 after he too had given up the pursuit of a nuclear weapon. North Korean President Kim Jong-un may, quite understandably, see his own life at stake: Hussein was hanged and Gaddafi was tortured and killed. Both hawks and doves say North Korea and Iran must not be allowed to have a weapon because both regimes are brutal, but nuclear weapons make nations more peaceful over time. There were three full-scale wars before India and Pakistan acquired the bomb and only far more limited conflicts since. And China became dramatically less bellicose after acquiring the bomb. Why? “History shows that when countries acquire the bomb, they feel increasingly vulnerable,” notes Waltz, “and become acutely aware that their nuclear weapons make them a potential target in the eyes of major powers. This awareness discourages nuclear states from bold and aggressive action.” Is it really so difficult to imagine that a nuclear-armed North Korea and Iran might follow the same path toward moderation as China, India, and Pakistan? Nuclear weapons are revolutionary in that they require the ruling class to have skin in the game. When facing off against nuclear-armed nations, elites can no longer sacrifice the poor and weak in their own country without risking their lives. Had Iraq in 2002 been in possession of a nuclear weapon, the U.S. would never have invaded. As such, we should be glad that North Korea acquired the bomb since it guarantees the U.S. will never invade. The End of Extended Deterrence? In a 2012 cover story for Foreign Affairs, “Why Iran Should Get the Bomb,” Waltz notes that “nuclear balancing would mean stability.” Why? Because, “It is Israel’s nuclear arsenal, not Iran’s desire for one, that has contributed most to the current crisis.” Israeli air strikes destroyed an Iraqi nuclear reactor in 1981, and destroyed a Syrian reactor in 2007. Wrote Waltz: Israel's proven ability to strike potential nuclear rivals with impunity has inevitably made its enemies anxious to develop the means to prevent Israel from doing so again. In this way, the current tensions are best viewed not as the early stages of a relatively recent Iranian nuclear crisis but rather as the final stages of a decades-long Middle East nuclear crisis that will end only when a balance of military power is restored." Little surprise that Israeli hardliners responded with outrage to Waltz’s essay. “Some have even said that Iran with nuclear weapons would stabilize the Middle East,” Israeli Prime Minister Benjamin Netanyahu said after Foreign Affairs published Waltz’s article. “I think people who say this have set a new standard for human stupidity.” But was Israel stupid for acquiring the bomb in 1968 to protect itself from its neighbors? No doubt Netanyahu would say no. How do nuclear-armed nations justify their double-standard on nuclear weapons? Mostly through fear-mongering. “Those who dread a world with more nuclear states do little more than assert that more is worse,” noted Waltz, “and claim without substantiation that new nuclear states will be less responsible and less capable of self-control than the old ones have been.” Nuclear-armed nations perpetuate two fictions, the first of which is that they will give up their weapons. They point to the weak language in the 1968 nuclear non-proliferation treaty, which says treaty members will “pursue negotiations” to achieve the goal of “complete disarmament under strict and effective international control.” And yet no nuclear-armed nation in the world is pursuing negotiations with the goal of “complete disarmament.” Indeed, most nuclear-armed nations are upgrading, not downgrading their arsenals. The second fiction is that nuclear-armed nations will protect their unarmed allies with nuclear weapons. But ask yourself: would President Donald Trump risk New York for Montenegro (population 643,000) — the newest member of NATO? In July, Trump suggested he was would not, even though the US is obligated to under NATO rules. And why should Americans risk New York for Berlin when Germans won’t risk Berlin for New York? Just 40 percent of Germans believe they “should use military force to defend a NATO ally if it got into a serious military conflict with Russia,” while 65 percent believe “the U.S. would use military force to defend a NATO ally.” And they are correct. Sixty-two percent of Americans agree that the U.S. should use military force to defend a NATO ally in a conflict with Russia. But that commitment to NATO will likely weaken given the lack of European solidarity, Middle East war fatigue, and President Trump’s questioning of America’s role in the Alliance. Already, a growing number of vulnerable U.S. allies are asking whether they should acquire weapons of their own. In Germany, a prominent political scientist has called for his nation to get the bomb. “Trump-bashing will only further undermine the U.S. commitment to ‘extended deterrence,’” warned Dr. Christian Hacke, Professor of Political Science at the University of Bonn, in a major essay in Welt am Sonntag, the country’s largest Sunday newspaper (an English version can be read here). Germany is, for the first time since 1949, without nuclear protection provided by the United States, and thus defenseless in an extreme crisis. As such, Germany has no alternative but to rely on itself. A nuclear Germany would stabilize NATO and the security of the Western World. But if we cannot persuade our allies, then Germany should go it alone. It may be that just six to eight submarines would insure the security of the German people." A similar dynamic is underway in Asia. In the wake of tensions with North Korea, 60 percent of South Koreans today say they want their own nuclear weapons, and 68 percent want to redeploy U.S. tactical nuclear weapons. And now, politicians with South Korea’s leading opposition party are urging their nation’s nuclear armament. Disarmament and Imperialism The end of extended deterrence provided by the U.S. to Europe should not come as a surprise. Its temporary nature was foreseen as early as 1962, when André Fontaine wrote in Le Monde: “It is inconceivable, unless we are resigned to an interminable cold war, that Europe forever relies on America for its security and for the orientation of its diplomacy.” As to be expected, the usual fears are being drummed up against why a militarily-weak nation like Germany shouldn’t get the bomb. “If Germany was to relinquish its status as a non-nuclear power, what would prevent Turkey or Poland, for example, from following suit?” a former German ambassador to the U.S., wrote in response to Hacke’s essay. “Germany as the gravedigger of the international nonproliferation regime? Who can want that?” In truth, it’s remarkable the nonproliferation regime has lasted as long as it has. It made sense for nuclear-armed nations in the 1950s and 60s to try to prevent the spread of nuclear weapons. After all, nations weren’t accustomed to the revolutionary new technology, and the likelihood was far higher back then that a weapon could get used accidentally or fall into the wrong hands. But 60 years later, in a multipolar world where the dominant power, the U.S., has grown tired of its role as global hegemon, the non-proliferation regime is falling apart under the weight of its own contradictions. The division of the world into nuclear-armed and unarmed nations has long been arbitrary and unfair. Nuclear-armed nations, except for France, hypocritically punished India for decades with trade sanctions for acquiring a weapon. People rightly worry about accidental or unauthorized use of weapons, such as by terrorists, but nations today safeguard their weapons and materials far better than they did in the past. After the fall of the Soviet Union, the United States spent $10 billion to help Russia maintain control of and destroy many of its nuclear weapons, and intelligence agencies around the world work together to prevent nuclear materials from falling into the hands of non-state actors. As for terrorism, why would a nation like Iran go to all the trouble of getting a bomb only to give it to a non-state actor like Hamas or Hezbollah? Not only would doing so risk retaliation from Israel, but the bomb could be used by those groups to gain leverage over Iran itself. Today, the greatest opposition to the spread of n

uclear weapons to weak nations like North Korea and Iran comes from militaristic figures like U.S. national security advisor John Bolton, who advocated the disastrous invasion of Iraq, and who now advocates “the Libya model” for North Korea. It’s easy to see why. “In a world without nuclear weapons,” a U.S. nuclear weapons designer explained, “the U.S. would have uncontested military dominance.” In other words, a world without nuclear weapons would be a world where relatively weak nations — like France and Britain before World War II and North Korea and Iran today — are deprived the only power on Earth capable of preventing a military invasion by a more powerful adversary. Who are we to deny weak nations the nuclear weapons they need for self-defense? The answer should by now be clear: hypocritical, short-sighted, and imperialistic.

#### No nuke winter---even in worst case scenarios

Jon Reisner 18, scientist at Los Alamos National Laboratory, et al., 2/13/18, “Climate Impact of a Regional Nuclear Weapons Exchange: An Improved Assessment Based on Detailed Source Calculations,” Journal of Geophysical Research: Atmospheres, Vol. 123, Issue 5, p. 2752-2772

**BC = Black Carbon**

3.2 Fire Results

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); for example, the higher energy density of the building fuels and the initial fluence from the weapon produce an intense response within HIGRAD‐FIRETEC 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 min) 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 pyrocumulonimbus 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, Oman, Stenchikov, et al., 2007). 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 time scales. But once at stratospheric altitudes, aerosol dilution via coagulation is hindered by low particulate concentrations (e.g., Robock, Oman, Stenchikov, et al., 2007) 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 2 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, for example, 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 2 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, Oman, Stenchikov, et al. (2007), in which the soot is initially emitted in the upper troposphere or higher. In Figure 7, the e‐folding time scale for the removal of tropospheric soot, here interpreted as the time required for an initial drop of a factor e, is about 1 week. This result compares favorably with the “LT” experiment of Robock, Oman, Stenchikov, et al. (2007), considering 5 Tg of BC released in the lower troposphere, in which 50% of the aerosols are removed within 2 weeks. By contrast, the initial e‐folding time scale 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 time scale from our forced ensemble simulations is close to those obtained by Mills et al. (2008) in their 1 Tg experiment, by Robock, Oman, Stenchikov, et al. (2007) in their experiment “UT 1 Tg,” and 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 time scale 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‐of‐2 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, Oman, Stenchikov, et al., 2007). 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 Figure 9, bottom), because of the higher soot concentrations in the Northern Hemisphere, as can be seen in Figure 11 (see also Figure 12, left). 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, Oman, Stenchikov, et al. (2007) (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 1 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 time scale of several years (Figures 8 and 9). This mass represents the effective amount of BC that can force climatic changes over multiyear time scales. 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 worst case 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) (Figure 11, top row) and as an average from the forced ensemble members (Figure 11, bottom row). All simulations predict enhanced concentrations at high latitudes during the first year after the exchange. In the cases shown in the top row, 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 row, mass‐mixing ratios larger than about 1 kg of BC per teragram 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 row (see also Robock, Oman, Stenchikov, et al., 2007). 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 row to 0.2–0.4 kg BC/Tg air in our forced simulations (see middle and right columns).

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 midlatitudes in the Northern Hemisphere and everywhere on the globe after about 2.5 years (without ever attaining this value in the Southern Hemisphere). In contrast, the soot optical depth in the calculation shown in the top row 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 30°S–30°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 year 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 India‐Pakistan 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, Oman, Stenchikov, et al. (2007) found that when only 1 Tg of soot 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 times 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 1 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 (SST) anomalies ranged between −0.2 and −0.55 K, and those of the precipitation anomalies varied between −0.15 and −0.2 mm/d. 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.

### 1NC – Warming

#### No co2 ag rofl

#### If they win that adapation requires at that level, then that would require like moving the entire city of New york west. Their ev does not say adaption is coming now, it’s just that having data is a prerequisite but there is no evdence that adaption is coming, what that would be, or what that would solve

#### Adaptation fails

Oreskes et al, ’10 [Naomi Oreskes, David A. Stainforth, Leonard A. Smith Philosophy of Science, Vol. 77, No. 5 (December 2010), pp. 1012-1028 “Adaptation to Global Warming: Do Climate Models Tell Us What We Need to Know?” http://www2.lse.ac.uk/CATS/publications/papersPDFs/80\_AdaptationtoGlobalWarming\_2010.pdf/]

This argument has been particularly promoted by the libertarian think tank, the CATO Institute, but some environmentalists accept it as well (e.g., Schellenberger and Nordhaus 2007). 3 When the Los Angeles Times summarized the views of advocates of adaptation, they glossed it this way: “Just deal with it” (Zarembo 2008). This gloss might be viewed as a bit misleading, because by and large advocates of adaptation are not arguing for simply responding to changes after they occur; they are arguing for preparing to adapt. But arguments for preparing for the consequences of global warming—rather than trying to prevent them—rest on the assumption that we know what “they” are. That is to say, they rest on the assumption that we can reliably anticipate the changes to which we will be adapting and therefore that we can sensibly plan for those changes. Do climate models give us the information we would need to accurately estimate the costs of adaptation and effectively prepare for the consequences of climate change? In this article, we argue that they do not. First, while climate models consistently suggest that the mean global temperature of the planet will rise, mean global temperature is not what any one person, state, or nation will be adapting to. Human beings will be adapting to changes in the weather at the places where they live and a host of concomitant local effects of climate change that ensue from such changes. While there is broad consensus on the expected change in average global temperature, there is much less agreement between models regarding these local changes and concomitant effects. In particular, there is widespread divergence in model simulations of the impact of global warm-ing on regional precipitation, a variable that is at least as important for human activities as temperature, if not much more so. Furthermore, models show systematic errors in the global mean temperature similar in magnitude to the size of the historical change we are seeking to understand. Models do not agree on the absolute value of the twentieth-century global warming temperature, but they do show close agreement on the size of the change over the past century. That is to say, while scientists agree that warming is underway, and broadly agree on the amount of anthropogenic change that has occurred to date, when we get down to the details of future changes and therefore anticipated future states, there is much less clarity and therefore much less agreement. Second, there is a gap between the scale on which models produce consistent information and the scale on which humans act. Planning for adaptation requires information on the scale over which human organizations and institutions have authority and power: towns, cities, states, provinces, and nations. The IPCC argues that current global circulation models (GCMs), with typical horizontal resolutions of 100–500 kilometers, provide “credible quantitative estimates of future climate change, particularly at continental scales and above”; phrasing that nods to the debates in the modeling community over their forecast skill on subcontinental scales (IPCC 2000). 4 Thus, while the reality of mean global warming is essentially undisputed, the future impacts on the scale at which humans would have to prepare for and adjust to them are still the subject of considerable research, inquiry, and debate (Oreskes 2004, 2007). Third, existing models are unable to simulate realistically (much less evaluate the likelihood of) extreme outcomes—a rapid disintegration of the West Antarctic Ice Sheet, for example, a major dieback of the Amazon, or a sudden increase in release of stored greenhouse gases from arctic permafrost. Yet, from a moral, ethical, and practical standpoint, our thinking must consider the ﬁnite (that is to say, nonzero) possibility that such outcomes may occur (Gardiner 2004). Our global models give us little relevant information regarding such perhaps unlikely, but potentially grave, impacts.

#### No warming impact

Curry '19 [Judith; 2/9/19; President of Climate Forecast Applications Network (CFAN), Professor Emerita of Earth and Atmospheric Sciences at the Georgia Institute of Technology, Ph.D. in atmospheric science from the University of Chicago; "Statement to the Committee on Natural Resources of the United States House of Representatives," https://curryja.files.wordpress.com/2019/02/curry-testimony-house-natural-resources.pdf]//GJ

The urgency (?) of CO2 emissions reductions

In the decades since the 1992 UNFCCC Treaty, global CO2 emissions have continued to increase, especially in developing countries. In 2010, the world’s governments agreed that emissions need to be reduced so that global temperature increases are limited to below 2 degrees Celsius.17 The target of 2oC (and increasingly 1.5oC)18 remains the focal point of international climate agreements and negotiations.

The original rationale for the 2oC target is the idea that ‘tipping points’ − abrupt or nonlinear transition to a different climate state − become likely to occur once this threshold has been crossed, with consequences that are largely uncontrollable and beyond our management. The IPCC AR5 considered a number of potential tipping points, including ice sheet collapse, collapse of the Atlantic overturning circulation, and permafrost carbon release. Every single catastrophic scenario considered by the IPCC AR5 (WGII, Table 12.4) has a rating of very unlikely or exceptionally unlikely and/or has low confidence. The only tipping point that the IPCC considers likely in the 21st century is disappearance of Arctic summer sea ice (which is fairly reversible, since sea ice freezes every winter).

In the absence of tipping points on the timescale of the 21st century, the 2oC limit iss more usefully considered by analogy to a highway speed limit:19 driving at 10 mph under the speed limit is not automatically safe, and exceeding the limit by 10 mph is not automatically dangerous, although the faster one travels the greater the danger from an accident. Analogously, the 2oC (or 1.5oC) limit should not be taken literally as a real danger threshold. An analogy for considering the urgency of emissions reductions is your 401K account: if you begin making contributions early, it will be easier to meet your retirement goals.

Nevertheless, the 2oC and 1.5oC limits are used to motivate the urgency of action to reduce CO2 emissions. At a recent UN Climate Summit, (former) Secretary-General Ban Ki-moon warned that: “Without significant cuts in emissions by all countries, and in key sectors, the window of opportunity to stay within less than 2 degrees [of warming] will soon close forever.”20 Actually, this window of opportunity may remain open for quite some time. The implications of the lower values of climate sensitivity found by Lewis and Curry21 and other recent studies is that human caused warming is not expected to exceed the 2oC ‘danger’ level in the 21st century. Further, there is growing evidence that the RCP8.5 scenario for future greenhouse gas concentrations, which drives the largest amount of warming in climate model simulations, is impossibly high, requiring a combination of numerous borderline impossible socioeconomic scenarios.22 A slower rate of warming means there is less urgency to phase out greenhouse gas emissions now, and more time to find ways to decarbonize the economy affordably and with a minimum of unintended consequences. It also allows for the flexibility to revise our policies as further information becomes available.

Is it possible that something truly dangerous and unforeseen could happen to Earth’s climate during the 21st century? Yes it is possible, but natural climate variability (including geologic processes) may be a more likely source of possible undesirable change than manmade warming. In any event, attempting to avoid such a dangerous and unforeseen climate by reducing fossil fuel emissions will be futile if natural climate and geologic processes are dominant factors. Geologic processes are an important factor in the potential instability of the West Antarctic ice sheet that could contribute to substantial sea level rise in the 21st century.23

Under the Paris Agreement, individual countries have submitted to the UNFCCC their Nationally Determined Contributions (NDCs). Under the Obama Administration, the U.S. NDC had a goal of reducing emissions by 28% below 2005 levels by 2025. Apart from considerations of feasibility and cost, it has been estimated24 using the EPA MAGICC model that this commitment will prevent 0.03oC in warming by 2100. When combined with current commitments from other nations, only a small fraction of the projected future warming will be ameliorated by these commitments. If climate models are indeed running too hot,25 then the amount of warming prevented would be even smaller. Even if emissions immediately went to zero and the projections of climate models are to be believed, the impact on the climate would not be noticeable until the 2nd half of the 21st century. Most of the expected benefits to the climate from the UNFCCC emissions reductions policy will be realized in the 22nd century and beyond.

Attempting to use carbon dioxide as a control knob to regulate climate on decadal to century timescales is arguably futile. The UNFCCC emissions reductions policies have brought us to a point between a rock and a hard place, whereby the emissions reduction policy with its extensive costs and questions of feasibility are inadequate for making a meaningful dent in slowing down the expected warming in the 21st century. And the real societal consequences of climate change and extreme weather events (whether caused by manmade climate change or natural variability) remain largely unaddressed.

This is not to say that a transition away from burning fossil fuels doesn’t make sense over the course of the 21st century. People prefer ‘clean’ over ‘dirty’ energy – provided that all other things are equal, such as reliability, security, and economy. However, assuming that current wind and solar technologies are adequate for providing the required amount and density of electric power for an advanced economy is misguided.26

The recent record-breaking cold outbreak in the Midwest is a stark reminder of the challenges of providing a reliable power supply in the face of extreme weather events, where an inadequate power supply not only harms the economy, but jeopardizes lives and public safety. Last week, central Minnesota experienced a natural gas ‘brownout,’ as Xcel Energy advised customers to turn thermostats down to 60 degrees and avoid using hot water.27 Why? Because the wind wasn’t blowing during an exceptionally cold period. Utilities pair natural gas plants with wind farms, where the gas plants can be ramped up and down quickly when the wind isn’t blowing. With bitter cold temperatures and no wind, there wasn’t enough natural gas.

A transition to an electric power system driven solely by wind and solar would require a massive amount of energy storage. While energy storage technologies are advancing, massive deployment of cost-effective energy storage technologies is well beyond current capabilities.28 An unintended consequence of rapid deployment of wind and solar energy farms may be that natural gas power plants become increasingly entrenched in the power supply system.

Apart from energy policy, there are a number of land use practices related to croplands, grazing lands, forests and wetlands that could increase the natural sequestration of carbon and have ancillary economic and ecosystem benefits.29 These co-benefits include improved biodiversity, soil quality, agricultural productivity and wildfire behavior modification.

In evaluating the urgency of CO2 emissions reductions, we need to be realistic about what reducing emissions will actually accomplish. Drastic reductions of emissions in the U.S. will not reduce global CO2 concentrations if emissions in the developing world, particularly China and India, continue to increase.

If we believe the climate model simulations, we would not expect to see any changes in extreme weather/climate events until late in the 21st century. The greatest impacts will be felt in the 22nd century and beyond, in terms of reducing sea level rise and ocean acidification.

Resilience, anti-fragility and thrivability

Given that emissions reductions policies are very costly, politically contentious and are not expected to change the climate in a meaningful way in the 21st century, adaptation strategies are receiving increasing attention in formulating responses to climate change.

The extreme damages from recent hurricanes plus the recent billion dollar disasters from floods, droughts and wildfires, emphasize that the U.S. is highly vulnerable to current weather and climate disasters. Even worse disasters were encountered in the U.S. during the 1930’s and 1950’s. Possible scenarios of incremental worsening of weather and climate extremes over the course of the 21st century don’t change the fundamental storyline that many regions of the U.S. are not well adapted to the current weather and climate variability, let alone the range that has been experienced over the past two centuries.

As a practical matter, adaptation has been driven by local crises associated with extreme weather and climate events, emphasizing the role of ‘surprises’ in shaping responses. Advocates of adaptation to climate change are not arguing for simply responding to events and changes after they occur; they are arguing for anticipatory adaptation. However, in adapting to climate change, we need to acknowledge that we cannot know how the climate will evolve in the 21st century, we are certain to be surprised and we will make mistakes along the way.

‘Resilience’ is the ability to ‘bounce back’ in the face of unexpected events. Resilience carries a connotation of returning to the original state as quickly as possible. The difference in impact and recovery from Hurricane Sandy striking New York City in 2012 versus the impact of Tropical Cyclone Nargis striking Myanmar in 200830 reflects very different vulnerabilities and capacities for bouncing back.

To increase our resilience to extreme weather and climate events, we can ‘bounce forward’ to reduce future vulnerability by evolving our infrastructures, institutions and practices. Nicholas Taleb’s concept of antifragility31 focuses on learning from adversity, and developing approaches that enable us to thrive from high levels of volatility, particularly unexpected extreme events. Anti-fragility goes beyond ‘bouncing back’ to becoming even better as a result of encountering and overcoming challenges. Anti-fragile systems are dynamic rather than static, thriving and growing in new directions rather than simply maintaining the status quo.

Strategies to increase antifragility include: economic development, reducing the downside from volatility, developing a range of options, tinkering with small experiments, and developing and testing transformative ideas. Antifragility is consistent with decentralized models of policy innovation that create flexibility and redundance in the face of volatility. This ‘innovation dividend’ is analogous to biodiversity in the natural world, enhancing resilience in the face of future shocks.32

Similar to anti-fragility, the concept of ‘thrivability’ has been articulated by Jean Russell:33 “It isn’t enough to repair the damage our progress has brought. It is also not enough to manage our risks and be more shock-resistant. Now is not only the time to course correct and be more resilient. It is a time to imagine what we can generate for the world. Not only can we work to minimize our footprint but we can also create positive handprints. It is time to strive for a world that thrives.”

A focus on policies that support resilience, anti-fragility and thrivability avoids the hubris of thinking we can predict the future climate. The relevant questions then become:

• How can we best promote the development of transformative ideas and technologies?

• How much resilience can we afford?

The threats from climate change (whether natural or human caused) are fundamentally regional, associated not only with regional changes to the weather/climate, but with local vulnerabilities and cultural values and perceptions. In the least developed countries, energy poverty and survivability is of overwhelming concern, where there are severe challenges to meeting basic needs and their idea of clean energy is something other than burning dung inside their dwelling for cooking and heating. In many less developed countries, particularly in South Asia, an overwhelming concern is vulnerability to extreme weather events such as floods and hurricanes that can set back the local economies for a generation. In the developed world, countries are relatively less vulnerable to climate change and extreme weather events and have the luxury of experimenting with new ideas: entrepreneurs not only want to make money, but also to strive for greatness and transform the infrastructure for society.

Extreme weather/climate events such as landfalling major hurricanes, floods, extreme heat waves and droughts become catastrophes through a combination of large populations, large and exposed infrastructure in vulnerable locations, and human modification of natural systems that can provide a natural safety barrier (e.g. deforestation, draining wetlands). Addressing current adaptive deficits and planning for climate compatible development will increase societal resilience to future extreme events that may possibly be more frequent or severe in the future.

Ways forward

Climate scientists have made a forceful argument for a future threat from manmade climate change. Based upon our current assessment of the science, the threat does not seem to be an existential one on the time scale of the 21st century, even in its most alarming incarnation. However, the perception of manmade climate change as a near-term apocalypse and alignment with range of other social objectives has narrowed the policy options that we’re willing to consider.

#### Extinction requires 12 degrees

Sebastian Farquhar 17, leads the Global Priorities Project (GPP) at the Centre for Effective Altruism, et al., 2017, “Existential Risk: Diplomacy and Governance,” https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf

The most likely levels of global warming are very unlikely to cause human extinction.15 The existential risks of climate change instead stem from tail risk climate change – the low probability of extreme levels of warming – and interaction with other sources of risk. It is impossible to say with confidence at what point global warming would become severe enough to pose an existential threat. Research has suggested that warming of 11-12°C would render most of the planet uninhabitable,16 and would completely devastate agriculture.17 This would pose an extreme threat to human civilisation as we know it.18 Warming of around 7°C or more could potentially produce conflict and instability on such a scale that the indirect effects could be an existential risk, although it is extremely uncertain how likely such scenarios are.19 Moreover, the timescales over which such changes might happen could mean that humanity is able to adapt enough to avoid extinction in even very extreme scenarios.

The probability of these levels of warming depends on eventual greenhouse gas concentrations. According to some experts, unless strong action is taken soon by major emitters, it is likely that we will pursue a medium-high emissions pathway.20 If we do, the chance of extreme warming is highly uncertain but appears non-negligible. Current concentrations of greenhouse gases are higher than they have been for hundreds of thousands of years,21 which means that there are significant unknown unknowns about how the climate system will respond. Particularly concerning is the risk of positive feedback loops, such as the release of vast amounts of methane from melting of the arctic permafrost, which would cause rapid and disastrous warming.22 The economists Gernot Wagner and Martin Weitzman have used IPCC figures (which do not include modelling of feedback loops such as those from melting permafrost) to estimate that if we continue to pursue a medium-high emissions pathway, the probability of eventual warming of 6°C is around 10%,23 and of 10°C is around 3%.24 These estimates are of course highly uncertain.

It is likely that the world will take action against climate change once it begins to impose large costs on human society, long before there is warming of 10°C. Unfortunately, there is significant inertia in the climate system: there is a 25 to 50 year lag between CO2 emissions and eventual warming,25 and it is expected that 40% of the peak concentration of CO2 will remain in the atmosphere 1,000 years after the peak is reached.26 Consequently, it is impossible to reduce temperatures quickly by reducing CO2 emissions. If the world does start to face costly warming, the international community will therefore face strong incentives to find other ways to reduce global temperatures.

#### Islands mean no extinction from warming

Alexey Turchin 19, Researcher at the Foundation Science for Life Extension in Moscow, Brian P. Green, director of technology ethics at the Markkula Center for Applied Ethics at Santa Clara University, 3/11/19, “Islands as refuges for surviving global catastrophes,” https://www.emerald.com/insight/content/doi/10.1108/FS-04-2018-0031/full/html

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.