### 1

#### Every 1AC advantage is based on false specificity – internal link narratives are merely “threat projection” to justify the national security state

Masco 12 – Professor of Anthropology at the University of Chicago (Joseph, “The End of Ends,” Anthropological Quarterly 84(4):1107-1124)

What these technical experts were attempting to negotiate through engineering is a basic relationship to death, a perverse project of building ever more destructive machines in the name of producing “security.” Indeed, displacing the threat of one machine (the bomb) with another (the bomb) became the basis for deterrence theory, a way of organizing and containing the thought of death by expanding technological systems. Freud (1991) saw this contradiction in militarism early on, and in his remarkable 1915 essay “ t houghts for the t imes on War and Death” he is definitive that it is impossible to comprehend—to actually believe in—one’s own death. Thus, he notes, even as the human organism moves closer to death with each tick of the clock, the ego pursues a program of immortality and works to relocate the onrushing reality of death to exterior locations—to novels, to foreign populations, to distant wars, to a radical outside. Thus, the thought of an “ending” here literally pro- duces a new set of means—fantasies, projections, displacements, and amnesias all mobilized to suture together an idea of an eternal self. In American national-culture, the Cold War performed this task through a series of circuits: the communist threat was simultaneously everywhere and nowhere, and the immanent threat of nuclear war was mitigated by a fetishistic focus on technological detail. Cold War planners managed the threat of nuclear war through constant proliferation—of weapons, deliv- ery systems, images, theories, and calculations. Through this prolifera- tion, Cold War planners pursued a program of intellectual compensation for the confrontation with a new kind of death. t hey did so by mobilizing all national resources (changing the very temporal horizon of war from days, to hours, to minutes in the process), as well as by pursuing proxy wars and covert actions around the world. In the process, Americans learned how to be committed to total war as a precondition for everyday life while locating death as exterior to the nation, even as the war machine grew ferociously in its technological capacities. This represents a distinctive national-cultural achievement: a notion of security that brings collective death ever closer in an attempt to fix its location with ever more precision. b y the time of the first Corona photograph, the US nuclear system was on constant and permanent alert, managing a global war machine on a minute-by-minute temporal scale—one that imagined a Soviet nuclear strike coming with less than seven minutes warning (Keeney 2011:186). US military systems became both the most direct application of technical rationality and the location of deep fantasies about national immortality and systems of total control. In the first decade of the Cold War, for example, the lack of detailed intelligence about the Soviet Union enabled an American national security project that was both technologically uto- pian and driven by increasingly apocalyptic visions of an omnipotent other. A top-secret, blue-ribbon panel studying the possibility of nuclear civil defense in 1957, known as the Gaither c ommittee, not only recom- mended a nationwide commitment to building underground bunkers and training citizens to think calmly about experiencing nuclear war, its mem- bers also concluded that a “missile gap” with the Soviet Union left the US incr easingly vulnerable to a devastating “first strike” ( s ecurity r esources Panel of the s cience Advisory c ommittee 1957). r einforced by the hys- teria over s putnik later in 1957—the first artificial satellite in space—U s national security debates, by the end of the 1950s, were structured by visions of a Soviet sneak attack that would destroy urban America in an instant. The Gaither c ommittee leaked to the press their conclusion that by 1959 the s oviets would have a decisive advantage in I cb Ms (see r oman 1995, s nead 1999) provoking huge nuclear arms expenditures in the US . The domestic politics informing the “missile gap” narrative were part of the battle between military branches for nuclear resources and soon key to John F. Kennedy’s presidential campaign strategy of positioning his r epublican rivals (Eisenhower and then Nixon) as weak on national security. Thus, a threat projection with multiple political uses became codified as a kind of truth in US national security policy, leading to massive increases in defense spending at the end of the Eisenhower administration and then again at the start of the Kennedy administration. The nuclear triad—of bombers, I cb Ms, and submarines—is built at this moment, providing multiple redundant systems for waging nuclear war and giving each branch of the military a nuclear capability. Today we can see that in addition to the new weapons systems built at the end of the 1950s, there was also an important political discovery crucial to the evolving Cold War: namely, the universal utility of threat pro- liferation in US security culture. The raw political value of existential threat as a motivating narrative became a well-worn domestic strategy in the US , one linking the “missile gap” of the 1950s to the “window of vulner - ability” of the 1970s, to the “strategic defense initiative” of the 1980s to the “space based Pearl Harbor” narratives of the 1990s to the terrorist “WMD” discourses of the 2000s as illustrations of a nuclear culture. In each of these cases, we can see how the bomb (as a consolidated form of existen- tial threat) has been good for Americans to think with, becoming the basis for building a nuclear state and a global military system but also for trans- forming raw military ambition into a necessary form of “defense.” b ut if the bomb has been crucial to constituting US “superpower” status, it has also produced a complex new domestic affective political domain, allowing images of, and appeals to, existential threat to become a central means of establishing and expanding a militarized national security culture. By 1961, US war planners sought to rationalize a vast set of military logics and capabilities into a comprehensive war plan—known as the s ingle Integrated Operating Plan or s IOP. The first plan, known as s IOP- 62, promised to reduce contingency and error, and to coordinate a US war machine that included bombers, submarines, and missiles deployed glob- ally, as well as a vast array of front line nuclear technologies, from nuclear cannons, to backpack bombs, to atomic land mines (see s agan 1987, b all and t oth 1990, and b urr 2004). The first s IOP had two options each involving a total assault on the communist block—preemptive war and retaliation. What is crucial to acknowledge today is that s IOP-62 was not a war plan in any traditional sense, rather it articulated in technologically feasible terms a total ending (see Keeney 2002, b urr 2005, r osenberg and Moor e 1981/1982). The preemptive option could be triggered by “signs” of an imminent Soviet attack. What constituted a definitive “sign” of such an attack however was left unstated, creating potential slippages between different organizations—the s trategic Air c ommand, the Navy, and the White House, for example—which might interpret Soviet actions differ - ently. American Cold War state and nation-building was also increasingly devoted to rehearsing a surprise attack on the US and to applying the worst-case scenario thinking as normative (Masco 2008). The preemptive option in s IOP-62 committed the full US arsenal in a simultaneous global nuclear strike, involving 3,200 nuclear weapons de- livered to 1,060 targets around the world. In short, it was a plan to elimi- nate “communism” from planet Earth within a few hours of nuclear war. It involved targets not only in the Soviet Union, but also c hina (not yet a nuclear power), and all of their allied states. In a few hours of nuclear war, hundreds of cities, and more than 500 million people would be destroyed, followed by millions more from radiation injuries. Not included in this cal- culation were nuclear counterstrikes or the environmental or climatic con- sequences of nuclear war, which would have magnified and spread these effects to all corners of the globe. The scale of destruction detailed in s IOP-62 is a distinctive moment in human history and is, in Kant’s strict technical sense of the term, sublime. It is beyond comprehension, which raises a crucial issue about how the nuclear state resolves such terror/complexity. In national security plan- ning, the compensation for this experience of cognitive overload was a fixation on command and control, as well as the articulation of specific war calculations, marking degrees of violence for different nuclear war scenarios (see Kahn 1960, Eden 2004). What would likely be an unknown chaos of missiles and bombs launched for the first time from a vast range of technologies, located all over the planet under deeply varied condi- tions, appears on paper as a rational program of cause and effect, threat and preemption, attack and counter attack. This was an apocalyptic vision presented simply as math. From 1962 until today, the s IOP nuclear war plan has been continually revised and rationalized for different global political contexts but never truly abandoned (McKinzie, c ochran, Norris, and Arkin 2001). The US maintains the ability to destroy all major popula- tion centers outside the continental US within a few minutes of nuclear conflict. It is important to recognize that this technical capacity to deliver overwhelming violence to any part of the world in mere minutes has relied on structures of the imagination as well as on machines, threat projections, and fantasies, as well as physics and engineering.

#### The impact is endless military intervention – apocalyptic fears colonize political deliberation

Masco 14 – Professor of Anthropology at the University of Chicago (Joseph, “Engineering the Future as Nuclear Ruin” Imperial Debris: On Ruins and Ruination, pp. 278-281)

Reclaiming the emotional history of the atomic bomb is crucial today, as nuclear fear has been amplified to enable a variety of political projects at precisely the moment American memory of the bomb has become impossibly blurred. In the United States, nuclear fear has recently been used to justify preemptive war and unlimited domestic surveillance, a worldwide system of secret prisons, and the practices of rendition, torture, and assassination. But what today do Americans actually know or remember of the bomb? We live not in the ruins produced by Soviet ICBMs, but rather in the emotional ruins of the Cold War as an intellectual and social project. The half-century-long project to install and articulate the nation through contemplating its violent end has colonized the present. The terrorist attacks on New York City and Washington in 2001 may have produced a political consensus that “the Cold War is over” and a formal declaration of a counterterrorism project.52 But American reactions to those attacks were structured by a multigenerational state project to harness the fear of mass death to divergent political and military industrial agendas. By evoking the image of the mushroom cloud to enable the invasion of Iraq, President George W. Bush appealed directly to citizens’ nuclear fear, a cultural product of the very Cold War nuclear stand-off he formally disavowed in inaugurating the new counterterrorist state. The mushroom-cloud imagery, as well as the totalizing immediacy of the threat in his presentation, worked to redeploy a cultural memory of apocalyptic nuclear threat (established during the four decades of the Soviet-American nuclear arms race) as part of the new “war on terror.” The new color-coded terrorist warning system (first proposed by Project East River in 1952 to deal with Soviet bombers) and the Homeland Security Administration’s transformation of shampoo bottles on planes into a totalizing threat are official efforts to install and regulate fear in everyday life.53 In this regard, the “war on terror” has been conducted largely as an emotional-management campaign in the United States, using the tropes and logics developed during the early Cold War to enable a new kind of American geopolitical project. The “war on terror” redirects but also reiterates the American assumptions about mass violence and democracy I have explored in this essay. If the September 11 attacks on New York and Washington felt strangely familiar to many U.S. citizens, it was because American society has been imaginatively rehearsing the destruction of these cities for over three generations: in the Civil Defense campaigns of the early and late Cold War, as well as in the Hollywood blockbusters of the 1990s, which destroyed these cities each summer with increasing nuance and detail. The genealogy of this form of entertainment is traumatic; it goes back to the specific way in which the United States entered the nuclear age with the atomic bombings of Hiroshima and Nagasaki, and to the specific propaganda campaigns informing nuclear threat throughout the Cold War. Indeed, the ease with which the 9/11 attacks were nationalized as part of a nuclear discourse by the second Bush administration has much to do with this legacy.54 Not coincidentally, the two graphic measures of nuclear blast damage most frequently used during the Cold War were the Pentagon and the New York City skyline.55 Figures 8.8 and 8.9, for example, are taken from the U.S. Atomic Energy Commission (aec) campaign to document the size of the first U.S. hydrogen bomb test from 1952. Fourteen true-to-scale versions of the Pentagon, identified by the aec as the largest building in the world, are placed inside the blast crater (the former Elugelab Island) to document its size, while the New York skyline is used to demonstrate the vast horizontal and vertical scope of the detonation. The events of 9/11 were easily nationalized and transformed into a nuclear discourse precisely because our security culture had imagined and rehearsed attacks on Washington and New York for generations, and because the specific symbols in the attacks—the Pentagon and the tallest building in the New York skyline—were also used by the nuclear state for three generations as part of its emotional-management strategy. The second Bush administration, in other words, mobilized a well-established logic of nuclear attack to pursue its policy objectives, translating discrete, nonnuclear threats into the emotional equivalent of the Cold War nuclear crisis. For a nation that constructs itself via discourses of ruination, it should not be a surprise to see the exportation of ruins on a global scale. As President Musharraf clearly understood, the “with us or against us” logics of the Bush administration in 2001 left no ambiguity about the costs of Pakistan not aligning with the sole global superpower. The threat to reduce Pakistan to a “Stone Age” ruin is the alternative, international deployment of nuclear fear, constituting a U.S. promise to reduce the country to a prenational, pre- technological state. Thus, the United States enters the twenty-first century as a nation both fascinated and traumatized by nuclear ruins. It transforms real and imagined mass death into a nationalized space, and supports a political culture that believes bombing campaigns can produce democracy abroad. It is simultaneously terrorized by nuclear weapons and threatens to use them. The U.S. military both wages preemptive war over nascent “weapons of mass destruction” programs and is preparing to build a new generation of U.S. nuclear weapons.56 American society is today neither “atomic bomb proof” nor capable of engaging nuclear technologies as a global problem of governance. Instead, U.S. citizens live today in the emotional residues of the Cold War nuclear arms race, which can only address them as fearful docile bodies. Thus, even in the twenty-first century, Americans remain caught between terror and fear, trapped in the psychosocial space defined by the once and future promise of nuclear ruins.

#### Vote neg to endorse non-utopian futures – only imagining politics outside of a “permanent crises” can produce meaningful governance

Masco 21 (Joseph, Professor of Anthropology and Social Sciences at the University of Chicago, Department Chair, The Future of Fallout, and Other Episodes in Radioactive World-Making, 2021, pp. 355-362, //mg)

The link between nuclear crisis and climate crisis is industrial agency: both of these existential dangers have been incrementally built over generations of labor in the pursuit of security. The nuclear complex is explicit in its goals, mobilizing the fear of mass destruction as the basis for U.S. security in a world of competing nation-states. A changing climate is the collective effect of human industrial activity, an accumulation of a vast set of petrochemical practices dispersed across regions that have made the global economy over time. These emergencies are thus infrastructural achievements of an American modernity, modes of endangerment that are the unwanted effects of modern military and industrial systems. Following Roitman’s (2014, 94) suggestion that crisis constitutes a “blind spot” that restricts narrative explanations as well as limiting the kind of actions that can be taken, we could interrogate here how crisis states have become lived infrastructures, linking imaginations, affects, and institutions in a kind of total social formation. The crisis in crisis from this point of view is the radical presentism of crisis talk, the focus on stabilizing a present condition rather than engaging the multiple temporalities at stake in a world of interlocking technological, financial, military, and ecological systems. As Jean-Luc Nancy argues in After Fukushima: “Fukushima is a powerfully exemplary event because it shows the close and brutal connections between a seismic quake, a dense population, and a nuclear installation (under inadequate management). It is also exemplary of a node of complex relationships between public power and private management of the installation, not to mention all the other chains of correlation that extend out from that starting point” (2015, 30). Put differently, there are no natural disasters any more, as the imbrication of technology, economy, and nature creates ever-emerging conditions for catastrophe, making crisis seem a permanent condition when it is in fact the effect of financial, technological, militaristic, and political processes interacting with earth systems. Crisis talk today seeks to stabilize an institution, practice, or reality rather than interrogating the historical conditions of possibility for that endangerment to occur. In our moment, crisis blocks thought by evoking the need for an emergency response to the potential loss of a status quo, emphasizing urgency and restoration over a review of first principles and historical ontologies. In an era of complex interlocking systems of finance, technology, militarism, and ecology, unanticipated effects are inevitable and often cascading processes. In light of a post–welfare state attitude of crisis management, one that does not protect citizens but rather seeks to restore the conditions from which crisis emerged, there is much attention today to precarity as the very condition for living. Precarity and resilience are the twin logics of a neoliberal order that abandons populations in pursuit of profit and then seeks to naturalize those abandonments as the only possible course of action (see Evans and Reid 2014). Put directly, crisis talk without a commitment to revolution becomes counterrevolutionary. With this in mind, how can we interrogate the blind spots informing nuclear crisis and climate crisis today? Despite the end of the Cold War, and the widespread politicization of weapons of mass destruction under the terms of the War on Terror (Masco 2014), the U.S. Department of Energy (2018) is currently planning to rebuild the U.S. nuclear complex over the next thirty years under the banner of modernization. This plan involves the first entirely new weapons designs since the 1980s, part of a strategic effort to create a nuclear arsenal and production complex that can last through the twenty-first century. These weapon systems will be less complicated mechanically and more robust than the Cold War designs in the current arsenal (which have been painstaking maintained part by part now for over two decades). They will also employ a new generation of weapons scientists through midcentury. These new warheads will not have to be detonated, as did all prior weapons systems, before being deployed into U.S. military arsenals thanks to the last twenty years of nuclear weapons research involving component testing, supercomputing, and simulations (see Masco 2006). The promise of the virtual weapons laboratory now points to a permanent nuclear production capacity in the U.S., one that can maintain a nuclear test ban while also introducing new and improved nuclear weapons. As a doe programmatic report to Congress declares, “By 2038, a new generation of weapons designers, code developers, experimentalists, and design and production engineers must demonstrate an understanding of nuclear weapons functionality using more predictive and more precisely calibrated computer-aided design and assessment tools than are possible today. High-fidelity experimental capabilities will produce quantitative data that preclude resumption of underground nuclear testing” (2013, 1–6). This commitment to building new nuclear weapons should place the recent U.S. wars over weapons of mass destruction—both real and imagined— in a new light. In the twenty-first century, the role of treaties in managing nuclear proliferation is also breaking down, an intentional dismantling of one of the key peaceful mechanisms for defusing global conflict. Both the George W. Bush and Donald J. Trump administrations have committed to undoing decades of international nuclear policy by removing the United States from nuclear treaties, including the 1972 Anti-Ballistic Missile Treaty (withdrawn in 2002) and the 1987 Intermediate-Range Nuclear Forces Treaty (withdrawn in 2019), while allowing the 2010 Strategic Arms Reduction Treaty to lapse in 2021. Indeed, even Obama-administration calls for a nuclear-free world were also linked to a multitrillion-dollar commitment over the coming decades in a new U.S. nuclear complex (Wolfsthal, Lewis, and Quint 2014). The nuclear arsenal is being redesigned for a deep future and is gaining new capacities for nuclear war fighting (including warheads, missiles, and lower-yield weapons that are designed for field use, not deterrence; see U.S. Department of Energy 2018). This makes U.S. policy, after seventy-five years of nuclear nationalism and existential danger, a paradoxical program of promising global nuclear disarmament through rebuilding a state-of- the- art U.S. nuclear production complex (see figure 17.5), including the production of entirely new classes of nuclear weapons (see figure 17.6). The crisis in crisis here is the automated renewal of an infrastructure that will necessarily encourage current and future nuclear powers to pursue their own nuclear programs and undercut the collective goal of creating a world incapable of nuclear war. This program also reinvigorates nuclear fear as the coordinating logic of American geopolitics. The doe National Nuclear Security Administration (nnsa) has turned aging nuclear weapons and experts into a crisis requiring immediate action rather than interrogating and building a new collective security for a post–Cold War, post–War on Terror world. Alongside a new generation of nuclear experts and weapons, future nuclear emergencies are being built into these programs. The U.S. nuclear production complex is approaching a moment unconstrained by arms control treaties for the first time in a half century with a vast agenda for new technologies, creating the terms of an entirely new kind of arms race in the twenty-first century. 5 The governance of a warming planet has also been thoroughly politicized in the United States, a victim of national security politics (see Masco 2010) and petrochemical industry propaganda (see Oreskes and Conway 2010). Not coincidentally, the George W. Bush administration loosened regulatory rules for domestic shale oil and gas extraction in 2005 (exempting it from the Clean Air Act, the Clean Water Act, and the Safe Drinking Water Act), which, in combination with technological breakthroughs in drilling technology, opened up several large domestic shale formations for immediate exploitation. The Deepwater Horizon oil spill (2010) in the Gulf—alongside Hurricane Katrina (2005), the Fukushima Daiichi nuclear meltdown (2011), and superstorm Sandy (2012)—demonstrated the vulnerability of complex natural-technological- social systems and the near impossibility of environmental remediation. The boom in hydraulic fracturing has allowed the United States to increase its oil production massively even as climate scientists describe in ever-greater detail the collective environmental costs of such extraction for ice caps, atmospheric chemistry, climate, and public health. In its article “The Economics of Shale Oil,” the Economist (2014) reveals that the U.S. moved from producing 600,000 barrels a day in 2008 to 3.5 million a day in 2014 because of shale oil extraction (see figure 17.7). The Economist focuses on the shifting geopolitics of renewed American oil power but does not mention the consequences for the global environment of abundant, inexpensive oil. As of 2020, the U.S. became the world’s leading oil producer—the number one petro-state— at precisely the moment when the damage of such an achievement has been scientifically documented across the earth sciences. Since 2005, a vast new infrastructure of wells, pipes, and ponds, as well as truck and train lines carrying oil and natural gas has been built to exploit shale formations from Texas to North Dakota to Pennsylvania. In addition to greenhouse gas emissions, these infrastructures require vast amounts of water, create waste ponds, and also leak, raising important questions about the environmental safety of these areas over the projected life of each well and into the future. New York State banned hydraulic fracturing because of the long list of unknown effects on water, air, and public health (New York Department of Health 2014), while in Texas and North Dakota there are boom-and- bust towns devoted entirely to the enterprise, and vast landscapes now covered with industrial infrastructures that produce both energy and radically uncertain environmental futures. 6 The deregulation of hydraulic fracturing has made petrochemical energy inexpensive and abundant by historical standards at precisely the moment when it would be most socially and environmentally sound to make it ever more expensive. If the neoliberal logics of market determinism were good at engineering a sustainable collective future, the U.S. would not be embracing shale with such unrestrained enthusiasm. The ever-shorter profit cycle of corporate review, in other words, is diametrically opposed to the long-term investments in renewable energy, installing the perfect terms for ongoing environmental and health crises as far into the future as anyone can imagine. Thus, one aspect of the crisis in crisis today is a notion of profit that has been so narrowly defined that a loss of the collective environment is easier to imagine than a shift in the nature of petrochemical capitalism. Instead of reenergizing a collective imaginary that can engage alternative modes of living and apply resources and agency to collective problems, governance today recommits to exactly those existentially dangerous projects that should be formally disavowed for the public good: nuclear weapons and oil. This creates a public feeling of permanent crisis as well as increasing vulnerabilities across a range of domestic and global issues. One perverse effect of this twenty-first- century circuit is that it encourages social theorists to focus narrowly on the endless modes of precarity that are emerging rather than articulating the alternative futures that are needed, reinforcing a generational gestalt of political gridlock and decline in the United States. It is vitally important to understand how cumulative and asymmetrically distributed industrial toxins (from carbon to plastic to nuclear materials) affect communities and individual bodies, and to articulate the ways that planetary-scale fallouts are now differentially remaking local conditions. The age of neoliberal calculation is one that naturalizes the abandonment of populations that are not immediately useful to the quarterly bottom line and renders invisible those many others affected remotely by financial, military, or industrial policies (see Lorey 2015). It is also important to interrogate the affective recruitments to existential crisis and the political work such recruitments do in supporting existing political structures (Masco 2014). However, it is equally important to recover the capacity to generate positive futurities—what, following Lauren Berlant (2011) we might call the not-yet- cruel optimisms—that can affectively charge collective action, particularly on those issues (like nuclear danger and climate danger) that have been constructed by generations of human agency, and thus are immediately available to reform. At the end of World War II, the U.S. embraced a new kind of technological utopianism, believing that science would solve the problems of health, welfare, and security. Designing the future for both security and prosperity was the role of the state, allowing significant investments in education, welfare state systems, and the establishment of a variety of environmental protection laws. Indeed, this mid-twentieth- century period of crisis is the moment when many of the key infrastructures and generational investments in education and environmental protections were established that inform the world today. Thus, the most dangerous moment in American history was from this point of view also one of the most productive, creating important commitments to civil rights, education, and the environment while establishing the precedents for international law and treaties to manage existential dangers. Since the 1980s neoliberal turn in the United States, militarism has remained the project of the state, but the collective future has been assigned to the marketplace, which elevates short-term profitability above all other concerns. What happened to the once-vibrant social debate about alternative futures and the commitment to making long-term investments in improving the terms of collective life? The force of global capital has absorbed the power of crisis talk to shock, and thus mobilize, requiring a different call to action. The crisis in crisis today is the inability for American subjects to both witness the accumulating damage of this system and imagine another politics. A fundamental challenge today is that the key existential dangers of the twenty-first century— nuclear weapons and climate disruption—operate on different scales, creating friction between the global and the planetary while demanding different kinds of governance to deal with accruing fallout. Since we do not yet have planetary-scale institutions that can govern these collective problems, it is easy to focus on the emerging and amplifying forms of precarity. Instead of a more aggressive media space devoted to detailing the current and projected crises, then, perhaps what our specific historical moment requires is an explicit commitment—a critical theory commitment—to generating the nonutopian but nonetheless positive futurities that can reactivate the world-making powers of society.

### Case

**Probability – 0.1% chance of a collision.**

**Salter 16** [(Alexander William, Economics Professor at Texas Tech) “SPACE DEBRIS: A LAW AND ECONOMICS ANALYSIS OF THE ORBITAL COMMONS” 19 STAN. TECH. L. REV. 221 \*numbers replaced with English words] TDI

The probability of a collision is currently low. Bradley and Wein estimate that the maximum probability in LEO of a collision over the lifetime of a spacecraft remains below one in one thousand, conditional on continued compliance with NASA’s deorbiting guidelines.3 However, the possibility of a future “snowballing” effect, whereby debris collides with other objects, further congesting orbit space, remains a significant concern.4 Levin and Carroll estimate the average immediate destruction of wealth created by a collision to be approximately $30 million, with an additional $200 million in damages to all currently existing space assets from the debris created by the initial collision.5 The expected value of destroyed wealth because of collisions, currently small because of the low probability of a collision, can quickly become significant if future collisions result in runaway debris growth.

**Time frame – Kessler effect 200 years away**

**Stubbe 17** [(Peter, PhD in law @ Johann Wolfgang Goethe University Frankfurt) “State Accountability for Space Debris: A Legal Study of Responsibility for Polluting the Space Environment and Liability for Damage Caused by Space Debris,” Koninklijke Brill Publishing, ISBN 978-90-04-31407-8, p. 27-31] TDI

The prediction of possible scenarios of the future evolution of the debris p o p ulation involves many uncertainties. Long-term forecasting means the prediction of the evolution of the future debris environment in time periods of decades or even centuries. Predictions are based on models84 that work with certain assumptions, and altering these parameters significantly influences the outcomes of the predictions. Assumptions on the future space traffic and on the initial object environment are particularly critical to the results of modeling efforts.85 A well-known pattern for the evolution of the debris population is the so-called Kessler effect’, which assumes that there is a certain collision probability among space objects because many satellites operate in similar orbital regions. These collisions create fragments, and thus additional objects in the respective orbits, which in turn enhances the risk of further collisions. Consequently, the num ber of objects and collisions increases exponentially and eventually results in the formation of a self-sustaining debris belt aroundthe Earth. While it has long been assumed that such a process of collisional cascading is likely to occur only in a very long-term perspective (meaning a time 1 n of several hundred years),87 a consensus has evolved in recent years that an uncontrolled growth of the debris population in certain altitudes could become reality much sooner.88 In fact, a recent cooperative study undertaken by various space agencies in the scope of i a d c shows that the current l e o debris population is unstable, even if current mitigation measures are applied. The study concludes:

Even with a 90% implementation of the commonly-adopted mitigation measures [...] the l e o debris population is expected to increase by an average of 30% in the next 200 years. The population growth is primarily driven by catastrophic collisions between 700 and 1000 km altitudes and such collisions are likely to occur every 5 to 9 years.89

#### No credible scenario for extinction—outdated fringe science and well-meaning threat inflation

Scouras 19 [(James Scouras, Johns Hopkins University Applied Physics Laboratory, formerly served on the congressionally established Comission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack) “Nuclear War as a Global Catastrophic Risk,” footnotes 2 and 4 included, Cambridge Core, September 2, 2019, <https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/nuclear-war-as-a-global-catastrophic-risk/EC726528F3A71ED5ED26307677960962>] TDI

It might be thought that we know enough about the risk of nuclear war to appropriately manage that risk. The consequences of unconstrained nuclear attacks, and the counterattacks that would occur until the major nuclear powers exhaust their arsenals, would far exceed any cataclysm humanity has suffered in all of recorded history. The likelihood of such a war must, therefore, be reduced as much as possible. But this rather simplistic logic raises many questions and does not withstand close scrutiny. Regarding consequences, does unconstrained nuclear war pose an existential risk to humanity? The consequences of existential risks are truly incalculable, including the lives not only of all human beings currently living but also of all those yet to come; involving not only Homo sapiens but all species that may descend from it. At the opposite end of the spectrum of consequences lies the domain of “limited” nuclear wars. Are these also properly considered global catastrophes? After all, while the only nuclear war that has ever occurred devastated Hiroshima and Nagasaki, it was also instrumental in bringing about the end of the Pacific War, thereby saving lives that would have been lost in the planned invasion of Japan. Indeed, some scholars similarly argue that many lives have been saved over the nearly threefourths of a century since the advent of nuclear weapons because those weapons have prevented the large conventional wars that otherwise would likely have occurred between the major powers. This is perhaps the most significant consequence of the attacks that devastated the two Japanese cities. Regarding likelihood, how do we know what the likelihood of nuclear war is and the degree to which our national policies affect that likelihood, for better or worse? How much confidence should we place in any assessment of likelihood? What levels of likelihood for the broad spectrum of possible consequences pose unacceptable levels of risk? Even a very low (nondecreasing) annual likelihood of the risk of nuclear war would result in near certainty of catastrophe over the course of enough years. Most fundamentally and counterintuitively, are we really sure we want to reduce the risk of nuclear war? The successful operation of deterrence, which has been credited – perhaps too generously – with preventing nuclear war during the Cold War and its aftermath, depends on the risk that any nuclear use might escalate to a nuclear holocaust. Many proposals for reducing risk focus on reducing nuclear weapon arsenals and, therefore, the possible consequences of the most extreme nuclear war. Yet, if we reduce the consequences of nuclear war, might we also inadvertently increase its likelihood? It’s not at all clear that would be a desirable trade-off. This is all to argue that the simplistic logic described above is inadequate, even dangerous. A more nuanced understanding of the risk of nuclear war is imperative. This paper thus attempts to establish a basis for more rigorously addressing the risk of nuclear war. Rather than trying to assess the risk, a daunting objective, its more modest goals include increasing the awareness of the complexities involved in addressing this topic and evaluating alternative measures proposed for managing nuclear risk. I begin with a clarification of why nuclear war is a global catastrophic risk but not an existential risk. Turning to the issue of risk assessment, I then present a variety of assessments by academics and statesmen of the likelihood component of the risk of nuclear war, followed by an overview of what we do and do not know about the consequences of nuclear war, emphasizing uncertainty in both factors. Then, I discuss the difficulties in determining the effects of risk mitigation policies, focusing on nuclear arms reduction. Finally, I address the question of whether nuclear weapons have indeed saved lives. I conclude with recommendations for national security policy and multidisciplinary research. 2 Why is nuclear war a global catastrophic risk? One needs to only view the pictures of Hiroshima and Nagasaki shown in figure 1 and imagine such devastation visited on thousands of cities across warring nations in both hemispheres to recognize that nuclear war is truly a global catastrophic risk. Moreover, many of today’s nuclear weapons are an order of magnitude more destructive than Little Boy and Fat Man, and there are many other significant consequences – prompt radiation, fallout, etc. – not visible in such photographs. Yet, it is also true that not all nuclear wars would be so catastrophic; some, perhaps involving electromagnetic pulse (EMP) attacks 2 Many mistakenly believe that the congressionally established Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack concluded that an EMP attack would, indeed, be catastrophic to electronic systems and consequently to people and societies that vitally depend on those systems. However, the conclusion of the commission, on whose staff I served, was only that such a catastrophe could, not would, result from an EMP attack. Its executive report states, for example, that “the damage level could be sufficient to be catastrophic to the Nation.” See www.empcommision.org for publicly available reports from the EMP Commission. See also Frankel et al., (2015).2 using only a few high-altitude detonations or demonstration strikes of various kinds, could result in few casualties. Others, such as a war between Israel and one of its potential future nuclear neighbors, might be regionally devastating but have limited global impact, at least if we limit our consideration to direct and immediate physical consequences. Nevertheless, smaller nuclear wars need to be included in any analysis of nuclear war as a global catastrophic risk because they increase the likelihood of larger nuclear wars. This is precisely why the nuclear taboo is so precious and crossing the nuclear threshold into uncharted territory is so dangerous (Schelling, 2005; see also Tannenwald, 2007). While it is clear that nuclear war is a global catastrophic risk, it is also clear that it is not an existential risk. Yet over the course of the nuclear age, a series of mechanisms have been proposed that, it has been erroneously argued, could lead to human extinction. The first concern3 arose among physicists on the Manhattan Project during a 1942 seminar at Berkeley some three years before the first test of an atomic weapon. Chaired by Robert Oppenheimer, it was attended by Edward Teller, Hans Bethe, Emil Konopinski, and other theoretical physicists (Rhodes, 1995). They considered the possibility that detonation of an atomic bomb could ignite a self-sustaining nitrogen fusion reaction that might propagate through earth’s atmosphere, thereby extinguishing all air-breathing life on earth. Konopinski, Cloyd Margin, and Teller eventually published the calculations that led to the conclusion that the nitrogen-nitrogen reaction was virtually impossible from atomic bomb explosions – calculations that had previously been used to justify going forward with Trinity, the first atomic bomb test (Konopinski et al., 1946). Of course, the Trinity test was conducted, as well as over 1000 subsequent atomic and thermonuclear tests, and we are fortunately still here. After the bomb was used, extinction fear focused on invisible and deadly fallout, unanticipated as a significant consequence of the bombings of Japan that would spread by global air currents to poison the entire planet. Public dread was reinforced by the depressing, but influential, 1957 novel On the Beach by Nevil Shute (1957) and the subsequent 1959 movie version (Kramer, 1959). The story describes survivors in Melbourne, Australia, one of a few remaining human outposts in the Southern Hemisphere, as fallout clouds approached to bring the final blow to humanity. In the 1970s, after fallout was better understood to be limited in space, time, and magnitude, depletion of the ozone layer, which would cause increased ultraviolet radiation to fry all humans who dared to venture outside, became the extinction mechanism of concern. Again, one popular book, The Fate of the Earth by Jonathan Schell (1982), which described the nuclear destruction of the ozone layer leaving the earth “a republic of insects and grass,” promoted this fear. Schell did at times try to cover all bases, however: “To say that human extinction is a certainty would, of course, be a misrepresentation – just as it would be a misrepresentation to say that extinction can be ruled out” (Schell, 1982). Finally, the current mechanism of concern for extinction is nuclear winter, the phenomenon by which dust and soot created primarily by the burning of cities would rise to the stratosphere and attenuate sunlight such that surface temperatures would decline dramatically, agriculture would fail, and humans and other animals would perish from famine. The public first learned of the possibility of nuclear winter in a Parade article by Sagan (1983), published a month or so before its scientific counterpart by Turco et al. (1983). While some nuclear disarmament advocates promote the idea that nuclear winter is an extinction threat, and the general public is probably confused to the extent it is not disinterested, few scientists seem to consider it an extinction threat. It is understandable that some of these extinction fears were created by ignorance or uncertainty and treated seriously by worst-case thinking, as seems appropriate for threats of extinction. But nuclear doom mongering also seems to be at play for some of these episodes. For some reason, portions of the public active in nuclear issues, as well as some scientists, appear to think that arguments for nuclear arms reductions or elimination will be more persuasive if nuclear war is believed to threaten extinction, rather than merely the horrific cataclysm that it would be in reality (Martin, 1982). 4 As summarized by Martin, “The idea that global nuclear war could kill most or all of the world’s population is critically examined and found to have little or no scientific basis.” Martin also critiques possible reasons for beliefs or professed beliefs about nuclear extinction, including exaggeration to stimulate action.4 To summarize, nuclear war is a global catastrophic risk. Such wars may cause billions of deaths and unfathomable suffering, as well set civilization back centuries. Smaller nuclear wars pose regional catastrophic risks and also national risks in that the continued functioning of, for example, the United States as a constitutional republic is highly dubious after even a relatively limited nuclear attack. But what nuclear war is not is an existential risk to the human race. There is simply no credible scenario in which humans do not survive to repopulate the earth.