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#### Counterplan text: The Committee on the Peaceful use of Outer Space ought to

#### establish an application system for property rights on celestial bodies. Applications and approval of property rights should be granted upon the condition of

#### open disclosure of data gathered in the exploration of a celestial body

#### Applications must be publicly announced

#### Property Rights will be made tradeable between private entities

#### Property Rights will be set to expire on the conclusion of a successful extraction mission

#### Private Entities will only be allowed one property right grant per celestial body and cannot have more than one grant at a time

#### Ban the militarization of outer space

#### The counterplan establishes international norms for safe extraction of resources on celestial bodies while increasing R&D in outer space.

**Steffen 21** [Olaf Steffen, Olaf is a scientist at the Institute of Composite Structures and Adaptive Sytems at the German Aerospace Center. 12-2-2021, "Explore to Exploit: A Data-Centred Approach to Space Mining Regulation," Institute of Composite Structures and Adaptive Systems, German Aerospace Center, [https://www.sciencedirect.com/science/article/pii/S0265964621000515 accessed 12/12/21](https://www.sciencedirect.com/science/article/pii/S0265964621000515%20accessed%2012/12/21)] Adam

4. The data-centred approach to space mining regulation

4.1. Core description of the regulatory regime and mining rights acquisition process

The data gathered in the exploration of a [celestial body](https://www.sciencedirect.com/topics/social-sciences/astronomical-systems) is not only of value for space mining companies for informing them whether, where and how to exploit resources from the body in question, but also for science. The irretrievability of information relating to the solar system contained in the body that will be lost during resource exploitation carries a value for humanity and future generations and can thus be assigned the characteristic of a common heritage for all mankind as invoked in the Moon Agreement. This characteristic makes exploration data an exceptional and unique candidate for use in a mechanism for acquiring mining rights because its preservation is of public interest and its disclosure in exchange for exclusive mining rights does not place any additional burden on the mining company. The following principles would form the cornerstones of the proposed regulatory regime and rights acquisition mechanism based on exploration data:

Without preconditions, no entity has a right to mine the resources of a celestial body.

An international regulatory body administers the existing rights of companies for mining a specific celestial body.

Mining rights to such bodies can be applied for from this international regulatory body, with applications made public. The application expires after a pre-set period.

Mining rights are granted on the provision and disclosure of exploration data on the celestial body within the pre-set period, proposedly gathered in situ, characterising this body and its resources in a pre-defined manner.

The explorer's mining right to the resources of the celestial body is published by the regulatory body in a mining rights grant.

The data concerning the celestial body are made public as part of the rights grant within the domain of all participating members of the regulatory regime.

The exclusive mining rights to any specific body are tradeable.

The scope of the regulatory body with respect to the granting of mining rights is not revenue-oriented.

The international regulatory body would thus act as a curator of a rights register and an attached database of exploration data. The concept is superficially comparable to patent law, where exclusive rights are granted following the disclosure of an invention to incentivise the efforts made in the development process. In the following section, the characteristics of such a regulatory regime are further discussed with respect to the formation of [monopolies](https://www.sciencedirect.com/topics/social-sciences/monopolies), market dynamics, conflict avoidance, inclusivity towards less developed countries and the viability of implementation.

4.2. Discussion and means of implementation

The proposed regulatory mechanism has advantages both from a business/investor and society perspective. First, it prevents already highly capitalised companies from acquiring exploitation rights in bulk to deny competitors those objects that are easiest to exploit or most valuable, which would otherwise be possible in any kind of pay-for-right mechanism and could result in preventing market access to smaller, emerging companies. Thus, early monopoly formation can be avoided.

The use of data disclosure for the granting of mining rights ensures the scientific community has access to this invaluable source of information. In this way, space mining prospecting missions can lead to a boost in research on small celestial bodies at a speed unmatchable by pure government/agency funded science probes. This usefulness to the scientific community could lead to sustained partnerships between prospecting companies and scientific institutions and could even provide a source of funding for the companies through R&D grants and public-private partnerships. The results of the exploration efforts contribute to research on the formation of planets and the history of the solar system and provide valuable insight for space defence against asteroids. The transition of exploration from a tailored mission profile with a purpose-built spacecraft to a standard task in space flight would also lead to a cost reduction of the respective exploration spacecraft through [economies of scale](https://www.sciencedirect.com/topics/social-sciences/economies-of-scale). This describes the very benefits Elvis [[24](https://www.sciencedirect.com/science/article/pii/S0265964621000515" \l "bib24)] and Crawford [[25](https://www.sciencedirect.com/science/article/pii/S0265964621000515" \l "bib25)] imagined as possible effects of a space economy. Thus, there is an immediate return for society from the exploitation rights grant. It also reconciles the adverse interests of space development and [space science](https://www.sciencedirect.com/topics/social-sciences/space-sciences) as laid out by Schwartz [[26](https://www.sciencedirect.com/science/article/pii/S0265964621000515" \l "bib26)]. It ensures that, by exploitation, information contained in celestial bodies is not lost for future generations.The application period should not be set in a manner that creates a situation that can be abused through the potential for stockpiling inventory rights. Rather, it is intended to prevent conflict in the phase before exploration data gathered by a mission, as a prerequisite to the mining rights grant, is available. In other words, only one exploration effort at a time can be permitted for a specific body. The time frame between the application and the granting of mining rights (meaning: availability of the required exploration data set) should be tight and should only consider necessary exploration time on site, transit time and possibly a reasonable launch preparation and data processing markup. These contributors to the application period make it clear that the time frame could be dynamic and individualistic, depending on the exploration target (transit time and duration of exploration) and the technology of the exploration probe (transit time). After the expiration of the application period, applications for the exploration target would again be permissible. To prevent the previously mentioned stockpiling of inventory rights, credible proof of an imminent exploration intention would need to be part of the application process, for example, a fixed launch contract or the advanced build status of the exploration probe. Such a mechanism would not contradict the statement in the OST that outer space shall be free for both exploration and scientific investigation. Applications would not apply to purely scientific exploration. An application would only be necessary as a prerequisite for mining. Even resource prospecting could take place without an application (for whatever reason), with a subsequent application comprising in situ data already gathered. For such cases, the application process would need to provide a short period for objections to enable the secretive explorer to make their efforts public. The publication of the application for the mining rights, which is nothing more than a statement of intention to explore, thus provides a strong measure for avoiding conflict.

The transparency of where exploration spacecraft are located and, at a later stage, where mining activities take place, provides additional benefits for the sustainable use of space, trust building and deterrence against malign misuse of mining technology. Involuntary spacecraft collisions of competitors in deep space are prevented by the reduction of exploration efforts at the same destination through the application for mining rights by one applicant at a time. As pointed out by Newman and Williamson [[20](https://www.sciencedirect.com/science/article/pii/S0265964621000515" \l "bib20)], this is relevant because space debris does not de-orbit in deep space as in the case of LEO. Deep space may be vast, but the velocities involved mean that small debris particles are no less dangerous. Considering NEO mining with fleets of small spacecraft, malfunctions and/or destructive events could create debris clouds crossing Earth's orbit around the sun on a regular basis, presenting another danger to satellites in Earth's own orbit. Thus, by effectively preventing the collision of two spacecraft, one source of debris creation can be mitigated through this regulation mechanism. With respect to Deudney's [[11](https://www.sciencedirect.com/science/article/pii/S0265964621000515" \l "bib11)] scepticism of asteroid mining and the dual-use character of technology to manipulate orbits of celestial bodies, it has to be stated that this potential is truly inherent to asteroid mining. An asteroid redirect mission for scientific purposes was pursued by NASA [[49](https://www.sciencedirect.com/science/article/pii/S0265964621000515" \l "bib49)] before reorientation towards a manned lunar mission. In one way or another, each type of asteroid mining will require the delivery of the targeted resource to a destination via a comparable technology as formerly envisioned by NASA, be it as a raw material or a useable resource processed in situ, even if this is not necessarily done through redirecting the whole asteroid and placing it in a lunar orbit. However, to be misused as a weapon, space mined resources would have to surpass a certain mass threshold to survive atmospheric entry at the target. This seems unfeasible for currently discussed mining concepts using small-scale spacecraft as described in this article. Redirecting larger masses or whole asteroids would require far more powerful mining vessels or small amounts of thrust over long periods of time. The continuous, (for a mining activity) untypical change in the orbit of an asteroid would make a redirect attempt with hostile intent easily identifiable, effectively deterring such an activity in the first place by ensuring the identification of the aggressor long before the projectile hits its target. The proposed database would provide a catalogue of asteroids with exploration and mining activities in place that should be tracked more closely because of their interaction with spacecraft. This would, in fact, be necessary per se as a precaution to avoid catastrophic mishaps, such as the accidental change of a NEO's orbit to intercept Earth by changing its mass through mining.

#### Space mining fails now due to profitability and unsafe tech which only the cp solves

**Steffen 21** [Olaf Steffen, Olaf is a scientist at the Institute of Composite Structures and Adaptive Sytems at the German Aerospace Center. 12-2-2021, "Explore to Exploit: A Data-Centred Approach to Space Mining Regulation," Institute of Composite Structures and Adaptive Systems, German Aerospace Center, [https://www.sciencedirect.com/science/article/pii/S0265964621000515 accessed 12/12/21](https://www.sciencedirect.com/science/article/pii/S0265964621000515%20accessed%2012/12/21)] Adam

* answers timeframe deficits
* creates solvency vs inequality/developing nation affs

The data-driven mechanism also addresses another potential risk of an emerging space-based resource economy: the reinforcing of the incontestable market positions of the market leaders based on an advantage in knowledge unattainable by new competitors. Explorations of celestial bodies will have a likelihood of failing from the perspective of the actual value of the explored object vs. the expected value. In this case, the costs of exploration would be a loss for the company, which could be significant and possibly ruinous considering the budgets needed for contemporary space agency-led exploration missions. Sanchez and McInnes [[5](https://www.sciencedirect.com/science/article/pii/S0265964621000515" \l "bib5)] explicitly mention the uncertainties in object distribution models used in their asteroid distribution study and for the conclusions drawn concerning reachable object masses with certain delta-v capabilities of spacecraft. With an increasing number of exploration missions led by a company, the data collected may lead to better in-house models and a higher probability of exploring the ‘right’ body for the value/resources aimed at. This may even provide information on the best spacecraft designs for matching the targeted objects’ orbit distribution. This risk is known from the digital platform economy, where the companies that are now leading have an uncatchable advantage in user data compared with market newcomers, translatable to a more refined and comfortable user experience, attracting additional users and thus offering superior services to business customers. This also holds true for space mining companies. Through their lack of legacy mission data, market newcomers would have a higher risk of misallocating exploration missions, making investments in those companies riskier than in established companies. To avoid the preferred investment in a single or a few companies, the risk of the investment in emerging companies is reduced by the proposed mechanism by ensuring the equal access to data for market newcomers and established companies alike. From a prospecting risk perspective, the market entrance of a new company becomes progressively less risky for investors with increasing amounts of publicly available exploration data, promoting progressive and dynamic development.

The long lead times of asteroid mining ventures coincide with a long time frame for an ROI. The exclusive mining rights granted after the exploration phase give investors security half-way into their space mining endeavours. The proposed tradability of the rights offers an early chance of gaining investment proceeds. It also offers the possibility of new business models: the classical asteroid mining system concept, as shown by Andrews et al. [[43](https://www.sciencedirect.com/science/article/pii/S0265964621000515" \l "bib43)], for example, covers exploration, exploitation and resource transfer. This maximises the investment needed to develop the technologies required for the entire process chain. Giving exploration a value could lead to a division of labour. Dedicated prospecting companies could emerge, providing mining companies with the data and mining rights to a body with the specific resource profile they are seeking. In this way, the investment needed for a successful mining endeavour is divided between different specialised companies. This considerably reduces the risk for investors as well as the investment needed for a company to meet their business goals, which are now aimed at just a particular part of the overall space mining endeavour. Third-party applications for mining rights should be possible to allow a mining company to subcontract to exploration companies. Such a regulatory mechanism design would also be more easily inclusive of less developed countries. They could simply contract exploration missions made affordable through economies of scale to become part of the emerging space mining economy as holders of tradeable mining rights. Through a wise selection of such missions’ targets, they could gain powerful positions of influence.

#### Unregulated mining of asteroids triggers space conflicts

Thompson ’16 [Clive, Writer for Wired, “Space Mining Could Set Off a Star War”, *Wired*, 01/14/2016, <https://www.wired.com/2016/01/clive-thompson-11/>]

SPACE IS LOUSY with profits. Consider the asteroid Ryugu: It’s made of so many tons of nickel, iron, cobalt, and water, it’s worth an estimated $95 billion. Venture into deeper space and there’s even richer plunder—like Davida, an asteroid that the wanna-be space mining company Planetary Resources values at more than $100 trillion. That’s more than five times the GDP of the US. These jaw-dropping payloads are why extraterrestrial mining is becoming an increasingly serious endeavor. Companies like Planetary Resources, backed by the likes of Googlers Larry Page and Eric Schmidt, are already launching satellites to scan for the most promising asteroids. Space experts say some firm could be ready to launch a mission within 10 years. But are they allowed to? Of course, anyone can reach an asteroid—NASA already has. But can you own one? Let’s start with existing space law. The big one on the books is the 1967 Outer Space Treaty. Ratified by 103 countries, including the spacefaring ones, it prohibits anyone from “appropriating” territory in space. (There’s an even more restrictive 1979 Moon Treaty as well, but the spacegoing countries haven’t signed, so it’s probably less relevant.) The upshot, most space-law scholars agree, is that nobody can claim a celestial body for their own. But what about just extracting resources and bringing them home? The issue hasn’t been litigated, but extraction is probably legally OK. Indeed, there’s precedent: The US brought 842 pounds of rocks back from the moon, and they’re designated as property of the US. No other country has disputed that ownership; in fact, the US and USSR traded moon rocks and regolith. “Russia has even sold some commercially,” says James Dunstan, a spacelaw expert with the Mobius Legal Group. The big wrinkle may not be whether it’s legal to mine an asteroid but how to figure out who has permission and who owns what claims. The US has no agency or process to issue licenses for space mining. “The politics can’t be known, but there will be politics,” says Joanne Gabrynowicz, a spacelaw expert at the University of Mississippi. Licenses give clarity not only to would-be miners but also to investors and governments starting their own operations. “If you don’t have that license, the investors are taking a big chance,” she says. The US is now drawing up a law. Problem is, it’s unilateral and incomplete. The Commercial Space Launch Competitiveness Act of 2015 says citizens can “possess, own, transport, use, and sell” an asteroid resource once they obtain it. But the bill doesn’t establish an agency or process for issuing licenses. Worse, it says your ownership claim begins as soon as you detect the existence of metals on an asteroid. You don’t even have to plant a flag. But what if China and Russia have different ideas—and different laws for their own citizens? Commercial activity in distant space could easily cause seething international strife here on our home planet. Luckily, there are precedents for working together. When satellites became big business in the 1960s, the major industrialized countries decided to use a multistate body—the International Telecommunication Union—to approve the orbits. It’s almost like domain-name registration. Fully 193 countries abide by these rules. Something similar could work for asteroid mining: an international body with local laws written in sync. Or, says Dunstan, countries could adopt bilateral agreements to recognize each other’s legislation and then build treaties. There’s a chance the spacefaring nations could get this right. I hope they do. Otherwise it’ll be Star Wars for real—with trillions in nickel and cobalt in the balance.

#### That goes nuclear

Grego ’18 [Laura, Senior Scientist in the Global Security Program at the Union of Concerned Scientists, Postdoctoral Researcher at the Harvard-Smithsonian Center for Astrophysics, PhD in Experimental Physics at the California Institute of Technology, Space and Crisis Stability, Union of Concerned Scientists, 3-19-18, <https://www.law.upenn.edu/live/files/7804-grego-space-and-crisis-stabilitypdf>]

Why space is a particular problem for crisis stability For a number of reasons, space poses particular challenges in preventing a crisis from starting or from being managed well. Some of these are to do with the physical nature of space, such as the short timelines and difficulty of attribution inherent in space operations. Some are due to the way space is used, such as the entanglement of strategic and tactical missions and the prevalence of dual-use technologies. Some are due to the history of space, such the absence of a shared understanding of appropriate behaviors and consequences, and a dearth of stabilizing personal and institutional relationships. While some of these have terrestrial equivalents, taken together, they present a special challenge. The vulnerability of satellites and first strike incentives Satellites are inherently fragile and difficult to protect; in the language of strategic planners, space is an “offense-dominant” regime. This can lead to a number of pressures to strike first that don‘t exist for other, better-protected domains. Satellites travel on predictable orbits, and many pass repeatedly over all of the earth‘s nations. Low-earth orbiting satellites are reachable by missiles much less capable than those needed to launch satellites into orbit, as well as by directed energy which can interfere with sensors or with communications channels. Because launch mass is at a premium, satellite armor is impractical. Maneuvers on orbit need costly amounts of fuel, which has to be brought along on launch, limiting satellites‘ ability to move away from threats. And so, these very valuable satellites are also inherently vulnerable and may present as attractive targets. Thus, an actor with substantial dependence on space has an incentive to strike first if hostilities look probable, to ensure these valuable assets are not lost. Even if both (or all) sides in a conflict prefer not to engage in war, this weakness may provide an incentive to approach it closely anyway. A RAND Corporation monograph commissioned by the Air Force15 described the issue this way: First-strike stability is a concept that Glenn Kent and David Thaler developed in 1989 to examine the structural dynamics of mutual deterrence between two or more nuclear states.16 It is similar to crisis stability, which Charles Glaser described as ―a measure of the countries‘ incentives not to preempt in a crisis, that is, not to attack first in order to beat the attack of the enemy,‖17 except that it does not delve into the psychological factors present in specific crises. Rather, first strike stability focuses on each side‘s force posture and the balance of capabilities and vulnerabilities that could make a crisis unstable should a confrontation occur. For example, in the case of the United States, the fact that conventional weapons are so heavily dependent on vulnerable satellites may create incentives for the US to strike first terrestrially in the lead up to a confrontation, before its space-derived advantages are eroded by anti-satellite attacks.18 Indeed, any actor for which satellites or space-based weapons are an important part of its military posture, whether for support missions or on-orbit weapons, will feel “use it or lose it” pressure because of the inherent vulnerability of satellites. Short timelines and difficulty of attribution The compressed timelines characteristic of crises combine with these “use it or lose it” pressures to shrink timelines. This dynamic couples dangerously with the inherent difficulty of determining the causes of satellite degradation, whether malicious or from natural causes, in a timely way. Space is a difficult environment in which to operate. Satellites orbit amidst increasing amounts of debris. A collision with a debris object the size of a marble could be catastrophic for a satellite, but objects of that size cannot be reliably tracked. So a failure due to a collision with a small piece of untracked debris may be left open to other interpretations. Satellite electronics are also subject to high levels of damaging radiation. Because of their remoteness, satellites as a rule cannot be repaired or maintained. While on-board diagnostics and space surveillance can help the user understand what went wrong, it is difficult to have a complete picture on short timescales. Satellite failure on-orbit is a regular occurrence19 (indeed, many satellites are kept in service long past their intended lifetimes). In the past, when fewer actors had access to satellite-disrupting technologies, satellite failures were usually ascribed to “natural” causes. But increasingly, even during times of peace operators may assume malicious intent. More to the point, in a crisis when the costs of inaction may be perceived to be costly, there is an incentive to choose the worst-case interpretation of events even if the information is incomplete or inconclusive. Entanglement of strategic and tactical missions During the Cold War, nuclear and conventional arms were well separated, and escalation pathways were relatively clear. While space-based assets performed critical strategic missions, including early warning of ballistic missile launch and secure communications in a crisis, there was a relatively clear sense that these targets were off limits, as attacks could undermine nuclear deterrence. In the Strategic Arms Limitation Treaty, the US and Soviet Union pledged not to interfere with each other‘s ―national technical means‖ of verifying compliance with the agreement, yet another recognition that attacking strategically important satellites could be destabilizing.20 There was also restraint in building the hardware that could hold these assets at risk. However, where the lines between strategic satellite missions and other missions are blurred, these norms can be weakened. For example, the satellites that provide early warning of ballistic missile launch are associated with nuclear deterrent posture, but also are critical sensors for missile defenses. Strategic surveillance and missile warning satellites also support efforts to locate and destroy mobile conventional missile launchers. Interfering with an early warning sensor satellite might be intended to dissuade an adversary from using nuclear weapons first by degrading their missile defenses and thus hindering their first-strike posture. However, for a state that uses early warning satellites to enable a “hair trigger” or launch-on-attack posture, the interference with such a satellite might instead be interpreted as a precursor to a nuclear attack. It may accelerate the use of nuclear weapons rather than inhibit it. Misperception and dual-use technologies Some space technologies and activities can be used both for relatively benign purposes but also for hostile ones. It may be difficult for an actor to understand the intent behind the development, testing, use, and stockpiling of these technologies, and see threats where there are none. (Or miss a threat until it is too late.) This may start a cycle of action and reaction based on misperception. For example, relatively low-mass satellites can now maneuver autonomously and closely approach other satellites without their cooperation; this may be for peaceful purposes such as satellite maintenance or the building of complex space structures, or for more controversial reasons such as intelligence-gathering or anti-satellite attacks. Ground-based lasers can be used to dazzle the sensors of an adversary‘s remote sensing satellites, and with sufficient power, they may damage those sensors. The power needed to dazzle a satellite is low, achievable with commercially available lasers coupled to a mirror which can track the satellite. Laser ranging networks use low-powered lasers to track satellites and to monitor precisely the Earth‘s shape and gravitational field, and use similar technologies. 21 Higher-powered lasers coupled with satellite-tracking optics have fewer legitimate uses. Because midcourse missile defense systems are intended to destroy long-range ballistic missile warheads, which travel at speeds and altitudes comparable to those of satellites, such defense systems also have inherent ASAT capabilities. In fact, while the technologies being developed for long-range missile defenses might not prove very effective against ballistic missiles—for example, because of the countermeasure problems associated with midcourse missile defense— they could be far more effective against satellites. This capacity is not just theoretical. In 2007, China demonstrated a direct-ascent anti-satellite capability which could be used both in an ASAT and missile defense role, and in 2009, the United States used a ship-based missile defense interceptor to destroy a satellite, as well. US plans indicated a projected inventory of missile defense interceptors with capability to reach all low earth orbiting satellites in the dozens in the 2020s, and in the hundreds by 2030.22 Discrimination The consequences of interfering with a satellite may be vastly different depending on who is affected and how, and whether the satellite represents a legitimate military objective. However, it will not always be clear who the owners and operators of a satellite are, and users of a satellite‘s services may be numerous and not public. Registration of satellites is incomplete23 and current ownership is not necessarily updated in a readily available repository. The identification of a satellite as military or civilian may be deliberately obscured. Or its value as a military asset may change over time; for example, the share of capacity of a commercial satellite used by military customers may wax and wane. A potential adversary‘s satellite may have different or additional missions that are more vital to that adversary than an outsider may perceive. An ASAT attack that creates persistent debris could result in significant collateral damage to a wide range of other actors; unlike terrestrial attacks, these consequences are not limited geographically, and could harm other users unpredictably. In 2015, the Pentagon‘s annual wargame, or simulated conflict, involving space assets focused on a future regional conflict. The official report out24 warned that it was hard to keep the conflict contained geographically when using anti-satellite weapons: As the wargame unfolded, a regional crisis quickly escalated, partly because of the interconnectedness of a multi-domain fight involving a capable adversary. The wargame participants emphasized the challenges in containing horizontal escalation once space control capabilities are employed to achieve limited national objectives. Lack of shared understanding of consequences/proportionality States have fairly similar understandings of the implications of military actions on the ground, in the air, and at sea, built over decades of experience. The United States and the Soviet Union/Russia have built some shared understanding of each other‘s strategic thinking on nuclear weapons, though this is less true for other states with nuclear weapons. But in the context of nuclear weapons, there is an arguable understanding about the crisis escalation based on the type of weapon (strategic or tactical) and the target (counterforce—against other nuclear targets, or countervalue—against civilian targets). Because of a lack of experience in hostilities that target space-based capabilities, it is not entirely clear what the proper response to a space activity is and where the escalation thresholds or “red lines” lie. Exacerbating this is the asymmetry in space investments; not all actors will assign the same value to a given target or same escalatory nature to different weapons.

#### Credible OST solves Space War.

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

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

#### No space PTD – no sovereignty.

Jonckheere, 18 – Master’s Dissertation on Public and International Law, Evarist Ghent University.

(Evarist Jonckheere, reviewed by Maes Frank and René Oosterlinck, professors at Evarist Ghent University, “The Privatization of Outer Space and the Consequences for Space Law”, May 2018)

b. Application of the Principle: The Public Trust Doctrine

66. Public trust.

121 The common heritage of mankind principle has been applied throughout history in the form of the ‘public trust’ doctrine.122 However, this application is problematic in outer space.

The doctrine proposes that states possess all the property rights of the common areas. While these states remain the owners, they can subsequently convey usage rights of the property to its residents – possibly private enterprises. This results in a division between the rights of the state and the rights conveyed to its residents. Both parties have their own interests in owning the area and using its resources, but the state’s interest is the primary concern.

Article I of the Outer Space Treaty seemingly creates such a public trust situation. However, states do not have the purposed sovereignty over outer space that is necessary in the public trust doctrine. Sovereign control over real property by a state is needed before any rights can be conferred to private actors. States do not have this control in outer space and as a result, states would not be able to recognize private ownership there.

#### 1AC Babcock is entirely out of context – it is not saying that expanding the PTD on its own is sufficient to create sustainable space – it requires the creation of new international frameworks, guidelines, and debris mitigation efforts which is external to an expansion of the PTD – only the counterplan sets the ground floor for sustainable space development – independently your author concedes public space programs are not interested in a global common – we read blue

#### 1AC Perez is also cut out of context – its advocating for the reinforcement of the COPOUS to set rules for sustainable use of outer space and cooperation which the aff doesn’t do but the counterplan does – it explicitly denounces the creation of a new international framework in space which is the aff

#### The Aff does nothing or its blatantly extra topical – that’s a voting issue for limits and ground since they can tack on infinite different permutations of planks and add ons to the plan to solve for neg ground and das which hurts in depth clash and kills negative engagement since we can never predict all the different planks they can add onto the 1ac . Drop the debater to deter future abuse and reject rvis because they bait theory and beat me on the debate preventing me from checking abuse.

## Case

#### Superior studies- theirs are confirmation-bias laden and repeatedly disproven

S. Fred **Singer 18**. Professor emeritus at the University of Virginia and a founding director and now chairman emeritus of the Science & Environmental Policy Project, specialist in atmospheric and space physics, founding director of the U.S. Weather Satellite Service, now part of NOAA, served as vice chair of the U.S. National Advisory Committee on Oceans &amp; Atmosphere, an elected fellow of several scientific societies, including APS, AGU, AAAS, AIAA, Sigma Xi, and Tau Beta Pi, and a senior fellow of the Heartland Institute and the Independent Institute. 6-27-2018. "Remember Nuclear Winter?." American Thinker. https://www.americanthinker.com/articles/2018/06/remember\_nuclear\_winter.html

Nuclear Winter burst on the academic scene in December 1983 with the publication of the hypothesis in the prestigious journal Science. It was accompanied by a study by Paul Ehrlich, et al. that hinted that it might cause the extinction of human life on the planet. MCANW stands for Medical Campaign Against Nuclear Weapons. Photo via Wellcome Images. The five authors of the Nuclear Winter hypothesis were labeled TTAPS, using the initials of their family names (T stands for Owen Toon and P stands for Jim Pollak, both Ph.D. students of Carl Sagan at Cornell University.) Carl Sagan himself was the main author and driving force. Actually, Sagan had scooped the Science paper by publishing the gist of the hypothesis in Parade magazine, which claimed a readership of 50 million! Previously, Sagan had briefed people in public office and elsewhere, so they were all primed for the popular reaction, which was tremendous. Many of today's readers may not remember Carl Sagan. He was a brilliant astrophysicist but also highly political. Imagine Al Gore, but with an excellent science background. Sagan had developed and narrated a television series called Cosmos that popularized astrophysics and much else, including cosmology, the history of the universe. He even suggested the possible existence of extraterrestrial intelligence and started a listening project called SETI (Search for Extraterrestrial Intelligence). SETI is still searching today and has not found any evidence so far. Sagan became a sort of icon; many people in the U.S. and abroad knew his name and face. Carl Sagan also had another passion: saving humanity from a general nuclear war, a laudable aim. He had been arguing vigorously and publicly for a "freeze" on the production of more nuclear weapons. President Ronald Reagan outdid him and negotiated a nuclear weapons reduction with the USSR. In the meantime, much excitement was stirred up by Nuclear Winter. Study after study tried to confirm and expand the hypothesis, led by the Defense Department (DOD), which took the hypothesis seriously and spent millions of dollars on various reports that accepted Nuclear Winter rather uncritically. The National Research Council (NRC) of the National Academy of Sciences published a report that put in more quantitative detail. It enabled critics of the hypothesis to find flaws – and many did. The names Russell Seitz, Dick Wilson (both of Cambridge, Mass.), Steve Schneider (Palo Alto, Calif.), and Bob Ehrlich (Fairfax, Va.) (no relation to Paul Ehrlich) come to mind. The hypothesis was really "politics disguised as science." The whole TTAPS scheme was contrived to deliver the desired consequence. It required the smoke layer to be of just the right thickness, covering the whole Earth, and lasting for many months. The Kuwait oil fires in 1991 produced a lot of smoke, but it rained out after a few days. I had a mini-debate with Sagan on the TV program Nightline and published a more critical analysis of the whole hypothesis in the journal Meteorology & Atmospheric Physics. I don't know if Carl ever saw my paper. But I learned a lot from doing this analysis that was useful in later global warming research. For example, the initial nuclear bursts inject water vapor into the stratosphere, which turns into contrail-like cirrus clouds. That actually leads to a strong initial warming and a "nuclear summer."

#### Rigorous climate simulations prove that hydrophilic black carbon would cause to atmospheric precipitation – results in a rainout effect that quickly reverses nuclear cooling

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\*BC = Black Carbon

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

#### Isolated island populations repopulate Earth after radiation and nuclear winter – bunkers and submarines expand the likelihood of survival

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

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

#### No Kessler---takes centuries and mitigation checks.

Hugh Lewis 15. Senior Lecturer in Aerospace Engineering at the University of Southampton, “Space debris, Kessler Syndrome, and the unreasonable expectation of certainty.” Room, <https://room.eu.com/article/Space_debris_Kessler_Syndrome_and_the_unreasonable_expectation_of_certainty>

There is now widespread awareness of the space debris problem amongst policymakers, scientists, engineers and the public. Thanks to pivotal work by J.C. Liou and Nicholas Johnson in 2006 we now understand that the continued growth of the debris population is likely in the future even if all launch activity is halted. The reason for this sustained growth, and for the concern of many satellite operators who are forced to act to protect their assets, are collisions that are expected to occur between objects – satellites and rocket stages – already in orbit. In spite of several commentators warning that these collisions are just the start of a collision cascade that will render access to low Earth orbit all but impossible – a process commonly referred to as the ‘Kessler Syndrome’ after the debris scientist Donald Kessler – the reality is not likely to be on the scale of these predictions or the events depicted in the film Gravity. Indeed, results presented by the Inter-Agency Space Debris Coordination Committee (IADC) at the Sixth European Conference on Space Debris show an expected increase in the debris population of only 30% after 200 years with continued launch activity. Collisions are still predicted to occur, but this is far from the catastrophic scenario feared by some. Constraining the population increase to a modest level can be achieved, the IADC suggested, through widespread and good compliance with existing space debris mitigation guidelines, especially those relating to passivation (whereby all sources of stored energy on a satellite are depleted at the end of its mission) and post-mission disposal, such as de-orbiting the satellite or re-orbiting it to a graveyard orbit. Nevertheless, the anticipated growth of the debris population in spite of these robust efforts merits the investigation of additional measures to address the debris threat, according to the IADC.

#### Even full-scale ASAT war can’t trigger Kessler – modelling

Drmola & Hubik 18 [Jakub Drmola, Division of Security and Strategic Studies, Department of Political Science at the Faculty of Social Sciences of Masaryk University. Tomas Hubik, Department of Theoretical Computer Science and Mathematical Logic, Faculty of Mathematics and Physics, Charles University. Kessler Syndrome: System Dynamics Model. Space Policy Volumes 44–45, August 2018, Pages 29-39. https://www.sciencedirect.com/science/article/pii/S0265964617300966?via%3Dihub]

The probabilities and rates of collisions of objects from different groups were calculated using a coefficient converting the rate of collisions between objects from one group to the rate of collisions between objects from another group. The initial base rate was estimated using iterative simulations and comparison of the resulting runs with real data and outputs from other models. Detailed model built by a group of researchers from the Lawrence Livermore National Laboratory was used as a base for the calibration [see 9]. As the major factor influencing collision probability is size, the probability increases with square of the diameter representing bigger area for possible impact. Speed would be another factor influencing the probability of impacts, but the speed depends on the distance from the Earth and is not influenced by debris size. It means that it will not vary between different debris groups and thus will not influence the collision probability conversion parameters in our model. One the most important limitations and simplifications of the model is the uncertainty of size, structure, and composition of the satellites—i.e. what debris the satellite will disintegrate into in case of a collision. Perhaps even more crucially, the rate of orbital decay changes significantly with the altitude and eccentricity of the trajectory. The lower the orbital altitude is or the more eccentric it is, the more drag the object experiences as it passes through the last vestiges of our atmosphere. Therefore, objects in the lower or more eccentric orbit will decay significantly faster. Thus, the actual lifetime of a piece of debris can easily vary from days to centuries. It also needs to be noted that while it may take many decades for a satellite to decay (especially from the popular orbits between 500 km and 800 km), we cannot assume the same about debris. That is because while satellite orbits typically have very low eccentricity, collisions result in fragments with velocities and trajectories that vary and differ from the original intact satellite (i.e. are more eccentric and decay faster). This makes estimating rate of orbital decay of debris quite difficult, especially when combined with the ongoing laudable efforts by Inter-Agency Space Debris Coordination Committee (IADC) to shorten the lifetime of satellites after they cease planned operations [14], [15]. Therefore, both the orbital and structural parameters used here are (and must be) overall averages designed to represent a “general LEO satellite” and are based on previous fragmentations, of which there are but few. Furthermore, this is getting increasingly more difficult as satellites are getting progressively more diverse, especially with the ongoing boom of the miniaturized CubeSats [16]. This leads to a relatively wide and heterogeneous population of real satellites being represented by a single, homogenized stock of simulated satellites in the model. It is also uncertain and difficult to predict how exactly is this going to evolve in the far future, what proportion of launched satellites will be of which size, and into which orbit they will be placed. Lacking precise information, we simply extrapolate current and expected trends. 5. Scenarios and simulation results 5.1. Business as usual and beyond The baseline scenario represents a continuation of the current trends, which are simply extended into the future. An average 1% growth rate of yearly launches of new satellites (starting at 89) is assumed, together with constant success rate in satellites’ ability to actively avoid collisions with debris and other satellites, constant lifetime, and failure rate. This basic model lacks any sudden events or major policy changes that would markedly influence the debris propagation. However, it serves both as a foundation for all the following scenarios and as a basis of comparison to see what the impact would be. Given high uncertainty regarding future state of the satellite industry (how many satellites will be launched per year, of what type and size, etc.), we elected to limit our simulations to 50 years. The model can certainly continue beyond this point, but the associated unknowns make the simulations progressively less useful. Running this model for its full 50 years (2016–2066) yields the expected result of perpetually growing amount of debris in the LEO. One can observe nearly 2-fold increase in the large debris (over 10 cm) and 3-fold increase in small debris (less than 1 cm) quantities (Fig. 5). The oscillations visible in the graph are caused by the aforementioned solar cycles which influence the rate of reentry for all simulated populations except the still active (i.e. powered) satellites. Also please note that throughout the article, the graphs use quite different scales for debris populations because of the considerable variations between scenarios. Using any single scale for all graphs would render some of them unintelligible. We can see that this increase in numbers still does not result in realization of the Kessler syndrome as most of the satellites being launched remain intact for their full expected service life. However, it comes with a considerable increase in risk to satellites, which is manifested by their higher yearly losses, making satellites operations riskier and more expensive for governments and private companies alike. This increased amount of debris in LEO combined with the larger number of active satellites makes it approximately twice as likely that an active satellite will suffer a disabling hit or a total disintegration during its lifetime. It should be noted that this risk might possibly be offset by future improvements in satellite reliability, debris tracking, and navigation [17]. This negative development of increasingly risky and costly operation of satellites can also be highlighted and visualized in a graph by comparing the number of satellites launched to the number of satellites lost (to collisions as well as malfunctions) in each given year (Fig. 6). This ratio shows diminishing efficiency of the system, where number of losses per launch increases. After fully acknowledging limitations stemming from inherent uncertainties, we can also try to “make things expectedly worse” by doubling the growth rate of yearly launches (to what it perhaps might end up being because of the boom in satellites industry because of increasing privatization of space, growing demand for communication satellites, etc.) and also extending the simulation timeframe to 200 years (Fig. 7). It must be stressed that the model was not designed with such long outlooks in mind, and many of the assumptions will certainly not hold over the next 200 years (such as static launch rate growth, size, and structure of the satellites, their lifetime, evasion rates, lack of mitigation, and many others). But in the overwhelmingly unlikely case that these assumptions stay true, the simulated outcome seems to suggest a collapse of sorts around the year 2163. However, it does not look like a suddenly triggered chain reaction leading to widespread fragmentation of the entire LEO but rather like a gradually reached point at which LEO is so full of debris, and the rate of active satellite fragmentation is so high (almost one every day) that the launches cannot keep up anymore. This is consistent with the findings reported by LaFleur and Finkelman, who found the debris system to be unconditionally stable [18], [19], [27]. 5.2. Antisatellite weapon system scenario Apart from the usual collisional risks that satellites face in the LEO, there has been growing concern regarding the development of antisatellite weapon systems (ASATs) by several world powers (namely China, Russian Federation, and the United States). These weapons are designed to intercept and destroy orbiting satellites and are, for the most part, descended from the antiballistic missile defense systems. While there are some alternative designs under development, the current generation mostly takes form of a boosted missile with a kinetic kill vehicle. This method of destruction (a collision of a missile with a satellite) leads to extensive fragmentation and creation of large debris clouds. A prime example of this was the Chinese 2007 ASAT test which destroyed China's own decommissioned weather satellite FengYun-1C. This hypervelocity collision created around 3000 pieces of medium to large debris and tens of thousands of smaller pieces, most of which will remain in orbit for decades, thus considerably contributing to overall risk of future orbital collisions [20]. As much as occasional tests of ASATs are increasing the amount of debris in the LEO, a greater danger by far is the possibility of a large-scale ASAT deployment during an armed conflict between two or more major, technologically advanced powers. Given the reliance of modern militaries on satellites for intelligence, communication, and navigation, it is generally presumed that the initial phase of any such conflict would involve mutual destruction of each other's satellites to blind the enemy and hinder their offensive operations [21], [22]. Such opening salvos could involve immediate destruction of dozens of satellites, thus creating massive clouds of debris threatening the remaining satellites and possibly leading to cascading disintegration across the entire orbit.This kind of hypothetical event is simulated in the second scenario, where an imaginary major military conflict erupts in the year 2040, during which roughly half of all military satellites are destroyed by intentional kinetic impacts using antisatellite weapons. With military and dual-use satellites generally representing a little over one-third of all satellites [23] (depending on criteria and the operating country), this results in some 200 satellites destroyed by ASATs in 2040 (Fig. 8). However, even this sudden event is not enough to trigger a chain reaction of satellites disintegrating in LEO, at least according to this model. Nevertheless, the number of collisions with active satellites ends up nearly twice as high at the end of the simulation (i.e. 25 years after the conflict and ASAT strikes) when compared to the previous run. This shows that the damage would be long-term and would negatively affect satellite operations (including commercial and scientific ones) for many years after any conflict involving ASATs.

#### The United States would respond to Russian attacks against them OR allies with a devastating counterforce – that crushes Russia.

Lonsdale **’**19 [David Lonsdale is the Director of the Centre for Security Studies at the University of Hull, UK, “The 2018 Nuclear Posture Review: A return to nuclear warfighting?,” *Comparative Strategy* 28:2, pub. online, May 17, 2019]

The important question is: what objectives would the U.S. pursue within a nuclear conflict, and how would they be achieved? It appears that the primary objectives sought would be damage limitation (an important component of warfighting) and the reestablishment of deterrence. This fits with the preliminary qualifying statement to this section of the review, in which it is stated that the U.S. would use nuclear weapons in compliance with the law of armed conflict.86 Indeed, the NPR is at pains to note that nuclear forces would only be used for defensive purposes. One assumes that this rules out counter-value targeting (deliberate attacks against enemy population centers). This leaves counterforce operations as the only option. Strikes against enemy nuclear forces and their command and control, in conjunction with active ballistic missile defenses (BMD), would help ensure damage limitation for the U.S. and its allies.87 A focus on counterforce options is reminiscent of later Cold War strategy, when the U.S. increasingly procured weapon systems with increased accuracy and penetrative capability designed for warfighting. Indeed, Lieber and Press argue that increases in accuracy and remote sensing have enhanced the potency of counterforce options, to the point that low-casualty counterforce options are possible for the first time.88 One can reasonably assume, although it is not explicitly noted in the review, that the restoration of deterrence would be achieved through a combination of intra-war deterrence by denial (as noted above in relation to counter-escalation strategies) and punishment for coercive purposes. Inclusion of the latter is premised on references to “unacceptable consequences” resulting from nuclear attack elsewhere in the NPR. 89 However, in the face of no counter-value targeting, it is reasonable to question how these costs would be inflicted. There are three possible answers, although none of them is discussed in the NPR. First, it may be that the enemy values highly their nuclear forces; so that the loss of them would inflict unacceptable costs. Alternatively, there may be an unwritten assumption that counterforce strikes would inevitably produce “bonus” counter-value damage. Much of the nuclear force infrastructure (including command and control, airbases, etc.) is within or near population centers. Thus, even a limited counterforce strike is likely to have a significant detrimental effect on counter-value targets. This assumption, however, is somewhat thrown into question by the stated desire to procure accurate limited-yield weapons and to operate within the norms of the war convention. Low-yield accurate weapons would be ideal for counterforce missions and would minimize damage to counter-value target sets. Thus, bonus damage is likely to be limited. Finally, although again not explicitly noted in the NPR, perhaps there is a return to the notion of attacking targets associated with political control. Yet again, though, concerns over collateral damage would likely restrict a campaign aimed at the means of political control. We are, thus, left with many questions concerning how the coercive effects of nuclear weapons would be administered. This is problematic, for as Thomas C. Schelling eloquently noted, “The power to hurt can be counted among the most impressive attributes of military force.” 90 It has to be concluded that the uncertainties in this area of strategy reflect either a paradox or incomplete strategic thinking in the NPR. Clarity on these matters would be welcome, especially as it would enhance deterrence credibility still further. Although countervailing is back on the agenda in the 2018 NPR, there is no mention of prevailing in a nuclear conflict. Indeed, the review quotes Defense Secretary Mattis, echoing the early thoughts of Brodie, that nuclear war can never be won, and thus must never be fought.91 This is both curious and disappointing from a warfighting perspective, and speaks to the need for the further development of strategic thinking in U.S. nuclear strategy under Trump. Damage limitation and the reestablishment of deterrence are perfectly admirable goals within the context of nuclear conflict. However, if the U.S. is to achieve its objectives in a post-deterrence environment, it must have a comprehensive theory of victory. Damage limitation and the reestablishment of deterrence are limited negative objectives. They do not provide a positive driving force for the use of nuclear weapons. To reiterate, victory refers to a policy objective that must be achieved in the face of the enemy. And, as Clausewitz reminds us, the will of the enemy must be broken by destroying his ability to resist, or putting him in such a position as his defeat is inevitable.92 If we consider the conditions under which U.S. nuclear weapons could be used, as stipulated by the 2018 NPR, then we can assume that an enemy power (likely) Russia, China, North Korea, or a state-sponsored terror group) has launched a substantial attack on either the U.S. or one of its allies. We can think in terms of a Russian assault on the Baltic States, a North Korean attack on South Korea, or perhaps a Chinese invasion of Taiwan. Alternatively, the U.S. may have been subjected to a substantial strategic attack, involving either weapons of mass destruction (including biological or chemical) or a crippling cyberattack. In any of these scenarios, more expansive objectives would be required. As Lieber and Press note, “In some cases, wars may be triggered by events that compel U.S. leaders to pursue decisive victory, conquest, and/or regime change.” 93 Thus, in order to achieve its objectives, the U.S. would variously need to: punish an aggressor to reinstate deterrence; defeat enemy forces for damage limitation or to reclaim lost territory; and, in the North Korean case, presumably overthrow a communist regime. In some of these cases, damage limitation and the reestablishment of deterrence would not be enough. Enemy forces would have to be defeated, removed, destroyed, or coerced (to withdraw from allied territory). Any operations in pursuit of these goals would need a theory of victory built on a detailed understanding of the use of nuclear weapons in the service of military objectives; i.e., nuclear warfighting. This could include defeating enemy nuclear forces for force protection of U.S. and allied conventional forces. Alternatively, U.S. nuclear forces may be required to defeat regionally superior enemy conventional forces. And yet, as previously noted, the NPR rules out a return to nuclear warfighting. This is a significant disjuncture in U.S. nuclear strategy. It is even more curious when one considers the range of modern forces the Trump administration seeks to acquire under the 2018 NPR.

#### We could initiate a strike in 22 minutes – that forces surrender.

Johnson **’**17 [Sarah Johnson, Writer for BillTrack50, citing Jeffrey Lewis, director of the East Asia Nonproliferation Program for the James Martin Center for Nonproliferation Studies at the Middlebury Institute of International Studies at Monterey, April 27, 2017, “U.S. Nuclear First Strike Policy; Be Afraid,” <https://www.billtrack50.com/blog/in-the-news/u-s-nuclear-first-strike-policy-be-afraid>]

For example, if Russia launched a nuclear weapon, the US has the 30 minute flight time of the intercontinental ballistic missile (ICBM) to assess their desire to “launch under attack”. The many different steps in the notification process take up about 22 of the 30 minutes; like the time it takes for the missiles to break through clouds, detection of the launch, transmitting different messages, informing the president and authenticating orders to launch. All of this effectively gives the president eight minutes to decide to whether or not to blow up the world. The second situation is a preemptive strike — a first-strike attack with nuclear weapons carried out to destroy an enemy’s capacity to respond. Preemptive strikes can be based on the assumption that the enemy is planning an imminent attack, but don’t have to be. The methodology behind a preemptive nuclear strike is to attack the enemy’s strategic nuclear weapon facilities (missile silos, submarine bases, bomber airfields), command and control sites and storage depots first. By hitting these targets first the enemy will be so wounded with so little of their resources left that they will be forced to surrender with minimal damage to the attacking party.

#### Limited nuclear war doesn’t cause extinction – BUT – solves future use.

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

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

#### Striking now is key – otherwise, Russia will continue developments AND beat us later with new super weapons.

**Schneider ’**19 [Mark B. Schneider is a Senior Analyst with the National Institute for Public Policy, joined the staff of the National Institute in September 2004 to provide on-site support to the Defense Policy Analysis Office of the Defense Logistic Agency, specializes in missile defense policy, nuclear weapons, deterrence, strategic forces, arms control, and arms control verification and compliance issues, “Russia's Massive Nuclear Weapons Arsenal Is a Threat,” National Interest, May 29, 2019, <https://nationalinterest.org/blog/buzz/russias-massive-nuclear-weapons-arsenal-threat-59947>]

The U.S. mainstream view of Russia has changed quite a bit in the last twenty years, particularly in the last five. We have moved from the fantasy that there was no threat from Russia after the demise of the Soviet Union to a recognition of a serious Russian threat to the U.S. and its allies, including a nuclear threat in the last two years of the Obama administration and the Trump administration. However, characterizing the relationship between the U.S. and Russia as “competition” as it now appears in U.S. Government documents, does not go far enough. Lockheed and Boeing compete; Russia threatens preemptive nuclear attack. It is unilaterally trying to create a sphere of influence in Eastern Europe and the former Soviet states in the classic 19th Century sense while building the largest nuclear arsenal in the world. There is no competition here but rather a serious threat from Russia. Russia and Nuclear Weapons Putin’s economic policies are a disaster for Russia; yet he continues to modernize and expand Russia’s military and nuclear capabilities. In January 2017, Russian Defense Minister General of the Army Sergei Shoigu stated that development of the strategic nuclear force was Russia’s first priority, noting that Russia will “…continue a massive program of nuclear rearmament, deploying modern ICBMs on land and sea, [and] modernizing the strategic bomber force.” The 2018 Nuclear Posture Review report agrees stating, “In addition to modernizing ‘legacy’ Soviet nuclear systems, Russia is developing and deploying new nuclear warheads and launchers. These efforts include multiple upgrades for every leg of the Russian nuclear triad of strategic bombers, sea-based missiles, and land-based missiles. Russia is also developing at least two new intercontinental range systems, a hypersonic glide vehicle, and a new intercontinental, nuclear-armed, nuclear-powered, undersea autonomous torpedo.” Secretary of Energy Rick Perry and National Nuclear Security Administration Director Lisa Gordon-Hagerty in April 2019 told the Senate Armed Services Committee, “[Russia](https://m.washingtontimes.com/topics/russia/) and [China](https://m.washingtontimes.com/topics/china/) are investing massive resources into upgrading and expanding their nuclear arsenals, all at a time when they seek to challenge U.S. interests and unravel U.S. alliances around the world.

#### Absent U.S. action, Russia follows through with advanced AI – extinction.

**Rogers ’**17 [Mike Rogers is a former US Representative from Michigan, chairman of the House Permanent Select Committee on Intelligence, “Artificial intelligence — the arms race we may not be able to control," TheHill, September 21, 2017, <https://thehill.com/opinion/technology/351725-artificial-intelligence-is-the-new-arms-race-we-may-not-be-able-to-control>]

“Whoever becomes the leader in this sphere will become ruler of the world,” [said](https://www.theverge.com/2017/9/4/16251226/russia-ai-putin-rule-the-world) Vladimir Putin. The sphere the President of Russia is referring to is artificial intelligence (AI) and his comments should give you a moment of pause. Addressing students at the beginning of our Labor Day weekend, Putin remarked “Artificial intelligence is the future, not only for Russia, but for all humankind,” adding, “It comes with colossal opportunities, but also threats that are difficult to predict.” For once, I find myself in agreement with the President of Russia, but just this once. Artificial Intelligence offers incredible promise and peril. Nowhere is this clearer than in the realm of national security. Today un-crewed systems are a fact of modern warfare. Nearly every country is adopting systems where personnel are far removed from the conflict and wage war by remote control. AI [stands](https://www.nytimes.com/2016/10/26/us/pentagon-artificial-intelligence-terminator.html) to sever that ground connection. Imagine a fully autonomous Predator or Reaper drone. Managed by an AI system, the drone could identify targets, determine their legitimacy, and conduct a strike all without human intervention. Indeed, the Ministry of Defence of the United Kingdom issued a press [statement](https://www.theverge.com/2017/9/12/16286580/uk-government-killer-robots-drones-weapons) in September that the country “does not possess fully autonomous weapon systems and has no intention of developing them,” and that its weapons systems “will always be under control as an absolute guarantee of human oversight and authority and accountability.” Let’s think smaller. Imagine a tiny insect-sized drone loaded with explosive. Guided by a [pre-programmed AI](https://www.amazon.com/Life-3-0-Being-Artificial-Intelligence/dp/1101946598), it could hunt down a specific target — a politician, a general, or an opposition figure — determine when to strike, how to strike, and if to strike based on its own learning. Howard Hughes Medical Center [recently](https://qz.com/1000011/scientists-attached-an-electronic-backpack-to-a-genetically-modified-dragonfly-and-turned-it-into-a-drone/) attached a backpack to a genetically modified dragonfly and flew it remotely. These examples are, however, where humans are involved and largely control the left and right limits of AI. Yet, there are examples of AI purposely and independently going beyond programed parameters. Rogue algorithms led to a [flash crash](http://gizmodo.com/rogue-algorithm-blamed-for-historic-crash-of-the-britis-1787523587) of the British Pound. In 2016, in-game AIs created super AIs weapons and [hunted down](http://www.kotaku.co.uk/2016/06/03/elites-ai-created-super-weapons-and-started-hunting-players-skynet-is-here) human players, and AIs have [created](https://www.forbes.com/sites/tonybradley/2017/07/31/facebook-ai-creates-its-own-language-in-creepy-preview-of-our-potential-future/#1cf69787292c) their own languages that were indecipherable to humans. AIs proved more effective than their human counterparts in producing and catching users in spear phishing programs. Not only did the AIs create more content, they successfully [captured](https://www.blackhat.com/docs/us-16/materials/us-16-Seymour-Tully-Weaponizing-Data-Science-For-Social-Engineering-Automated-E2E-Spear-Phishing-On-Twitter.pdf) more users with their deception. While seemingly simple and low stakes in nature, extrapolate these scenarios into more significant and risky areas and the consequences become much greater. Cybersecurity is no different. Today we are focused on the hackers, trolls, and cyber criminals (officially sanctioned and otherwise) who seek to penetrate our networks, steal our intellectual property, and leave behind malicious code for activation in the event of a conflict. Replace the individual with an AI and imagine how fast hacking takes place; networks against networks, at machine speed all without a human in the loop. Sound far-fetched? It’s not. In 2016, the Defense Advanced Research Projects Agency held an AI on AI capture the flag contest called the [Cyber Grand Challenge](https://www.youtube.com/watch?v=qSgYu3w3DMM) at the DEF CON event. AI networks against AI networks. In August of this year the founders of 116 AI and robotics companies signed a letter petitioning the United Nations [to ban](https://www.theverge.com/2017/8/21/16177828/killer-robots-ban-elon-musk-un-petition) lethal autonomous systems. Signatories to this letter included Google DeepMind’s co-founder Mustafa Suleyman and Elon Musk who, in response to Putin’s quote [tweeted](https://twitter.com/elonmusk/status/904638455761612800), “Competition for AI superiority at national level most likely cause of WW3 imo (sic)”. AI is not some far off future challenge. It is a challenge today and one with which we must grapple. I am in favor of fielding any system that enhances our national security, but we must have an open and honest conversation about the implications of AI, the consequences of which we do not, and may not, fully understand. This is not a new type of bullet or missile. This is a potentially fully autonomous system that even with human oversight and guidance will make its own decisions on the battlefield and in cyberspace. How can we ensure that the system does not escape our control? How can we prevent such systems from falling into the hands of terrorists or insurgents? Who controls the source code? How and can we build in so-called impenetrable kill switches? AI and AI-like systems are slowly being introduced into our arsenal. Our adversaries, China, Russia, and others are also introducing AI systems into their arsenals as well. Implementation is happening faster than our ability to fully comprehend the consequences. Putin’s new call spells out a new arms race. Rushing to AI weapon systems without guiding principles is a dangerous. It risks an escalation that we do not fully understand and may not be able to control. The cost of limiting AI intelligence being weaponized [could vastly exceed](https://www.belfercenter.org/sites/default/files/files/publication/AI%20NatSec%20-%20final.pdf) all of our nuclear proliferation efforts to date. More troubling, the consequences of failure are equally existential.

#### Russia is developing genetically-engineered super soldiers – makes future war unwinnable and causes extinction.

**Holloway ’**16 [Henry Holloway is the Chief Reporter at Star Online, cites Bob Work, the deputy secretary of defense at the Pentagon and US Air Force Colonel Dave Shunk, Star Online, 2016 "Dawn of the super soldier: Russia 'creating steroid-fueled bionic warriors for battle'"]

Top American military chiefs have warned Moscow is working to create “enhanced human operations” technology which they say “scares the crap out of us”. Super-soldiers are fast becoming a reality as armies across the world search for ways to beef up their troopers to make them stronger, faster, and more deadly. But while [most future weapons are based around robotics, lasers and exoskeletons](https://www.dailystar.co.uk/news/latest-news/533525/Super-Weapons-Future-Tech-Energy-Weapons-Cyber-Attacks-Aircraft-Nuclear-World-War-3), defense bigwigs in the United States believe Russia is going one step beyond to create the ultimate super soldier. Military science experts have predicted super soldiers could be very close to the horizon and Russia could be leading the way. Steroids and other performance enhancing drugs can be pumped into soldiers bodies to make them tougher on the battlefield. The drugs would allow troops to march for longer distances faster, carry more gear, and fight more fiercely in close combat. Brain implants can also be embedded into soldiers heads to allow them to shoot with better aim or be more susceptible to orders. Microscopic technology could also be implanted into men which would fix their wounds on the battlefield without need for a medic. Bionics could also be used to allow ~~men~~ [people] to control machines or extensive prosthetics with their minds. Pentagon commander Bob Work, the deputy secretary of defense, said: “Our adversaries, quite frankly, are pursuing enhanced human operations. And it scares the crap out of us, really.” The former artillery battalion commander said the US is working on tech to assist soldiers such as exoskeletons– as opposed to the suggested biological Russian gear to enhance soldiers. He added the United States is facing a “big, big decision on whether or not we are comfortable going that way" in a speech. America’s secret science DARPA division is already exploring the tech needed to create super soldiers. Their scientists have researched mind-altering pain vaccines, drugs which mean soldiers can stay awake for longer periods, and microscopic magnets which would seal wounds in the wave of a hand. Russia’s [superhuman schemes extend to their athletes where a state-sponsoring doping programme landed them in trouble](https://www.dailystar.co.uk/news/latest-news/531215/Rio-2016-Putin-Russia-Olympics-prank-doping-scandal) at the Olympics. Maria Sharapova was caught out using the drug Meldonium – which the Soviet Union used to bolster their soldiers during the Cold War. The pharmaceutical was unwittingly necked by Russian troopers during the superpower’s invasion of Afghanistan after being given it by military chiefs to boost their endurance. The drug’s inventor Ivar Kalvins told a Latvian newspaper in a 2009 interview “They were all given meldonium. They themselves were not aware they were using it. No one was being asked if they agree to it back then”. Russia is not the only power to have been experimenting with superhuman technology – as America said they suspect China could also be working on “enhanced human operations”. Nazis during World War 2 also used performance enhancers to boost the Third Reich’s soldiers – using pills based on Crystal Meth to make them fight longer as they stormed across Europe. The British Ministry of Defence is looking into the feasibility of super soldiers in the next 30 years according to papers made public in 2013 – featuring augmented bodies and even telepathy by signalling from electronic chips in their brain. US Air Force Colonel Dave Shunk, now retired, described the possibilities of America’s war against supermen in a report about soldiers of the near future. He wrote: “The Army must come to terms not only with creating—or fighting against—enhanced soldiers but also with understanding the unforeseen ethical challenges He added: “The soldier of the future likely will be enhanced through neuroscience, biotechnology, nanotechnology, genetics, and drugs.” Stephen Hawking has warned [humanity's pursuit of deadlier weapons and new technology could lead to arms race](https://www.dailystar.co.uk/news/latest-news/526324/Stephen-Hawking-professor-robots-nuclear-drones-world-war-3-war-terminator-AI) which would spell our doom. Moscow archives also show a superhuman programme as early as the 1920s. Allegedly soviet dictator Stalin told scientist Ilya Ivanov “I want a new invincible human being, insensitive to pain, resistant and indifferent about the quality of food they eat.” The Kremlin passed a request to Russia’s top scientists to create a “living war machine”.

#### BMD will absorb any missiles that survive our initial strike.

Lieber and Press 6 [Keir, Professor @ Georgetown, Daryl, Professor @ Dartmouth, “The End of MAD? The Nuclear Dimension of U.S. Primacy,” <https://www.mitpressjournals.org/doi/pdf/10.1162/isec.2006.30.4.7>]

MISSILE DEFENSE. U.S. offensive nuclear capabilities will grow as the United States deploys a national missile defense (NMD) system. In 2001 the United States withdrew from the Antiballistic Missile Treaty and began to build a missile shield. The first contingent of NMD interceptors was deployed in 2004, but this step is only the starting point for a large, multilayered missile defense system. To this end, the United States has doubled investment in missile defense and accelerated research and development on a range of land-, air-, sea-, and space-based missile defense systems.52 Opponents of national missile defense raise two important critiques regarding its feasibility. First, they note that even a few hundred incoming warheads would overwhelm any plausible defense. Second, a missile defense system based on intercepting warheads outside the Earth’s atmosphere is impractical because it is extremely difficult to differentiate decoys from warheads in space.53 Although both criticisms are cogent, even a limited missile shield could be a powerful complement to the offensive capabilities of U.S. nuclear forces. Russia has approximately 3,500 strategic nuclear warheads today, but if the United States struck before Russian forces were alerted, Russia would be lucky if a half-dozen warheads survived. A functioning missile defense system could conceivably destroy six warheads. Furthermore, the problem of differentiating warheads from decoys becomes less important if only a handful of surviving enemy warheads and decoys are left to intercept. Facing a small number of incoming warheads and decoys, U.S. interceptors could simply target them all.

#### We would CRUSH them.

Rogan 18 [Tom, a senior fellow with the Steamboat Institute, MSc in Middle Eastern Politics from the School of Oriental and African Studies @ Kings College, and a Graduate Diploma in Law from The College of Law in London, “Don't worry, the US would win a nuclear war with Russia,” Washington Examiner, <https://www.washingtonexaminer.com/opinion/dont-worry-the-us-would-win-a-nuclear-war-with-russia>]

Do not be alarmed by Russia's announcement of production on a new nuclear-armed intercontinental ballistic missile. While the ICBM, RS-28 Sarmat, will likely be operational within the next few years, it will not change the nuclear strike balance of power in Russia's favor. In a nuclear war with Russia, U.S. victory would remain the most likely outcome. That's primarily because the U.S. has better potential to get more nuclear warheads onto Russian targets than Russia could get onto U.S. targets. The extension here is that while both nations retain a triad of nuclear strike forces -- ICBM-armed ground bases, aircraft, and submarines -- Russia would struggle to utilize the aircraft and submarine components effectively. For a start, Russia's strategic bomber force is aged and nonstealth in nature. While the Russians are attempting to upgrade these capabilities, they are [a long way](https://www.washingtonexaminer.com/blowing-28-billion-on-10-strategic-bombers-putin-proves-his-egotistical-strategic-flaws) from being able to rival U.S.-equivalent platforms such as the B-2 bomber. Correspondingly, in the event of war, Russian strategic bombers would find themselves highly vulnerable to detection, interception, and destruction by U.S. fighter interceptors. Similarly, Russian nuclear strategic submarine, or SSBN, forces are also less adept than their U.S. counterparts. Yes, the Russians have developed a relatively new class of SSBN, the Borei class, but that program has been delayed repeatedly and only three boats are currently operational. While the Russian Navy has ten other SSBNs, all those boats were built in the Soviet era and they struggle with maintenance issues. They are also loud. That matters in better enabling U.S. intelligence services to monitor the location of Russia's SSBN force at all times. In war, this would enable U.S. Virginia class attack submarines to hunt and kill the Russian fleet before they reached their launch patrol sectors. In a crisis, the U.S. would surge its attack submarines to ensure redundant capability. Moreover, the U.S. Navy is considering placing nuclear-armed missiles on some of its Virginia class attack submarines and is actively developing a next generation SSBN boat, the Columbia class. The second weakness of Russian nuclear forces is that they are underfunded and less competent than their U.S. counterparts. Put simply, their equipment is less reliable, less available, and their leadership lower in quality. This is a problem for Russia in that the exigency of effective nuclear strike command, control, and operational competency is impossible to overstate. If one unit fails to deliver on its mission, an adversary could launch a counterstrike or its second wave strikes.

#### Our surrender argument is specifically true for Russia.

Martel 81 [William, DPhil, UMass Political Science, “A nuclear war-fighting strategy for the United States”, <https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=2900&context=dissertations_1>]

In the second model, surrender occurs when a nation ceases to fight after the war has begun. In contrast to the first option in which the United States would surrender before beginning a futile nuclear war, in this case it would surrender after a nuclear exchange. The criteria for this decision rests on the costs of the first exchange: U.S. versus Soviet losses, the size of U.S. and Soviet reserve forces, and the relative standing of the United States. Thus, the pressure to surrender could be irresistible if a nation sees itself in a losing position. Although surrender is not as "overt" as passing the sword from the defeated to the victorious general, unilateral cessation of hostilities by the United States is symbolic, especially if the Soviet Union sustains less casualties. In summary, nuclear war is limited if the United States or the Soviet Union terminates hostilities before its nuclear arsenal is depleted. This is, therefore, the definition of limited nuclear war.

Empirically proven – after we nuked Japan in World War II, they immediately surrendered and we disbanded their military, stopping the tech advances that THEY had in the pipeline.

#### Russia without nukes couldn’t compete with us on anything

Weitz 18 [Richard, Director, Center for Political-Military Analysis @ Hudson, “Exploiting Sino-Russian Nuclear Divergence,” Hudson, <https://www.hudson.org/research/14601-exploiting-sino-russian-nuclear-divergence>]

Several possible reasons explain these contrasting responses. First, Russian leaders are preoccupied with nuclear capabilities because Moscow relies on them to maintain great power status. Without nuclear weapons, Russians rightly fear their country would become a regional power of limited international influence – the dread of Russian strategists.

#### They wouldn’t even be a sovereign state

Couretas 9 [John, “Patriarch Kirill: Russia needs nuclear weapons”, <http://www.aoiusa.org/patriarch-kirill-russia-needs-nuclear-weapons>]

The head of Russia’s Orthodox Church said on Friday that Russia needed nuclear weapons. Speaking in the Volga Region town of Sarov, Patriarch Kirill of Moscow and All Russia said that while the Church was in favor of “a world without weapons,” Russia required nuclear arms to ensure that it was able to “remain a sovereign state.” Sarov is the center of Russia’s nuclear weapon industry and closed to foreigners. Speaking before several thousand young people, the patriarch said “the reason for war is sin and evil in man’s heart,” and that peace can only be guaranteed by “fighting against sin.” “You can have excellently developed systems of international law, international organizations, but fall into the abyss of war,” he added.

If conventional war with Russia started or was imminent, the US would use nukes first. The Pentagon would feel pressured to conduct a damage-limitation strike on Russia because it’s a core element of our warfighting policy here is MORE ev.

Oliker 18 [Olga, senior associate of the Russia and Eurasia Program at the Center for Strategic and International Studies, “The Nuclear Posture Review and Russian ‘De-Escalation:’ A Dangerous Solution to a Nonexistent Problem,” War on the Rocks, <https://warontherocks.com/2018/02/nuclear-posture-review-russian-de-escalation-dangerous-solution-nonexistent-problem>]

Second, the argument that capabilities prove intent works both ways. The United States also has low-yield nuclear capabilities (and will have more if proponents have their way). Should Russia therefore expect the United States to use nuclear weapons first if American conventional forces were losing, say in a fight against Russia over Ukraine? Indeed, such an approach would be consistent with the American doctrine outlined in the new Nuclear Posture Review.

#### We go first.

Roberts 17 [PhD @ University of Virginia, former assistant secretary of the Treasury for Economic Policy and associate editor of The Wall Street Journal, “Washington Plans to Nuke Russia and China,” PCR, <https://www.paulcraigroberts.org/2017/04/27/washington-plans-nuke-russia-china>]

Not everyone likes to hear about the threat of nuclear war. Some find refuge in denial and say that nuclear war is impossible because it makes no sense. Unfortunately, humankind has a long record of doing things that make no sense. In previous posts in recent years I have pointed out both written documents and changes in US war doctrine that indicate that Washington is preparing a preemptive nuclear attack on Russia and China. More recently, I have shown that Washington’s demonization of Russia and President Putin, the incessant lies about Russian deeds and intentions, and the refusal of Washington to cooperate with Russia on any issue have convinced the Russian government that Washington is preparing the Western populations for an attack on Russia. It is obvious that China has come to the same conclusion.

#### C3I entanglement proves – none of their evidence assumes this.

Zhao et al. 18 [Tong, fellow @ Carnegie, PhD in Science, Technology, and International Affairs @ Georgia Institute of Technology, MA in International Relations @ Tsinghua University, “Reducing the Risks of Nuclear Entanglement,” <https://carnegieendowment.org/2018/09/12/reducing-risks-of-nuclear-entanglement-pub-77236>]

Chinese or Russian non-nuclear strikes against the United States could also spark escalation—a risk that has been overlooked since the Cold War—for reasons other than crisis instability. The risk would be most acute if China or Russia launched non-nuclear attacks against dual-use U.S. C3I assets (including early-warning and communication satellites, as well as ground-based radars and transmitters). Even if conducted exclusively for the purpose of winning (or at least not losing) a conventional war, such non-nuclear attacks could be misinterpreted by Washington as preparations for nuclear use. As a result, Washington might come to believe (wrongly) that it was about to become the victim of a nuclear attack—an effect termed misinterpreted warning. For example, China or Russia might attack U.S. early-warning satellites to enable their regional non-nuclear ballistic missiles (or, perhaps, non-nuclear ICBMs or boost-glide weapons in the future) to penetrate U.S. missile defenses. However, such an attack might be misinterpreted by the United States as an attempt to disable missile defenses designed to protect the homeland against limited nuclear strikes. Even if the United States did not believe that nuclear use by an adversary was imminent, it might still worry that non-nuclear strikes against its dual-use C3I assets could compromise its ability to limit the damage it would suffer if the war turned nuclear at some later point. Such damage-limitation operations, which are an acknowledged part of U.S. nuclear strategy, would probably involve nuclear or non-nuclear attacks on the adversary’s nuclear forces backed up by missile defenses. To have any chance of success, these operations would require very sophisticated C3I capabilities (to target mobile missiles, for example). Attacks on—or even perceived threats to—these C3I assets (many of which are dual use) could lead to concerns in Washington that, unless it took action now, effective damage limitation might be impossible—that is, the damage-limitation window might already have closed—if the war turned nuclear. The United States might respond to either of these concerns in ways that could further escalate the crisis. Washington would probably take steps to protect surviving C3I capabilities. It might, for example, attack anti-satellite weapons that were seen as particularly threatening. Such strikes could prove especially escalatory if they were conducted deeper inside the adversary’s borders than the United States had previously struck. Alternatively, or additionally, Washington might issue explicit or implicit nuclear threats against nuclear use or further attacks on C3I assets. In fact, the 2018 U.S. Nuclear Posture Review even goes so far as to threaten to use nuclear weapons in response to attacks on C3I assets. Risk mitigation will likely prove challenging. China may not want to disentangle its nuclear and non-nuclear forces because doing so might weaken its ability to deter U.S. attacks against the latter and because such disentanglement might prove challenging organizationally for the People’s Liberation Army Rocket Force (which operates China’s land-based nuclear forces). For Russia, the financial costs associated with disentanglement are likely to be a significant barrier. Moreover, inadvertent escalation is not generally regarded as a serious risk in China or Russia. Unfortunately, the belief that inadvertent escalation is unlikely actually makes it more probable because it leaves political and military leaders less inclined, in peacetime, to take steps that could mitigate the risks and more inclined, in wartime, to interpret ambiguous events in the worst possible light. Although there is more acceptance of the possibility of inadvertent escalation in the United States, there is little evidence that the U.S. government and military have fully factored the risks of entanglement into procurement policies and war planning. There is also little evidence that the administration of President Donald Trump is willing to invest significant political capital in reducing the risk of inadvertent escalation.

#### The US will strike first

Roberts 17 [PhD @ University of Virginia, former assistant secretary of the Treasury for Economic Policy and associate editor of The Wall Street Journal, “Washington Plans to Nuke Russia and China,” PCR, <https://www.paulcraigroberts.org/2017/04/27/washington-plans-nuke-russia-china>]

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