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## 1

#### Megaconstellations are key to solve illegal fishing

Karlis, 2019

Nicole Karlis is a staff writer at Salon. “Why SpaceX's plan to put 25,000 satellites in orbit is bad news for astronomers”, PUBLISHED NOVEMBER 12, 2019 7:50PM (EST), <https://www.salon.com/2019/11/12/why-spacexs-plans-to-put-25000-satellites-in-orbit-could-ruin-astronomy/>, accessed 12/5/21, sb

Indeed, those who study space fear these satellites are just the beginning of more technology commercializing space. “These mega-constellations are just beginning,” Danica Remy, president of b612 told Salon in an emailed statement. “The LEO satellite traffic problem is only going to grow. At the same time with the growth of communication satellites, like the ones SpaceX launched, humanity is collectively launching many more constellations.” She added: “They will be able to do things like track methane gas, illegal fishing in the seas, human migration from war and famine, water levels, fires, and fire management and many more things that we are just starting to imagine, develop and deploy.”

#### Overfishing destroys the oceans

Rader 2-26-14 [Douglas, Environmental Defense Fund's chief ocean scientist, “Trending: Concern for ocean health and the resources to help,” http://www.edf.org/blog/2014/02/26/trending-concern-ocean-health-and-resources-help]

While great strides have been made in the eight years since the study was written, overall oceans' health continues to decline. Globally, nearly two-thirds of fisheries are in trouble with pollution, overfishing, and habitat loss all continuing to pose a very real threat to oceans and their resilience in the face of new threats, including climate change and ocean acidification.¶ Overfishing: The root cause of oceans decline¶ During our talk, Dr. Worm and I discussed these issues and took a deeper dive into **the root cause of oceans decline—overfishing**. The world’s population is rising steadily and is estimated to reach about 8 billion people by 2024 and 9 billion by 2040. As the population increases, so too does the world’s appetite for seafood. As a result, fish are taken out of the ocean faster than they can reproduce. **This can cause** obvious problems up to and including **extinction of especially vulnerable species** (thus the catchy but grim headline on the HuffPo story, “Scientists Predict Salt-Water Fish Extinction”).¶ Frankly, extinction is not the biggest problem. Overfishing reduces the abundance of vulnerable species, but it also alters ecosystem structure and function, as other species react to the reduced abundance through what ecologists call “ecological cascades.” Valuable large fish that help maintain stable ocean ecosystems can be replaced by more opportunistic, “weedy” species. Under severe fishing pressure, the ability of marine food webs to sustain themselves can be compromised – a real problem with the challenges that lie ahead from climate change.¶ When our oceans suffer, we do too. Overfishing affects the three billion people around the world who rely on seafood as a source of protein and millions more that depend on healthy fisheries for their livelihoods. Furthermore, poor management costs the world’s fisheries $50 billion annually.

#### Extinction

Craig 2003 (Robin Kundis Craig, Associate Professor at Indiana University School of Law, “Taking Steps Toward Marine Wilderness Protection”, McGeorge Law Review, Winter)

Biodiversity and ecosystem function arguments for conserving marine ecosystems also exist, just as they do for terrestrial ecosystems, but these arguments have thus far rarely been raised in political debates. For example, besides significant tourism values - the most economically valuable ecosystem service coral reefs provide, worldwide - coral reefs protect against storms and dampen other environmental fluctuations, services worth more than ten times the reefs' value for food production. 856 Waste treatment is another significant, non-extractive ecosystem function that intact coral reef ecosystems provide. 857 More generally, "ocean ecosystems play a major role in the global geochemical cycling of all the elements that represent the basic building blocks of living organisms, carbon, nitrogen, oxygen, phosphorus, and sulfur, as well as other less abundant but necessary elements." 858 In a very real and direct sense, therefore, human degradation of marine ecosystems impairs the planet's ability to support life. Maintaining biodiversity is often critical to maintaining the functions of marine ecosystems. Current evidence shows that, in general, an ecosystem's ability to keep functioning in the face of disturbance is strongly dependent on its biodiversity, "indicating that more diverse ecosystems are more stable." 859 Coral reef ecosystems are particularly dependent on their biodiversity. [\*265] Most ecologists agree that the complexity of interactions and degree of interrelatedness among component species is higher on coral reefs than in any other marine environment. This implies that the ecosystem functioning that produces the most highly valued components is also complex and that many otherwise insignificant species have strong effects on sustaining the rest of the reef system. 860 Thus, maintaining and restoring the biodiversity of marine ecosystems is critical to maintaining and restoring the ecosystem services that they provide. Non-use biodiversity values for marine ecosystems have been calculated in the wake of marine disasters, like the Exxon Valdez oil spill in Alaska. 861 Similar calculations could derive preservation values for marine wilderness. However, economic value, or economic value equivalents, should not be "the sole or even primary justification for conservation of ocean ecosystems. Ethical arguments also have considerable force and merit." 862 At the forefront of such arguments should be a recognition of how little we know about the sea - and about the actual effect of human activities on marine ecosystems. The United States has traditionally failed to protect marine ecosystems because it was difficult to detect anthropogenic harm to the oceans, but we now know that such harm is occurring - even though we are not completely sure about causation or about how to fix every problem. Ecosystems like the NWHI coral reef ecosystem should inspire lawmakers and policymakers to admit that most of the time we really do not know what we are doing to the sea and hence should be preserving marine wilderness whenever we can - especially when the United States has within its territory relatively pristine marine ecosystems that may be unique in the world. We may not know much about the sea, but we do know this much: if we kill the ocean we kill ourselves, and we will take most of the biosphere with us. The Black Sea is almostdead, 863 its once-complex and productive ecosystem almost entirely replaced by a monoculture of comb jellies, "starving out fish and dolphins, emptying fishermen's nets, and converting theweb of life into brainless, wraith-like blobs of jelly." 864 More importantly, the Black Sea is not necessarily unique.

## 2

#### Chinese and Russian hypersonics already here and will be used – mega-constellations are uniquely key to tracking and interception – no alternatives

Erwin 18 (Sandra, SpaceNews Staff Writer and covered the military, the Pentagon, Congress and the defense industry for nearly two decades as editor of NDIA’s National Defense Magazine and Pentagon correspondent for Real Clear Defense, “U.S. would need a mega-constellation to counter China’s hypersonic weapons” <https://spacenews.com/u-s-would-need-a-mega-constellation-to-counter-chinas-hypersonic-weapons/)SLAIR> recut 12/15/21 VD

The Pentagon admittedly is already five to 10 years behind in the development of an anti-missile system to thwart advanced hypersonic weapons that are now being tested by China and Russia. The good news for the Defense Department is that the commercial space technology boom that is fueling the development of mega-constellations could help the military reach that goal. The Pentagon is studying options to build a space-based surveillance network to fill blind spots in the nation’s current defenses — which were designed to counter ballistic missiles that fly on a predictable arch-shaped pattern. To detect and track hypersonic weapons — which fly into space at supersonic speeds and then descend back down to Earth directly on top of targets — the answer is a large constellation of small satellites. “Our response has to be a proliferated space sensor layer, possibly based off commercial space developments,” said Undersecretary of Defense for Research and Engineering Michael Griffin. The hypersonic threat brings a “new urgency” that the United States has not seen since the Cold War and that demands a different type of thinking about the architecture, Griffin told reporters on Wednesday at the Space & Missile Defense Symposium. The only way to provide global coverage and not go bankrupt installing radars on the ground is to go to space. Griffin cautioned that the traditional approach to developing “exquisite” military satellites is not going to work in this case. The Pentagon already has a sophisticated network of early warning satellites that detect missile launches. Another layer of sensors will be needed in the future for “persistent, timely global, low-latency surveillance to track and provide fire control for hypersonic threats.” Details such as how many satellites, in what orbits, at what altitudes have yet to be worked out. The Missile Defense Agency, which Griffin oversees, was designated the Pentagon’s “executive agent” for hypersonic defense. Griffin said the United States for decades has conducted its own hypersonic weapons development but chose to not weaponize the technology. “Our enemies have, so we have to respond,” he said. “The first step in that response absolutely has to be a sensor layer from space.” There are no alternatives, “unless you plan to wallpaper the Earth with radars,” he said. This is not a mission that can be done realistically from the ground or the oceans. “You would need a lot of radars that are very expensive and themselves become targets,” Griffin said. “That’s not an acceptable defensive posture. The only way to see these things coming is from space.” The military’s early warning satellites in geosynchronous earth orbit cannot do this mission. “Hypersonic vehicles are hard to see from high orbit because they are not as bright. They’re a factor of 10 or more dimmer than strategic missiles. So we have to get closer to see them and track them.” The Pentagon during the Clinton administration conceived a plan for a 24-satellite LEO constellation to track missiles, but it never got off the ground. The Bush White House ordered two satellites from Northrop Grumman, known as the Space Tracking and Surveillance System. These were experimental satellites that were supposed to last only three or four years but are still in operation. Two satellites in LEO, however, cannot cover the globe. “We know that this can be done,” said Griffin. “To me this is not a technology challenge, this is a policy decision. Is the United States going to deploy a space layer so we can track the Chinese hypersonic threat from cloud break forward? The answer had better be yes.” Like any major defense procurement, the space sensor layer will have to be approved by the White House and get support from Congress. The 2019 National Defense Authorization Act adds $140 million to the Missile Defense Agency’s budget for the development hypersonic defense capabilities. In the absence of a capable hypersonic defense, the U.S. military in a future war would be vulnerable to China’s long-range tactical hypersonic weapons. “The Chinese have been thoughtful in their missile development,” said Griffin. “They have focused on tactical precision guided systems that could be really influential in a conventional fight,” he said. “The Chinese would hold our forward-deployed assets at risk. And that’s something to which we have to respond.”

#### Hypersonics cause nuclear war – warhead ambiguity causes retaliation

Klare 19 (Micheal Klare, Michael T. Klare is a Five Colleges professor of Peace and World Security Studies, whose department is located at Hampshire College (Amherst, Massachusetts, USA), defense correspondent of The Nation magazine and author of Resource Wars and Blood and Oil: The Dangers and Consequences of America's Growing Petroleum Dependency (Metropolitan). Klare also teaches at Amherst College, Smith College, Mount Holyoke College and the University of Massachusetts Amherst.Klare serves on the board of directors of the Arms Control Association. He is a regular contributor to many publications including The Nation, TomDispatch and Mother Jones, and is a frequent columnist for Foreign Policy In Focus., 6-28-2019, accessed on 1-14-2021, Armscontrol, "An ‘Arms Race in Speed’: Hypersonic Weapons and the Changing Calculus of Battle | Arms Control Association", https://www.armscontrol.org/act/2019-06/features/arms-race-speed-hypersonic-weapons-changing-calculus-battle#endnote12) [Lynbrook AG]

Escalation Risks and ‘Entanglement’ Many weapons can be employed for offensive and **defensive purposes**, but **hypersonic** weapon**s**, especially those designed for use in a regional context, are primarily intended to be used **offensively**, to destroy high-value enemy assets, including **command-and-control facilities**. This raises two major concerns: the risk of **rapid escalation** from a **minor** crisis to a **full-blown war** and the unintended escalation from **conventional** to **nuclear warfare.** That hypersonic weapons are being designed for **offensive use** at an **early stage in a conflict** has been evident in U.S. strategic policy from the beginning. Claiming that a major adversary might try to hide or move critical assets at the outbreak of a crisis to protect them from U.S. air and missile strikes, the Pentagon hoped the prompt global-strike program would enable U.S. forces to attack those targets with minimal warning. As this program got under way, hypersonic weapons became the technology of choice for its implementation. “Systems that operate at hypersonic speeds … offer the potential for military operations from longer ranges with shorter response times and enhanced effectiveness compared to current military systems,” states the U.S. Defense Advanced Research Projects Agency. Such munitions, it adds, “could provide significant payoff for future U.S. offensive strike operations, particularly as adversaries’ capabilities advance.”12 Most of the hypersonic weapons being developed by the U.S. military, including the Air Force cruise missile and the Navy’s sea-launched system, are intended for strikes against key enemy assets at an early stage of conflict, when speed confers a significant advantage. Certain Russian weapons, such as the Kinzhal, also seem intended for this purpose. Some analysts fear that the mere **possession** of such weapons might induce leaders to escalate a military clash at the very outbreak of a crisis—believing their early use will confer a significant advantage in any major engagement that follows—while **reducing the chances** of keeping the fighting **limited**. It is easy to imagine, for example, how a **clash** between U.S. and **Chinese naval vessels** in the **South China Sea**, accompanied by signs of an air and naval mobilization on either or both sides, might prompt one combatant to launch a **barrage of hypersonic weapons** at all those ships and planes and their command-and-control systems, hoping to prevent their use in any full-scale encounter. This might make sense from a military perspective, but would undoubtedly prompt a fierce counterreaction from the injured side and restrict efforts to halt the fighting at a lower level of violence. The introduction of **hypersonic weapons** also raises concerns over the **escalation** from **conventional** to **nuclear warfare.** The United States has focused primarily on the development of hypersonic weapons carrying conventional warheads, but there is no fundamental reason why they could not be nuclear armed. Indeed, Russia’s Avangard missile is intended to deliver a nuclear warhead, and it is assumed that China’s DF-ZF is also designed with this in mind. This leads to what is called “**warhead ambiguity**”: the risk that a **defending nation**, aware of an enemy’s **hypersonic launch** and having **no time** to assess the warhead type, will **assume the worst** and **launch** its own **nuclear weapons**.13 Concern over this risk has led the U.S. Congress to bar funding for the development of ICBM-launched hypersonic glide vehicles, thereby helping to propel the Pentagon’s shift away from such systems and toward the development of medium-range weapons more suitable for use in a regional context. Nevertheless, **warhead ambiguity** will remain a feature of any future landscape involving the deployment of **multiple hypersonic weapons**, as a defender will **never be certain** that an enemy’s assault is **entirely non-nuclear**. With as little as **five minutes** to **assess an attack**—the time it would take a hypersonic glide vehicle to traverse **2,000** **miles**—a defender would be understandably **hard pressed** to avoid **worst-case assumptions.**

## 3

#### Constellations are key to natural disaster response – saves lives

Grant, 2019 – former University of Pretoria Computer Science Department Visiting Professor, PhD in AI

Tim Grant, Retired But Active Researchers (R-BAR), Benschop, The Netherlands, “Tsunami of Smallsat Mega-Constellations: C2 implications.” In Alberts, D.S. (ed.), Proceedings, 24th International Command & Control Research & Technology Symposium (ICCRTS 2019), Laurel, MD, 29-31 October 2019, paper 45. 24th International Command & Control Research & Technology Symposium, <https://www.researchgate.net/profile/Tim-Grant-9/publication/337286466_Tsunami_of_Smallsat_Mega-Constellations_C2_implications/links/5dcecce192851c382f4081f3/Tsunami-of-Smallsat-Mega-Constellations-C2-implications.pdf>, accessed 12/2/21, sb

In major natural disasters and military operations, terrestrial networks, both fixed and cellular, are usually destroyed, heavily disrupted, or overwhelmed by demand. This happened, for example, during the 2010 Haiti earthquake7 and the 2013 Haiyan (a.k.a. Yolanda) typhoon8 in the Philippines. Towns may be cut off for days, local communities and NGOs in the affected area are unable to organize themselves, and victims fail to receive attention. By contrast, the comsat constellations are highly likely to survive the natural and man-made forces that destroy or disrupt terrestrial networks (NBC, 2015). Towns will no longer be cut off. Local communities that have (or are given) user terminals will be able to organize their response more quickly via the constellations. Victims can be located and rescued, and NGOs can operate more normally.

#### Unchecked natural disasters risk extinction

Sid-Ahmed 5 – Mohamed Sid-Ahmed, Managing Editor for Al-Ahali, “The Post-Earthquake World”, Al-Ahram Weekly, Issue #724, 1-12, http://weekly.ahram.org.eg/2005/724/op3.htm

The year 2005 began with a calamity, resulting not from conflicts between people but from an unprecedented natural disaster that has so far claimed over 155,000 lives, a figure that is expected to rise still more over the coming period. Is this Nature's reaction to the abuse it is suffering at the hands of the human race, its revenge on us for challenging its laws beyond acceptable limits?

The earthquake that struck deep under the Indian Ocean was the strongest in over a century. What is still more critical is that what we have witnessed so far is only the beginning of the catastrophe. According to a spokesman from the World Health organisation, "there is certainly a chance that we could have as many dying from communicable diseases as from the tsunamis". The logistics of providing the survivors with clean water, vaccines and medicines are formidable, and, with many thousands of bodies lying unburied, epidemics spread by waterborne diseases are expected to claim many thousands of victims. There is also the possibility of seismic activity elsewhere in the world because disturbances in the inner structure of the earth's crust have occurred and there are no means to foresee how they will unfold. Will they build up into still broader disarray and eventually move our planet out of its orbit around the sun? Moreover, even if we can avoid the worse possible scenario, how can we contain the earthquake's effects ecologically, meteorologically, economically and socially?

The contradiction between Man and Nature has reached unprecedented heights, forcing us to re-examine our understanding of the existing world system. US President George W Bush has announced the creation of an international alliance between the US, Japan, India, Australia and any other nation wishing to join that will work to help the stricken region overcome the huge problems it is facing in the wake of the tsunamis. Actually, the implications of the disaster are not only regional but global, not to say cosmic. Is it possible to mobilise all the inhabitants of our planet to the extent and at the speed necessary to avert similar disasters in future? How to engender the required state of emergency, that is, a different type of inter-human relations which rise to the level of the challenge before contradictions between the various sections of the world community make that collective effort unrealisable?

The human species has never been exposed to a natural upheaval of this magnitude within living memory. What happened in South Asia is the ecological equivalent of 9/11. Ecological problems like global warming and climatic disturbances in general threaten to make our natural habitat unfit for human life. The extinction of the species has become a very real possibility, whether by our own hand or as a result of natural disasters of a much greater magnitude than the Indian Ocean earthquake and the killer waves it spawned. Human civilisation has developed in the hope that Man will be able to reach welfare and prosperity on earth for everybody. But now things seem to be moving in the opposite direction, exposing planet Earth to the end of its role as a nurturing place for human life.

Today, human conflicts have become less of a threat than the confrontation between Man and Nature. At least they are less likely to bring about the end of the human species. The reactions of Nature as a result of its exposure to the onslaughts of human societies have become more important in determining the fate of the human species than any harm it can inflict on itself.

Until recently, the threat Nature represented was perceived as likely to arise only in the long run, related for instance to how global warming would affect life on our planet. Such a threat could take decades, even centuries, to reach a critical level. This perception has changed following the devastating earthquake and tsunamis that hit the coastal regions of South Asia and, less violently, of East Africa, on 26 December.

This cataclysmic event has underscored the vulnerability of our world before the wrath of Nature and shaken the sanguine belief that the end of the world is a long way away. Gone are the days when we could comfort ourselves with the notion that the extinction of the human race will not occur before a long-term future that will only materialise after millions of years and not affect us directly in any way. We are now forced to live with the possibility of an imminent demise of humankind.

#### Disasters cause Indonesian deforestation

Tipson 13 – Frederick S. Tipson, Adviser to the USIP Center of Innovation on Science, Technology, and Peacebuilding, MA in International Relations from Yale, JD and PhD Degrees from the University of Virginia, “Natural Disasters as Threats to Peace”, USIP Special Report, February, p. 6-7

Political Catalysts

Natural disasters can dramatically expose deep social inequities and government indifference or incompetence, fomenting opposition movements. In 1970, the government in western Pakistan responded so poorly to the cyclone that struck eastern Pakistan that it strongly contributed to the secession of what became Bangladesh. The Nicaraguan earthquake in 1972 fatally discredited the Somoza regime. The Myanmar government’s heartless response to Cyclone Nargis in 2008 was likely a further factor in the military regime’s political vulnerability and may have accelerated the recent transition there. An unprecedented drought in Syria from 2006 to 2010 disrupted agriculture in regions that then became strong supporters of the armed resistance.26 The rise in global food prices that began with a severe drought in Russia in the summer of 2010 was a key factor in provoking popular uprisings in various Arab states the following year.27

An earthquake and tsunami near Jakarta—40 percent of which is below sea level and frequently inundated by heavy rains—could render much of that city uninhabitable and set back Indonesia’s economic growth and democratic development for years. It could also reduce the country’s ability to cooperate on global issues, such as deforestation or pandemic prevention, on which its involvement has been crucial.28 An earthquake in Karachi or Delhi or a major flood in Mumbai or Lagos could cripple the economies of their respective countries and further degrade the effectiveness of government authorities to avoid serious ethnic, sectarian, or even international conflicts. Major deterioration of any one of these cities could undermine the stability of their respective regions, with direct economic and possibly military consequences for the United States. Weak governments or failed states lack the capacity to prevent even moderate disasters from becoming severe crises. For any of the above scenarios, it is insufficient for only government agencies to be aware or prepared. As the extent of global fragility in the face of natural disasters becomes more widely felt, the public may sense the start of a regional or even global slide toward scarcities of various kinds, leading to political pressures for more secure sources of necessities. Such pressures increase the risk of international confrontation and present opportunities for exploitation by terrorists, criminals, or fanatics who see increased mayhem as in their interest.29

#### Extinction---they’re the lungs of the Earth

Sutherlin 15 – Laurel Sutherlin, Rainforest Action Network's Communications Manager for the Forest Program, “We Fight For Forests”, http://www.ran.org/we\_fight\_for\_forests#basic

Even if you live thousands of miles away from the nearest rainforest, they are essential to your survival.

Rainforests truly are the lungs of our planet. They produce vital oxygen for all of us while providing homes for millions of people and some of the world’s most threatened and endangered animals.

Despite the fact that we all rely on rainforests, we are currently losing an acre every second for commodities like palm oil, cattle, biofuels, soya, wood and paper.

But ecologically and culturally significant rainforests still remain, which means we have the opportunity to be the generation that makes sure it stays that way. But we must take immediate action.

Right now, the rainforests facing the most urgent threats are in Indonesia and Malaysia. Horrifyingly, Indonesia ranks third in total global greenhouse emissions--behind China and the United States--due to the uncontrolled clearing and burning of its rainforests and peatlands. If we don’t mount an all out effort to protect Indonesia’s forest landscapes, we will not only see climate emissions continue to skyrocket but we will lose unique cultures and livelihoods and irreplaceable animals like the orangutan forever.

So what can you do to help protect rainforests?

The leading cause of deforestation and land grabs in Indonesia is clearing and plantation development for palm oil production and pulp and paper. These commodities are being produced to feed international demand. In many cases, we are the customers being sold paper and palm oil-laced foods and other products fueling the loss of Indonesia’s forests. This means that working together we have power to change the situation. We are having real influence on the big corporate consumers of these products and they, in turn, are requiring changes to their suppliers’ policies and practices.

## 4

#### Megaconstellations key to sustain US arctic warfighting

Strout/Gould, 2020

Nathan Strout covers space, unmanned and intelligence systems for C4ISRNET. Joe Gould is the Congress and industry reporter at Defense News, covering defense budget and policy matters on Capitol Hill as well as industry news. “Will SpaceX and OneWeb help the military stay connected in the Arctic?”, Feb 24, 2020, <https://www.c4isrnet.com/battlefield-tech/c2-comms/2020/02/24/will-spacex-and-oneweb-help-the-military-stay-connected-in-the-arctic/>, accessed 12/2/21, sb

The military wants to experiment with commercial satellites from OneWeb and SpaceX’s Starlink mega-constellations to keep war fighters connected in the Arctic, but it will need extra funding to do so. Those companies aim to provide internet access via proliferated constellations made up of thousands of small satellites in low earth orbit. The military has been keen on leveraging this growing commercial capability, and the Air Force has awarded contracts to test how the satellite broadband service can be used by war fighters. Now the commander of the United States Northern Command and the North American Aerospace Defense Command is expressing interest in using these commercial space internet services to provide communications in the polar regions, where satellite communications have traditionally been more limited. Gen. Thomas O’Shaughnessy is seeking $130 million for the effort, which he has listed as his number one unfunded priority for fiscal year 2021. In a Feb. 11 letter to Congressional defense committees, O’Shaughnessy explained the money will be used for polar communications experiments and the fielding of prototype terminals capable of utilizing Starlink and OneWeb satellites. Additionally, the commander expressed hope that these experiments will incentivize further commercial investments in satellite communications and internet in the Arctic. Full coverage will require an additional $110 million in fiscal year 2022, the document notes. OneWeb leaders have said they expect to have 24 hour coverage in the Arctic by early 2021. The request for polar communications funding was one of four unfunded priorities the commander sent to Congress. That funding is “focused on my most pressing needs of increasing our domain awareness and establishing a layered homeland defense architecture.”

#### Ceding the Arctic causes great power war.

Trujillo 19 [Michael Gregory Morgan; MA Polisci @ PSU; 2019; “Arctic Security: the Race for the Arctic through the Prism of International Relations Theory”; <https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=5895&context=open_access_etds>; Recut-Lowell-TT]

Russian northern forces atrophied before Putin sought a sphere of influence in 2008, while the U.S. has been reluctant to focus on the Arctic because they have other issues around the globe. This gives Russia a regional advantage over any Western military. However, the DOD committed to invest and improve American forces to deter aggression in the Arctic (DOD 2016). Putin and Russia will negatively view any U.S. or NATO militarization of the region, possibly triggering an arms race. However, the DOD cautions against spending too much time, money and effort in the region with other, high threat risks and austerity (DOD 2010). This could allow the U.S. to escape from the security dilemma, but possibly underestimate Putin’s desire for a sphere of influence. The U.S. cedes regional hegemon status to Russia and China, allowing the two states to forge a new regional order that resembles the Silk Road, thus returning the world to two economic blocks. As Cold War 2.0 gets underway, militaries will posture, and proxies might fight, but due to nuclear weapons, neither bloc will directly confront each other. Under a new order, China and Russia will keep the region stable to increase economic investment and opportunities, while China seeks to become the global economic juggernaut via the Silk Road. Another possibility is Russia will argue they are protecting Russian minorities to occupy areas that don’t trigger a NATO reaction. With various agreements and claims on Arctic territory, Russia might try to occupy a NATO member’s territorial claim like Denmark’s. Without any deaths, NATO is unlikely to invoke Article Five because of its slow decision-making structure and defense cuts, leaving members to most likely debate the issue without any action (Eyal 2014). “As presently postured, NATO cannot successfully defend the territory of its most exposed members” (Shlapak and Johnson 2016 p. 6). This gives Russia an incentive to increase the size of their economic bloc while being able to use Peter the Great and Soviet historical claims of returning Russia to superpower imperial status. Russia can ignore the norms of territorial aggression due to inadequate NATO defense and their regional offensive advantage (Shirreff 2016). If Russia claimed territory in either the Baltic or the Arctic, Moscow would quickly work to annex that land to make it part of the Russian Federation. NATO would either have to accept the occupation or launch a counter-offensive that might develop into a nuclear war, both bad options for the West (Shlapak and Johnson 2016). If the U.S. accepted occupation, a new Russian sphere of influence would be created and another Berlin-like wall or ship patrols potentially would fortify the new border. Depending on whether the collective defense agreement failed to protect another member’s sovereignty, this would allow Russia to sow seeds to undermine NATO. However, like other Russian Arctic regulations, the U.S. will probably reject any new claims, arguing Russia is acting beyond its territorial waters. The U.S. argued in NSPD-66 the Navy can protect the freedom of navigation and U.S. interests in the Northern Sea Route (U.S. Navy 2014). The U.S. may exercise their sovereign rights in the Arctic to protect natural resources since energy is a national interest (White House 2009). This worries Russia, as they are concerned an ice-free Arctic will allow Western warships with missile systems to travel into their EEZ (Russian Federation 2015). However, Russia has argued they have the localization dominance due to their coastline, icebreaker fleet and military strength in the region. The U.S. doesn’t have any plans to match Russia’s regional dominance preventing a security dilemma. Since the end of World War II, states have either jockeyed for power and position within various international organizations or tried to limit the expansion of those organizations to ensure more unilateral actions if necessary. States will use international organizations like UNCLOS and Arctic Five to try to legally exclude other states from developing resources while ensuring their future economy won’t be impeded by regulations or other states. Once Russia establishes a boundary and favorable regional governance, they will secure the area to protect Chinese trade. Whenever a new regional order is established, the marriage of convenience might end as both Russia and China seek to become the regional economic hegemon, causing tension between the two neighboring states. However, complex interdependence in the Arctic might keep the two states from using military force as they would hurt the Polar Silk Road economic development. Realism will become the best theory to describe Arctic relations when development costs become cheaper and transit safer due to the lack of ice. “The tectonic shifts that are happening are the rise of a powerful China… and the resurgence of a weak, but very dangerous, and well-armed Russia, so the return of a period of great power competition is happening” (Flournoy 2017). Also, the U.S. is “guided by a return to principled realism” (White House 2017). The risk of interstate war is increasing, and the Arctic is not immune to energy security and geopolitics (Coats 2018). Russia and China will seek to be the regional hegemon or create a sphere of influence since projecting force across the world is costly and hard. Under the One Belt, One Road initiative, China seeks to establish a trade block with sixty states, while hoping to shift the global economy to its favor, thus altering the global balance of power. China seeks safe Polar Silk Road routes protected by Russian forces. Once states have an Arctic regional sphere that suits them, states will protect their interests by any means necessary. The United States can either allow the new Polar Silk Road and a shift in the balance of power or seek to stymie the progress through sanctions/force. There will always be security competition, and it will be intense at times when states seek either regional or global hegemony.

#### U.S.-Russia war is an existential threat.

Cotton-Barratt ’17 [Owen; February 3; Research Associate at the Future of Humanity Institute, Lecturer in Mathematics at Oxford University, Ph.D. in Pure Mathematics from Oxford University; Global Priorities Project, “Existential Risk,” <https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf>; Recut-Lowell-TT]

1.1.1 Nuclear war The bombings of Hiroshima and Nagasaki demonstrated the unprecedented destructive power of nuclear weapons. However, even in an all-out nuclear war between the United States and Russia, despite horrific casualties, neither country’s population is likely to be completely destroyed by the direct effects of the blast, fire, and radiation.8 The aftermath could be much worse: the burning of flammable materials could send massive amounts of smoke into the atmosphere, which would absorb sunlight and cause sustained global cooling, severe ozone loss, and agricultural disruption – a nuclear winter. According to one model 9, an all-out exchange of 4,000 weapons 10 could lead to a drop in global temperatures of around 8°C, making it impossible to grow food for 4 to 5 years. This could leave some survivors in parts of Australia and New Zealand, but they would be in a very precarious situation and the threat of extinction from other sources would be great. An exchange on this scale is only possible between the US and Russia who have more than 90% of the world’s nuclear weapons, with stockpiles of around 4,500 warheads each, although many are not operationally deployed.11 Some models suggest that even a small regional nuclear war involving 100 nuclear weapons would produce a nuclear winter serious enough to put two billion people at risk of starvation,12 though this estimate might be pessimistic.13 Wars on this scale are unlikely to lead to outright human extinction, but this does suggest that conflicts which are around an order of magnitude larger may be likely to threaten civilisation. It should be emphasised that there is very large uncertainty about the effects of a large nuclear war on global climate. This remains an area where increased academic research work, including more detailed climate modelling and a better understanding of how survivors might be able to cope and adapt, would have high returns. It is very difficult to precisely estimate the probability of existential risk from nuclear war over the next century, and existing attempts leave very large confidence intervals. According to many experts, the most likely nuclear war at present is between India and Pakistan.14 However, given the relatively modest size of their arsenals, the risk of human extinction is plausibly greater from a conflict between the United States and Russia. Tensions between these countries have increased in recent years and it seems unreasonable to rule out the possibility of them rising further in the future.

## 5

#### Counterplan: Large Satellite Constellations by private entities are unjust.

#### Space policies are all grounded on representations of outer space and rely on a virtual relationship to space itself produced by mediated technological simulations — this virtual relationship erases territory as threat and risk becomes ubiquitous and requires a drive towards certainty that makes weaponization and conflict inevitable

Bormann 9 (Natalie Bormann – Teaching Professor at Northeastern University. “The lost dimension? A spatial reading of US weaponisation of space” Ch. 5 in *Securing Outer Space: International Relations Theory and the Politics of Space* (2009) pgs. 81-89. <https://books.google.com/books?id=xHt8AgAAQBAJ&pg=PA78&lpg=PA78&dq=virilio+and+%22outer+space%22&source=bl&ots=stoPb9axPg&sig=ACfU3U1kOc7P7ncw4EeHZ-k5I0XgAK6jbw&hl=en&sa=X&ved=2ahUKEwj9isOt_6XjAhWpxVkKHY5SB0MQ6AEwCXoECAkQAQ#v=onepage&q=virilio%20and%20%22outer%20space%22&f=false>, DOA: 8/1/19,)

The representation of a ‘battlefield’ and combat in and through space is certainly contingent in our reading of key documents; for instance, in 2001, the US Space Commission evoked the powerful image that the US is an ‘attractive candidate for another Pearl Harbor’ in space, making the case that weapons in space were needed to counter perceived US vulnerabilities in form of an attack on a virtual US territory and habitat in space. Further examples for the ways in which claims to spatiality are deeply implicated in the forging of US space weaponisation abound; they range from mapping outer space as a ‘final frontier’, the ‘ultimate high ground’, or a space that follows ‘the rules of the road’ for which there is a ‘space road map’. One finds these discourses generally embedded within the logic of the our/their space nexus coupled with the attributes of defending our space versus an offending other that allow for the drawing of the boundaries around space. In 2004, US Strategic Command (2004) contemplated that the first step in space control is identifying exactly what’s in orbit around the Earth, who it belongs to, and its mission. It goes on to claim that space control involves the ability to ‘ensure our use of space while denying the use to our adversaries. And lastly, the US National Space Policy of 1996 narrates a story along similar lines when it proposes the need to assure that ‘hostile forces cannot prevent our use of space’.

How does this matter? I argue that the task of tracing these constructions of spatiality, the meaning-giving of the ‘material’ as reality, is vital for the direction space policies have taken (and will continue to take). There is no spatiality – as produced in the aforementioned examples – that is not organised by the determination of frontiers and boundaries that in turn determine the space ‘inside’ these drawn lines. The virtual function of space weapons is what has allowed for the process of ‘drawing’ and mapping around ‘our space’, and has allowed for ‘stationing’ weapons to control, patrol and defend along a virtual territory with virtual frontiers (the extend of which has been determined by the reach of technology). The construction of a space of a certain kind, and the protection of its ‘new’ frontiers, is what precedes its weaponisation; it is what renders it meaningful. If we assume the construction of space, as opposed to the notion that space can be explored, then we need to ask: what has informed this process? What turns space into a battlefield?

‘[War] now takes place in “aero-electro-magnetic space”. It is equivalent to the birth of a new type of flotilla, a home fleet, of a new type of naval power, but in orbital space’ (Virilio 2000b). What should be clear by now is that material space is pre-constructed. According to Virilio, it is the technical that precedes the spatial. The possibility of new military technology underpins the ways we invent and organise our environment, geographies and landscapes. And it is the effects of technology which produces outer space as a place and authorises contingent action in support of weaponisation. This is not to suggest that technologies have an existence of and on their own and independent of social practice; of course, technology cannot be studied in isolation (see Bourdieu 1992).

The new technologies that allow us to penetrate outer space are producing new domains of experience and new modes of representations and perception. Now, that technology is deeply infatuated with current policies in outer space comes to no surprise, and we find ourselves amidst visions of ‘hyper-spectral imagery’, ‘advanced electro-optical warning sensors’ and ‘space-based radars and lasers’. While I am interested in these technologies of, and soon in, space I am even more interested in the ways in which they augment spatiality and accelerate claims to, and over, spatial authority. Thus, how do these technologies relate to space? Virilio is clear on this: to begin with, and to strip these technologies of their obfuscation, they shrink the planet (and space outwith the planet, the exoatmospheric); and they do so in two ways. First, Virilio insists that technologies lead to a doing away of spatial distance and the geo-strategic reference points that go with it. As the Rumsfeld Commission put it quite aptly, ‘Space enters homes, businesses, schools, hospitals and government offices’ (US Space Commission 2001). To take this notion further and to include the idea of a space-based laser as an example, from any given spot in outer space we will be able to strike and destroy each other at any given point and at any given time. Space stops to matter. The author contends that technologies therefore lead space to suffer from ‘torsion and distortion, in which the most elementary reference points disappear one by one’ (Virilio 1991: 30). The foreseeable deployment of a space-based laser, or, of a kinetic energy interceptor missile (designed to ‘hit and kill’ an incoming hostile missile) are testament to this sense of distortions insofar as space-based weapons would overcome the ‘location problem’ and the need of proximity close to target. As a recent study put it aptly, ‘interceptors fired from orbiting satellites could in principle defend the United States against ICBMs launched from anywhere on Earth [. . .]. Their coverage would not be constraint by geography’. The Transformation Study Report of 27 April 2001, reflects similar sentiments, claiming that ‘Space capabilities are inherently global, unaffected by territorial boundaries or jurisdirectional limitations’ [emphasis added]. It follows from here that, second, technologies ‘reduce-distance-reduce-reaction-time’ – or, as Virilio puts it much more eloquently: not only does technology deterritorialise space it also de-personalises it (and us in our relation to space). No doubt, outer space plays a key role in the ‘real-time’ enhancement of military operations on a global scale. Satellites are not only used to spot targets as they emerge and transmit data but they also allow us to offset weapons that meet these targets anywhere and at any time – instantly. The swiftness blurs if not erases the assumed (and familiar) distinction between offence and defence, which affects our views on spatiality insofar as the image of the battlefield can now become ubiquitous: ‘Every place becomes the front line’ (Virilio 1991: 132). Virilio further clarifies this for us; whereas in the past there was a sense that the ‘front’ is where the tanks are, now, he suggests, we assume that ‘where we find the satellites there is the fourth front’ (Virilio 2002: 3). This is furthered and amplified by the US Air Force vision that calls for ‘prompt global strike space systems with the capability to directly apply force from or through Space against terrestrial targets’ (US Air Force Space Command 2003). And fast forward to the present, the Quadrennial Defense Review of 2006 is clear in its visualisation for Intelligence, Surveillance and Reconnaissance in which it seeks to establish what it aptly terms an ‘unblinking eye’ over the ‘battlespace’ that suggests the instant, constant and ‘persistent surveillance’ of US space in outer space (Quadrennial Defense Review 2006: 55). For Virilio, this process of de-materialisation of space in outer space along these lines can turn into a de-realisation of the objectives of fighting and destruction, and as suggested by the problematic of proximity that this chapter addresses. There is no time left for reflecting on, and responding to, warfare and its mode of targeting, hitting, destruction and killing and, subsequently, no time to invent space differently. The author expresses this as the ‘dematerialization of armaments, de-personalisation of command, de-realisation of the aims of war’ (Virilio 2000: 87).

In an attempt to close the circle to the start of this chapter and draw the line back to the notion of an imagination of outer space as a battlefield – yet devoid of matter – consider the following: creating, fabricating, moulding and representing a field of combat in outer space, ubiquitous and instant in its ability to project modes of destruction and killing, in fact determines, reproduces and locks in the very existence and rationale of the need to defend space against an other, colonise space before a competitor can do so, and divide space into ‘ours’ and ‘theirs’. Put differently, the invention of outer space as a battlefield with the above ‘qualities’ assumes a notion of vulnerability and threat to that space – at any time and from anywhere – before it in fact becomes one. Thus, outer space as a sphere of permanent crisis in effect constitutes and constructs the very reality that it purports to counter. I am referring here to Carol Cohn’s (1987) argument that military projects pre-empt threats and threatening intentions. In the context of past US/Soviet rivalry she contends that, if one asks what the Soviets ‘can’ do, one quickly comes to assume that ‘that is what they intend to do’. In other words, strategic planning and the logic of worst-case-scenarios commit us to assume something will happen. Foucault’s notion of ‘technologies of normalization’ springs to mind by way of summary, and by which the author depicts technology as an essential component in the systematic creation, classification and control of space, habitat and its claim to contingent action drawn from that control over that space.

I began this chapter by implicitly suggesting that the ‘problem’ of outer space lies in the fact that – unlike the ‘blue sky above us’ or the ‘Azure Coast’ in the Virilio quote at the outset – we cannot ‘see’ outer space; unlike the tanks, guns, and soldiers, on ground and air, we cannot ‘see’ the satellites, anti-satellite weapons and space-based lasers. Both the place of outer space and its reference points for space-based weapons are presented to us through that which we can know about them – a particular reality, a certain landscape, and as organised in a meaningful and common-sensical way. This is not to suggest, however, that what we ‘see’ (again, ‘the blue sky’) is not equally dependent on that which we can know about it. According to Virilio, there is ‘little’ physicality in our geographical vision; most of what we ‘see’ is achieved through certain modes of representation, technology, narrating, and so forth. In this sense, this chapter was interested in that which we cannot look at on, and from, Earth and in the distance – yet, which is always-already ‘Earth-bound’ and locally embedded. It was interested in the landscapes and geographies of outer space which we cannot ‘see’ and visualise – yet, which are presented to us and narrated as spatially contingent. And it was concerned with the military technologies in outer space which are ‘Earth-bound, locally embedded, and close to us’ – yet, which provide for the possibility of a mode of war fighting and destruction ‘from the distance’, clean and sanitised, instant and with no time left for reflection.

#### Technological control of outer space is what designs and upholds contemporary imperialism — the United States’ overwhelming satellite infrastructure generates unfettered economic and military domination of the world by means of arranging legal regimes and manufacturing emergencies to secure its role as the benevolent colonizer

Jason Beery, 2016, Ph.D. in Human Geography from University of Manchester, “Terrestrial Geographies in and of Outer Space”, Ch.1 in *The Palgrave handbook of society, culture and outer space*, Eds. Peter Dickens and James S. Ormrod, pgs. 64-67 [entire chapter pgs. 47-70]

While the legal regime was being negotiated, technological developments made human activity in outer space possible. Improved geophysical knowledge of the mechanics of Earth in space and of Earth's orbits brought with it speculation about how these orbits, and outer space more broadly, could be used to facilitate and improved existing activities on Earth, such as military reconnaissance, communication, navigation, scientific research, and weather forecasting. Much of the technological developments came in the form of artificial satellites. As scientific satellites recorded more measurements about the geophysical characteristics of Earth and the orbital environment, satellites were improved, even more potential uses and benefits imagined, and orbits were made into vital resources for terrestrial activities. In turn, these satellite technologies, made possible by the scientific and legal production of outer space, have been central tools in the production of contemporary terrestrial geographies. Over the last several decades, some geographers have employed satellite technology in their research, while others have examined how space technologies have been deployed, (re)shaped economic landscapes and often (re)produced the social relations under which they were developed.

Satellite technology has facilitated scientists' (geographers included) knowledge of terrestrial nature. Through various forms of photographic reconnaissance and measurement, remote sensing satellites have provided vast amounts of information about a wide variety of human and environmental spatial relations and processes, ranging from identifying hazardous environmental risk and impact areas, types vegetation covers, geological formations, water drainage patterns, fisheries, and fertile soils, to monitoring non-human animal movements, human movements, pollution, and land cover change, and to measuring sea-level rise, temperature changes, wind patterns, polar ice coverage, and other meteorological phenomena. Many geographers rely on and create such information in their own research. These images, measurements, and other scientific representations of Earth are contemporary constructions of terrestrial natures. Geographers and others, as demonstrated in this volume, through the creation, interpretation, or application of such representations, have contributed to the production of Earth. In addition, these representations of terrestrial natures have been performed in the spatial practice of many terrestrial activities, as highlighted in the introduction to this chapter, including environmental management, agriculture, urban planning, weather forecasting, military incursions, and resource extraction, all of which have reshaped terrestrial geographies by affecting how terrestrial spaces and natures are organized and incorporated (and by whom) into wider flows and processes.

Just like in previous centuries, these constructions of terrestrial space(s) and nature(s) are tied to existing political, economic, social, and environmental contexts and relations. In this context, satellite technology and outer space are means through which these relations themselves are reproduced. As Warf Observes, 'Although satellites circulate in outer space, their origins and impacts Occur very much on the ground' (2007, p. 385). Warf explains that satellite technologies have reflected terrestrial power relations (i) through large, longstanding imbalances in the number of satellites, especially communications and reconnaissance ones, and in the number of Earth stations between industrialized and developing countries, (ii) through imbalances again between industrialized and developing countries in participation in international satellite organizations, (iii) through re-regulation, neoliberalization, and privatization of major satellite networks such as Intelsat, which are primarily based in industrialized countries, and (iv) through the commodification of satellite-based and enabled products, such as photo imagery. 'Satellites', he argues, 'do not simply reflect the world's geopolitics, they are simultaneously constitutive of it, blurring the boundaries between earth and space' (2007, p. 395). Such imbalances, though, were always part of the outer space project. Even before the first satellites were launched, the US government envisioned potential military and commercial uses for satellite technology and sought to ensure, during the negotiation of the international legal regime, its ability to use orbits and satellites to their maximum political and economic advantage (Beery, 2011).

The US government's political and economic ambitions have played out through the geo-positioning and reconnaissance capabilities of satellites, which have aided the ability to extend and exert power across Earth. For example, the US military utilized these capabilities to carry out anti-terrorism operations in Afghanistan in the early 2000s (Beck, 2003), as it did again to locate and monitor the capture of Osama bin Laden (Whitlock & Gellman, 2013). These technologies offer (the US mostly) an Apollonian view-from-above (Cosgrove, 1994; MacDonald, 2007) that normalizes geopolitical activity through constant surveillance from orbit (MacDonald, 2007, p. 601). This view is also beneficial to the extension of corporate power and profits through the sale of vast numbers of routinely used products that use and rely on geo-positioning and navigation (MacDonald, 2007). Importantly, as MacDonald emphasizes, the use of this powerful satellite gaze to pursue US geopolitical and geoeconomic power is neither happenstance nor a mere Cold War artifact: some US government policy-makers and officials actively sought during the Cold War, and still seek today, to use space technologies to establish US dominance in outer space to dominate Earth (2007).

The gaze of non-military satellites, too, has been implicated in the perpetuation and extension of power and uneven social relations. Despite notions of the neutrality and objectivity of remote sensing and the communication of remotely sensed images, questions of power and control abound. Dodge and Perkins (2009, p. 48) point out, 'resolution and specifications vary, and despite apparent democratisation of access, "shutter control" remains firmly in the hands of powerful government institutions and unaccountable corporations. Beyond questions of what sites should be sensed and with what resolution, the satellite images must be 'grounded — that is, read, decoded, and contextualized — in order to signify anything other than its orbital perspective, to even remotely make sense' (Parks, 2005, p. 113). By 'grounding' images in this way, the ‘neutrality' of the image becomes inseparable from the multiple discourses that surround the sensed object, whether those discourses be ones of race, gender, class, colonialism, power, or some combination of these and others. Even when this remote sensing imagery in the hands of individuals, it may reflect and re-inscribe existing race and class divisions on a cyberlandscape, as was the case in the social online mapping of New Orleans after Hurricane Katrina hit the city in 2005 (Crutcher & Zook, 2009).

Although the production of outer space as a space free of sovereign claims, to which all countries should have access, and in which activities should be conducted for the benefit of humankind suggests equal access, use, and benefit, it has enabled economically developed countries to access outer space when and where they please. As such, they have placed large numbers of satellites in orbit, which have been fundamental in terrestrial political-economic infrastructures, flows and processes dominated by industrialized countries and their private companies over the last 50 years. By enabling military and civilian surveillance, establishing high-speed, long-distance communications networks, aiding navigation of goods and missiles, and forecasting weather for agricultural speculation, these infrastructures, flows, and processes have integrated and reshaped terrestrial geographies this last half-century. Although some developing countries have launched their own satellites into orbit, they have not done so at nearly the same magnitude, nor have they benefitted economically to the same degree (Beery, 2011). In these ways, outer space has been a means to contemporary imperial practices on Earth (Dickens & Ormrod, 2007). Indeed, the production of outer space has been central to the production of terrestrial uneven development over the past 50 years (Beery, 2011). The production of outer space and Earth remains tethered to the reification of terrestrial social relations and hierarchies of power.

## Case

### Collisions

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

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

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

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

**Space collision is hype---there are thousands of satellites and only 15 debris collisions ever**

Mark **Albrecht 16**, Chairman of the board of USSpace LLC & fmr. head of the National Space Council, “Congested space is a serious problem solved by hard work, not hysteria, 5/9/16, https://spacenews.com/op-ed-congested-space-is-a-serious-problem-solved-by-hard-work-not-hysteria/

There are over a half million pieces of human-made material in orbit around our planet. Some are the size of school buses, some the size of BB gun pellets. They all had a function at some point, but now most are simply space debris littered from 100 to 22,000 miles above the Earth. Yet, all behave perfectly according to the laws of physics. Many in the space community have called the collision hazard caused by space debris a crisis.

Popular culture has embraced the risks of collisions in space in films like Gravity. Some participants have dramatized the issue by producing graphics of Earth and its satellites, which make our planet look like a fuzzy marble, almost obscured by a dense cloud of white pellets meant to conceptualize space congestion.

Unfortunately, for the sake of a good visual, satellites are depicted as if they were hundreds of miles wide, like the state of Pennsylvania (for the record, there are no space objects the size of Pennsylvania in orbit). Unfortunately, this is the rule, not the exception, and almost all of these articles, movies, graphics, and simulations are **exaggerated and misleading**. Space debris and collision risk is real, but it **certainly** is **not a crisis.**

So what are the facts?

On the positive side, space is **empty** and it is **vast**. At the altitude of the International Space Station, **one half a degree** of Earth longitude is almost **40 miles long**. That same one half a degree at geostationary orbit, some 22,000 miles up is over 230 miles long. Generally, we don’t intentionally put satellites closer together than one-half degree. That means at geostationary orbit, they are no closer than 11 times as far as the eye can see on flat ground or on the sea: That’s the horizon over the horizon 10 times over. In addition, other than minute forces like solar winds and sparse bits of atmosphere that still exist 500 miles up, **nothing gets in the way of orbiting objects** and **they behave quite predictably**. The location of the smallest spacecraft can be predicated within a 1,000 feet, 24 hours in advance.

Since we first started placing objects into space there have been 11 known low Earth orbit collisions, and three known collisions at geostationary orbit. Think of it: 135 space shuttle flights, all of the Apollo, Gemini and Mercury flights, **hundreds** of telecommunications satellites, **1,300 functioning satellites** on orbit today, **half a million** total objects in space larger than a marble, and **fewer than 15 known collisions**. **Why** do people **worry?**

### Space Mil

#### The phrase “space” stalker in the 1AC is violent -- it trivializes violence against feminized bodies attempting to translate that violence universally and appropriates the discourse of misogyny to describe the military through a masculine linguistic screen -- turns case.

Anderson & Acoomando 1999 [Madcap misogyny and romanticized victim-blaming: Discourses of stalking in There's Something About Mary

Anderson, Kristin J; Accomando, Christina.Women and Language: WL; Urbana Vol. 22, Iss. 1, (Spring 1999): 24-28.]

There is a rich history of feminist scholars exposing the sexism underlying their own academic disciplines as well as the broader cultural representations of women. One important method of challenging patriarchal assumptions about gender has been to interrogate the specific rhetoric used in popular culture to describe women and men. In this paper, we critically examine the 1998 box office hit There's Something About Mary along with twelve representative reviews of the film for their discourse about stalkers and stalking. The overall plot of the film as well as specific rhetoric in both the film and the reviews reveal three central themes: (1) the normalization of stalking--pursuit and deception as appropriate heterosexual ritual; (2) the undermining of women's resistance to stalking; and (3) the assignment of blame to the target of the stalking. Since stalking is rendered comedic and romantic in the film, we want to begin by describing stalking. In real life, stalking is threatening, violating, and frightening. Stalking is often illegal. It can take place in the context of a person pursuing and harassing someone they have never met (e.g., obsessed fans stalking celebrities) or in the context of a present or previous relationship (e.g., under the rubric of domestic violence). Stalkers who know their victims are much more common than stalkers who have never met their victims. Moreover, stalkers who know their victims are more likely to commit violence against their targets than are stalkers who pursue strangers (De Becker, 1998). Stalking can take the form of phone calls, letters, surveillance, visits to home or work, following, breaking into the home, threats of physical harm, kidnapping, or murder (Coleman, 1997; Kienlen, et al., 1997; Kurt, 1995). Despite some high-profile cases in which the targets have been men (e.g., David Letterman, Steven Spielberg), women are far more likely to be the targets of stalking and men are more likely to be the stalkers. In fact, a recent study conducted by Patricia Tjaden and the U.S. Department of Justice estimates that 80% of stalking victims are women, while 87% of stalkers are men (Tjaden, 1997). The nature of the relationship between targets and stalkers seems to be different for women and men. Whereas men are more likely to be stalked by a stranger or an acquaintance, women are more likely to be stalked by someone they know more intimately such as a husband, exhusband, or date (Tjaden, 1997). Since violent endings are more likely to occur to victims who know their stalker, it is not surprising that as many as 90% of women murdered by boyfriends or husbands may have been stalked prior to their deaths (Anderson, 1993). There's Something About Mary has been described as the sleeper-hit of the summer 1998 movie season. By mid-September, it had reached #1 at the box office. By the end of the year it had became one of the top grossing films of the 1998 movie season, earning $173 million in domestic sales alone. Entertainment Weekly rated the film's writers and directors, Peter and Bobby Farrelly, among the top 12 entertainers of 1998 (Jacobs, 1998). The film, ostensibly a "romantic comedy," in fact depicts actions common to stalkers and experiences familiar to those who have been stalked in real life. Stalker #1 is the film's protagonist. His perspective dominates the story and the audience is expected to identify and sympathize with him. He becomes obsessed with Mary after a failed high school prom date and, thirteen years later, upon the suggestion of a friend (who turns out to be Stalker #4), hires a private investigator to track her down, spy on her and report back with the information. The investigator (Stalker #2) bugs her conversations, views her through high-powered binoculars (as she undresses in front of an open window), and then becomes fixated on her. Armed with information gleaned from his eavesdropping, Stalker #2 begins an elaborate scheme to deceive her into believing he is exactly the kind of man she wants: an architect, sports fan, world traveler, and avid volunteer. Stalker #3 is a friend of Mary's, and, like her relationship with Stalker #2, their relationship is based on her genuine identity and his false identity. His first contact with Mary occurred when he delivered a pizza to her apartment. Mary answered the door in her nightgown, which according to Stalker #3 triggered an obsession leading him to alter his identity and become a British architect with a back injury. Mary is an orthopedic surgeon (although we never see her actually work), and thus Stalker #3 had a friend break his back with a baseball bat so that he would have an excuse to show up at her clinic. Stalker #4 is an ex-boyfriend of Mary's from high school. His stalking behavior was so severe that she went to court, obtained a restraining order, changed her name, and moved across the country. Her drastic behavior is a real-life necessity for some women who have been the targets of stalkers (White & Cawood, 1998). According to a recent Department of Justice study, about 25% of women who reported being stalked obtained a restraining order; however, 80% of the restraining orders were violated by the assailant (Tjaden, 1997), just as Mary's restraining order is later violated by Stalker #4. Stalker #5 is an older sailor who plays a minor role in the movie, but as it turns out he is also obsessed with Mary and was just "boning [her neighbor] to get to Mary." Though his role is brief, Stalker #5 closes the film by shooting at Mary and Stalker #1 when he finds them together. The storyline of this film certainly reveals disturbing constructions of gender, but its appearance as romantic comedy or madcap farce might allow us to dismiss the story as too trivial to analyze. Examining in more detail the rhetoric of the film and its reviews, however, can help reveal how it is precisely the comedy and triviality of the film that help transmit its misogyny. The film normalizes stalking by making it ubiquitous and humorous and by making the protagonist the most normal of the stalkers. It might be surprising that the characters in the film, particularly the men pursuing Mary, actually engage in a meta-narrative about stalking by accusing each other of being stalkers. One might think that the filmmakers would try to squelch overt dialogue about stalking, for fear of alienating the viewing audience, and instead maintain the topic only in subtext. In fact, the meta-narrative creates a self-consciousness about stalking that functions to put the viewer at ease. It works in the following way. The men accuse each other of stalking Mary while each engages in behaviors characteristic of real-life stalkers such as pursuit, surveillance, threats, or violence (Hall, 1998). Examples include: "It's that stalker Ted"; "Oh I'm a stalker? You're calling me a stalker? You're a sick fuck"; and "You're the biggest stalker of us all." All this talk about stalking leaves the viewer in the position of asking, "Will the real stalker please stand up?" This meta-narrative works in favor of the protagonist because the viewer begins to distinguish him (Stalker #1) from the other, more creepy stalkers. His obsession comes from what had been a genuine if brief relationship shown in the film's opening flashback. In the present of the film, Stalker #1, the character the viewer most identifies with, self-consciously grapples with his own stalking behavior in a scene in which Mary describes to him her discovery that the man she was presently dating (Stalker #2, the investigator hired by Stalker #1) is a fraud. Mary earlier told Stalker #1 that she had to obtain a restraining order and change her name to avoid a previous boyfriend. When Mary says to Stalker #1, "I'm tired of talking about stalkers, let's talk about you," Stalker #1 chokes on his drink, demonstrating to the viewer that he does not approve of his own stalker-like behavior. Stalker #1's self-consciousness functions to get the viewer on his side, to think he's okay--as if his concern about being a stalker allows the audience to categorize him as a non-stalker or a "good" stalker. Stalker #1's self-consciousness also may function to help the audience accept his decision not to tell Mary the truth about how he hired someone to locate her (even though he and the audience know the lengths to which she went to make sure someone could not locate her). Not only is the plot dominated by the theme of stalking, but the film also undermines the brief suggestions of Mary's resistance to stalking. Mary has resisted stalking in the past (when she fled Stalker #4), and we also glimpse her brief resistance to the stalking tactics of the protagonist. Based on information received from the investigator (Stalker #2), Stalker #1 locates Mary in another state, pretends to run into her in front of her office and then begins to date her. After Mary establishes a romantic relationship with Stalker #1, she receives an anonymous letter (written by Stalker #4) revealing that Stalker #1 had initiated the surveillance plan and hired Stalker #2 to follow her. When Mary discovers Stalker #1's deceit, she responds, "How could you do that ... trick me into feeling something for you?" and tells him to "get out." Stalker #1's response to her rejection is, "I did it because I never stopped thinking about you. And if I didn't find you, I knew that my life would never ever be good again." Stalker #1's response is typical of stalkers who make their target responsible for their well-being (De Becker, 1998). Mary's explicit acknowledgment of the protagonist's deception and her conscious act of resistance (telling him to leave) make her ultimate choice of him undermining of her resistance. The movie culminates in a scene when four of the stalkers meet up in Mary's apartment. Mary is called a "cock tease" by Stalker #4 and is commanded to choose one of the men by Stalker #2, who declares, "We're all in love with Mary... I say none of us leaves this room until our young Mary here stops jerking us around and decides once and for all who she really wants." Since it is not Stalker #1, the protagonist, making these comments but rather the more extreme and unlikeable stalkers, this scene pushes the viewer again to empathize with Stalker #1, keeping him separate from the other more extreme stalkers. At this point in the scene, Brett, another former boyfriend (and one of the men in the film who is not a stalker) shows up to Mary's surprise. Stalker #1 says, "Yeah, I called him Mary. I told him to ... get down here ... he's the guy you should be with." Stalker #1 further says, "I'm no better than any of these guys. I mean, none of them love you really. They're just fixated on you `cause how you make them feel about themselves." While Stalker #1 is willing to give her up, this seeming act of self-sacrifice still operates within the confines of Mary having to make a choice of one of the men in the room. He gives her up by offering another man. While Mary reacts to this forced-choice with resistance, holding her ground in the immediate scene, she eventually accepts the terms of the confrontation and chooses Stalker #1, reversing herself and giving up the resolution she articulated only a couple scenes earlier. True, she has some new information now--she has witnessed Stalker #1's apparent sacrifice--but that does not change the facts that made her tell him to "get out" in the earlier scene. He still tracked her down, kept crucial information from her, and lied to her. He seems to reform before she takes him back but that too is a common part of undermining women's resistance--that is part of the mythology ("he'll change, if you just give him a chance") that has to be problematized rather than being indulged in. In the terms of the movie, his reform further takes him off the hook and allows viewers to make room for a decent, less culpable stalker, ultimately making the endorsement of stalking behavior more insidious. The discourse on stalking in the movie presents a significant disjuncture with the descriptions in movie reviews. We discuss twelve mainstream published reviews of the film. Nationally known reviewers (Gene Siskel and Roger Ebert) or well-known newspapers and magazines with relatively large readerships (e.g., People Magazine, USA Today, Time, Variety, Newsday) were targeted for inclusion. Smaller newspapers and magazines and unpublished reviews in websites were not included. A complete listing of the film reviews is included in the reference list. As discussed above, stalking is mentioned many times in the movie, although not dealt with in any critical way. In the reviews, stalking is rarely mentioned. When it is acknowledged, it actually gets reinterpreted as "romance" or is mentioned in the context of blaming Mary, the target of the stalking. Two themes emerge from the reviews: The stalking behavior is quaint and romantic, and, to the extent that inappropriate behavior is occurring, it is the fault of the target. Only three of the reviews examined here even mention the word "stalker" or "stalking," even though it is the premise of the film. Stephen Hunter in the Washington Post, is one of the three reviewers who mentions stalking and writes, "In fact, she seems to inspire stalkers, as several others show up and pitch woo in her direction..." (emphasis added). Not only does Hunter not problematize the behavior of the men in the film, but he also downplays their behavior by describing it as pitching woo and attributes their behavior to something Mary causes. Owen Gleiberman, in Entertainment Weekly, in one short sentence manages to both trivialize stalking and equate it with romance when he mentions it only in passing as he makes his way to discussing more serious shortcomings in the film: "The romantic-stalker plot is really an excuse for the Farrellys to indulge in their overdeliberate brand of madcap tastelessness." That is, it's the overdeliberateness of the madcap tastelessness that's really the problem, not stalking. Finally, John Anderson from Newsday writes, "There's something about Mary. There sure is. A stalker love story, from the people who brought you `Dumb and Dumber' and `Kingpin.'" Modifying "love story" with "stalker," Anderson makes a direct connection between love and stalking behavior in a way that renders stalking normal and appropriate. That references to the stalker plot are either completely omitted or mentioned in passing suggests that the threatening and deceptive behaviors that men displayed in the film are part of normal, heterosexual courtship. That is, the stalking plot is not notable enough to get in the way of describing other aspects of the film. And in fact, as described below, the reviewers go even a step further by equating the threatening behavior with sweetness and romance. How is the film described if it isn't described as a woman who is stalked by five men? Reviews construct the film, as at least in part, a sweet and innocent love story. Chicago Tribune critic Gene Siskel describes the stalking behavior in the film merely as men "developing crushes on the same attractive woman." Michael O'Sullivan in the Washington Post calls it "fitfully amusing and ultimately kind of heartwarming in a twisted sort of way[.]" Richard Corliss in Time Magazine writes about the "rowdy innocence of the whole thing[.]" Susan Wloszczyna, in USA Today, says, "But a certain stupid-cupid innocence hovers over There's Something about Mary." Leah Rozen in People Magazine describes the film as "a romantic comedy with its heart in the right place and its mind considerably lower" and concludes that "[a]t the center of Mary lies a sweet love story." Finally, Glenn Whipp in the Los Angeles Daily News describes the sequences in the film as part of the normal, regular antics of a madcap love story: "Basically, it's `Sleepless in Seattle' with a courtrestraining order thrown in." Also, "The goofball he enlists, Pat Healy (Matt Dillon), ends up falling for Mary himself, which puts into motion a love triangle that eventually expands to include other idiotic suitors." Whipp acknowledges some inappropriateness in the men's behavior in the film, by mentioning the necessity of a restraining order and referring to the men as idiotic. This nod to problematizing the film is simultaneously undermined by Whipp since he refers to the events in the movie as a "love triangle" and refers to stalkers more innocently as "suitors." Whipp concludes his review with, "'There's Something about Mary' is the funniest movie of the year, and it mixes in just enough sweetness with its bodily fluids to make it good, deranged fun." Thus, half of the reviews examined here reinterpret illegal surveillance techniques, false identities, and violence (a shooting scene and a scene in which Stalker #4 breaks into Mary's apartment and attacks her, but instead of raping or killing her, he steals her shoe because he has a foot fetish--transforming a disturbing scene into a comical one) to mean courtship. These reviewer remarks reflect not only how the stalking premise is viewed positively, but also, in many cases, how it is viewed as the most noble aspect of the movie (compared to the "raunchy" or "gross-out" comedy scenes in the movie). The film critics' comments and that the protagonist "gets the girl" in the end normalize stalking and even construct it as romantic (a la boy meets girl, boy loses girl, boy gets girl in the end). Whether one believes the men's behavior in the film resembles real-life stalking or heterosexual romance, it's obvious from both the film and the film critics who is responsible for it all. It's Mary. This theme is obvious from the title of the film, and from the opening song performed by an onscreen singer who serves as a modern Greek chorus singing to the viewer: "There's something about Mary that [those who don't know her] don't know." That is, there's something about Mary that actually causes men to stalk her. This attribution of blame is a common articulation about women who have been stalked or raped, both by the public and by the perpetrator (see Lonsway & Fitzgerald, 1994, for a review). One aspect of victim-blaming is the belief in rape myths. Rape myths serve a patriarchal world view, in which men possess and deserve greater power and privilege than women. Such myths include the construction that women cause, deserve, or even enjoy being raped. Blaming the victim of rape also shifts causality in interesting ways. On the one hand, in stereotypical representations, men are depicted are powerful and active while women are depicted as powerless and passive. On the other hand, rape myths shift causality to preserve male privilege (in this case the right of access to women's bodies) by constructing women as agents of their own rape. Women become temptresses and men appear at the mercy of women and of their own hormones. A more general theory to explain victim-blaming is the belief in a just world. The "just world" hypothesis is the tendency to believe that the world is a fair and just place and that good things happen to good people and bad things happen to bad people. Thus, to maintain this belief, one must search for evidence to suggest that victims instigated their misfortune (see Lonsway & Fitzgerald, 1994, for a review). Ryan (1971) explains victim-blaming as a strategy to avoid the hard work of societal change. He argues that by blaming victims for their misfortunes, society can then work to change specific unfortunate individuals rather than change institutional and widespread prejudices. Therefore, instead of examining why some men stalk women and why that is viewed as normal, one can examine women for characteristics about them that must have caused them to be stalked. There's Something About Mary perpetuates victimblaming. The woman being stalked inflicts the pathological behavior upon herself by being so beautiful, seductive, or friendly. Hence, even though the stalkers in the film are not always represented favorably, no matter how horrendous their behavior is, there's something about Mary that brings it out. The perpetrator is rendered unaccountable and the target is rendered culpable. Several of the film critics also hold Mary responsible for the stalkers' behavior. While only three of the reviews mention the stalker premise by name, more (five) hold the character Mary responsible for her effect on men. As mentioned above, critic Stephen Hunter states that the character Mary inspires stalkers. Similarly, Roger Ebert in the Chicago-Sun-Times writes, "Now here is a movie about a woman who is beautiful, sunny, good and pure, and inspires a remarkable array of creeps to fall in love with her" (emphasis added). Glenn Whipp in Los Angeles Daily News writes, "You see, there is, indeed, something about Mary, and it seems to attract every man on the Eastern seaboard with an IQ of less than 50." Michael O'Sullivan from the Washington Post complains that Cameron Diaz didn't do a good enough job portraying the blameworthiness of Mary. He writes, "Which brings us to the movie's biggest flaw. As a femme fatale, a siren capable of driving men to distraction and deceit, I just don't buy Cameron Diaz." He does not question that the film blames the woman--the character Mary does indeed drive the film's men to their deceptive and violent acts. She is both a femme fatale (literally, "deadly woman") and a siren (the mythological female sea creature who compelled sailors to pursue her even to their death). Rather, for O'Sullivan, the greatest flaw is that Diaz is not persuasive enough in depicting her character as the cause of her own stalking. One of the most exuberant renditions of victimblaming appeared not in a review but in promotional material for the film posted on the Movie Web website: "There's something about Mary all right. Something that brings out the stalker in every guy she meets!" The reviewers' rhetoric of victim-blaming and woman-blaming extends outside the boundaries of the film itself and into the audience. Gene Siskel reports what might be a criticism of the film, but the language reveals how easily the woman-blaming lessons of the film are learned even by those disturbed by it. Siskel writes that a friend called him to say that this movie is not for kids, adding: "If my 13-year-old daughter ever saw that picture, I'd kill her." While one might think the friend was worried the film would harm his daughter, concern slips quickly into blame and punishment, expressed as violence and directed against not the filmmakers but the daughter. Siskel laughs off the comment, making a joke about homicide. Certainly Siskel's friend was joking and hyperbolizing, but the fact that such comments can be seen as humorous is itself revealing. The two discourses examined here--the filmmakers' and film reviewers' constructions of stalking--work in combination to normalize threatening and illegal behavior as an ordinary and appropriate heterosexual ritual. This theme both is evident in the film's portrayal of the behavior without it being problematized and is reinforced by the character Mary ultimately choosing one of her stalkers. Additionally, these discourses further perpetuate the myth about women who have been stalked as ultimately being responsible for the crimes against them. This idea is evident in the title of the film, the discourse of the characters in the film, and the descriptions in the film reviews. Finally, the filmmakers undermine the target's attempts to resist being subjected to stalking and deception, by trivializing her relationships with the stalkers and by ultimately reversing her agency in her final "choice" of Stalker #1 after previously rejecting him. As bell hooks argues, "The process by which any of us alter the way we look at images is political" (1996, p. 72-73). As feminist scholars and activists, we can engage in political action by analyzing regressive representations of women's experiences produced in popular culture. We can challenge ourselves and others to reinterpret status quo representations of women and interrogate the role that patriarchy plays in normalizing misogyny in the guise of comedy. In an era when stalking is a real-life hazard for many women, feminist scholars should examine discourses of stalking in film, television, advertising, video games and other cultural representations. Future work in this area might contrast the representation of men's versus women's stalking behavior. For example, De Becker (1998) exposes the double-standard found in films that contain stalking themes: If a man in the movies wants a sexual encounter or applies persistence, he's a regular, everyday guy, but if a woman does the same thing, she's a maniac or a killer. Just recall Fatal Attraction, The King of Comedy, Single White Female, Play Misty for Me, The Hand that Rocks the Cradle, and Basic Instinct. When the men pursue, they usually get the girl. When the women pursue, they usually get killed (p. 239). In addition, researchers might also examine explicitly violent stalking alongside stalking in the guise of romance or comedy. Researchers could analyze the decisions made by filmmakers and others in constructing such images as well as take apart why audiences find such depictions pleasurable or amusing. Perhaps viewers agree to these myths because truly facing the prevalence of stalking, rape, and other acts of violence against women in society might force us to face our own complicity in societal structures and our obligation to act to change those structures. Madcap Misogyny and Romanticized Victim-Blaming: Discourses of Stalking in There's Something About Mary

#### Vote Neg –

#### PIK – you can do the affirmative without the representations of stalking

#### Reject the Debater – in-round reps come before fiat – o/w on ballot proximity

#### Sat attacks don’t cause nuke war

Zarybnisky 18 [Eric J. Zarybnisky, MA in National Security Studies from the Naval War College, PhD in Operations Research from the MIT Sloan School of Management, Lt Col, USAF. Celestial Deterrence: Deterring Aggression in the Global Commons of Space. March 28, 2018. <https://apps.dtic.mil/dtic/tr/fulltext/u2/1062004.pdf>]

PREVENTING AGGRESSION IN SPACE

While deterrence and the Cold War are strongly linked in the public’s mind through the nuclear standoff between the United States and the Soviet Union, the fundamentals of deterrence date back millennia and deterrence remains relevant. Thucydides alludes to the concept of deterrence in his telling of the Peloponnesian War when he describes rivals seeking advantages, such as recruiting allies, to dissuade an adversary from starting or expanding a conflict.6F 6 Aggression in space was successfully avoided during the Cold War because both sides viewed an attack on military satellites as highly escalatory, and such an action would likely result in general nuclear war.7F 7 In today’s more nuanced world, attacking satellites, including military satellites, does not necessarily result in nuclear war. For instance, foreign countries have used highpowered lasers against American intelligence-gathering satellites8F 8 and the United States has been reluctant to respond, let alone retaliate with nuclear weapons. This shift in policy is a result of the broader use of gray zone operations, to which countries struggle to respond while limiting escalation. Beginning with the fundamentals of deterrence illuminates how it applies to prevention of aggression in space

#### Military sats are hardened to resist debris

Richard Stenger 2, Reporter for CNN, “Scientist: Space Weapons Pose Debris Threat”, CNN Space, 5/3/2002, http://www.cnn.com/2002/TECH/space/05/03/orbit.debris/index.html

The use of weapons in space could leave so much debris in orbit that low-flying satellites could not safely operate, according to a prominent astrophysicist. But military and other officials dismissed the claim as overblown.

The Pentagon's missile defense program envisions the possibility that powerful lasers or other weapons in orbit could help protect against enemy missile attacks.

Joel Primack of the University of California, Santa Cruz, contends that such high-tech defenses could transform low-Earth orbits into a wasteland for decades or longer.

"Even one war in space will [encase] the entire planet in a shell of whizzing debris that will thereafter make space near the Earth highly hazardous for peaceful as well as military purposes," Primack wrote in a report presented weeks ago to an international conference on science and spirituality.

However, one of the foremost experts on space junk, Donald Kessler, has mixed thoughts about the issues raised by Primack.

"Everything he says in (his report) has truth in it, but it's exaggerated," the retired NASA scientist said. "What he is talking about is technically correct, but from a practical or economic standpoint, it is not likely to happen."

Kessler conducted groundbreaking research in the 1970s on the threat of orbital debris to satellites. His mathematical predictions that collisions would cascade into more and more collisions became known as the Kessler effect.

He was one of the first people to sound the alarm about space junk. In fact, Kessler and others think there is enough junk now to pose significant risks to spacecraft in low-Earth orbits, a contention supported by returning space shuttles, which often have dings and window cracks.

Other space dignitaries lend support to Primack, a Stanford University-trained particle physicist who helped develop the theory that dark matter helps structure the universe.

Sydney Van Den Bergh, a physicist with the National Research Council of Canada, said he raised similar concerns years ago at an international conference on space law.

And in April, astronaut Sally Ride, the first U.S. woman in space, gave a speech in which she said that anti-satellite weapons would be "disastrous."

She said debris created by their use could damage satellites traveling in low-Earth orbits, a particularly popular zone of real estate between 150 and 400 miles high that includes the space shuttle, the international space station and reconnaissance satellites.

U.S. Air Force officials said such fears are unwarranted. Lt. Col. Rick Lehner, spokesman for the Ballistic Missile Defense Organization at the Pentagon, said that the budget request for space-based programs was minimal compared with other parts of the proposed missile defense system.

"The current missile defense program is not space-based. There's some low-level research going on with space-based lasers and other space-based defenses, but the emphasis now and for many years to come is ground-based, air-based and possibly sea-based missile defense systems," he said.

Still, Primack argues that even a low-tech prelude to a high-tech space battle could prove catastrophic. An enemy could deliver giant loads of rock or metal pellets into space.

"No actual space war even has to be fought," Primack said. "Any country that felt threatened by America's starting to place lasers or other weapons in space would only have to launch the equivalent of gravel to destroy the sophisticated weaponry."

Such mini-missiles could do serious damage, going at speeds as high as 17,000 mph (27,000 km/h), 10 times faster than a rifle bullet. A marble at that speed could hit a satellite with as much force as a one-ton safe dropped three stories.

As they pulverize existing space junk and satellites, they would create even more debris and set off a chain reaction that eventually renders the orbital zone unusable, Primack said.

That scenario would likely never succeed or even happen in the first place, other space experts said.

Military satellites are hardened to resist impacts from debris already in space and future orbiters will likely become even more protected as the technology improves, said Michael Kucharek, spokesperson for the U.S. Air Force Space Command. The Colorado-based outpost tracks almost 10,000 thousands of pieces of space junk four inches (10 cm) in diameter or larger.

Moreover, such an attack would be technologically and economically daunting.

"Very few nations could do that today. Even If you were to put tens of thousands of particles out there, it would pale in comparison to what is already out there," said Nick Johnson of NASA's Orbital Debris Program Office, which monitors the threat of small space debris to spacecraft.

"We've looked at so-called chain reaction scenarios and it would require an exceptionally large number of particles," Johnson said.

#### No cypberattacks

Borowitz, 19

(Mariel Borowitz is an Assistant Professor in the Sam Nunn School of International Affairs at Georgia Tech. Her research deals with international space policy issues, primarily international cooperation in Earth observing satellites, and satellite data sharing policies, “Strategic Implications of the Proliferation of Space Situational Awareness Technology and Information: Lessons Learned from the Remote Sensing Sector”, <https://www.sciencedirect.com/> science/article/pii/S0265964617300164#!, *Space Policy*, Volume 47, February 2019, Pages 18-27, Ak.)

The spread of SSA technology is unlikely to significantly increase the development of evasion techniques. First, evading detection by SSA systems is more challenging than evading detection by imaging satellites—which in some cases can be accomplished simply by moving operations indoors or conducting movements at night. Still, deception, including measures taken to confuse or mislead an adversary with respect to location of a national security system or payload, was identified as an element of achieving resilience of the U.S. national security space architecture, and there are indications that some SSA deception techniques are already in use [45] [46]. Furthermore, unlike military and other sensitive facilities on the ground, which exist in every nation, only a handful of countries operate classified satellite systems. The incentive for these nations to develop evasion techniques existed even when relatively few SSA systems existed, and the incentive is unlikely to increase meaningfully as additional SSA systems are developed. Destruction of SSA assets is also unlikely. SSA networks are composed primarily of telescopes, radars, and data centers on the ground, all of which could be destroyed relatively easily using existing conventional weapons. However, the strategic logic of the situation makes these attacks unlikely. In the case of a crisis, an adversary may determine that a first strike on U.S. space assets would be worthwhile to degrade the U.S. warfighting capability—deterring the U.S. from taking action in the crisis or decreasing the effectiveness of U.S. action. Such an attack may be even more tempting if it is possible for the nation to plausibly deny that it was the source of the attack. However, while destroying U.S. SSA assets would make attribution of the ASAT more difficult, attribution of a conventional ground attack would likely be relatively easy, undermining the purpose of such an attack. Furthermore, an attack on U.S. ground systems would be much more provocative than the ASAT attack it was attempting to obscure, further decreasing the value of undertaking such an action. A cyberattack on SSA assets or data analysis systems, conducted in conjunction with an ASAT attack, may be a more viable option, but this still poses significant risks to the attacker if the cyberattack fails or is correctly attributed. 6.2.1. Implication: develop and use deceptive techniques with caution Although there are few countries with the incentive to develop techniques to evade detection by SSA systems or to destroy these systems, the United States should be aware of the potentially destabilizing effect of such practices. With respect to deception, if the United States is the only country with hidden systems, it can always take the initiative to maneuver its own systems in the case of a close approach with another spacecraft.

**No space war.**

**Pavur and Martinovic 19** [James Pavur, DPhil Researcher Cybersecurity Centre for Doctoral Training Oxford University, Ivan Martinovic, Professor of Computer Science Department of Computer Science Oxford University, “The Cyber-ASAT: On the Impact of Cyber Weapons in Outer Space,” 2019 11th International Conference on Cyber Conflict: Silent Battle, <https://ccdcoe.org/uploads/2019/06/Art_12_The-Cyber-ASAT.pdf>]

3. STABILITY IN SPACE Given the uncomfortable combination of high dependency and low survivability, one might expect to observe frequent attacks against critical military assets in orbit. However, **despite decades of recurring prophesies of impending space war, no such conflict has broken out** [14]–[18]. It is true that a handful of space security crises have occurred; most notably, the 2007 Chinese anti-satellite weapon (ASAT) test and the 2008 US ASAT demonstration in response [19]. Moreover, a recent Centre for Strategic and International Studies report suggests increasing interest in attacking US space assets, particularly among the Chinese, Russian, North Korean and Iranian militaries [20]. Overall, however, the space domain has remained puzzlingly peaceful. In this section, we outline three major contributors to this enduring stability: limited accessibility, attributable norms, and environmental interdependence. A. Limited Accessibility Space is difficult. Over 60 years have passed since the first Sputnik launch and only nine countries (ten including the EU) have orbital launch capabilities. Moreover, a launch programme alone does not guarantee the resources and precision required to operate a meaningful ASAT capability. Given this, one possible reason why space wars have not broken out is simply because only the US has ever had the ability to fight one [21, p. 402], [22, pp. 419–420]. Although launch technology may become cheaper and easier, it is unclear to what extent these advances will be distributed among presently non-spacefaring nations. Limited access to orbit necessarily reduces the scenarios which could plausibly escalate to ASAT usage. Only major conflicts between the handful of states with ‘space club’ membership could be considered possible flashpoints. Even then, the fragility of an attacker’s own space assets creates de-escalatory pressures due to the deterrent effect of retaliation. Since the earliest days of the space race, dominant powers have recognized this dynamic and demonstrated an inclination towards de-escalatory space strategies [23]. B. Attributable Norms There also exists a long-standing normative framework favouring the peaceful use of space. The effectiveness of this regime, centred around the Outer Space Treaty (OST), is highly contentious and many have pointed out its serious legal and political shortcomings [24]–[26]. **Nevertheless, this status quo framework has somehow supported over six decades of relative peace in orbit.** Over these six decades, norms have become deeply ingrained into the way states describe and perceive space weaponization. This de facto codification was dramatically demonstrated in 2005 when the US found itself on the short end of a 160-1 UN vote after opposing a non-binding resolution on space weaponization. **Although states have occasionally pushed the boundaries of these norms, this has typically occurred through incremental legal re-interpretation rather than outright opposition** [27]. Even the most notable incidents, such as the 2007-2008 US and Chinese ASAT demonstrations, were couched in rhetoric from both the norm violators and defenders, depicting space as a peaceful global commons [27, p. 56]. Altogether, this suggests that **states perceive real costs to breaking this normative tradition and may even moderate their behaviours accordingly.** One further factor supporting this norms regime is the high degree of attributability surrounding ASAT weapons. For **kinetic ASAT technology, plausible deniability and stealth are essentially impossible**. The literally explosive act of launching a rocket cannot evade detection and, if used offensively, retaliation. **This imposes high diplomatic costs on ASAT usage and testing**, particularly during peacetime. C. Environmental Interdependence A third stabilizing force relates to the orbital debris consequences of ASATs. China’s 2007 ASAT demonstration was the largest debris-generating event in history, as the targeted satellite dissipated into thousands of dangerous debris particles [28, p. 4]. Since debris particles are indiscriminate and unpredictable, they often threaten the attacker’s own space assets [22, p. 420]. This is compounded by Kessler syndrome, a phenomenon whereby orbital debris ‘breeds’ as large pieces of debris collide and disintegrate. As space debris remains in orbit for hundreds of years, the cascade effect of an ASAT attack can constrain the attacker’s long-term use of space [29, pp. 295– 296]. Any state with kinetic ASAT capabilities will likely also operate satellites of its own, and they are necessarily exposed to this collateral damage threat. **Space debris thus acts as a strong strategic deterrent to ASAT usage.**

### Ozone

#### No Ozone Impact.

Ridley 14 (Matthew White Ridley, BA and PhD in Zoology from Oxford. “THE OZONE HOLE WAS EXAGGERATED AS A PROBLEM,” *Rational Optimist*, 9/25/14, <http://www.rationaloptimist.com/blog/the-ozone-hole-was-exaggerated-as-a-problem.aspx>) dwc 19

Serial hyperbole does the environmental movement no favours My recent Times column argued that the alleged healing of the ozone layer is exaggerated, but so was the impact of the ozone hole over Antarctica: The ozone layer is healing. Or so said the news last week. Thanks to a treaty signed in Montreal in 1989 to get rid of refrigerant chemicals called chlorofluorocarbons (CFCs), the planet’s stratospheric sunscreen has at last begun thickening again. Planetary disaster has been averted by politics. For reasons I will explain, this news deserves to be taken with a large pinch of salt. You do not have to dig far to find evidence that the ozone hole was never nearly as dangerous as some people said, that it is not necessarily healing yet and that it might not have been caused mainly by CFCs anyway. The timing of the announcement was plainly political: it came on the 25th anniversary of the treaty, and just before a big United Nations climate conference in New York, the aim of which is to push for a climate treaty modelled on the ozone one. Here’s what was actually announced last week, in the words of a Nasa scientist, Paul Newman: “From 2000 to 2013, ozone levels climbed 4 per cent in the key mid-northern latitudes.” That’s a pretty small change and it is in the wrong place. The ozone thinning that worried everybody in the 1980s was over Antarctica. Over northern latitudes, ozone concentration has been falling by about 4 per cent each March before recovering. Over Antarctica, since 1980, the ozone concentration has fallen by 40 or 50 per cent each September before the sun rebuilds it. So what’s happening to the Antarctic ozone hole? Thanks to a diligent blogger named Anthony Watts, I came across a press release also from Nasa about nine months ago, which said: “ Two new studies show that signs of recovery are not yet present, and that temperature and winds are still driving any annual changes in ozone hole size.” As recently as 2006, Nasa announced, quoting Paul Newman again, that the Antarctic ozone hole that year was “the largest ever recorded”. The following year a paper in Nature magazine from Markus Rex, a German scientist, presented new evidence that suggested CFCs may be responsible for less than 40 per cent of ozone destruction anyway. Besides, nobody knows for sure how big the ozone hole was each spring before CFCs were invented. All we know is that it varies from year to year. How much damage did the ozone hole ever threaten to do anyway? It is fascinating to go back and read what the usual hyperventilating eco-exaggerators said about ozone thinning in the 1980s. As a result of the extra ultraviolet light coming through the Antarctic ozone hole, southernmost parts of Patagonia and New Zealand see about 12 per cent more UV light than expected. This means that the weak September sunshine, though it feels much the same, has the power to cause sunburn more like that of latitudes a few hundred miles north. Hardly Armageddon. The New York Times reported “an increase in Twilight Zone-type reports of sheep and rabbits with cataracts” in southern Chile. Not to be outdone, Al Gore wrote that “hunters now report finding blind rabbits; fisherman catch blind salmon”. Zoologists briefly blamed the near extinction of many amphibian species on thin ozone. Melanoma in people was also said to be on the rise as a result. This was nonsense. Frogs were dying out because of a fungal disease spread from Africa — nothing to do with ozone. Rabbits and fish blinded by a little extra sunlight proved to be as mythical as unicorns. An eye disease in Chilean sheep was happening outside the ozone-depleted zone and was caused by an infection called pinkeye — nothing to do with UV light. And melanoma incidence in people actually levelled out during the period when the ozone got thinner.

#### Two Thumpers to Ozone:

#### 1] Space Tourism

Marais 21 Eloise Marais 7-19-2021 "Space tourism: rockets emit 100 times more CO₂ per passenger than flights – imagine a whole industry" <https://theconversation.com/space-tourism-rockets-emit-100-times-more-co-per-passenger-than-flights-imagine-a-whole-industry-164601> (Associate Professor in Physical Geography, UCL)//Elmer

The commercial race to get tourists to space is heating up between Virgin Group founder Sir Richard Branson and former Amazon CEO Jeff Bezos. On Sunday 11 July, Branson ascended 80 km to reach the edge of space in his piloted Virgin Galactic VSS Unity spaceplane. Bezos’ autonomous Blue Origin rocket is due to launch on July 20, coinciding with the anniversary of the Apollo 11 Moon landing. Though Bezos loses to Branson in time, he is set to reach higher altitudes (about 120 km). The launch will demonstrate his offering to very wealthy tourists: the opportunity to truly reach outer space. Both tour packages will provide passengers with a brief ten-minute frolic in zero gravity and glimpses of Earth from space. Not to be outdone, Elon Musk’s SpaceX will provide four to five days of orbital travel with its Crew Dragon capsule later in 2021. What are the environmental consequences of a space tourism industry likely to be? Bezos boasts his Blue Origin rockets are greener than Branson’s VSS Unity. The Blue Engine 3 (BE-3) will launch Bezos, his brother and two guests into space using liquid hydrogen and liquid oxygen propellants. VSS Unity used a hybrid propellant comprised of a solid carbon-based fuel, hydroxyl-terminated polybutadiene (HTPB), and a liquid oxidant, nitrous oxide (laughing gas). The SpaceX Falcon series of reusable rockets will propel the Crew Dragon into orbit using liquid kerosene and liquid oxygen. Burning these propellants provides the energy needed to launch rockets into space while also generating greenhouse gases and air pollutants. Large quantities of water vapour are produced by burning the BE-3 propellant, while combustion of both the VSS Unity and Falcon fuels produces CO₂, soot and some water vapour. The nitrogen-based oxidant used by VSS Unity also generates nitrogen oxides, compounds that contribute to air pollution closer to Earth. Roughly two-thirds of the propellant exhaust is released into the stratosphere (12 km-50 km) and mesosphere (50 km-85 km), where it can persist for at least two to three years. The very high temperatures during launch and re-entry (when the protective heat shields of the returning crafts burn up) also convert stable nitrogen in the air into reactive nitrogen oxides. These gases and particles have many negative effects on the atmosphere. In the stratosphere, nitrogen oxides and chemicals formed from the breakdown of water vapour convert ozone into oxygen, depleting the ozone layer which guards life on Earth against harmful UV radiation. Water vapour also produces stratospheric clouds that provide a surface for this reaction to occur at a faster pace than it otherwise would. Space tourism and climate change Exhaust emissions of CO₂ and soot trap heat in the atmosphere, contributing to global warming. Cooling of the atmosphere can also occur, as clouds formed from the emitted water vapour reflect incoming sunlight back to space. A depleted ozone layer would also absorb less incoming sunlight, and so heat the stratosphere less. Figuring out the overall effect of rocket launches on the atmosphere will require detailed modelling, in order to account for these complex processes and the persistence of these pollutants in the upper atmosphere. Equally important is a clear understanding of how the space tourism industry will develop. Virgin Galactic anticipates it will offer 400 spaceflights each year to the privileged few who can afford them. Blue Origin and SpaceX have yet to announce their plans. But globally, rocket launches wouldn’t need to increase by much from the current 100 or so performed each year to induce harmful effects that are competitive with other sources, like ozone-depleting chlorofluorocarbons (CFCs), and CO₂ from aircraft. During launch, rockets can emit between four and ten times more nitrogen oxides than Drax, the largest thermal power plant in the UK, over the same period. CO₂ emissions for the four or so tourists on a space flight will be between 50 and 100 times more than the one to three tonnes per passenger on a long-haul flight. In order for international regulators to keep up with this nascent industry and control its pollution properly, scientists need a better understanding of the effect these billionaire astronauts will have on our planet’s atmosphere.

#### 2] Dichloromethane

Perkins 17 Sid Perkins 6-27-2017 "New threat to ozone layer found" <https://www.science.org/content/article/new-threat-ozone-layer-found> (Sid is a freelance science journalist based in Crossville, Tennessee. He specializes in earth sciences and paleontology but often tackles topics such as astronomy, planetary sciences, materials sciences, and engineering. Sid has a bachelor’s degree in natural science from Christian Brothers College in Memphis, Tennessee; bachelor’s and master’s degrees in aeronautical engineering from the Air Force Institute of Technology in Ohio; and a master’s degree in journalism from the University of Missouri in Columbia)//Elmer

The ozone layer—a high-altitude expanse of oxygen molecules that protects us from the sun's ultraviolet rays—has been on the mend for the past decade or so. But a newly discovered threat could delay its recovery. Industrial emissions of a chemical commonly used in solvents, paint removers, and the production of pharmaceuticals have doubled in the past few years, researchers have found, which could slow the healing of the ozone layer over Antarctica anywhere between 5 and 30 years—or even longer if levels continue to rise. The findings are "frightening" and "a big deal," says Robyn Schofield, an environmental scientist at the University of Melbourne in Australia who was not involved with the work. The chemical in question is called dichloromethane (CH2Cl2). Natural sources of this substance are small, says Ryan Hossaini, an atmospheric chemist at Lancaster University in the United Kingdom. Thus, he notes, the increase in emissions seen in recent years likely stems from human sources. Between 2000 and 2012, low-altitude concentrations of CH2Cl2 vapor rose, on average, about 8% per year, he adds. Globally, concentrations of CH2Cl2 approximately doubled between 2004 and 2014. Current CH2Cl2 emissions are about 1 million metric tons per year, Hossaini and his team estimate. Like chlorofluorocarbons (CFCs) and several other ozone-destroying chemicals you may have heard of, CH2Cl2 breaks apart when struck by sunlight. The chlorine atoms that are released then dismantle any ozone molecules they interact with. In 1987, an international agreement known as the Montreal Protocol led to a ban on the production and use of CFCs and many related compounds in industrial nations, but it ignored CH2Cl2 because researchers thought it didn't stay intact in the atmosphere long enough to rise into the stratosphere. Recent evidence now suggests, however, that the molecules can reach the lower edge of the stratosphere, which includes the ozone layer, despite its height 8 kilometers above the poles. To gauge the current and future threat to high-altitude ozone from CH2Cl2, Hossaini and his colleagues used computer simulations. In 2016, their analyses suggest, about 3% of the summer ozone loss in the Antarctic could be traced to CH2Cl2. That seems small, but in 2010 the substance was responsible for only 1.5% of the region's summer ozone loss, Hossaini says. If CH2Cl2 emissions continue to rise at the rate seen in the last decade, recovery of the ozone hole would be delayed about 30 years, the researchers estimate in Nature Communications. But if emissions of CH2Cl2 are held to current levels, healing of the ozone hole would be delayed only 5 years or so, the team finds. Simulations that don't include the effect of CH2Cl2 suggest that high-altitude ozone in the Antarctic will return to pre-1980 levels, the concentration measured before CFCs and other ozone-destroying chemicals were recognized as a problem, in 2065. The team's analyses "are quite important," says Björn-Martin Sinnhuber, an atmospheric scientist at Karlsruhe Institute of Technology in Germany. "It's clear that concentrations [of CH2Cl2] have increased quite a lot," he notes. But one critical question, he contends, is what will happen to emissions over the long term: "They've been quite variable in recent years, and it's difficult to say how they might evolve." Although the rapid rise in CH2Cl2 emissions may one day level off, it's also possible that emissions of this multipurpose chemical may accelerate even further. Hossaini and his team also assessed what would happen to high-altitude ozone if CH2Cl2 emissions rose at twice the rate seen in the past decade. The answer? Not good. Antarctic ozone wouldn't recover to pre-1980 levels until well after the year 2100, the analyses suggest. All this means that scientists now reviewing the Montreal Protocol should consider expanding the agreement to also regulate substances like CH2Cl2 that have atmospheric lifetimes of less than 6 months, Schofield says. Possibly as important, however, the team's results might also help other researchers identify which sources of CH2Cl2 are contributing most to the recent rise in emissions. That sort of information, Hossaini admits, is sadly lacking as of now.