# 1

#### Interpretation: “Appropriation of outer space” by private entities refers to the exercise of exclusive control of space.

TIMOTHY JUSTIN TRAPP, JD Candidate @ UIUC Law, ’13, TAKING UP SPACE BY ANY OTHER MEANS: COMING TO TERMS WITH THE NONAPPROPRIATION ARTICLE OF THE OUTER SPACE TREATY UNIVERSITY OF ILLINOIS LAW REVIEW [Vol. 2013 No. 4]

The issues presented in relation to the nonappropriation article of the Outer Space Treaty should be clear.214 The ITU has, quite blatantly, created something akin to “property interests in outer space.”215 It allows nations to exclude others from their orbital slots, even when the nation is not currently using that slot.216 This is directly in line with at least one definition of outer-space appropriation.217 [\*\*Start Footnote 217\*\*Id. at 236 (“Appropriation of outer space, therefore, is ‘the exercise of exclusive control or exclusive use’ with a sense of permanence, which limits other nations’ access to it.”) (quoting Milton L. Smith, The Role of the ITU in the Development of Space Law, 17 ANNALS AIR & SPACE L. 157, 165 (1992)). \*\*End Footnote 217\*\*]The ITU even allows nations with unused slots to devise them to other entities, creating a market for the property rights set up by this regulation.218 In some aspects, this seems to effect exactly what those signatory nations of the Bogotá Declaration were trying to accomplish, albeit through different means.219

#### Violation: They spec large constellations- banning those violates because they don’t exercise exclusive control or use over space, and limit other entities access.

#### Standards:

#### Limits and ground: the aff interpretation explodes the topic to allow any aff about something harmful in space which structurally alters the neg research burden because there’s a qualitative difference between property rights and things in space being bad. That alters neg ground because it means the aff can defend trivial middle grounds that go beyond just exclusive appropriation unbalancing the topic.

#### Precision o/w – anything else justifies the aff arbitrarily jettisoning words in the resolution at their whim which decks negative ground and preparation because the aff is no longer bounded by the resolution.

#### Use competing interps - Topicality is a binary question, you can’t be reasonably topical

#### No Rvis – they’ll just bait theory and prep it out; illogical – you shouldn’t win for being fair

# 2

#### Counterplan: States ought to allow appropriation of outer space by private or public companies via Large Satelilite Constellations if that are signatories of and abide by the “Net Zero Space” initiative.

#### Solves unsustainable debris, collisions, rivalrous orbits, warming more.

PPF ND

[Net Zero Space, <https://parispeaceforum.org/en/initiatives/net-zero-space/>, Paris Peace Forum, ND] [SS]

Net Zero Space At the occasion of the 4th edition of the Paris Peace Forum, actors from all over the world concerned by the long-term sustainability of outer space have launched the “Net Zero Space” initiative. From satellite operators to launchers, from space agencies to academia and the civil society, all these stakeholders gathered to call to achieving sustainable use of outer space for the benefit of all humankind by 2030 by taking concrete actions so as to tackle the pressing challenge of reducing debris orbiting Earth. “Net Zero Space” Declaration Activities in outer space have entered a new era of growth, creating new possibilities for human development and the protection of Earth. However, the amount of orbital debris is increasing dangerously. This trend threatens humanity’s ability to benefit from outer space by increasing the risk of collision for space assets, further affecting the safety and sustainability of space operations, and increasing the cost of access to the most useful orbits. Article I of the Outer Space Treaty of 1967 provides that the exploration and use of outer space are “the province of all [hu]mankind”. The protection of Earth’s orbital environment should be at the center of all space activities in order to guarantee that current and future actors will continue to have access to and use of this domain. It is therefore critical to ensure the sustainable development of both public and private space activities, to protect the integrity of existing and future objects in orbit, and to maintain equitable access to outer space for all. Our common goal is to ensure safe space operations and the long-term sustainability of outer space activities. To do so, we seek to adopt appropriate mitigation and remediation measures in all space operations from the outset, taking into account the distinctive features of the different orbits used for space operations. We share the conviction that this goal can only be achieved by international and multi-stakeholder cooperation through gathering forces from the private sector, civil society, and academia, as well as public authorities and regulators. All entities operating in orbit, or contributing on Earth to space operations, have a part to play in this task. On-going scientific research from national and international bodies indicates that collective, concrete steps must be taken to prevent a rapid degradation of Earth’s orbital environment. By launching the “Net Zero Space” initiative, we are calling for a global commitment to achieving sustainable use of outer space for the benefit of all humankind by 2030. We recommend urgent action from 2021 onwards to rapidly contain and then reduce the ongoing pollution of Earth’s orbital environment: by avoiding further generation of hazardous space debris, and by remediating existing hazardous space debris. We are calling on all stakeholders worldwide to join us in supporting the “Net Zero Space” initiative. When announcing their support, all stakeholders will commit to declaring concrete, tangible example(s) of actions they took, or are planning to undertake, in accordance with the scale of their operations and within their means so as to contribute to the “Net Zero Space” goal. In order to follow up on the progresses made to reach this goal and to keep incentive in this regard, we ask the Paris Peace Forum to host the “Net Zero Space” initiative secretariat, to report annually on the status of the initiative and promote subsequent steps towards the realization of the “Net Zero Space” goal. List of supporters: Astroscale Astroscale has pledged to 1/ develop innovative and scalable solutions across the spectrum of on-orbit servicing, and 2/ build the economics and working with government and commercial stakeholders to develop norms, regulations, and incentives that support the responsible use of space. Read the press release here. Arianespace Arianespace has pledged to reduce its orbital footprint, with the Vinci restartable engine which will facilitate the deorbitation of Ariane 6 upper stages at the end of the launch sequence. You can read the press release here. CGSTL/Chang Guang Satellite Clutch Space Systems Clutch Space Systems has pledged to 1/ provide persistent connectivity and location awareness to satellites in low earth orbit for total immediate command and control for supervised autonomy to enable safe and sustainability focused satellite operators and to 2/ provide satellite ground stations with 1% of the carbon footprint of the equivalent traditional system. CNES EUSST EU SST provides operational space safety services that safeguard space infrastructure, including the European Union flagships Galileo and Copernicus, from the risk of collision and prevent the proliferation of space debris. These services will become available to users beyond Europe in the near future. EU SST has also pledged to work on the development of additional public services to improve space traffic coordination and ensure safe space operations, for instance, supporting space debris mitigation and remediation activities. Read the press release here. Eutelsat Eutelsat has pledged to implementing a company-specific “Space Debris Mitigation Plan”, an in-house initiative constantly updated since its launch in 2005, ensuring compliance with the strictest standard related to sustainable space operations. With this plan, Eutelsat has achieved a success rate in excess of 95% for deorbiting its spacecraft. The Group has also committed to work closely with the French authorities on updating France’s national space law to take account of the new challenges in space, including debris. Read the press release here. GMV IAASS Inmarsat International institute of air and space law The International Institute of Air and Space Law has pledged to educating students and young professionals from around the world about the space law and policy aspects of debris mitigation and remediation, and encouraging and supporting them in their research on these topics. Read the press release here. ISISPACE ISISPACE has pledged to 1/ develop and using disruptive space technologies for debris mitigation and removal, and 2/ comply with the strictest norms regarding sustainable space operations, including Dutch standard of deorbiting objects sent in outer space 25 years after their launch rather than 25 years after their end of life. Read the press release here. Planet Share my Space Share my Space has pledged to 1/ foster independent capacities regarding space debris detection, automated maneuvers technologies and autonomous satellite navigation, and 2/ develop an independent database of more than 150,000 objects to increase our common knowledge on the state of Earth’s orbital environment. Read the press release here. Skyroot Aerospace SpaceAble SpaceAble has pledged to provide the space community with two breakthrough services, backed on a full-fledged SSA solution, to enhance sustainability of Low Earth Orbit operations by an order of magnitude. In terms of preventions, SpaceAble provides the space community with 1/ the commercialization in 2022 of ISSAN, a SSA software solution dedicated to aggregate and process space data including space weather to limit the risk of failures in LEO, and 2/ with the test in 2023 of the Orbiter, a low Earth orbit inspector satellite dedicated to complement telemetry and assess in near real time the status of satellites in low Earth Orbit. In terms of remediation, SpaceAble will provide the space community with a subscription solution to insurance contracts that would cover space debris collection missions for deorbiting debris, faulty satellites or launcher part.

# 3

#### Terrestrial Internet Cables are vulnerable now – risks access.

Griffiths 19 James Griffiths 7-26-2019 "The global internet is powered by vast undersea cables. But they’re vulnerable." <https://www.cnn.com/2019/07/25/asia/internet-undersea-cables-intl-hnk/index.html> (CNN Analyst)//ELmer

Hong Kong (CNN) - On July 29, 1858, two steam-powered battleships met in the middle of the Atlantic Ocean. There, they connected two ends of a 4,000 kilometer (2,500 mile) long, 1.5 centimeter (0.6 inch) wide cable, linking for the first time the European and North American continents by telegraph. Just over two weeks later, the UK’s Queen Victoria sent a congratulatory message to then US President James Buchanan, which was followed by a parade through the streets of New York, featuring a replica of a ship which helped lay the cable and fireworks over City Hall. In their inaugural cables, Queen Victoria hailed the “great international work” by the two countries, the culmination of almost two decades of effort, while Buchanan lauded a “triumph more glorious, because far more useful to mankind, than was ever won by conqueror on the field of battle. The message took over 17 hours to deliver, at 2 minutes and 5 seconds per letter by Morse code, and the cable operated for less than a month due to a variety of technical failures, but a global communications revolution had begun. By 1866, new cables were transmitting 6 to 8 words a minute, which would rise to more than 40 words before the end of the century. In 1956, Transatlantic No. 1 (TAT-1), the first underwater telephone cable, was laid, and by 1988, TAT-8 was transmitting 280 megabytes per second – about 15 times the speed of an average US household internet connection – over fiber optics, which use light to transmit data at breakneck speeds. In 2018, the Marea cable began operating between Bilbao, Spain, and the US state of Virginia, with transmission speeds of up to 160 terabits per second – 16 million times faster than the average home internet connection. Today, there are around 380 underwater cables in operation around the world, spanning a length of over 1.2 million kilometers (745,645 miles). Underwater cables are the invisible force driving the modern internet, with many in recent years being funded by internet giants such as Facebook, Google, Microsoft and Amazon. They carry almost all our communications and yet – in a world of wireless networking and smartphones – we are barely aware that they exist. Yet as the internet has become more mobile and wireless, the amount of data traveling across undersea cables has increased exponentially. “Most people are absolutely amazed” by the degree to which the internet is still cable-based, said Byron Clatterbuck, chief executive of Seacom, a multinational telecommunications firm responsible for laying many of the undersea cables connecting Africa to the rest of the world. “People are so mobile and always looking for Wi-Fi,” he said. “They don’t think about it, they don’t understand the workings of this massive mesh of cables working together. “They only notice when it’s cut.” Network down In 2012, Hurricane Sandy slammed into the US East Coast, causing an estimated $71 billion in damage and knocking out several key exchanges where undersea cables linked North America and Europe. “It was a major disruption,” Frank Rey, director of global network strategy for Microsoft’s Cloud Infrastructure and Operations division, said in a statement. “The entire network between North America and Europe was isolated for a number of hours. For us, the storm brought to light a potential challenge in the consolidation of transatlantic cables that all landed in New York and New Jersey.” For its newest cable, Marea, Microsoft chose to base its US operation further down the coast in Virginia, away from the cluster of cables to minimize disruption should another massive storm hit New York. But most often when a cable goes down nature is not to blame. There are about 200 such failures each year and the vast majority are caused by humans. “Two-thirds of cable failures are caused by accidental human activities, fishing nets and trawling and also ships’ anchors,” said Tim Stronge, vice-president of research at TeleGeography, a telecoms market research firm. “The next largest category is natural disaster, mother nature – sometimes earthquakes but also underwater landslides.” A magnitude-7.0 earthquake off the southwest coast off Taiwan in 2006, along with aftershocks, cut eight submarine cables which caused internet outages and disruption in Taiwan, Hong Kong, China, Japan, Korea and the Philippines. Stronge said the reason most people are not aware of these failures is because the whole industry is designed with it in mind. Companies that rely heavily on undersea cables spread their data across multiple routes, so that if one goes down, customers are not cut off. How a cable gets laid Laying a cable is a years-long process which costs millions of dollars, said Seacom’s Clatterbuck. The process begins by looking at naval charts to plot the best route. Cables are safest in deep water where they can rest on a relatively flat seabed, and won’t rub against rocks or be at risk of other disturbances. “The deeper the better,” Clatterbuck said. “When you can lay the cable down in deep water you rarely have any problems. It goes down on the bottom of the seabed and just stays there.” Things become more difficult the closer you get to shore. A cable that is only a few centimeters thick on the bottom of the ocean must be armored from its environment as reaches the landing station that links it with the country’s internet backbone. “Imagine a long garden hose, inside of which are very small tubes that house a very, very thin fiber pair,” Clatterbuck said. That hose is wrapped in copper, which conducts the direct current that powers the cable and its repeaters, sometimes up to 10,000 volts. “The fibers are wrapped in urethane and wrapped in copper and wrapped again in urethane,” he said. “If we’re going to have to put that cable on a shoreline that is very shallow and has a lot of rocks, you’re now going to have to armor coat that cable so no one can hack through it.” Cables in less hospitable areas can be far thicker than garden hoses, wrapped in extra plastic, kevlar armor plating, and stainless steel to ensure they can’t be broken. Depending on the coast, cable companies might also have to build concrete trenches far out to sea, to tuck the cable in to protect it from being bashed against rocks. “Before the cable-laying vessels go out they send out another specialized ship that maps the sea floor in the area when they want to go,” said TeleGeography’s Stronge. “They want to avoid areas where there’s a lot of undersea currents, certainly want to avoid volcanic areas, and avoid a lot of elevation change on the sea floor.” Once the route is plotted and checked, and the shore connections are secure, huge cable laying ships begin passing out the equipment. “Imagine spools of spools of garden hose along with a lot of these repeaters the size of an old travel trunk,” Clatterbuck said. “Sometimes it can take a month to load the cable onto a ship.” The 6,600 kilometer (4,000 mile) Marea cable weighs over 4.6 million kilograms (10.2 million pounds), or the equivalent of 34 blue whales, according to Microsoft, which co-funded the project with Facebook. It took more than two years to lay the entire thing. Malicious cuts The blackout came without warning. In February 2008, a whole swath of North Africa and the Persian Gulf suddenly went offline, or saw internet speeds slow to a painful crawl. This disruption was eventually traced to damage to three undersea cables off the Egyptian coast. At least one – linking Dubai and Oman – was severed by an abandoned, 5,400 kilogram (6-ton) anchor, the cable’s owner said. But the cause of the other damage was never explained, with suggestions it could have been the work of saboteurs. That raises the issue of another threat to undersea cables: deliberate human attacks. In a 2017 paper for the right-wing think tank Policy Exchange, British lawmaker Rishi Sunak wrote that “security remains a challenge” for undersea cables. “Funneled through exposed choke points (often with minimal protection) and their isolated deep-sea locations entirely public, the arteries upon which the Internet and our modern world depends have been left highly vulnerable,” he said. “The threat of these vulnerabilities being exploited is growing. A successful attack would deal a crippling blow to Britain’s security and prosperity.” However, with more than 50 cables connected to the UK alone, Clatterbuck was skeptical about how useful a deliberate outage could be in a time of war, pointing to the level of coordination and resources required to cut multiple cables at once. “If you wanted to sabotage the global internet or cut off a particular place you’d have to do it simultaneously on multiple cables,” he said. “You’d be focusing on the hardest aspect of disrupting a network.”

#### Mega-constellations provide fast, affordable internet that bridges digital divide – independently, competition lowers prices across the board.

Novo 21 Paula Novo 3-31-2021 "Will Starlink Change the Internet?' <https://www.highspeedoptions.com/resources/insights/will-starlink-change-the-internet> (With over four years of broadband experience, Paula Novo is the Site Editor and Senior Writer for HighSpeedOptions. She has helped develop the criterion by which HighSpeedOptions reviews and recommends internet service providers, striving to simplify and guide the user’s decision toward the best communications services. Paula also leads HighSpeedOptions coverage of the digital divide, ISP reviews, and broadband policy.)//Elmer

While it’s not the first – and won’t be the last – company to test low Earth orbit satellites, Starlink, the satellite internet division of SpaceX, is making waves in the telecommunications industry for its residential beta program launched in 2020. As the first U.S.-based firm to successfully bring LEO internet to market, Starlink shows promise where others have heroically failed. Every satellite company in history to launch a low Earth orbit (LEO) constellation has gone bankrupt, except for Starlink, that is. Said best in a tweet by Elon Musk, founder and CEO of this venture, “Starlink is a staggeringly difficult technical and economic endeavor. However, if we don’t fail, the cost to end-users will improve every year.” In the span of a decade, broadband moved from a “nice-to-have” to a “must-have” – the COVID-19 pandemic simply speeding up the clock on its shift towards a utility. Yet, we’re a far cry away from total connectivity. Due to availability and cost issues (to name a few), millions of Americans don’t have access to reliable internet, which further widens the education and wealth gaps. If successful, Starlink – and LEO satellite internet as a whole – may be the first real solution for billions of people missing out on the benefits of broadband. Current State of the Telecom Industry Despite advances in technology, the telecom industry is lagging behind. And, contrary to what internet service providers and the media report, the United States’ internet options are still very limited. The three biggest hurdles standing in the way of real progress include access, affordability, and lack of competition. Access According to the Federal Communications Commission’s (FCC) 2020 Broadband Deployment Report, roughly 6% of all Americans have zero access to fixed broadband at home. And, of those without access, a majority live in rural areas. That’s about 19 million people who, even if they could afford to subscribe to internet service, are out of luck. The FCC defines broadband speeds as just 25 Mbps down and 3 Mbps up, which may be fast enough to check emails but won’t reliably support your Breaking Bad marathon. You can see how living in an underserved area, then, can severely limit a person’s job prospects, schooling, and social connections. Still, we can’t rate internet access without also looking at affordability. While some 19 million Americans do not have access at all, as many as one in three Americans choose to not subscribe to internet service, citing cost as a leading factor. Affordability FCC data shows that nearly 35% of Americans, or about 114 million people, do not subscribe to broadband service at their homes. Affordability – or lack thereof – is often cited as the main driver for this decision. Despite government intervention via efforts like the FCC Lifeline Program and ISP subsidies to incentivize network expansions, America still seems to lag behind other developed countries when it comes to internet cost. In a 2020 study by New America, it turns out that we pay quite a bit more for internet service than most developed countries in Asia and Europe, regardless of speed. Before factoring in data caps and other ancillary ISP fees, we pay “nearly twice as much as European countries for high-speed internet.” Naturally, the ballooning question pops up – How did we fall behind? Lack of Competition The lack of competition today may be the single greatest obstacle preventing the telecom industry (read: ISPs and consumers) from thriving. A long history of privately-owned infrastructures and government regulations has enabled monopolies to quash competition in the marketplace and ignore the demand for innovation. Unsurprisingly, the Institute of Self-Reliance released a new report finding that two of the largest broadband companies in the U.S. – Comcast and Charter Spectrum – maintain a monopoly over 47+ million American households. It also sheds light on an additional 33 million homes only serviceable by one or two DSL providers. While these are just a few examples of the current market, you can easily see how large segments of the population lack the competitive supply needed to drive down costs and push for more development. What if there was a solution to address these pitfalls with the internet? What if Americans (or, really, anyone in the world) could circumvent some of the physical and political barriers stopping us from connecting from seemingly anywhere? These are questions Starlink is attempting to answer. Ways Starlink May Change the Internet First, what is Starlink and how is it different from other internet providers? It’s an Elon Musk satellite internet company bringing life to the telecom industry. In the last year, Starlink launched over 1,000 satellites into low orbit with the goal of offering a new type of broadband. If successful, this LEO service could not only supersede traditional satellite internet like HughesNet or Viasat but also rival the likes of fiber internet in rural and remote communities. Unlike GEO satellite providers who use a few hundred large satellites orbiting over 35,000 kilometers from Earth, Starlink plans to use up to 42,000 small satellites in low orbit no higher than 1,200 kilometers. Because of these key differences, Starlink is anticipated to offer reliable speeds up to 1 Gbps with lower latency of 20ms to 40ms worldwide. Essentially, it’d combine the performance of grounded internet with the geographical freedom of traditional satellite internet so people can live anywhere on Earth while staying connected. In general, LEO satellite service represents a real chance at solving connectivity issues for anyone outside city limits. Starlink may also pave the way for tangible changes to the industry as a whole, including lower prices, faster speeds, and better economic opportunities. Pricing of Internet As Starlink enters new markets, the added competition has the potential to drive down the cost of internet over time. In a study by the Analysis Group, they calculated that when just one new competitor joins a designated market area (DMA), the price of plans with speeds ranging from 50 Mbps to 1 Gbps sees a monthly decline of $1.50. That’s it? McDonald’s saves me more than that. Not so fast, though. Remember how we said Starlink isn’t the only company testing low orbit satellites? With other ventures like Blue Origin, OneWeb, and Telesat itching to launch their own LEO constellations, it won’t be long before new players enter the market. At which point, the Analysis Group guesstimates an 8% reduction in monthly broadband prices, or about $7.50. For low-income households, that may be the difference needed to break even on bills. And, even though Starlink itself is quite expensive, its presence in the market has the potential to still benefit consumers who could choose a (now) cheaper internet provider. Internet Speeds Similarly, the buzz around LEO internet speeds has industry heads raising their eyebrows as well. While Starlink is only testing speeds of 50 Mbps to 150 Mbps right now, in time it’s expected to offer speeds up to 1 Gbps with low latency. Normally these speeds are reserved for grounded connections like fiber or cable internet. So, if Starlink manages to deliver, we may no longer be limited by our geography. Even further, the Analysis Group reports that the availability of higher internet speeds in a DMA “increases the likelihood that other providers will introduce high-speed plans to match […] their competition.” In particular, they found that broadband providers are 4 to 17 percent more likely to increase their speeds on an annual basis because of competition. This goes to show that a little healthy rivalry in the marketplace first and foremost benefits the consumer. Economic Opportunity If Starlink is successful, we expect to see economic opportunity improve for billions with a B as well. With global availability, more people will have the means to compete for jobs in today’s digital age. To put things into perspective, consider the world population. Of the current 7.8 billion people, a little under half of them (40%) lack regular internet access. That’s nearly one out of every two people. If LEO satellite service can make it to where geography, price, and speeds aren’t roadblocks anymore, what happens? In general, more people with internet access equates to more job access. And, as jobs continue to transition online, it’s safe to assume that people won’t be as limited by obstacles such as disabilities, poor education, and wealth disparities when they compete for openings. In these ways, Starlink has the potential to help offset poverty where many governments have failed.

#### Internet solves extinction

**Eagleman 10** [David Eagleman is a neuroscientist at Baylor College of Medicine, where he directs the Laboratory for Perception and Action and the Initiative on Neuroscience and Law and author of Sum (Canongate). Nov. 9, 2010, “ Six ways the internet will save civilization,”  
 http://www.wired.co.uk/magazine/archive/2010/12/start/apocalypse-no]

Many **great civilisations have fallen**, leaving nothing but cracked ruins and scattered genetics. Usually this results **from: natural disasters, resource depletion, economic meltdown, disease, poor information flow and corruption**. But we’re luckier than our predecessors because **we command a technology that no one else possessed: a rapid communication network that finds its highest expression in the internet**. I propose that there are six ways in which **the net has vastly reduced the threat of societal collapse. Epidemics can be deflected by telepresence** One of our more dire prospects for collapse is an infectious-disease epidemic**. Viral and bacterial epidemics precipitated the fall of** the Golden Age of Athens**,** the Roman Empire and most of the empires of the Native Americans. **The internet can be our key to survival because the ability to work telepresently can inhibit microbial transmission by reducing human-to-human contact**. In the face of an otherwise devastating epidemic, businesses can keep supply chains running with the maximum number of employees working from home. This can reduce host density below the tipping point required for an epidemic. **If we are well prepared when an epidemic arrives, we can fluidly shift into a self-quarantined society** in which microbes fail due to host scarcity. Whatever the social ills of isolation, they are worse for the microbes than for us. **The internet will predict natural disasters We are witnessing the downfall of slow central control in the media**: news stories are increasingly becoming user-generated nets of up-to-the-minute information. **During the recent California wildfires,** locals went to the TV stations to learn whether their neighbourhoods were in danger. But the news stations appeared most concerned with the fate of celebrity mansions, so Californians changed their tack: they uploaded geotagged mobile-phone pictures, updated Facebook statuses and tweeted. The balance tipped: **the internet carried news about the fire more quickly and accurately than any news station could.** In this grass-roots, decentralised scheme, there were embedded reporters on every block, and the news shockwave kept ahead of the fire. This head start could provide the extra hours that save us. If the Pompeiians had had the internet in 79AD, they could have easily marched 10km to safety, well ahead of the pyroclastic flow from Mount Vesuvius. **If the Indian Ocean had the Pacific’s networked tsunami-warning system, South-East Asia would look quite different today. Discoveries are retained and shared** Historically, **critical information has required constant rediscovery**. Collections of learning -- from the library at Alexandria to the entire Minoan civilisation -- have fallen to the bonfires of invaders or the wrecking ball of natural disaster. Knowledge is hard won but easily lost. And information that survives often does not spread. **Consider smallpox inoculation**: this was under way in India, China and Africa centuries before it made its way to Europe**. By the time the idea reached North America, native civilisations who needed it had already collapsed. The net solved the problem. New discoveries catch on immediately;** information spreads widely. In this way, societies can optimally ratchet up, using the latest bricks of knowledge in their fortification against risk. **Tyranny is mitigated Censorship of ideas** was a familiar spectre in the last century, with state-approved news outlets ruling the press, airwaves and copying machines **in the USSR**, Romania, Cuba, China, Iraq **and elsewhere**. In many cases, such as Lysenko’s agricultural despotism in the USSR, it **directly contributed to the collapse of the nation**. Historically**, a more successful strategy has been to confront free speech with free speech -- and the internet allows this in a natural way.** It democratises the flow of information by offering access to the newspapers of the world, the photographers of every nation, the bloggers of every political stripe. Some posts are full of doctoring and dishonesty whereas others strive for independence and impartiality -- but all are available to us to sift through. Given the attempts by some governments to build firewalls, it’s clear that this benefit of the net requires constant vigilance. **Human capital is vastly increased Crowdsourcing brings people together to solve problems.** Yet far fewer than one per cent of the world’s population is involved. We need expand human capital. Most of the world not have access to the education afforded a small minority. For every Albert Einstein, Yo-Yo Ma or Barack Obama who has educational opportunities, uncountable others do not. This squandering of talent translates into reduced economic output and a smaller pool of problem solvers. **The net opens the gates education to anyone with a computer**. A motivated teen anywhere on the planet can walk through the world’s knowledge -- from the webs of Wikipedia to the curriculum of MIT’s OpenCourseWare**. The new human capital will serve us well when we confront existential threats we’ve never imagined before. Energy expenditure is reduced** Societal collapse can often be understood in terms of an energy budget: **when energy spend outweighs energy return, collapse ensues**. This has taken the form of deforestation or soil erosion; **currently, the worry involves fossil-fuel depletion. The internet addresses the energy problem with a natural ease**. Consider the massive energy savings inherent in the shift from paper to electrons -- as seen in the transition from the post to email. **Ecommerce reduces the need to drive long distances to purchase products. Delivery trucks are more eco-friendly** than individuals driving around, not least because of tight packaging and optimisation algorithms for driving routes. Of course, there are energy costs to the banks of computers that underpin the internet -- but these costs are less than the wood, coal and oil that would be expended for the same quantity of information flow. **The tangle of events that triggers societal collapse can be complex,** and there are several threats the net does not address. **But vast, networked communication can be an antidote to several of the most deadly diseases threatening civilisation.** The next time your coworker laments internet addiction, the banality of tweeting or the decline of face-to-face conversation, you may want to suggest that the net may just be the technology that saves us.

#### Starlink solves internet monopolies

**Krow 21** Krow, A. (2021, February 27). *Will Starlink disrupt spectrum’s internet provider monopoly?* Medium. <https://medium.com/technology-hits/will-starlink-disrupt-spectrums-internet-provider-monopoly-c3b33d20be11> (Teacher. Writer. Future Author. Aspiring Linguist. Progressive Voter. Twitter @ajkrow\_writer.) //Aadit

Throughout college and well into my teaching career, I’ve spent several hundred dollars sitting in coffee shops, drinking a latte or a Frappuccino while I completed work using their Wi-Fi until closing. Once I arrived home, I opened YouTube on my phone and played a video at the lowest resolution, 144p. I waited for several minutes as the video buffered. This became a daily occurrence when living in a rural area. Millions still don’t have access to fast internet at home As of [2019](https://www.digitaltrends.com/web/31-percent-us-households-no-broadband-internet/), a third of households nationwide do not have a reliable internet connection. The only way those families can access the internet is to leave their homes and go to a public library, school, or Starbucks. A week before schools transitioned to virtual learning in 2020, I remember some of my students stared at their phones under their desks. When I caught them and asked them to turn it in, they refused. For many students, the only internet access they had available was at school. [As of September 2020](https://usafacts.org/articles/internet-access-students-at-home/), 3.7 million children still did not have access to an internet connection at home. In August of 2020, teachers were expected to provide live (synchronous) classes to students via Zoom. I panicked. I still did not have access to the internet in my rural home. I immediately went on apartments.com and searched for a decent apartment that would have access to the internet. Once school started, many students could not log in to Google Classroom or Zoom and attend class. Of the seventy or so students I see every other day, less than half log in to Zoom. All the other students have never logged in, nor have they turned in a single assignment since school began. As a result, teachers, schools, and [districts nationwide failed them](https://apnews.com/article/distance-learning-coronavirus-pandemic-oregon-7fde612c3dbfd2e21fab9673ca49ad89). Corporations control who gets access to the internet In the United States, only two companies control a majority of the internet service available in the country. Those are Spectrum (also known as Comcast) and Charter (also known as Xfinity). Both companies decided they wouldn’t compete against each other. Instead, they would each claim one area and be the only internet service provider available. By doing so, they could raise prices and provide data caps. Customers have no choice other than to agree to the terms and conditions. In the U.S., [83.3 million people](https://ilsr.org/report-most-americans-have-no-real-choice-in-internet-providers/) are controlled by an internet monopoly: either Charter or Spectrum. Since both corporations have no other competition, they have no incentive to innovate or expand their services to other areas, namely rural areas. Spectrum and Charter see no benefit in laying out hundreds or thousands of feet of underground cable and spend tens of thousands of dollars to provide internet to a rural home, as the customer would only pay $50-$100 a month. Meanwhile, their “competitors” provide poor services and fail to offer any sort of competition to Charter or Spectrum. ViaSat, for example, offers limited data plans — its most expensive plan offers 150GB for $200 per month. In a family of four or five people, where children are connected to Zoom meetings, that data plan will reach its limit very quickly. This data plan also can’t compare to Spectrum, which offers unlimited internet for a quarter of the price of ViaSat. However, ViaSat and HughesNet are the only internet service providers available to rural areas. Since ViaSat and HughesNet face no competition from Spectrum and Charter, they have no incentive to provide fast speeds for their consumers. The average speed of ViaSat clocks in at [11.7Mbps](https://testmy.net/hoststats/viasat), or 1.4 Megabytes per second. At that speed, a YouTube video has to be played at the lowest resolution and would still buffer. Google Fiber failed to disrupt the market Roughly ten years ago, Google announced it would become an internet service provider. Google planned to disrupt

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Multilateralism CP:

#### States should convene a meeting of parties to the Outer Space Treaty and propose an Optional Protocol for review and acceptance by any state that establishes rules for restricting private entity Large Satellite Constellations in space. States should ratify and implement the protocol.

#### Multilat avoids backlash.

Meyer ’18 [Paul, Senior Fellow in Space Security at The Simons Foundation Canada, Adjunct Professor of International Studies at Simon Fraser University, Fellow in International Security at Simon Fraser University’s Centre for Dialogue, “Diplomacy: The Missing Ingredient in Space Security”, Simons Papers in Security and Development, Number 67, November, p. 15-17 [Note – ‘GGE’ = Group of Governmental Experts (GGE) on Transparency and Confidence-Building Measures (TCBMs) in Outer Space Activities]

A Way Forward

As the leading space power appears to be bent on unilateral steps regarding space security matters, a challenge is posed to those wishing to uphold the “peaceful purposes” aims of the Outer Space Treaty. Remedial action to promote cooperative security approaches in outer space will require a far more active campaign that is not limited to states, but which also engages all constituencies within the space community. While the three multilateral processes mentioned earlier hold out some prospect of success, they are a thin reed to lean on given their inherent constraints. Any effort to revitalize space security diplomacy will need to feature several, mutually reinforcing measures. Some possible near-term steps that could be taken to avoid a drift into space conflict and which would help to restore a more constructive atmosphere include the following:

1. All states should practice strategic restraint in their military space programs, offer greater transparency as to their nature and mute the escalating threat rhetoric and belligerent posturing.

2. A representative group of states should initiate a process at the UNGA to establish an open-ended working group to elaborate an International Code of Conduct on outer space activities. Despite its problematic diplomatic roll-out by the EU, this initiative has too much useful potential to be simply set aside and abandoned.

3. Whereas through the creation of the GGE, China and Russia have managed finally to escape the moribund CD and empower a UN forum to initiate discussion of their proposed PPWT and legally binding arms control in space generally, this step needs amplification. The closed-door nature of the GGE process and its dependency on an ultimate consensus for results, makes this a risky vehicle for conducting a discussion of legally binding versus politically binding approaches to space security. The GGE could be supplemented by a series of open-ended consultations hosted by concerned states or NGOs to permit discussion of the important factors of definitions, scope and verification that have not had a thorough or transparent airing in a multilateral context.

4. Similarly, a concerted effort is made to revisit and promote the TCBMs recommended by the 2013 GGE. Greater acceptance and implementation of these TCBMs would be a powerful counter-force to those seeking to depict outer space as a battleground in which inter-state conflict is inevitable. While it would be desirable if a group of like-minded states cooperated on convening a conference to focus on TCBMs this work could also benefit from private sector and civil society involvement as well.

5. A deliberate effort is pursued to re-establish common ground concerning the regime governing outer space. As the Outer Space Treaty is the embodiment of this regime, an effort to raise its profile and remind audiences of its core principles and provisions is called for. One step of both symbolic and substantive importance would be to have a champion state or a ginger group of “Friends of the Outer Space Treaty” to convene the first ever meeting of its state’s parties. As an early multilateral accord the Outer Space Treaty was not provided with follow-up mechanisms and hence lacks the attention that annual conferences of states parties provide for most multilateral agreements. After half a century of being in effect it is overdue to bring together its membership. Such a diplomatic gathering in honor of this cornerstone treaty could help consolidate support for its key principles and obligations as well as stimulate new cooperative steps for the future. A suitable gathering of states parties could also provide an incentive for further universalization of the treaty as countries outside the treaty will likely want to attend.

These proposed actions could help revitalize diplomacy, that missing ingredient from current considerations of space security and realign the depiction of outer space as a realm of promising international cooperation rather than one of inevitable confrontation and conflict.

#### Normal means is not multilateral.

Meyer ’14 [Paul, Senior Fellow in Space Security at The Simons Foundation Canada, Adjunct Professor of International Studies at Simon Fraser University, former career diplomat with Canada’s Foreign Service, Ambassador and Permanent Representative to the United Nations and Conference on Disarmament in Geneva (2003-2007), Director-General of the Security and Intelligence Bureau of the Canadian Department of Foreign Affairs, 3/20/14, “Space Security and Diplomatic Disconnects: A Canadian Perspective,” http://www.thesimonsfoundation.ca/sites/default/files/Space%20Security%20and%20Diplomatic%20Disconnects-A%20Canadian%20Perspective%20by%20Paul%20Meyer-2014%20Space%20Security%20Conference%2C%20Geneva.pdf

Any observer of the international system’s treatment of the subject of outer space security would have to be struck with the contrast between word and deed in this sphere of multilateral activity. On the one hand the “grave danger for international peace and security” represented by an arms race in outer space and the consequent “importance and urgency” of preventing such a calamity has been espoused for years. On the other hand, very little has been done to respond to this identified threat and even less by means of the steps specified in the guidance provided by the international community.

That guidance has primarily come in the form of a resolution of the UN General Assembly. One that has been adopted annually since the early 1980s and, in most recent years, with near universal support (no negative votes and only two abstentions). By now most in this room will know that I am referring to the resolution entitled “Prevention of an arms race in outer space” or PAROS to its friends. This resolution (A/RES/68/29 in its most recent iteration) constitutes the expression of a consensus concerning the situation of outer space security and what needs to be done to safeguard it. The resolution represents the international community’s declared policy on the subject.

Besides its characterization of the importance and urgency to prevent an arms race in outer space already cited above, the resolution is very action oriented, and in several places, quite prescriptive as to what should be done. Take for example its preambular paragraph “Convinced that further measures should be examined in the search for effective and verifiable bilateral and multilateral agreements in order to prevent an arms race in outer space, including the weaponization of outer space”. It clearly indicates that further measures are needed, that bilateral and multilateral agreements are a part of such measures and that the non-weaponization of outer space is a core element of the prevention of an arms race there. A subsequent preambular paragraph recalls “the importance of confidence-building measures as a means conducive to ensuring the attainment” of the PAROS objective.

This prescriptive character continues in the operational section of the resolution with OP2 reaffirming the need to “consolidate and reinforce” the existing legal regime for outer space security “and enhance its effectiveness” and OP3 emphasizing “the necessity of further measures with appropriate and effective provisions for verification to prevent an arms race in outer space”. Ops 5 and 6 refer to the Conference of Disarmament, noting its “primary role in the negotiation of a multilateral agreement or agreements” and inviting it to establish a working group under its PAROS agenda item early in its 2014 session.

So the direction of the international community seems clear enough – but what about the implementation record? Here one must acknowledge that there is a major disconnect between what states collectively say what they want to happen and what actually gets done. Obviously the bilateral and multilateral agreements envisaged have not transpired. The stress on verifiable accords suggest a content of real security significance and no agreements of that nature have been forthcoming. For those based in Geneva, I needn’t point to the surreal aspect of the appeal to the CD to establish “as early as possible in its 2014 session” a PAROS working group – something the CD has been unable to do in any of its sessions since the termination of the previous WG in 1995. Needless to say that the CD’s exercise of its primary role in the negotiation of PAROS agreements has not been noticeable for its exertions to date, let alone delivering any product.

Now some in civil society might point to this disconnect and simply attribute it to the cynicism of states, equally content to sign up to various declarations and then proceed to act at variance with them. This is an appealing if not fully satisfying hypothesis. Is it that states are being consciously insincere when endorsing the PAROS resolution or does it represent a set of goals and steps that ideally they would like to see realized but for a variety of reasons this has not occurred? And is there a further explanatory factor of institutional inertia, that in the peculiar universe of the UN and the resolution-factory that is the General Assembly, it seems easier to repeat constantly past formulations which have developed a patina of frequent use, regardless of whether they are now outmoded?

While you are pondering this, let me flag that the general background of diplomatic inaction on this security file is not uniform. Over the last decade we have seen a handful of diplomatic initiatives regarding space security that have broken with the prevailing pattern of neglect. Several of these flow from actions taken by Russia, which in turn reflects the relative and sustained priority this subject has had for that country. Russia alongside China were the sponsors of the draft treaty on the Prevention of Placement of Weapons in Outer Space that was formally tabled at the CD in 2008 (although elements were introduced as early as 2002). If we consider the PPWT against the criteria of the PAROS resolution it certainly aligns with a substantive multilateral agreement with a major security focus, although it manages the verification criterion in an indirect “could be added latter” manner. Providing for verification would entail some expenditure, but given how much we have invested in what is up there and the costs that would be occurred if these space assets are threatened or attacked, spending something to monitor a ban would be a fiscally responsible act.

Although the draft text has received some feedback from states, the PPWT has not been the subject of a dedicated session or conference. I note with interest the statement by Russian Ambassador Alexey Borodavkin that an updated version of the PPWT is shortly to be submitted to the CD. It would be necessary in my view that any new text is accompanied by a procedural plan that ensures actual consideration of the proposal. A workable process is as important as the product itself.

Russia has been the initiating force behind a series of UNGA resolutions promoting consideration of transparency and confidence-building measures (TCBM) for outer space. Russia also initiated and chaired the UN Group of Governmental Experts that studied TCBMs and produced a consensus report in July 2013. This report outlined a variety of transparency, notification and consultative measures which it commended to states for their consideration and implementation on a voluntary basis. Russia has also encouraged states to make political commitments to the effect that they would not be the first to place weapons into outer space. It is noteworthy that in his January statement already referred to, Ambassador Borodavkin expressed Russia’s intention to introduce a resolution at this fall’s UNGA session relating to such unilateral pledges. I am troubled by this particular formulation, because while it would be terrible to have a state be the first to weaponize space, it would be just as bad to have a second, third or fourth follow suit. The ‘no first placement’ proposition could be seen as an invitation to develop space weapons in order to be in a position to retaliate in kind. Much preferable in my opinion would be a pledge not to weaponize outer space period.

While I think it is fair to describe Russia as the leading diplomatic actor on this file in recent years, it doesn’t mean that others have not contributed in some fashion as well (China most notably). The EU, starting in 2008, has championed an International Code of Conduct on Outer Space activities. The Code now in a third version after several rounds of multilateral consultation also can be seen as an attempt to respond to the UNGA space security resolutions espousing TCBMs. The Code indeed identifies itself as a regime of TCBMs “with the aim of creating mutual understanding and trust, helping both to prevent confrontation and foster national, regional and global security and stability,”(1.3). Some proposals for individual TCBM have also originated with other states. Canada, for example, proposed in 2007 and 2009 a triad of security pledges aimed at preventing the weaponization of outer space and attacks against satellites from any environment.

All of these diplomatic steps have been taken within (and perhaps motivated by) a space security situation which was seen to be deteriorating. In particular the demonstrations of ASAT capabilities by China and the US in 2007 and 2008 respectively, contributed to renewed concerns that the peaceful operating environment of outer space could be readily threatened by terrestrial systems. As the growth of space users and the number of stakeholders continues apace, we should expect a commensurate increase in the attention being paid, inside and outside of governments, to the security of outer space. This in turn should yield more engagement, than we have witnessed in several years, in the admittedly demanding work of analyzing and debating the PAROS-related proposals that have come forward.

A major impediment to such consideration is the absence of an appropriate, functioning multilateral forum for addressing this subject matter. The CD, would of course be the preferred forum, for such official PAROS relevant work, but it has been out of action for 15 years. COPOUS can deal with some sustainability and safety-related aspects, but is not mandated to take up the security aspects. The UN General Assembly’s First committee can continue to consider the topic of outer space security at its annual deliberations, but needs some more operational entity to undertake on-going work. The EU, in relation to its draft Code of Conduct, has said it intends to convene an ad hoc diplomatic conference to adopt eventually this document. This may be the diplomatic vehicle that other proponents of space security initiatives should consider utilizing if they truly wish to see a debate on their specific proposals take place. Perhaps it is time for a meeting of the states parties to the 1967 Outer Space Treaty to review its implementation and the prospects for reinforcing its core legal regime for outer space with additional measures as foreseen in the PAROS resolution. If the international community is ever going to be able to overcome the diplomatic disconnect embodied in the PAROS resolution, it will need to find the means to channel its policy direction into practical results. States cannot continue to hide behind the

#### Fractionalization kills space law.

Beard ’17 [Jack, Assistant Professor of Law at the University of Nebraska College of Law, Space, Cyber & Telecommunications Law Program, LLM from Georgetown University, JD from the University of Michigan School of Law, and Former Associate Deputy General Counsel (International Affairs) at the Department of Defense, Former Lieutenant Colonel in the Judge Advocate General's Corps in the U.S. Army Reserve, “Soft Law's Failure on the Horizon: The International Code of Conduct for Outer Space Activities”, University of Pennsylvania Journal of International Law, Spring 2017, 38 U. Pa. J. Int'l L. 335, Lexis]

Russia and China thus continue to lie beyond the reach of the Code, defeating efforts by proponents to make the Code a widely subscribed and broadly accepted instrument and greatly diminishing its purported "norm-setting" capabilities. Whatever benefits soft law instruments are asserted to have in addressing security matters, participation by only a fraction of states in the Code, particularly a fraction that fails to include all the major space-faring countries, will not provide a sound basis for establishing new norms or help to identify or isolate aggressors and other non-participating, misbehaving states. Furthermore, states facing perceived security threats in space are not likely to be assured by a fractional version of the Code in which their potential adversaries do not even participate.

In some areas of international cooperation, such as the protection of human rights, persuading only a fraction of states to initially sign multilateral instruments may be viewed as a positive, progressive [\*394] step of achievement (particularly since human rights agreements are not focused on reciprocal obligations). 240 As an arms control initiative for space, however, the Code's failure to include Russia and China and other major space stakeholders is a fundamental flaw. The absence of powerful, potential adversaries makes multilateral conventions addressing arms control or disarmament issues highly problematic for those states contemplating joining such regimes and making potentially dangerous, non-reciprocal commitments. 241 [FOOTNOTE] 241 Richard L. Williamson Jr., Hard Law, Soft Law, and Non-Law in Multilateral Arms Control: Some Compliance Hypotheses, 4 Chi. J. Int'l L 59, 61-62 (2003) ("Other matters can affect a treaty's effectiveness, such as the degree to which essential nations become parties to the treaty. If key parties remain outside the treaty, it increases pressure on the other states to withdraw or cheat"). [END FOOTNOTE] To the extent that soft law arrangements such as the proposed Code seek to promote arms control measures in the face of severe security dilemmas and the threat of arms races, the non-participation of powerful adversaries clearly undermines such efforts.

If the proposed Code is adopted by states in its current state of limited acceptance, a fractional soft law product will emerge which will present its own particular disadvantages and problems (beyond those associated with soft law arrangements generally). Not only would a fractionalized Code fail to identify aggressors and isolate rogue states, it could instead lead to de facto competing legal regimes in space, as subscribing states respect their own "rules of the road" while other non-participating states - especially major, non-participating space powers - seek to advance their own interests through different or less restrictive approaches. Attempts to later successfully persuade non-participating states to accede to the Code will be challenging, if not impossible, and could risk further weakening rather than improving the Code. 242

#### Extinction.

Pelton ’17 [Joseph, PhD in International Relations from Georgetown University, Director Emeritus of the Space and Advanced Communications Research Institute at George Washington University, The New Gold Rush: The Riches of Space Beckon!, p. 1-9]

Are We Humans Doomed to Extinction?

What will we do when Earth’s resources are used up by humanity? The world is now hugely over populated, with billions and billions crammed into our overcrowded cities. By 2050, we may be 9 billion strong, and by 2100 well over 11 billion people on Planet Earth. Some at the United Nations say we might even be an amazing 12 billion crawling around this small globe. And over 80 % of us will be living in congested cities. These cities will be ever more vulnerable to terrorist attack, natural disaster, and other plights that come with overcrowding and a dearth of jobs that will be fueled by rapid automation and the rise of artificial intelligence across the global economy. We are already rapidly running out of water and minerals. Climate change is threatening our very existence. Political leaders and even the Pope have cautioned us against inaction. Perhaps the naysayers are right. All humanity is at tremendous risk. Is there no hope for the future? This book is about hope. We think that there is literally heavenly hope for humanity. But we are not talking here about divine intervention. We are envisioning a new space economy that recognizes that there is more water in the skies that all our oceans. Th ere is a new wealth of natural resources and clean energy in the reaches of outer space—more than most of us could ever dream possible. There are those that say why waste money on outer space when we have severe problems here at home? Going into space is not a waste of money. It is our future. It is our hope for new jobs and resources. The great challenge of our times is to reverse public thinking to see space not as a resource drain but as the doorway to opportunity. The new space frontier can literally open up a “gold rush in the skies.” In brief, we think there is new hope for humanity. We see a new a pathway to the future via new ventures in space. For too long, space programs have been seen as a money pit. In the process, we have overlooked the great abundance available to us in the skies above. It is important to recognize there is already the beginning of a new gold rush in space—a pathway to astral abundance. “New Space” is a term increasingly used to describe radical new commercial space initiatives—many of which have come from Silicon Valley and often with backing from the group of entrepreneurs known popularly as the “space billionaires.” New space is revolutionizing the space industry with lower cost space transportation and space systems that represent significant cost savings and new technological breakthroughs. “New Commercial Space” and the “New Space Economy” represent more than a new way of looking at outer space. These new pathways to the stars could prove vital to human survival. If one does not believe in spending money to probe the mysteries of the universe then perhaps we can try what might be called “calibrated greed” on for size. One only needs to go to a cubesat workshop, or to Silicon Valley or one of many conferences like the “Disrupt Space” event in Bremen, Germany, held in April 2016 to recognize that entrepreneurial New Space initiatives are changing everything [ 1 ]. In fact, the very nature and dimensions of what outer space activities are today have changed forever. It is no longer your grandfather’s concept of outer space that was once dominated by the big national space agencies. Th e entrepreneurs are taking over. The hopeful statements in this book and the hard economic and technical data that backs them up are more than a minority opinion. It is a topic of growing interest at the World Economic Forum, where business and political heavyweights meet in Davos, Switzerland, to discuss how to stimulate new patterns of global economic growth. It is even the growing view of a group that call themselves “space ethicists.” Here is how Christopher J. Newman, at the University of Sunderland in the United Kingdom has put it: Space ethicists have offered the view that space exploration is not only desirable; it is a duty that we, as a species, must undertake in order to secure the survival of humanity over the longer term. Expanding both the resource base and, eventually, the habitats available for humanity means that any expenditure on space exploration, far from being viewed as frivolous, can legitimately be rationalized as an ethical investment choice. (Newman) On the other hand there are space ethicists and space exobiologists who argue that humans have created ecological ruin on the planet—and now space debris is starting to pollute space. Th ese countervailing thoughts by the “no growth” camp of space ethicists say we have no right to colonize other planets or to mine the Moon and asteroids—or at least no right to do so until we can prove we can sustain life here on Earth for the longer term. However, for most who are planning for the new space economy the opinion of space philosophers doesn’t really fl oat their boat. Legislators, bankers, and aspiring space entrepreneurs are far more interested in the views of the super-rich capitalists called the space billionaires. A number of these billionaires and space executives have already put some very serious money into enterprises intent on creating a new pathway to the stars. No less than fi ve billionaires with established space ventures—Elon Musk, Paul Allen, Jeff Bezos, Sir Richard Branson, and Robert Bigelow—have invested millions if not billions of dollars into commercializing space. Th ey are developing new technologies and establishing space enterprises that can bring the wealth of outer space down to Earth. Th is is not a pipe dream, but will increasingly be the economic reality of the 2020s. Th ese wealthy space entrepreneurs see major new economic opportunities. To them space represents the last great frontier for enterprising pioneers. Th us they see an ever-expanding space frontier that off ers opportunities in low-cost space transportation, satellite solar power satellites to produce clean energy 24 h a day, space mining, space manufacturing and production, and eventually space habitats and colonies as a trajectory to a better human future. Some even more visionary thinkers envision the possibility of terraforming Mars, or creating new structures in space to protect our planet from cosmic hazards and even raising Earth’s orbit to escape the rising heat levels of the Sun in millennia to come. Some, of course, will say this is sci-fi hogwash. It can’t be done. We say that this is what people would have said in 1900 about airplanes, rocket ships, cell phones and nuclear devices. The skeptics laughed at Columbus and his plan to sail across the oceans to discover new worlds. When Thomas Jefferson bought the Louisiana Purchase from France or Seward bought Alaska, there were plenty of naysayers that said such investment in the unknown was an extravagant waste of money. A healthy skepticism is useful and can play a role in economic and business success. Before one dismisses the idea of an impending major new space economy and a new gold rush, it might useful to see what has already transpired in space development in just the past fi ve decades. Th e world’s fi rst geosynchronous communications satellite had a throughput capability of about 500 kb / s. In contrast, today’s state of the art Viasat 2 —a half century later— has an impressive throughput of some 140 Gb/s. Th is means that the relative throughput is nearly 300,000 greater, while its lifetime is some ten times longer (Figs. 1.1 and 1.2 ). Each new generation of communications satellite has had more power, better antenna systems, improved pointing and stabilization, and an extended lifetime. And the capabilities represented by remote sensing satellites , meteorological satellites , and navigation and timing satellites have also expanded their capabilities and performance in an impressive manner. When satellite applications fi rst started, the market was measured in millions of dollars. Today commercial satellite services exceed a quarter of a billion dollars. Vital services such as the Internet, aircraft traffi c control and management, international banking, search and rescue and much, much more depend on application satellites. Th ose that would doubt the importance of satellites to the global economy might wish to view on You Tube the video “If Th ere Were a Day Without Satellites?” [ 2 ]. Let’s check in on what some of those very rich and smart guys think about the new space economy and its potential. (We are sorry to say that so far there are no female space billionaires, but surely this, too, will come someday soon.) Of course this twenty-fi rst century breakthrough that we call the New Space economy will not come just from new space commerce. It will also come from the amazing new technologies here on Earth. Vital new terrestrial technologies will accompany this cosmic journey into tomorrow. Information technology, robotics, artifi cial intelligence and commercial space travel systems have now set us on a course to allow us humans to harvest the amazing riches in the skies—new natural resources, new energy, and even totally new ways of looking at the purpose of human existence. If we pursue this course steadfastly, it can be the beginning of a New Space renaissance. But if we don’t seek to realize our ultimate destiny in space, Homo sapiens can end up in the dustbin of history—just like literally millions of already failed species. In each and every one of the fi ve mass extinction events that have occurred over the last 1.5 billion years on Earth, some 50–80 % of all species have gone the way of the T. Rex, the woolly mammoth, and the Dodo bird along with extinct ferns, grasses and cacti. On the other hand, the best days of the human race could be just beginning. If we are smart about how we go about discovering and using these riches in the skies and applying the best of our new technologies, it could be the start of a new beginning for humanity. Konstantin Tsiokovsky, the Russian astronautics pioneer, who fi rst conceived of practical designs for spaceships, famously said: “A planet is the cradle of mankind, but one cannot live in a cradle forever.” Well before Tsiokovsky another genius, Leonardo da Vinci, said, quite poetically: “Once you have tasted fl ight, you will forever walk the earth with your eyes turned skyward, for there you have been, and there you will always long to return.” Th e founder of the X-Prize and of Planetary Resources, Inc., Dr. Peter Diamandis, has much more brashly said much the same thing in quite diff erent words when he said: “Th e meek shall inherit the Earth. Th e rest of us will go to Mars.” The New Space Billionaires Peter Diamandis is not alone in his thinking. From the list of “visionaries” quoted earlier, Elon Musk, the founder of SpaceX; Sir Richard Branson, the founder of Virgin Galactic; and Paul Allen, the co-founder of Microsoft and the man who fi nanced SpaceShipOne, the world’s fi rst successful spaceplane have all said the future will include a vibrant new space economy. Th ey, and others, have said that we can, we should and we soon shall go into space and realize the bounty that it can off er to us. Th e New Space enterprise is today indeed being led by those so-called space billionaires , who have an exciting vision of the future. Th ey and others in the commercial space economy believe that the exploitation of outer space may open up a new golden age of astral abundance. Th ey see outer space as a new frontier that can be a great source of new materials, energy and various forms of new wealth that might even save us from excesses of the past. Th is gold rush in the skies represents a new beginning. We are not talking about expensive new space ventures funded by NASA or other space agencies in Europe, Japan, China or India. No, these eff orts which we and others call New Space are today being forged by imaginative and resourceful commercial entrepreneurs. Th ese twenty-fi rst century visionaries have the fortitude and zeal to look to the abundance above. New breakthroughs in technology and New Space enterprises may be able to create an “astral life raft” for humanity. Just as Columbus and the Vikings had the imaginative drive that led them to discover the riches of a new world, we now have a cadre of space billionaires that are now leading us into this New Space era of tomorrow. Th ese bold leaders, such as Paul Allen and Sir Richard Branson, plus other space entrepreneurs including Jeff Bezos of Amazon and Blue Origin, and Robert Bigelow, Chairman of Budget Suites and Bigelow Aerospace, not only dream of their future in the space industry but also have billions of dollars in assets. Th ese are the bright stars of an entirely new industry that are leading us into the age of New Space commerce . Th ese space billionaires, each in their own way, are proponents of a new age of astral abundance. Each of them is launching new commercial space industries. Th ey are literally transforming our vision of tomorrow. Th ese new types of entrepreneurial aerospace companies—the New Space enterprises—give new hope and new promise of transforming our world as we know it today. The New Space Frontier What happens in space in the next few decades, plus corresponding new information technologies and advanced robotics, will change our world forever. Th ese changes will redefi ne wealth, change our views of work and employment and upend almost everything we think we know about economics, wealth, jobs, and politics. Th ese changes are about truly disruptive technologies of the most fundamental kinds. If you thought the Internet, smart phones, and spandex were disruptive technologies, just hang on. You have not seen anything yet. In short, if you want to understand a transition more fundamental than the changes brought to the twentieth century world by computers, communications and the Internet, then read this book. There are truly riches in the skies. Near-Earth asteroids largely composed of platinum and rare earth metals have an incredible value. Helium-3 isotopes accessible in outer space could provide clean and abundant energy. There is far more water in outer space than is in our oceans. In the pages that follow we will explain the potential for a cosmic shift in our global economy, our ecology, and our commercial and legal systems. These can take place by the end of this century. And if these changes do not take place we will be in trouble. Our conventional petro-chemical energy systems will fail us economically and eventually blanket us with a hydrocarbon haze of smog that will threaten our health and our very survival. Our rare precious metals that we need for modern electronic appliances will skyrocket in price, and the struggle between “haves” and “have nots” will grow increasingly ugly. A lack of affordable and readily available water, natural resources, food, health care and medical supplies, plus systematic threats to urban security and systemic warfare are the alternatives to astral abundance. The choices between astral abundance and a downward spiral in global standards of living are stark. Within the next few decades these problems will be increasingly real. By then the world may almost be begging for new, out of- the-box thinking. International peace and security will be an indispensable prerequisite for exploitation of astral abundance, as will good government for all. No one nation can be rich and secure when everyone else is poor and insecure. In short, global space security and strategic space defense, mediated by global space agreements, are part of this new pathway to the future.

Don’t give them 1AR theory

1. It’s a bad norm because we have less speeches to have the theory debate – only three speeches
2. Leads to intervention since any counter interps or responses to the counter interps are new in the 2
3. Unfair since we only get one speech to respond so the 2ar can spin the shell and we can’t do anything about it

# 5

#### Hacking towards Satellites is coming now – incentives and vulnerabilities align.

Culpan 21 Tim Culpan 11-2-2021 "The Next Big Hack Could Come From the Stars" <https://archive.is/XElln#selection-3035.0-3040.0> (Bloomberg Opinion Columnist)//Elmer

“As space becomes more important, there becomes unfortunately even greater incentives for malicious actors to disrupt, deny or alter our space-based assets,” Bob Kolasky, head of the Department of Homeland Security’s National Risk Management Center, told the same conference organized by the National Institute of Standards and Technology. “With space, whatever you put in orbit is what you must live with. Systems must be designed so that they can address threats and hazards throughout their lifespan.” What makes satellites and their associated land-based infrastructure more vulnerable is that the data they transmit can be easily accessed by anyone on Earth with $300 worth of TV reception equipment, allowing you to eavesdrop on unencrypted financial data or download information from Russian and American weather satellites in real time. A nefarious actor with its own satellite could even cause interference or block the signal from these orbiting stations. But among the scariest of scenarios would be for an adversary to break into the control systems of a satellite, redirect its movement or even crash it into another satellite or the planet. That may have already happened. According to one account, a breach at the Goddard Space Flight Center in Washington, D.C., in 1998 led to a U.S.-German satellite called ROSAT being overtaken and turned toward the sun, damaging the ultraviolet filter on its image sensors. This allegation has been denied, yet whether real or apocryphal the incident (the filter was indeed destroyed by the sun) shows the challenges of repairing hardware 360 miles above the earth’s surface or even investigating the cause of the malfunction.

#### Megaconstellations solves satellite hacking – multiple warrants. Commercial Satellites are key due to production capacity.

Hallex and Cottom 20 Hallex, Matthew, and Travis Cottom. "Proliferated commercial satellite constellations: Implications for national security." Joint Forces Quarterly 97.July (2020): 20-29. (Matthew A. Hallex is a Research Staff Member at the Institute for Defense Analyses. Travis S. Cottom is a Research Associate at the Institute for Defense Analyses.)//Re-cut by Elmer

While potentially threatening the sustainability of safe orbital operations, new proliferated constellations also offer opportunities for the United States to increase the resilience of its national security space architectures. Increasing the resilience of U.S. national security space architectures has strategic implications beyond the space domain. Adversaries such as China and Russia see U.S. dependence on space as a key vulnerability to exploit during a conflict. Resilient, proliferated satellite constellations support deterrence by denying adversaries the space superiority they believe is necessary to initiate and win a war against the United States.28 Should deterrence fail, these constellations could provide assured space support to U.S. forces in the face of adversary counterspace threats while imposing costs on competitors by rendering their investments in counterspace systems irrelevant. Proliferated constellations can support these goals in four main ways. First, the extreme degree of disaggregation inherent in government and commercial proliferated constellations could make them more resilient to attacks by many adversary counterspace systems. A constellation composed of hundreds or thousands of satellites could withstand losing a relatively large number of them before losing significant capability. Conducting such an attack with kinetic antisatellite weapons—like those China and Russia are developing—would require hundreds of costly weapons to destroy satellites that would be relatively inexpensive to replace. Second, proliferated constellations would be more resilient to adversary electronic warfare. Satellites in LEO can emit signals 1,280 times more powerful than signals from satellites in GEO.29 They also are faster in the sky than satellites in more distant orbits, which, combined with the planned use of small spot beams for communications proliferated constellations, would shrink the geographic area in which an adversary ground-based jammer could effectively operate, making jammers less effective and easier to geolocate and eliminate.30 Third, even if the United States chooses not to deploy national security proliferated constellations during peacetime, industrial capacity for mass-producing proliferated constellation satellites could be repurposed during a conflict. Just as Ford production lines shifted from automobiles to tanks and aircraft during World War II, one can easily imagine commercial satellite factories building military reconnaissance or communications satellites during a conflict. Fourth, deploying and maintaining constellations of hundreds or thousands of satellites will drive the development of low-cost launches to a much higher rate than is available today. Inexpensive, high-cadence space launch could provide a commercial solution to operationally responsive launch needs of the U.S. Government. In a future where space launches occur weekly or less, the launch capacity needed to augment national security space systems during a crisis or to replace systems lost during a conflict in space would be readily available.31

#### Hacking on Satellites goes Nuclear.

Miller and Fontaine 17 James Miller and Richard Fontaine 11-26-2017 "Cyber and Space Weapons Are Making Nuclear Deterrence Trickier" <https://www.defenseone.com/ideas/2017/11/cyber-and-space-weapons-are-making-nuclear-deterrence-trickier/142767/> (James N. Miller, Jr. is a member of the Board of Advisors of the Center for a New American Security. He served as U.S. Under Secretary of Defense for Policy from 2012 to 2014.)//Elmer

Cyber weapons are not, of course, the sole preserve of Russia. Washington has acknowledged its own development of them, and senior U.S. officials have highlighted their use against ISIS. Their possession by both Russia and the United States complicates traditional notions of strategic stability. Using non-kinetic, non-lethal cyber tools is likely to be very attractive in a crisis, and certainly in a conflict. Yet with both sides possessing the means to disrupt or destroy the other’s military systems and critical infrastructure – both war-supporting infrastructure as well as purely civilian infrastructure - a small “cyber-spark” could prompt rapid escalation. Such an attack could inadvertently “detonate” a cyber weapon that had been intended to lay dormant in the other side’s systems. Or a spark produced by sub-national actors – “patriotic hackers” inside or outside the government – could generate unintended cascading effects. The spark could even come via a false flag attack, with a third-party trying to pit the United States and Russia against one another. A second scenario could appear if armed conflict looks likely. At the outset, there would exist strong incentives to use offensive cyber and counter-space capabilities early, in order to negate the other side’s military. The U.S. and Russian militaries depend (though not equally) on information technology and space assets to collect and disseminate intelligence, as well as for command, control, and communications. Hence the incentive to use non-kinetic cyber or space attacks to degrade the other side’s military, with few if any direct casualties. By moving first, the cyber- or space-attacker could gain military and coercive advantage, while putting the onus on the attacked side to dare escalate with “kinetic” lethal attacks. Would the United States or Russia respond with, say, missile strikes or a bombing campaign in response to some fried computers or dead robots in outer space? Given the doubt that they would, large-scale cyber and space attacks – before a kinetic conflict even starts – are likely to be seen as a low-risk, high-payoff move for both sides. A third scenario plays out if one side believes that its critical infrastructure and satellites are far less vulnerable than the other side. In that case, a severe crisis or conflict might prompt the country to threaten (and perhaps provide a limited demonstration of) cyber attacks on civilian critical infrastructure, or non-kinetic attacks on space assets. Such a move would require the attacked side to respond not in kind but by escalating. So far, the three scenarios we have described could well undermine stability between the United States and Russia, but need not implicate nuclear stability. Yet consider this: U.S. and Russian nuclear forces rely on information technology and space assets for warning and communications. Attack the right satellites, or attack the right computers, and one side may disrupt the other’s ability to use nuclear weapons – or at least place doubt in the minds of its commanders. As a result, a major cyber and space attack could put nuclear “use-or-lose” in play early in a crisis. While we are generally accustomed to thinking about nuclear use as the highest rung on the escalatory ladder, such pressures – generated via non-nuclear attacks – could bring the horrors of a nuclear excha nge closer rather than substituting for them.

# Case

### solvency

**Circumvention**

**Johnson 20** [Matthew Johnson, PhD, University of Technology Sydney, “Mining the high frontier: sovereignty, property and humankind’s common heritage in outer space,” 2020, PhD Thesis, https://opus.lib.uts.edu.au/handle/10453/142380, EA]

However, the terrestrial history of mineral sovereignty tells us that even modest constraints imposed on private space mining interests may be undermined through the capture of democratic institutions. Private mining firms that have drawn on the political infrastructure of the neoliberal network have proven adept at hindering policies and governments that protect common interests in common spaces, from counter-movements against the nationalisation of mining operations to concerted lobbying efforts against international agreements that seek to impose limits on atmospheric carbon emissions. The US rejection of the Moon Agreement is consistent with neoliberal resistance to protective ‘double movements’ in a host of policy arenas, ranging from the creation of ecological conservation zones and provision of free healthcare, to increasing minimum wages or funding for public education. When the interests of mining capital are supported by and even embedded within political institutions (as in the case of ‘revolving doors’ between industry and public office), a concerted effort will need to be made in domestic and international institutions to push international space law towards anything resembling the ambitions of the Moon Agreement. Given the emergent connections between NewSpace and the Atlas Network, any double movement towards the preservation of intergenerational rights in the space commons would likely meet well-funded and well-organised resistance.

#### No solvency – aff leads to a shift to government space activities which are just as bad.

Ben-Itzhak 1/11

[Companies are commercializing outer space. Do government programs still matter?, <https://www.washingtonpost.com/politics/2022/01/11/companies-are-commercializing-outer-space-do-government-programs-still-matter/>, Svetla Ben-Itzhak, 1/11/21] [SS]

Why the commercial space sector won’t replace governments’ role Three factors help explain why the role of national space initiatives will continue. First, countries dictate the rules in space. The 1967 Outer Space Treaty, which provides the basic legal framework of international space law, gives countries full responsibility (Article 6), liability (Article 7) and ownership (Article 8) of any commercial entity and object in space. Governments have written and signed into effect current space laws, and this means governments will continue to have primacy in space affairs. While companies may operate in space, the current system remains centered around national governments. Second, national governments continue to play a major role in commercial space activities, often by providing substantial funding. Under NASA’s 2008 Commercial Resupply Services, for example, the U.S. agency awarded $5.9 billion in the first round of commercial resupply contracts, and up to $14 billion in the second. And under its 2011 Commercial Crew Program, NASA invested billions of dollars in a number of companies, with the goal of developing a safe and reliable U.S. commercial crew space transportation capability. NASA also funds a wide range of other commercial space initiatives, but there is little public information detailing exactly how much commercial partners invest in these joint ventures. In 2012, NASA Associate Administrator Bill Gerstenmaier acknowledged that “80-90 percent of the funding for ‘commercial’ crew is from the government, not the companies.” More recent reports suggest that the government’s investment share in commercial launches has changed little, at 77.6 percent. A third factor is federal deregulation, which helped U.S. commercial space activities to flourish and to dominate. For instance, in 2020, out of 114 total launch attempts, 38 were purely commercial; U.S. companies conducted 23 of these launch attempts, or 61 percent. In addition to launch services, the U.S. commercial space sector similarly leads in other areas, including satellite and spacecraft manufacturing, on-orbit servicing missions and human spaceflight. In the absence of deregulation in other countries, commercial space ventures are unlikely to develop along similar lines. While commercial space sectors in countries like Russia and China have expanded, growth has been limited and often contingent upon substantial government investments. Space will remain a national prerogative Commercial space companies appear well-positioned to continue to make groundbreaking contributions to space travel and exploration. However, despite the impressive growth of the commercial space sector, governments will continue to play a large role in commercial space enterprises, and in space travel and exploration — unless their ability to shape the dynamics of relations in space declines radically.

### debris

#### Collision risk is infinitesimally small

Fange 17 Daniel Von Fange 17, Web Application Engineer, Founder and Owner of LeanCoder, Full Stack, Polyglot Web Developer, “Kessler Syndrome is Over Hyped”, 5/21/2017, http://braino.org/essays/kessler\_syndrome\_is\_over\_hyped/

The orbital area around earth can be broken down into four regions. Low LEO - Up to about 400km. Things that orbit here burn up in the earth’s atmosphere quickly - between a few months to two years. The space station operates at the high end of this range. It loses about a kilometer of altitude a month and if not pushed higher every few months, would soon burn up. For all practical purposes, Low LEO doesn’t matter for Kessler Syndrome. If Low LEO was ever full of space junk, we’d just wait a year and a half, and the problem would be over. High LEO - 400km to 2000km. This where most heavy satellites and most space junk orbits. The air is thin enough here that satellites only go down slowly, and they have a much farther distance to fall. It can take 50 years for stuff here to get down. This is where Kessler Syndrome could be an issue. Mid Orbit - GPS satellites and other navigation satellites travel here in lonely, long lives. The volume of space is so huge, and the number of satellites so few, that we don’t need to worry about Kessler here. GEO - If you put a satellite far enough out from earth, the speed that the satellite travels around the earth will match the speed of the surface of the earth rotating under it. From the ground, the satellite will appear to hang motionless. Usually the geostationary orbit is used by big weather satellites and big TV broadcasting satellites. (This apparent motionlessness is why satellite TV dishes can be mounted pointing in a fixed direction. You can find approximate south just by looking around at the dishes in your northern hemisphere neighborhood.) For Kessler purposes, GEO orbit is roughly a ring 384,400 km around. However, all the satellites here are moving the same direction at the same speed - debris doesn’t get free velocity from the speed of the satellites. Also, it’s quite expensive to get a satellite here, and so there aren’t many, only about one satellite per 1000km of the ring. Kessler is not a problem here. How bad could Kessler Syndrome in High LEO be? Let’s imagine a worst case scenario. An evil alien intelligence chops up everything in High LEO, turning it into 1cm cubes of death orbiting at 1000km, spread as evenly across the surface of this sphere as orbital mechanics would allow. Is humanity cut off from space? I’m guessing the world has launched about 10,000 tons of satellites total. For guessing purposes, I’ll assume 2,500 tons of satellites and junk currently in High LEO. If satellites are made of aluminum, with a density of 2.70 g/cm3, then that’s 839,985,870 1cm cubes. A sphere for an orbit of 1,000km has a surface area of 682,752,000 square KM. So there would be one cube of junk per .81 square KM. If a rocket traveled through that, its odds of hitting that cube are tiny - less than 1 in 10,000.

#### Uncertainty from debris collisions creates restraint not instability.

MacDonald 16, B., et al. "Crisis stability in space: China and other challenges." Foreign Policy Institute. Washington, DC (2016). (senior director of the Nonproliferation and Arms Control Project with the Center for Conflict Analysis and Prevention)//Elmer

In any crisis that threatens to escalate into major power conflict, political and military leaders will face uncertainty about the effectiveness of their plans and decisions. This uncertainty will be compounded when potential conflict extends to the space and cyber domains, where weapon effectiveness is largely untested and uncertain, infrastructure interdependencies are unclear, and damaging an adversary could also harm oneself or one’s allies. Unless the stakes become very high, no country will likely want to gamble its well-being in a “single cosmic throw of the dice,” in Harold Brown’s memorable phrase. 96 The novelty of space and cyber warfare, coupled with risk aversion and worst-case assessments, could lead space adversaries into a situation of what can be called “hysteresis,” where each adversary is restrained by its own uncertainty of success. This is conceptually shown in Figures 1 and 2 for offensive counter-space capabilities, though it applies more generally. 97 These graphs portray the hypothetical differences between perceived and actual performance capabilities of offensive counter-space weapons, on a scale from zero to one hundred percent effectiveness. Where uncertainty and risk aversion are absent for two adversaries, no difference would exist between the likely performance of their offensive counter-space assets and their confidence in the performance of those weapons: a simple, straight-line correlation would exist, as in Figure 1. The more interesting, and more realistic, case is notionally presented in Figure 2, which assumes for simplicity that the offensive capabilities of each adversary are comparable. In stark contrast to the case of Figure 1, uncertainty and risk aversion are present and become important factors. Given the high stakes involved in a possible large-scale attack against adversary space assets, a cautious adversary is more likely to be conservative in estimating the effectiveness of its offensive capabilities, while more generously assessing the capabilities of its adversary. Thus, if both side’s weapons were 50% effective and each side had a similar level of risk aversion, each may conservatively assess its own capabilities to be 30% effective and its adversary’s weapons to be 70% effective. Likewise, if each side’s weapons were 25% effective in reality, each would estimate its own capabilities to be less than 25% effective and its adversary’s to be more than 25% effective, and so on. In Figure 2, this difference appears, in

### ozone

#### Ozone Layer is increasing – flips U/Q.

Horton 21 Helena Horton 9-15-2021 "‘Larger than usual’: this year’s ozone layer hole bigger than Antarctica" <https://www.theguardian.com/environment/2021/sep/16/larger-than-usual-ozone-layer-hole-bigger-than-antarctica> (Environmental Journalist for the Guardian)//Elmer

The hole in the ozone layer that develops annually is “rather larger than usual” and is currently bigger than Antartica, say the scientists responsible for monitoring it. Researchers from the Copernicus Atmosphere Monitoring Service say that this year’s hole is growing quickly and is larger than 75% of ozone holes at this stage in the season since 1979. Ozone exists about seven to 25 miles (11-40km) above the Earth’s surface, in the stratosphere, and acts like a sunscreen for the planet, shielding it from ultraviolet radiation. Every year, a hole forms during the late winter of thesouthern hemisphere as the sun causes ozone-depleting reactions, which involve chemically active forms of chlorine and bromine derived from human-made compounds. In a statement Copernicus said that this year’s hole “has evolved into a rather larger than usual one”. Vincent-Henri Peuch, the service’s director, told the Guardian: “We cannot really say at this stage how the ozone hole will evolve. However, the hole of this year is remarkably similar to the one of 2020, which was among the deepest and the longest-lasting – it closed around Christmas – in our records since 1979.

#### 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.

### space war

#### Zero risk of escalation from ASATs

**Pavur and Martinovic 19** [James Pavur and Ivan Martinovic, May 2019, "The Cyber-ASAT: On the Impact of Cyber Weapons in Outer Space," ResearchGate, 11th International Conference on Cyber Conflict: Silent Battle [https://www.researchgate.net/publication/334422193\_The\_Cyber-ASAT\_On\_the\_Impact\_of\_Cyber\_Weapons\_in\_Outer\_Space accessed 12/10/21](https://www.researchgate.net/publication/334422193_The_Cyber-ASAT_On_the_Impact_of_Cyber_Weapons_in_Outer_Space%20accessed%2012/10/21)]Adam

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.

#### Interdependence checks space war.

**Hall 15** [Luke Penn-Hall 15, Analyst at The Cipher Brief, M.A. from the Johns Hopkins School for Advanced International Studies, B.A. in International Relations and Religious Studies from Claremont McKenna College, “5 Reasons “Space War” Isn’t As Scary As It Sounds”, The Cipher Brief, 8/18/2015, <https://www.thecipherbrief.com/article/5-reasons-%E2%80%9Cspace-war%E2%80%9D-isn%E2%80%99t-scary-it-sounds>] recut Adam

* If you are also reading the Pavur evidence then unhighlight the debris stuff

The U.S. depends heavily on military and commercial satellites. If a less satellite-dependent opponent launched an anti-satellite (ASAT) attack, it would have far greater impact on the U.S. than the attacker. However, it’s not as simple as that – for the following reasons:

1. An ASAT attack would likely be part of a larger, terrestrial attack. An attack on space assets would be no different than an attack on territory or other assets on earth. This means that no space war would stay limited to space. An ASAT campaign would be part of a larger conventional military conflict that would play out on earth.

2. Every country with ASAT capabilities also needs satellites. While the United States is the most dependent on military satellites, most other countries need satellites to participate in the global economy. All countries that have the technical ability to play in this space – the U.S., Russia, China and India - also have a vested interest in preventing the militarization of space and protecting their own satellites. If any of those countries were to attack U.S. satellites, it would likely hurt them far more than it would hurt the United States.

3. Destruction of satellites could create a damaging chain reaction. Scientists warn that the violent destruction of satellites could result in an effect called an ablation cascade. High-velocity debris from a destroyed satellite could crash into other satellites and create more high-velocity debris. If an ablation cascade were to occur, it could render certain orbital levels completely unusable for centuries.

4. Any country that threatened access to space would threaten the global economy. Even if a full-blown ablation cascade didn’t occur, an ASAT campaign would cause debris, making operating in space more hazardous. The global economy relies on satellites and any disruption of operations would be met with worldwide disapproval and severe economic ramifications.

5. International Prohibits the Use of ASAT Weapons. Several international treaties expressly prohibit signatory nations from attacking other countries’ space assets. It is generally accepted that space should be treated as a global common area, rather than a military domain.

While it remains necessary for military planners to create contingency plans for a, space war it is a highly unlikely scenario. All involved parties are incentivized against attacking. However, if a space war did occur, it would be part of a larger conflict on Earth. Those concerned about the potential for war in space should be more concerned about the potential for war, period.

#### The costs are so high nobody would use a kinetic ASAT – they’ll disable instead

Su 17 [Jinyuan Su, School of Law, Xi’an Jiaotong University, People’s Republic of China Institute of Air and Space Law, Faculty of Law, McGill University, Canada. "Space Arms Control: Lex Lata and Currently Active Proposals." Asian Journal of International Law, 7 (2017), pp. 61–93. https://www.cambridge.org/core/journals/asian-journal-of-international-law/article/space-arms-control-lex-lata-and-currently-active-proposals/33AEE2235DA44A208E96C66DB034B23D]

# 2n