# 1NC

## 1

#### Interpretation: debaters may not garner offense from extra-topical planks of the plan

#### Violation: they say the specific process of appropriation via large sats in the LEO is unjust

#### Prefer:

#### 1] Limits and ground– they justify an infinite number of affs i.e. the appropriation of space is unjust via small sats, medium sats, mini sats, the Middle Earth orbit, the High Earth orbit, etc. – makes it impossible to prep since each aff requires unique case negs – ows since the rez is the only stasis point we have for prep pre-round

#### 2] Vagueness - only our interp lets them clearly define what they defend from the start. Their model leads to late-breaking debates that destroy ground, for example we won’t know if asteroid mining or space exploration or heg are offense until the 1AR, which skews neg prep

#### Use competing interps – reasonability is arbitrary and requires intervention

#### DTD – T indicts the whole aff

#### No RVIs – 1] illogical – shouldn’t win for being fair 2] forces us into a theory debate which crowds out substance

#### Fairness is a voter – making arguments assumes they’re being evaluated fairly

#### Education is a voter – why schools fund debate

#### 1NC theory first - abuse was self-inflicted, the only reason I was abusive was because the 1ac was initially abusive

## 2

#### Interp: The AFF must defend policy action by a state or states in the 1AC.

#### "Resolved:" the appropriation of outer space by private entities is "unjust" entails policy action:

#### 1---Resolved.

Parcher 1 [Jeff; former debate coach at Georgetown; Feb 26, 2001; <https://web.archive.org/web/20020929065555/http://www.ndtceda.com/archives/200102/0790.html>] brett

(1) Pardon me if I turn to a source besides Bill. American Heritage Dictionary: Resolve: 1. To make a firm decision about. 2. To decide or express by formal vote. 3. To separate something into constiutent parts See Syns at \*analyze\* (emphasis in orginal) 4. Find a solution to. See Syns at \*Solve\* (emphasis in original) 5. To dispel: resolve a doubt. - n 1. Frimness of purpose; resolution. 2. A determination or decision.

(2) The very nature of the word "resolution" makes it a question. American Heritage: A course of action determined or decided on. A formal statemnt of a deciion, as by a legislature.

(3) The resolution is obviously a question. Any other conclusion is utterly inconcievable. Why? Context. The debate community empowers a topic committee to write a topic for ALTERNATE side debating. The committee is not a random group of people coming together to "reserve" themselves about some issue. There is context - they are empowered by a community to do something. In their deliberations, the topic community attempts to craft a resolution which can be ANSWERED in either direction. They focus on issues like ground and fairness because they know the resolution will serve as the basis for debate which will be resolved by determining the policy desireablility of that resolution. That's not only what they do, but it's what we REQUIRE them to do. We don't just send the topic committtee somewhere to adopt their own group resolution. It's not the end point of a resolution adopted by a body - it's the prelimanary wording of a resolution sent to others to be answered or decided upon.

(4) Further context: the word resolved is used to emphasis the fact that it's policy debate. Resolved comes from the adoption of resolutions by legislative bodies. A resolution is either adopted or it is not. It's a question before a legislative body. Should this statement be adopted or not.

#### 2---Unjust.

Black’s Law [The Law Dictionary Featuring Black's Law Dictionary Free Online Legal Dictionary 2nd Ed. No Date. <https://thelawdictionary.org/unjust/>] brett

What is UNJUST?

Contrary to right and justice, or to the enjoyment of his rights by another, or to the standards of conduct furnished by the laws.

#### Violation: The plan says “private entities ought not” which indicates they are the actor.

#### Prefer:

#### 1---Ground---regulation good/bad is a core topic controversy around space commerce -- private actor fiat lets them skirt out of politics DAs, BizCon, Innovation, and any DA predicated around macroeconomic impacts of regulation.

#### 2---Limits---they can pick any private actor changes a policy, meaning even if we can make DA’s to individual companies they can spike out of it in the next debate.

#### CA Paradigms

## 3

#### Megaconstellations solve rural broadband---Starlink alone solves.

Weinschenk ‘21 [Carl; February 21; Freelance Editor, Freelance. Contributor, Telecompetitor, Technology, U.S. “Report: Starlink Looks Very Promising for Rural Broadband,” <https://www.telecompetitor.com/report-starlink-looks-very-promising-for-rural-broadband/>] brett

SpaceX’s Starlink satellite broadband service has the potential to be a game changer for rural broadband, according to an analysis by PCMag of Starlink speeds. The analysis is based on beta tester data exclusively provided to it by Ookla Speedtest.

The site looked at data from rural, suburban and urban areas. Among its more than 10,000 users in its semi-public beta were “a perplexing” number in urban and suburban areas where a variety of high-speed options already are available. The story cites Chicago, Seattle and Minneapolis as places where there were testers, despite readily available alternatives.

The site compared download speeds against other fixed service providers in 30 counties with at least 30 samples in any month from December 30 to February 24. The counties in which the fixed providers had the biggest speed advantage over Spacelink were urban or suburban: Los Angeles and Santa Clara counties, CA; Cook County, IL; King County, WA and Washington County, MN.

It is in rural areas that Starlink shines, according to the research. The five counties in which Starlink had the biggest download speed advantage over the fixed group were rural: Vilas County, WI; Ravali County, MT; Waldo County, ME; Okanogan County, WA and Lamoile County, VT.

Source: PCMag

The number of counties in which Starlink beat the fixed providers and those in which the fixed providers beat Starlink appeared to be about equal, as was the speed differential.

“Our own analysis shows that Starlink will make the biggest difference in rural, low-density, low-population counties with few options other than lower-quality satellite services,” wrote Sascha Segan, author of the PCMag article about Startlink rural speeds.

There is some skepticism about Starlink and its ability to serve rural broadband at scale, especially considering it has committed to serve 642K locations through the FCC RDOF program. Detractors have argued the service will struggle to provide adequate broadband speeds to that many rural customers.

At this point, Starlink is geographically constrained. The story says that reports put its current constellation most effectively covering areas ” between either 44 degrees or 45 degrees north, and either 52 degrees or 53 degrees north.” This region is in the northern third of the country and extends into Canada. A distribution map shows most beta testers in the northwest, with some in the upper Midwest and a smattering in the northeast and central and southern California.

Beta users report download speeds of as much as 170 Mbps with no data caps.

Starlink may be getting a speed boost. Last week, Space X CEO Elon Musk tweeted that he expects download speeds to hit 300 Mbps later this year. He added that latency will be 20 milliseconds.

#### Rural broadband is key to precision ag---solves supply which turns FDI 12.

USDA ‘19 [US department of agriculture, April 2019, A Case For Rural Broadband, accessed 8/12/21, <https://mobroadband.org/wp-content/uploads/sites/44/2020/07/case-for-rural-broadband.pdf>] brett

Across the agricultural production cycle, farmers and ranchers can implement digital technologies as other modern businesses are doing, enhancing agriculture by driving decision-making based on integrated data, automating processes to increase operational efficiency, improving productivity with tasks driven by real-time insights, augmenting the role of management in the business of farming, and creating new markets with extended geographic reach. These patterns of digital transformation create fundamental shifts in agricultural production, developing new ways of working that make the industry more productive, attractive, and financially sustainable for farmers and ranchers. Tech companies which stand to benefit from industry transformation continue to capitalize on these shifts by developing new technologies, which according to one recent study, may help position themselves to capture a portion of an estimated $254 billion to $340 billion in global addressable digital agriculture market.13 Business Management shifts decision making from instinct to integrated data Precision Agriculture is transforming the way producers collect, organize, and rely on information to make key decisions. Traditionally, producers’ long-term experiences have created a competitive advantage: years of experiments have produced insights and instincts about the land they have farmed and the animals they have raised. But the volume of data that is possible to collect today can accelerate that learning curve, helping producers learn faster and more rapidly adapt to market shifts—particularly on new fields and with new animals—and creating more nuanced insights, enabling them to act on leading indicators. This creates a disparity between producers who can utilize high-speed Internet service and those who cannot. Examples include the ability to do the following: • create decision tools to help farmers and ranchers estimate the potential profit and economic risks associated with growing one particular crop over another • decide which fertilizer is best for current soil conditions • apply pesticides in targeted areas of the field, to control pests rather than applying pesticides over the entire field • use limited water resources more effectively • respond to findings of sensors that monitor animal health and nutrition Better choices about what, where, and when to plant, fertilize, and harvest—or breed, feed, and slaughter—can drive above-average returns by removing unrecognized inefficiencies and scaling insights. Digitization shifts supply chain management and resource allocation from generic to precise. Precision Agriculture helps make the business of farming more efficient by minimizing inputs— such as raw materials and labor—and maximizing outputs. For example, previous research has found that 40 percent of fields are over-fertilized, which not only inflates the cost of inputs but also results in 15 percent–20 percent yield loss suffered from improper fertilizer application.14 Precise application of inputs, such as fertilizer, herbicides, and pesticides, allows farmers to adjust inputs to location-based characteristics and use exact amounts needed, which saves money and increases sustainability due to more efficient resource stewardship. Improved fertilizer, soil, and water use can significantly improve water quality with less runoff and reduce climate gas emissions, which is important since agriculture accounts for 10-15 percent of worldwide emissions.15 Despite reductions in necessary inputs, Next Generation Precision Agriculture helps maintain or increase yields, leading to significant gains in efficiency14. Real-time insights also improve logistics. When growing melons, for instance, real-time data can help farmers overcome challenges in storing and shipping their products. Melons should be stored in an optimal refrigeration environment to minimize spoilage, and real-time precision sensors can reduce spoilage by alerting staff to suboptimal variations in temperature and humidity, allowing the execution of remedies before major losses occur. When refrigerated storage is full or the market price is at a peak, the “Internet of Things” can provide real-time information about where trucks are located and locating customers to market products to help make the sale. LABOR EFFICIENCY boosts productivity by automating routine processes and enabling real-time response Connected devices equip farmers with a clear picture of their operations at any moment, making it possible to prioritize tasks more effectively and triage the most pressing issues. While routine inspection and scouting has typically been a regular part of farm management and has increased farm profitability14, connected technologies can track, sense, and flag where a producer should focus their time and attention that day. Similarly, e-connectivity has allowed rural farms to access new training resources and high-skilled labor that has not been previously available. Real-time data and automation can radically improve a producer’s peace of mind and performance under time constraints, especially because of reduced physical and mental stress (no longer struggling to keep the machine on a row line between 6 and 10 hours in the field during harvest or planting). On dairy farms, for example, automated devices that milk and feed animals can also track each cow’s activity and alert producers to potential problems. Because these tasks are traditionally done by the producer and farm personnel, e-connectivity can substantially reduce the amount of time and effort necessary to run farms. This leads to dramatic increases in flexibility, enabling time and talent to be directed to more advanced tasks. Farmers can use newly found time to re-invest in more high-value tasks like long-term planning and management of the operation. This shift towards farm management opens new possibilities for the way that farms conduct business. GEOGRAPHIC ACCESS extends the reach of the supply chain and shifts marketing from standard to differentiated As explained in the previous section, as Precision Agriculture unlocks additional time and resources to explore new ways of doing business farmers are re-investing their time into identifying options to improve inputs, including better-trained labor and more effective types of inputs. New customers and markets can also be explored to increase sales volume and revenues.

#### The modern food system relies on satellites. Collapse triggers global shocks to supply.

Tompkins 19 [Steven, Inmarsat’s Director of Sector Development for Agriculture. Head of Resilient and Sustainable Supply Chains Team at ADAS. Entrepreneurial manager with a sustained track record of building new profitable business streams for science-based organizations in the agri-food sector.; 3-18-2019; "Enabling the connected farm – the importance of satellite communications," Inmarsat, <https://www.inmarsat.com/blog/enabling-the-connected-farm-the-importance-of-satellite-communications/>] brett

The Agri-Tech Revolution, Agriculture 4.0, the smart and connected farm. There is no shortage of buzzwords hinting at a digitalised future, or solutions being touted as game-changing for the global agricultural industry. Commonly claimed benefits include increasing crop yields, and a reduction in input costs and the reliance on manual labour. Many of these solutions rely on reliable internet connectivity in the field to push data from one place to another, but there are still vast swathes of agricultural land that suffer from unreliable or non-existent connectivity, either lacking cellular or broadband connectivity. If we are to take advantage of the huge possibilities available to us, overcoming our connectivity challenges will be crucial. This is where satellite communications can help. When I tell people that I am an agriculturalist working for a satellite company, almost always the response is related to an experience of using space imagery (known as Earth Observation) to help automate processes such as crop scouting. But there is another breed of satellites that don’t produce images but do provide fast and reliable internet and voice communications across the world in areas that cellular and fibre connectivity cannot reach. Ubiquitous connectivity from satellites opens up huge possibilities for farmers in remote areas to take advantage of the Agri-Tech Revolution. In some cases, this is as simple as connecting frontline worker teams in large plantations to operations centres to prioritise workload and create efficiencies. Taking it one step further, satellite communications can be a bridge to enable farmers to connect data producing devices in the field (such as weather stations, sensors, data from farm machinery) to business applications. Known by the tech world as the ‘Internet of Things’ or IoT, this approach collects data from the field and harnesses it to support intelligent decision-making. For instance: obtaining real-time data on nutrient status in the field from NPK (Nitrogen Phosphorous and Potassium) sensors, alongside crop monitoring data and hyper-local weather that would allow you to make completely objective risk-based decisions on when and where to apply fertiliser. We know the industry is taking this proposition seriously – our own research told us that on average agriculture respondents expect to spend close to $1million on IoT solutions in the next three years and 72% of respondents would use satellite technology to support their projects. Of course, satellite isn’t the answer to everything and should be used in tandem with other connectivity types, and the good news is it’s easy to integrate with other connectivity technologies. With increasing demand to connect the physical world to the digital world, in some of the world’s remotest locations think of satellite not just as a series of images taken from space but an enabler to the Agri-Tech Revolution.

#### Food shortages go nuclear.

FDI 12 [FDI; a Research institute providing strategic analysis of Australia’s global interests; citing Lindsay Falvery, PhD in Agricultural Science and former Professor at the University of Melbourne’s Institute of Land and Environment (Future Directions International, , “Food and Water Insecurity: International Conflict Triggers & Potential Conflict Points,” <http://www.futuredirections.org.au/workshop-papers/537-international-conflict-triggers-and-potential-conflict-points-resulting-from-food-and-water-insecurity.html>] brett

There is a growing appreciation that the conflicts in the next century will most likely be fought over a lack of resources. Yet, in a sense, this is not new. Researchers point to the French and Russian revolutions as conflicts induced by a lack of food. More recently, Germany’s World War Two efforts are said to have been inspired, at least in part, by its perceived need to gain access to more food. Yet the general sense among those that attended FDI’s recent workshops, was that the scale of the problem in the future could be significantly greater as a result of population pressures, changing weather, urbanisation, migration, loss of arable land and other farm inputs, and increased affluence in the developing world. In his book, Small Farmers Secure Food, Lindsay Falvey, a participant in FDI’s March 2012 workshop on the issue of food and conflict, clearly expresses the problem and why countries across the globe are starting to take note. . He writes (p.36), “…if people are hungry, especially in cities, the state is not stable – riots, violence, breakdown of law and order and migration result.” “Hunger feeds anarchy.” This view is also shared by Julian Cribb, who in his book, The Coming Famine, writes that if “large regions of the world run short of food, land or water in the decades that lie ahead, then wholesale, bloody wars are liable to follow.” He continues: “An increasingly credible scenario for World War 3 is not so much a confrontation of super powers and their allies, as a festering, self-perpetuating chain of resource conflicts.” He also says: “The wars of the 21st Century are less likely to be global conflicts with sharply defined sides and huge armies, than a scrappy mass of failed states, rebellions, civil strife, insurgencies, terrorism and genocides, sparked by bloody competition over dwindling resources.” As another workshop participant put it, people do not go to war to kill; they go to war over resources, either to protect or to gain the resources for themselves. Another observed that hunger results in passivity not conflict. Conflict is over resources, not because people are going hungry. A study by the International Peace Research Institute indicates that where food security is an issue, it is more likely to result in some form of conflict. Darfur, Rwanda, Eritrea andthe Balkans experienced such wars. Governments, especially in developed countries, are increasingly aware of this phenomenon. The UK Ministry of Defence, the CIA, the US Center for Strategic and International Studies and the Oslo Peace Research Institute, all identify famine as a potential trigger for conflicts and possibly even nuclear war.

## 4

#### PC gets BBB across the finish line, but negotiations are key ---interruption must be avoided. Climate provisions will be preserved.

Leber 1-21 [Rebecca Leber, environmental reporter and Journalist at Vox, 1-21-2022, "Democrats may have to sacrifice something big for the climate," Vox, <https://www.vox.com/2022/1/21/22892382/joe-manchin-climate-change-biden-negotiations-bbb> [accessed 1-21-22] lydia

Historic climate legislation may still have a chance. Success now hinges on Democrats, once and for all, figuring out exactly what it is Sen. Joe Manchin (D-WV) wants to bring him back to the negotiating table to pass a version of the Build Back Better Act. The party is running out of time to deliver on climate change, but first they need to find a break in the [frozen talks](https://www.politico.com/newsletters/morning-energy/2022/01/21/the-climate-kinks-in-bbb-799982). When Democrats took control of the Senate a year ago, they had a mandate to ensure the United States would accelerate a transition away from fossil fuels and to avoid the worst effects of climate change. Without legislation, they underdeliver to a political base worried about the climate, a constituency they are counting on turning out in the midterms. Though the [original](https://www.vox.com/2021/12/13/22799436/build-back-better-senate-manchin-parliamentarian) Build Back Better Act is now [dead](https://www.vox.com/2021/12/19/22845060/joe-manchin-climate-change-build-back-better-clean-energy), Congress still may have a shot at passing a bill to fund $550 billion for implementing clean energy incentives, funding electric vehicles and charging stations, instituting a fee on methane pollution, and helping the most vulnerable communities facing climate disasters. On the eve of his one-year anniversary as president, Biden laid out one last path forward to breaking the Senate stalemate on the original bill. “It’s clear to me ... that we’re going to have to probably break it up,” Biden told reporters at a press conference Wednesday. “I’ve been talking to a number of my colleagues on the Hill — I think it’s clear that we would be able to get support for the $500-plus billion for energy and the environmental issues that are there.” There’s still more wrangling ahead to get Manchin’s support, but the Senate is up against a clock that’s ticking down until the midterms. The Senate doesn’t have forever to figure this out or start from scratch, because it also has to confirm nominees to the administration and avert a government shutdown in February. His vote, along with that of every other Democratic senator, is required to pass it using the reconciliation process, which lets Democrats bypass the Republican filibuster. Manchin has said much work still lies ahead. On Thursday, he told CNN congressional correspondent [Manu Raju](https://twitter.com/mkraju/status/1484219829452214280), “We will just be starting from scratch. The main thing we need to do is take care of the inflation. Get your financial house in order. Get a tax code that works and take care of the pharmaceuticals that are [gouging] the people with high prices. We can fix that. We can do a lot of good things.” Biden suggested Democrats could reach a deal with Manchin and the other holdout, Sen. Kyrsten Sinema (D-AZ), with a slimmed-down version of Build Back Better, possibly by cutting back on the child tax credit and free community college. Importantly, Biden said that even with concessions to Manchin, they could preserve the climate provisions. Then Democrats might take another shot at passing these other priorities later this year. For once, there’s surprising agreement from Democratic leaders that the climate priorities won’t be what are sacrificed in any dealmaking ahead. Biden has been firm on that, and Manchin himself said a [few weeks ago](https://thehill.com/policy/energy-environment/588180-manchin-expresses-openness-to-climate-action-amid-spending-bill?rl=1), “The climate thing is one that we probably can come to an agreement much easier than anything else. There’s a lot of good things in there.” Other senators have rallied around the imperative that the US not spend another decade delaying billions in clean energy funds and climate adaptation. “I just came off the worst year ever on my farm,” Sen. Jon Tester (D-MT) said. “We need to do something on climate change. I think we spent [$144 billion](https://www.forbes.com/sites/joewalsh/2022/01/10/us-natural-disasters-cost-145-billion-in-2021---3rd-costliest-year-on-record/?sh=63ede07d4606) this year on disasters, and I don’t think that included crop insurance. So we need to do something on climate, too.” There is no deal yet on what this slimmed-down BBB would look like, nor has Manchin suggested what he could agree to. And some pieces on climate change could still be cut: Manchin has criticized some provisions of the House bill, like a methane fee on gas producers responsible for excess pollution and tax credits that favor union-made electric vehicles. But much of the work of negotiating a climate agreement has already been done. “There’s already been tough choices and compromise to get to to a place where 50 US senators and the president support the climate provisions,” said Jamal Raad, executive director of Evergreen, a climate group that has been advising Democrats on the legislation. The biggest compromise was cutting out the single most impactful climate policy in the House bill, a clean electricity standard that required utilities to meet benchmarks for wind and solar adoption. The remaining climate policies include $320 billion to finance clean energy adoption nationwide. These tax credits are already priced out for the decade, meeting one of Manchin’s demands to account for the 10-year cost of proposals in the package. Biden and congressional Democrats have hard decisions ahead. If Manchin is still negotiating in good faith, proposals will be on the chopping block. The tall order is getting every Democratic senator to come around to the idea that something will have to give to break through this logjam. “We’re just too close to striking a deal on this transformative climate investment,” Raad said. “We need to find the biggest, most aggressive Build Back Better bill that we can pass, taking the climate provisions with whatever we can agree to on the health care side, and we need to get this done.” More Senate Democrats have said this week they are open to giving Manchin what he wants to see this done. “We need to move to pass a package now that has 50 votes,” Sen. Edward Markey (D-MA)[told Axios](https://www.axios.com/congress-biden-bbb-strategy-055c69bc-a2da-463b-ab32-eecb61c4197a.html). “The climate, justice and clean-energy provisions in Build Back Better have been largely worked through and financed, so let’s start there and add any of the other important provisions to support working families that can meet the 50-vote threshold.”

#### The plan trades off -- ratification requires PC and floor time.

---even if popular, even some opposition ensures immense floor time due to Senate procedures.

Kelley & Pevehouse 15 [Judith G.\*, Duke Sanford School of Public Policy; AND Jon C.W.\*\*, University of Wisconsin-Madison; International Studies Quarterly (2015); “An Opportunity Cost Theory of US Treaty Behavior,” <https://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/12521/isqu12185.pdf?sequence=1>] brett

An Opportunity Costs Theory

Although existing theories about veto players and political ideology explain the fate of some treaties, they leave some questions open. To complement these theories, we draw on economic theory to offer an opportunity cost theory of treaty ratification. In economics, the opportunity cost of a resource refers to the value of the nexthighest-valued alternative use of that resource. Scholars of domestic legislation have applied this concept to the time and resources of individual policymakers (Schiller 1995) but also to the fixed chamber time. For example, Koger refers to “[T]he foregone uses of the same [chamber] time for legislators as individuals as well as for the chamber collectively” (Koger 2010:22). Indeed, the Senate’s chamber time is not only fixed, but also scarce. A vast portion of its time goes to required routine business. This leaves little opportunity for discretionary activities (Walker 1977). Given that international policy matters have to draw on exactly the same remaining discretionary floor time as domestic policy, we argue that the United States sometimes delays or derails treaty ratification simply because political capital and Senate floor time are fixed and entail opportunity costs (Heitshusen 2013:4). As Koger (2010:33) argues more generally for legislation, “The expected gains from making a proposal must exceed the time and effort legislators invest in preparing it, organizing and coalition to support it, and taking the time of the chamber to debate and pass it.”

For a treaty to progress, the opportunity cost logic thus would mean that the net gains of the treaty must outweigh the opportunity costs of the advice and consent process. Thus, if the President or some Senators assign only low political value to a particular treaty or if they believe that passage of the treaty will take a lot of Senate floor time, they may decide that they would rather spend their political capital on other matters. If they think they have to fight a war of attrition to overcome opposition, this cost in terms of time and resources may tip the scales against moving the treaty forward. Under these conditions, the opportunity cost of processing the treaty may be too high for the treaty to gain attention, even if the President or more than the required two-thirds of the Senators think the treaty yields some benefits. As a result, whether or how fast a treaty makes it through the process depends on whether it has sufficient support to pass the constitutional process and on whether its value to politicians outweighs the opportunity cost of their political resources: legislative floor time and political capital.

The Fixed Political Agenda Space and Policy Priorities

Why do treaties incur these opportunity costs? Opportunity costs arise when resources are fixed and fully employed. Political agenda space is such a resource; there are only so many policy priorities a President can promote, and only so much Senate floor time to consider them. The media will pay attention to only so many issues on the Washington agenda. Both the President and the Senate must protect their legislative opportunities. They each face opportunity costs.

For the President, the transmittal process is not simple. If the United States signs an international agreement that falls under Article II of the Constitution, the President must transmit it to the Senate for advice and consent before the United States can ratify it. This process entails an analysis of the implications of the treaty including possible implementation legislation required, and the writing of a transmittal letter that serves as a report to the Senate Foreign Relations Committee (SFRC). Because of these requirements, usually there has to be some push from the White House (Halloran 2011), and this can take precious time away from domestic legislative priorities. Thus, transmittals can be costly, especially in the face of expected opposition. Indeed, in 1995 when President Clinton wanted to transmit the UN Convention on the Rights of the Child to the Senate, Jessie Helms, who chaired the SFRC, and 26 cosponsors introduced a resolution urging him to not transmit the Convention. Such opposition can be distracting or politically harmful for the President. Furthermore, because the President usually endorses the treaty in the transmittal letter, he may incur a reputational cost by transmitting treaties that stall (Krutz and Peake 2009:140). Dealing with treaties thus involves political costs, and withholding transmittal can conserve political capital.

For the Senate, floor time is of the essence. After transmittal, the SFRC must hold a meeting on the treaty, and eventually issue its own analysis and recommendation, and (if it has enough support) pass it out of committee. The treaty then has to be scheduled for debate, possible amendments, and a vote. To gain Senate advice and consent, the treaty must pass with at least a two-thirds majority. Crucial to differentiating the opportunity cost argument from a straight veto player model, the Senate rules for debate and passage enable opponents to increase the time expended on a treaty, even if they do not have the ability to vote it down on the floor. Dealing with a treaty thus ties up the SFRC time, but even more importantly, it could potentially take up scarce discretionary time on the Senate floor. Senators seek to maximize their reputational returns from the issues they spend time on, favoring issues that have broad appeal (Walker 1977:430). Before scheduling a treaty for debate and a vote, the relevant actors therefore have to consider the opportunity cost of dealing with the treaty: What else could the Senate accomplish with that time? Even if the Senate is not being productive in terms of passing legislation, what else does the Senate want to be seen focusing on at that moment? Even if there is strong support for a treaty, Senators may hold back if they anticipate serious and potentially time consuming opposition—opposition that can result in any number of procedural maneuvers that could take up costly time in the Senate. This explains why so few treaties ever take up much floor time for debate. If senators expect them to take time, they do not schedule them.

Thus, both the President and the Senate face opportunity costs of fixed resources: Presidents are concerned with “misusing” political capital and opportunities. The Senators are protective of floor time, or how they are seen to be using their time by a public foremost focused on domestic matters. At the same time, the political benefits of treaty ratification are uncertain. Treaty ratification is often invisible, because the media rarely covers such events and whatever benefits treaties may bring may never be attributed to the treaty advocates directly.

The implication of these political calculations is central to our argument: Contrary to standard assumptions of international relations, the decision to push a treaty through the advice and consent process may be less about an isolated examination of costs and benefits of the treaty itself than about the political benefit of spending time on the treaty relative to the benefit of other possible agenda activity that may produce important domestic legislation such as health-care reform, for example. In other words: Senate advice and consent and, by association, transmittal decisions depends on the associated legislative opportunity cost.

The opportunity cost can manifest itself for many types of treaties. Even nondivisive treaties require some Presidential attention and Senate floor time to move through the process (Johnson 2010), and therefore even these may fall by the wayside, which is of course even more likely to occur if they are not considered particularly vital. More important treaties might also be affected by the opportunity cost, however. Even if opponents might not command the requisite 1/3 of Senators to block the treaty, their willingness to obstruct it (even the threat to do so) may impose such high costs in terms of time that supporters are reluctant to spend time on it when they have many competing priorities. In a time-constrained Senate, minimal winning coalitions that reach supermajority status have become less important. Each piece of legislation must compete with all other legislation and having only a minimum backing can deprioritize legislation on the agenda, slowing it down (Oppenheimer 1985:410). And although the Senate can use a cloture vote to end filibustering and technically should be able to do so easily if the treaty commands two-thirds support, Senators may be reluctant to push for treaties that push these boundaries (for example, by objecting to a unanimous consent request (Heitshusen 2013:4)).

#### Opposition is guaranteed. NewSpace companies will lobby for their survival against the plan.

GC 17 [GC Magazine; Autumn 2017; Business thinking, In-house management, Published by legal500; “The new space race,” <https://www.legal500.com/gc-magazine/feature/the-new-space-race/>] brett

The upshot is that the ability to engage with legislators and policymakers will be essential for the long-term viability of companies like Planetary Resources.

‘We’re seeing already that with a regulatory framework laid out for a very quickly growing and expanding sector, there’s a lot of opportunity for policy engagement. That’s equally true in other countries too, which are either enacting their first national space laws or overhauling them,’ says Israel.

Before Israel joined the company, Planetary Resources was heavily involved in lobbying the US Congress to support the Spurring Private Aerospace Competitiveness and Entrepreneurship Act – better known as the SPACE Act.

That piece of legislation explicitly granted permission to US entities to ‘engage in the commercial exploration and exploitation of “space resources”.’ But the international community remains divided over whether the SPACE Act runs contrary to the obligations imposed on the US under the Outer Space Treaty.

‘The Americans are a sovereign state and according to their international treaty commitments, it’s hard to say that their domestic law is compatible with international law,’ says Smith.

Lobbying, both at a domestic and international level, stands to become increasingly critical, particularly as the US is in the process of crafting a framework for supervising non-governmental space activities, while ensure conformity with the Outer Space Treaty.

image of cartoon Mars Rover

‘It is incumbent on Congress to use the 50-year anniversary of the Outer Space Treaty to properly determine our actual international obligations, decide if specific articles in the Treaty are self-executing or not, and ensure that our domestic policy moving forward creates an environment that provides certainty for industry while protecting our national security,’ said Senator Ted Cruz, earlier this year.

‘The design and objectives in doing this must not only be to implement the government’s obligations, but to do so in a way that is not unduly burdensome on emerging space activities,’ adds Israel.

‘This is particularly relevant when the exact contours of how the activity will be carried out are not known, which makes it imperative that the regulators do not get too far ahead of the technology and make guesses about how it will be done, what is feasible, then lock in standards that are ultimately irrelevant and unworkable.’

#### Prevents existential climate disaster.

Moncrief ’11-11 [Aliki; 2021; executive director of Florida Conservation Voters; Orlando Sentinel, “Build Back Better Act would help in climate crisis,” https://www.orlandosentinel.com/opinion/guest-commentary/os-op-climate-change-congress-act-now-20211111-44u6bgyn5fdvnp3eqievkebqpe-story.html]

Last week, Congress passed the Infrastructure Investment and Jobs Act. This bipartisan bill will address upgrades to things like our transportation system, rural broadband, public transit, and clean-water infrastructure. These are badly needed, overdue investments that will make our communities more resilient to the climate impacts we are already seeing. But we know much more is needed.

It’s not enough to just respond to extreme weather — we need to cut the pollution driving it in the first place. That’s why Congress must also pass the Build Back Better Act, the most transformational climate and jobs legislation in our nation’s history. By investing in clean energy and things like electric vehicles and more energy-efficient homes and businesses, we can stop making the problem worse and avoid a growing disaster. We don’t have time for half measures, and Floridians know it — more than 75% of registered voters in the state support bold congressional action on climate change.

The Build Back Better Act takes bold steps to dramatically reduce climate pollution for everyone. But it also centers those who have been disproportionately impacted by this crisis by taking steps to address the decades of unchecked environmental injustice, ensuring at least 40% of the benefits of this bill go to those communities hardest hit by pollution and climate change.

Building a clean energy economy is an investment that will pay dividends for families today and for generations to come. Preventing the most catastrophic hurricanes, floods and heat waves will help ensure that we still bring people from all over the world to our beaches, the Everglades, and every amazing destination across our state that supports our multi-billion dollar tourism industry.

And the robust clean-energy investments in the Build Back Better Act will create millions of good-paying jobs for Floridians in every corner of our state. Florida already ranks fourth in the nation for clean-energy employment, and this legislation would help this industry grow exponentially by tapping into the Sunshine State’s solar power potential.

Orlando has some great members of Congress who understand that climate change is an existential threat to our state and they ran on being a part of the solution to this crisis. Now, we are counting on them to take bold action and pass the Build Back Better Act. This is a win-win-win that creates jobs, lowers energy bills for Floridians, and begins to address the climate crisis at the same time.

## 5

#### CP Text: States should establish a treaty banning ASAT testing – their own ev

1AC Blatt 20 Talia M. Blatt, I am a rising sophomore at Harvard, considering a joint concentration in Social Studies and Integrative Biology with a citation in Chinese. I specialize in East Asian geopolitics and security issues., 5-26-2020, "Anti-Satellite Weapons and the Emerging Space Arms Race," Harvard International Review, <https://hir.harvard.edu/anti-satellite-weapons-and-the-emerging-space-arms-race/> // ella

The PPWT was an empty solution for an arms race, clearly designed to benefit Russia and China rather than prevent additional weapons development. But a comprehensive agreement that the US, Russia, and China all find satisfactory seems unlikely. The Proposed Prevention of an Arms Race in Space Treaty (PAROS) has been discussed since the 1980s without much progress. Perhaps a more feasible solution is a limited test ban treaty: an agreement to stop testing debris-producing ASATs. It has precedent—the PTBT successfully prevented the testing of nuclear weapons in space—and could stave off the worst effects of debris accumulation by eliminating debris-producing tests. Additionally, in the long term, a test ban could reduce countries’ confidence in their ASATs; capabilities atrophy without regular testing, meaning countries would be less likely to base their military strategies on ASATs in the event of a conflict. By banning specific systems, a test ban treaty is not too vague as to be unenforceable like the PPWT, but it could be limited enough to not affect broader space development. Russia and China might find the terms acceptable; after all, debris threatens their satellites too, and they have a reciprocal interest in reining in US weapons development.

# Case

## T/L

### 1NC—Circumvention

#### Big problem with the aff is that “large satellite constellations” isn’t a term of art and can be circumvented with a slightly less satellite constellation-- **Their solvency ev concedes this – we read blue**

Takaya et al 18 “The Principle of Non-Appropriation and the Exclusive Uses of LEO by Large Satellite Constellations” Yuri Takaya-Umehara [Visiting researcher at the University of Tokyo since April 2017. She was affiliated to the Kobe University to provide a course on space law to post-graduate students (2011-2017). She chairs a working group on the formulation of global norms in space law organized by the Keio University since 2018. She obtained her Ph.D. degree at the IDEST of Paris XI University in France, LL.M. at the Leiden University in the Netherlands.] Quentin Verspieren [Ph.D. in public policy @ The University of Tokyo, Assistant Professor of Space Policy @UTokyo, General Manager, Global Strategy @ArkEdge Space Inc., Associate Research Fellow @ESPI] Goutham Karthikeyan [The University of Tokyo & Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency (ISAS-JAXA)] 2018 https://www.researchgate.net/publication/328094878\_The\_Principle\_of\_Non-Appropriation\_and\_the\_Exclusive\_Use\_of\_LEO\_by\_Large\_Satellite\_Constellations SM

* LSC = large satellite constellations
* Outlines “L”SC thresholds

By investigating expected large satellite constellation projects and by reviewing existing interpretations of international space law, this paper argues that the exclusive use of specific LEO orbits by a large constellation of satellite could constitute a violation of the non-appropriation principle by means of occupation and by means of use, drawing a parallel between orbits as resources and the exploitation of tangible mineral resources in space. Based on this, the important question to be raised is what constitutes an exclusive use of a specific orbit. In other words, an important hurdle in the concrete evaluation of whether a planned or established constellation potentially violates the non-appropriation principle through an exclusive use of LEO resides in the lack of clear definition on what can be considered an exclusive use. While the authors claim that legal issue can be clearly solved in abstracto, it naturally shifts towards a regulatory challenge.

This regulatory challenge consists in first defining qualitatively what is the exclusive use of an orbit before translating this definition into measurable, technical rules. In this paper, the authors define an exclusive use of an orbit by a state40 as any use that would prevent/hinder the usage of the same orbit by any other state. Translating this definition into an applicable regulation could consist in defining a threshold of orbital collision risk or a threshold of density of satellites along an orbit based on its altitude, shape, relative velocity of neighbouring objects, etc. It is however not the purpose of this space law paper. What is more appropriate here is to think about which organization or forum would be in charge of elaborating this technical definition. Serious candidates could be the ITU, with excellent track-record in dealing with the use of the GEO region but which would have to review its “first come, first served” principle, or the UNCOPUOS, aiming for the widespread adoption of a new piece of international law. Moreover, even if its rules suffer from a low implementation rates, the IADC would be an appropriate discussion platform thanks to its very deep technical focus.6. Conclusion

The various announced projects of LSC, also called mega-constellations, push existing regulations and practices to their limit, forcing researchers and practitioners around the world to rethink the applicability of existing space law principles to this new trend. In this paper, the authors, after providing background information on current LSC plans as well as recalling the legal status of the LEO region, investigate whether the deployment of an LSC having an exclusive use of an orbit constitutes a violation of the nonappropriation principle as stated in OST Article II. This paper concludes that:

♣ The exclusive use of an orbit by an LSC constitutes a violation of the non-appropriation principle by means of occupation due to the innate nature of orbit being a specific location in space that can be occupied, but most notably by means of use, considering orbits as “limited natural resources” and invoking parallels with the exploitation of natural resources in outer space;

♣ ITU’s “first come, first served” principle is reaching its limits with current LSC projects and should be re-evaluated;

♣ The main challenge ahead is not legal but technical and regulatory and consists in defining precisely what can constitute an exclusive use of an orbit and in translating such definition into a clear regulation or code of conduct.

## Advantage 1

### AT Wong

#### Their ev is specific to small sats but their plan text is about large sats – proves a massive alt cause – also their ev says large sats are key to mitigate delays - we read blue

1AC Wong 19 “Congested Outer Space: Increased Deployment of Small Satellite Constellations Could Hamper Military Space Operations” 2019 Arthur Wong [Strategic Development of Forces Division, SHAPE. Prior to working at SHAPE he has worked at NATO HQ, within the Defence Investment Division on interoperability for NATO’s multinational battlegroups.] <https://www.japcc.org/congested-outer-space/> SM

\*Added from original article\*

Increased Deployment of Small Satellite Constellations Could Hamper Military Space Operations

Introduction When thinking about satellite construction, most people envision multi-billion dollar projects and satellites which are equal to the size of a city bus. The satellite itself includes expensive equipment as well as propulsion systems, which are capable of manoeuvring to different orbits to avoid collisions with space debris or other assets. This was the case before the 21st century, when spacecraft had to be huge and only national space agencies were capable of funding such programmes, but now we are now entering into a new era where satellites are being built on a much smaller scale and can be constructed in just months.

What are Small Satellites? Compared to typical satellites which have ranged in weight from 1,000 kg and up to 6 tonnes, small satellites are made with both a lower mass and smaller size. While there is no predefined dimensional requirement, the mass is usually less than 500 kg. Small satellites offer an alternative option for space agencies and companies due to the lower launch cost while maintaining similar capabilities to a larger satellite. Among the challenges engineers experience when constructing small satellites are the mass restraints of the spacecraft bus1. Such restraints thereby constrain the overall mass of the satellite; further restricting any propulsion systems placed on-board the spacecraft.2 For this reason, most of the current small satellites projects focus on orbiting in the Low Earth Orbit (LEO) with a few exceptions.3

One of the most dramatic changes in the space industry within the last ten years is the transformation from large geosynchronous communication satellites to a constellation of hundreds to thousands of small satellites, linking each other to provide a worldwide communication link in the LEO with a less expensive price tag. Due to the similarity and functions of each satellite in the constellation, companies and space agencies are able to produce the same item in a factory environment and produce the product at a much higher rate compared to the large satellites, which have to be custom-made to meet the requirements of different missions. While these smaller satellites are expendable and generally will deorbit within a year, they can be purchased and produced in bulk.4 With a short life expectancy of a year for small satellites at low altitude, it allows companies to upgrade and ensure the equipment on-board the satellites are most up-to-date as they are likely to be replaced within a few years.5

The cost of small satellites is also one of the major motivations for companies to adopt this new concept of satellite operations. The lowest production cost of a cube satellite6 can be as low as USD 50,000. This has attracted small business and universities to develop such assets for space environment assessments and for commercial purposes, which likely contributes to the increasing number of cube satellites in recent years.

The use of small satellites also eliminates the need for engineers to make long-term estimations for on-board equipment that will now be upgraded in the next iteration. In the past, engineers and scientists had to ensure that their equipment would last until the satellite reached its End of Life (EOL), normally anywhere from 10 to 15 years.7 Malfunctioning instruments would also shorten the length of the mission, causing millions of dollars of losses to companies or space agencies. Small satellites constellations can also provide redundancy and allow engineers to focus on short-term planning. Furthermore, these satellites will also remove the need for redundant payloads, which are used on-board large satellites to increase their survivability, as they can be covered by other identical satellites within the constellations.

Current Plans for Small Satellite Constellations

\*Their card

Since the production of a large number of small satellites in a factory environment will lower the cost of the overall programme, companies such as SpaceX, Amazon and OneWeb have been creating a satellite constellation within the LEO and Medium Earth Orbit (MEO).8, 9 OneWeb is a new company which plans to create an initial constellation of 648 satellites to provide global satellite internet broadband services. Each satellite weighs approximately 150 kg and will be programmed to operate in 20 different orbital planes at an altitude of 1,200 km.10 Creating a large constellation within the LEO could mitigate transmission delays and latency due to their closer range to ground stations while allowing users to send and receive data in a timely manner. The first six of the 648 satellites were launched in early 2019 with more launches scheduled to occur throughout this year.

Both SpaceX and Amazon have also announced their intention of creating a separate constellation for internet communication systems. SpaceX satellite constellations, named Starlink, will be the largest constellation ever built when it is completed. The constellations consist of nearly 12,000 satellites in more than 20 different orbital planes.11 The altitude of Starlink will range between 550 km to 1,150 km. SpaceX aims to have a minimum of 2,200 satellites in the next five years and achieve initial commercial operation by 2020.12 Amazon’s version of constellation, named Kuiper, has also been seeking approval from the Federal Communications Commission (FCC) to launch more than 3,200 satellites between 590 km to 630 km in the LEO.13

Space Debris Threat Increases in the LEO

The usage of cube satellite has provided positive impacts in various fields, ranging from environmental studies to offering worldwide internet access in rural areas through communication constellations. However, the current space environment is becoming congested. Hundreds of satellites have already been scheduled to launch each year before the construction of the constellation programme by OneWeb, SpaceX and Amazon. To further worsen the space debris situation in the LEO, direct-ascent Anti-Satellite Testing (ASAT) was conducted in recent years and more debris will be created through such testing. During the Chinese ASAT in 2007, some debris from the collision was blasted outward away from the Earth, causing a potential threat to satellites above the altitude where the ASAT testing occurred.14 Nine years after the incident happened, there are still more than 3,000 traceable pieces in orbit.

In 2009, two satellites collided at a speed of 10 km/s at an altitude of 800 km. This was the first time a collision had happened between two satellites. The incident created more than 1,000 pieces of debris larger than 10 cm. Such activity could initiate a chain reaction, creating more collisions from the initial impact. This phenomenon is known as the Kessler Syndrome.15

From early 2019, there were approximately 34,000 pieces of debris larger than 10 cm (similar to the size of a cube satellite) and more than 900,000 pieces of debris ranging from one cm to 10 cm in size. Objects that are smaller than one cm in size are expected to be more than 100 million within the LEO.16 Despite the small size of the space debris, they are travelling at a speed of more than seven km/s. At this speed, tiny objects could harm any large satellite orbiting in the LEO. While satellites can increase their physical hardening to protect the on-board instruments from impact, some satellites cannot be hardened due to the size and dimensional constraints. Furthermore, hardened materials would also increase the overall cost of the satellite.

Constellation in the Making Could Impact Space-Based Military Assets

The previous examples revealed the congestion of the LEO. With companies continuing to launch thousands of small satellites, the chances of a collision in space will continue to increase. This will hinder space-based Intelligence, Surveillance and Reconnaissance (ISR) support to provide valuable information to military operations. A majority of the ISR assets are orbiting in the LEO. NATO relies on space-based assets to assist its operations. Increasing the number of spacecraft in the LEO could raise problems and threats to military assets as well as access to space assets to support operations. If the orbital path of these smaller objects were not tracked by the Space Operation Centre regularly, larger satellites or manned-space stations could be penetrated by the non-propulsion satellites, making them a potential kinetic kill vehicle.

Most satellites within the 600 km region of the LEO are affected by the atmospheric drag, which is helping to bring down some of the obsolete satellites. However, satellites orbiting above 800 km are less likely to be affected by the atmospheric drag, making cube satellites or small satellites without propulsion systems difficult to deorbit once they have reached the EOL.17, 18 The altitude for some of the OneWeb, Starlink and Kuiper constellations is planned to be above the atmospheric drag region. Despite this, Starlink satellites will have propulsion system for orbital manoeuvre and EOL deorbiting, tracking the full constellation with 12,000 satellites could be challenging for the company and the Combined Space Operations Center (CSpOC).19 Additionally, there is the possibility of losing contact with satellites before they reach their EOL. Envisat, an 8,210 kg satellite that is currently drifting at an altitude of 785 km, poses a collision threat with other satellites. Envisat was expected to decommission in 2014 but the European Space Agency (ESA) lost contact with the satellite in 2012.20 If no interaction will be made with the Envisat, it is expected to stay in orbit for the next 150 years.21

### AT Hacking

#### Turn hacking - Megaconstellations solves - multiple warrants

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

### AT Collisions

#### No collisions.

**Mosher** **’19** [Dave; September 3rd; Journalist with more than a decade of experience reporting and writing stories about space, science, and technology; Business Insider, “Satellite collisions may trigger a space-junk disaster that could end human access to orbit. Here’s How,” <https://www.usafa.edu/app/uploads/Space_and_Defense_2_3.pdf>; GR]

The Kessler syndrome plays center-stage in the movie "Gravity," in which an accidental space collision endangers a crew aboard a large space station. But Gossner said that type of a runaway space-junk catastrophe is unlikely. "Right now I don't think we're close to that," he said. "I'm not saying we couldn't get there, and I'm not saying we don't need to be smart and manage the problem. But I don't see it ever becoming, anytime soon, an unmanageable problem." There is no current system to remove old satellites or sweep up bits of debris in order to prevent a Kessler event. Instead, space debris is monitored from Earth, and new rules require satellites in low-Earth orbit be deorbited after 25 years so they don't wind up adding more space junk. "Our current plan is to manage the problem and not let it get that far," Gossner said. "I don't think that we're even close to needing to actively remove stuff. There's lots of research being done on that, and maybe some day that will happen, but I think that — at this point, and in my humble opinion — an unnecessary expense." A major part of the effort to prevent a Kessler event is the Space Surveillance Network (SSN). The project, led by the US military, uses 30 different systems around the world to identify, track, and share information about objects in space. Many objects are tracked day and night via a networkof radar observatories around the globe. Optical telescopes on the ground also keep an eye out, but they aren't always run by the government. "The commercial sector is actually putting up lots and lots of telescopes," Gossner said. The government pays for their debris-tracking services. Gossner said one major debris-tracking company is called Exoanalytic. It uses about 150 small telescopes set up around the globe to detect, track, and report space debris to the SSN. Telescopes in space track debris, too. Far less is known about them because they're likely top-secret military satellites. Objects detected by the government and companies get added to a catalog of space debris and checked against the orbits of other known bits of space junk. New orbits are calculated with supercomputers to see if there's a chance of any collisions. Diana McKissock, a flight lead with the US Air Force's 18th Space Control Squadron, helps track space debris for the SSN. She said the surveillance network issues warnings to NASA, satellite companies, and other groups with spacecraft, based on two levels of emergency: basic and advanced. The SSN issues a basic emergency report to the public three days ahead of a 1-in-10,000 chance of a collision. It then provides multiple updates per day until the risk of a collision passes. To qualify for such reporting, a rogue object must come within a certain distance of another object. In low-Earth orbit, that distance must be less than 1 kilometer (0.62 mile); farther out in deep space, where the precision of orbits is less reliable, the distance is less than 5 kilometers (3.1 miles). Advanced emergency reports help satellite providers see possible collisions much more than three days ahead. "In 2017, we provided data for 308,984 events, of which only 655 were emergency-reportable," McKissock told Business Insider in an email. Of those, 579 events were in low-Earth orbit (where it's relatively crowded with satellites).

### AT Kessler

#### Long time frame.

Burns Interviewing Kessler **’**13 Corrinne Burns, interviewing Donald Kessler, who made up the concept. [Space junk apocalypse: just like Gravity? 11-15-2013, https://www.theguardian.com/science/blog/2013/nov/15/space-junk-apocalypse-gravity]//BPS

Now? Are we in trouble? Not yet. Kessler syndrome isn't an acute phenomenon, as depicted in the movie – it's a slow, decades-long process. "It'll happen throughout the next 100 years – we have time to deal with it," Kessler says. "The time between collisions will become shorter – it's around 10 years at the moment. In 20 years' time, the time between collisions could be reduced to five years." Fortunately, communications satellites are, in the main, situated high up in geosynchronous orbit (GEO), whereas the risk of collisions lies mainly in the much lower, and more crowded, low Earth orbit (LEO). But that doesn't mean we can relax. "We've got to get a handle on it – we need to prevent the cascade process from speeding up." And the only way to do that is, he says, to begin actively removing junk from space. Charlotte Bewick agrees. She's a mission concepts engineer with the German space technology company OHB System, with special expertise in space junk – specifically, how we can capture it and bring it back to Earth. While agreeing with Kessler that the movie scenario is exaggerated, she remains concerned. "Fragments of junk can naturally re-enter the atmosphere [and so be removed from orbit]. But we're at the stage where the rate of creation of new debris fragments is higher than the rate of natural removal. The orbits most at risk harbour important space assets – satellites for weather forecasting, oil spill and bush fire detection, and polar ice monitoring." Bewick highlights the case of Envisat, a defunct 8,000kg spacecraft circling Earth in an orbit that is very popular with space agencies and, hence, pretty crowded. "If Envisat collides with a piece of debris or a micrometeorite, the fragments could render the whole orbital region unusable." So can we get the junk down, I asked Massimiliano Vasile, part of the Mechanical & Aerospace Department at the University of Strathclyde and co-ordinator of the Stardust network. He told me defunct satellites in the high GEO region have, for some time, been shifted to higher "graveyard orbits" to keep them out of the way. But that's not an option for items in low Earth orbit. For this, he tells me, researchers are looking seriously into active debris removal – in-orbit capture techniques like harpooning, netting and tethering, the use of contactless systems like ion-beams or lasers, and even onboard robotics to position the junk away from high-risk orbital regions. As for middle Earth orbit – well, ideas are welcome, he says. We're in no immediate danger from Kessler syndrome – but it's not a problem that's going away. Despite Gravity's artistic license, Donald Kessler is pleased to see the phenomenon represented on the big screen. "It is very improbable that events would play out as they did in the film," he says. "But if it raises awareness, then that's great."

#### Kessler says it won’t happen for at least 30 years

Paul Ratner, 18, 8-29-2018, "How the Kessler Syndrome can end all space exploration and destroy modern life", [https://bigthink.com/paul-ratner/how-the-kessler-syndrome-can-end-all-space-exploration-and-destroy-modern-life], AVD

If a chain reaction of exploding space junk did occur, filling the orbital area with such dangerous debris, the space program would indeed be in jeopardy. Travel that goes beyond the LEO, like the planned mission to Mars, would be made more challenging but still conceivably possible. What would, of course, be affected if the Kessler Syndrome’s worst predictions came to pass, are all the services that rely on satellites. Core aspects of our modern life—GPS, television, military and scientific research—all of that would be under threat. NASA experienced a small-scale Kessler Syndrome incident in the 1970s when Delta rockets that were left in orbit started to explode into shrapnel clouds. This inspired Kessler, an astrophysicist, to show that there is a point when the amount of debris in an orbit gets to critical mass. At that point, the collision cascading would start even if no more things are launched into space. And once the chain of explosions begins, it can keep going until the orbital space can no longer be used. In Kessler’s estimate, it would take 30 to 40 years to get to such a threshold.

#### Timeframe is *super long* even if they are right about everything

Ted Muelhaupt, 15, Fall 2015, "Understanding Space Debris Causes, Mitigations, and Issues", Fall 2015 Vol. 16 No. 1, [https://aerospace.org/sites/default/files/2019-04/Crosslink%20Fall%202015%20V16N1%20.pdf], AVD

Short-term debris cascades are impossible. This may seem like a contradiction to the statement above, but one must consider the timescale. The predictions of the Kessler syndrome are quite real and broadly based, but the timescale is in decades and centuries, not hours and days. Therefore, Kessler is right, but the movies are wrong. This is a slowmotion disaster, and the good news is that it can be stopped or slowed with immediate action by the space community.

#### Solar storms are an alt cause

Wild 15 (Jim Wild, Professor of Space Physics at Lancaster University, “With So Much Vested In Satellites, Solar Storms Could Bring Life To A Standstill,” July 30, 2015, https://theconversation.com/with-so-much-vested-in-satellites-solar-storms-could-bring-life-to-a-standstill-45204)

These can disrupt satellite operations by depositing electrical charge within the on-board electronics, triggering phantom commands or overloading and damaging sensitive components. The effects of space weather on the Earth’s upper atmosphere disrupts radio signals transmitted by navigation satellites, potentially introducing positioning errors or, in more severe cases, rendering them unusable.

These are not theoretical hazards: in recent decades, solar storms have caused outages for a number of satellites services – and a handful of satellites have been lost altogether. These were costly events – satellite operator losses have run into hundreds of millions of dollars. The wider social and economic impact was relatively limited, but even so it’s unclear how our growing amount of space infrastructure would fare against the more extreme space weather that we might face.

When Space Weather Becomes A Hurricane

The largest solar storm on record was the Carrington event in September 1859, named after the British astronomer who observed it. Of course there were no Victorian satellites to suffer the consequences, but the telegraph systems of the time were crippled as electrical currents induced in the copper wires interfered with signals, electrocuted operators and set telegraph paper alight. The geomagnetic storm it triggered was so intense that the northern lights, usually a polar phenomenon, were observed as far south as the Bahamas.

Statistical analysis of this and other severe solar storms suggests that we can expect an event of this magnitude once every few hundred years – it’s a question of “when” rather than “if”. A 2007 study estimated a Carrington event today would cause US$30 billion in losses for satellite operators and threaten vital infrastructure in space and here on the ground. It’s a risk taken sufficiently seriously that it appears on the UK National Risk Register and has led the government to draw up its preparedness programme.

## Advantage 2

### AT Space War

#### No miscalc from satellite disruptions or hacking, but terrestrial conflict turns it

Mazur 12 (Jonathan Mazur, Manager Engineering at Northrop Grumman, writing in Space & Defense, from the Eisenhower Center for Space and Defense Studies. Past U.S. Actions: Redlines in Space. Space & Defense, Volume 6, Number 1, Fall 2012. https://inss.ndu.edu/Portals/97/Space\_and\_Defense\_6\_1.pdf?ver=2018-09-06-135424-147)

U.S. Reactions To Foreign Disruption Of U.S. Capabilities

In the 1970s, it was suspected that a U.S. maritime communications satellite was turned off by the Soviets when it was outside of the range of U.S. tracking stations.25 There does not appear to be any documented U.S. reaction, and I suspect there was none. In the mid-1990s, satellite hackers in Brazil began hijacking U.S. military communication satellite signals to broadcast their own information, though it took until 2009 for Brazil to crack down on the illegal activity with the support of the DoD.26 In 1998, a U.S.-German satellite known as ROSAT was rendered useless after it turned suddenly toward the sun. NASA investigators later determined the accident was possibly linked to a cyber-intrusion by Russia.

The fallout? Though there was an ongoing criminal investigation as of 2008; NASA security officials have seemed determined to publicly minimize the seriousness of the threat.27 In 2003, a signal originating from Cuba—later determined to be coming from Iranian embassy property— was jamming a U.S. communications satellite that was transmitting Voice of America programming over Iran, which was publicly referred to as an “act of war” by a U.S. official. 28 Press reporting indicates the U.S. administration was [frozen]“paralyzed” about how to cope with the jamming that continued for at least a month, even after U.S. diplomatic protests to Cuba.29 In 2005, U.S. diplomats protested to the Libyan government after two international satellites were illegally jammed disrupting American diplomatic, military, and FBI communications.30 In 2006, press reporting indicates that China hit a U.S. spy satellite with a ground-based laser. This action was acknowledged by the then director of the NRO, though the DoD remained tight lipped about the incident.31

“We’re at a point where the technology’s out there, and the capability for people to do things to our satellites is there. I’m focused on it beyond any single event.” – Air Force Space Command Commander, General Chilton, 2006 32

In 2009, a U.S. commercial Iridium communications satellite—extensively used by the DoD—was accidently destroyed by a collision with a dead Russian satellite.33 The U.S. company, Iridium, was able to minimize any loss of service by implementing a network solution within a few days.34 As of early 2011, no legal action had been taken by the company either because it is not clear who was at fault or because it might be politically problematic for the United States, which is trying to enter into bi-lateral transparency and confidence-building measures (TCBM) with Russia regarding space activities.35 Since August of 2010, North Korea has been intermittently using GPS jamming equipment, which reportedly has been interfering with U.S. and South Korean military operations and civilian use south of the North Korean border.36 Reportedly, only South Korea and the United Nations International Telecommunications Union—at the request of South Korea—have issued letters to Pyongyang demanding the cessation of disruptive communications signals in South Korea.37

It appears that the only time the U.S. military has responded with force to a disruption in U.S. space capabilities was in 2003, a few days after the start of the Iraq war.38 According to U.S. officials, Iraq was using multiple GPS jammers—which supposedly did not affect military GPS functionality. However, the U.S. military bombed the jammers anyway after a diplomatic complaint to Russia.39 The use of military force against the GPS jamming threat was possibly because the United States was already intervening in Iraq, and the bombing probably would not have occurred if the United States was not at war.

#### Legal norms, empirics, costs.

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

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

### AT MacDonald

#### Their own ev says no escalation

1AC MacDonald 18 senior director of the Nonproliferation and Arms Control Project with the Center for Conflict Analysis and Prevention, Adjunct Lecturer at Johns Hopkins School of Advanced International Studies. Bruce MacDonald, “Chapter 2. Space and Escalation” in Outer Space; Earthly Escalation? Chinese Perspectives on Space Operations and Escalation, A Strategic Multilayer Assessment (SMA) Periodic Publication, August 2018, [https://nsiteam.com/social/wp-content/uploads/2018/08/SMA-White-Paper\_Chinese-Persepectives-on-Space\_-Aug-2018.pdf //](https://nsiteam.com/social/wp-content/uploads/2018/08/SMA-White-Paper_Chinese-Persepectives-on-Space_-Aug-2018.pdf%20//) ella

Both China and the US will have major incentives not to escalate their conflict into the realm of their economies and financial systems, as both nations receive immense benefits from the strength of their economies, and it is possible that diplomacy and negotiations could head off such an escalation. Under specialized circumstances involving, for example, the threatened failure of China’s political system, such escalation could be perceived as preferable. Unintended “contamination” of the economic infrastructure with serious economic consequences from military strikes in Phase 3 could usher in a transition to this Phase 4 Major conflict: This would feature widespread strategic economic attacks, with particular emphasis on space and cyber domains. Phase 5 Escalation into the nuclear domain: Less likely still but an option that cannot be ruled out would be a further escalation into a Phase 5 where nuclear weapons use is at least threatened if the economic and military effects are seen as threatening the existence of the Chinese regime. Challenges across all five phases: Another escalation threat is the inexperience that nations share in the space and cyber domains, unlike in conventional domains of conflict and in the nuclear domain to a lesser extent. This inexperience gives rise to a “sorcerer’s apprentice” problem, placing leaders at risk of making potentially unwise judgment calls without a full grasp of their implications. The space and cyber domains are sufficiently new and dynamic that such decisions are highly likely. Adding to this uncertainty is the ever-growing interdependence of infrastructures within and among advanced countries, making the impact of major attacks against a country’s space and/or cyber infrastructures inherently unknowable. In considering all these factors, it is important to keep in mind that events in space do not happen in isolation. Any space conflict would likely be part of a multidimensional field of play, with space being important because of the effects it has on the earth. Significant instability in space is unlikely to lead to war if there is stability in other domains and in the larger geopolitical relationship between participants, while conflict could easily spread to a stable space domain if war in other domains appeared preferable to the alternative. While any use of nuclear weapons would pose a serious threat of escalation to full-scale nuclear war, any use of space or cyber offense would not pose a comparable escalation threat. That said, a series of reciprocal escalations could easily become unstable. No clear-cut escalation barrier exists in the space and cyber domains, and given the short-term tactical benefits of escalating ahead of anadversary, each additional escalation could create incentives for further escalation that an adversary would not always anticipate. Escalation in space, then, is a slippery slope with few off-ramps

## Advantage 3

#### No impact to Ozone and squo solves – our ev is 2 years more recent

NASA 1-13-22 NASA, Global Climate Change, Vital Signf of the Planet, “Is the ozone hole causing climate change?”, 1-13-2022, <https://climate.nasa.gov/faq/15/is-the-ozone-hole-causing-climate-change/> // ella

Yes and no. The ozone hole is basically a human-caused hole in the ozone layer above the South Pole during the Southern Hemisphere’s spring. The ozone layer, which lies high in the atmosphere, shields us from harmful ultraviolet (UV) rays that come from the Sun. Human activities effectively punched a hole in it, through the use of gases like chlorofluorocarbons (CFCs) in spray cans and refrigerants, which break down ozone molecules in the upper atmosphere. While some extra UV rays slip through the ozone hole, their net effect is to cool the stratosphere more than they warm the troposphere. So, this increase in UV rays cannot explain the warming of the planet's surface. The good news is many governments recognized the danger CFCs posed on Earth’s ozone layer, and international agreements were made and acted upon in the 1980s to reduce the production of CFCs. Furthermore, these chemicals were replaced by hydrofluorocarbons (HFCs). Since the 1990s, surface UV levels have been relatively stable, and ozone hole recovery has contributed to less surface UV than expected. However, while HFCs have helped the ozone layer recover, they still cause some harm, resulting in the area reforming more slowly than once thought. Ozone holes still form regularly in Antarctica. While scientists expect the ozone hole to recover over time, there are still many natural forces affecting its progress. For example, given the long lifespan of ozone-depleting chemicals in the atmosphere, it will take decades for the hole to return to pre-industrial levels. The latest data from NASA satellites show that our ozone layer is recovering and that a short-lived resurgence in the emission of ozone-depleting pollutants in eastern China will not significantly delay the revival of Earth’s protective “sunscreen” layer. In summary, negative changes in the ozone layer are being offset by positive changes in human behavior, allowing the ozone layer to reform. The role the ozone hole itself plays in global warming and the resulting climate change is small compared to the impacts coming from human activities.

#### Turn – alumina leads to a cooling effect

Extance 15 Andy Extance, Before becoming a full-time science writer, Andy Extance worked for six and a half years in early-stage drug discovery research, followed by brief stint in silicone adhesive and rubber manufacturing, 10-26-2015, "Climate scientists ponder spraying diamond dust in the sky to cool planet," Nature, [https://www.nature.com/articles/nature.2015.18634 //](https://www.nature.com/articles/nature.2015.18634%20//) ella

Climate scientists have thought up plenty of futuristic ways to cool the planet, but an analysis published on 26 October1 examines what may be their wildest idea yet: spraying tiny diamonds high into the atmosphere. Researchers have for years discussed the merits of pumping water-based sulphate spray into the sky to reflect and scatter the Sun's energy — essentially, mimicking the cooling caused by volcanic eruptions. Like most kinds of geoengineering, the idea is highly controversial and so far untested. But if anyone does try this 'solar-radiation management', then it may be safer to use dusts of solid, nanometre-sized particles, suggests a team of scientists from Harvard University in Cambridge, Massachusetts. In a paper published in Atmospheric Chemistry and Physics1, they calculate that nanoparticles of diamond or alumina (aluminium oxide) could be more effective and less environmentally damaging than sulphates. And although diamond dust is expensive, it is not completely out of the question, the researchers argue. "Our paper is really geared towards removing the mindset that it has to be sulphate that's used to do solar radiation management," says Debra Weisenstein, an atmospheric modelling expert at Harvard and one of the study's authors. Sulphate's side-effects Other researchers have proposed spraying solid dusts before 2. But the latest study is the first to model the particles' effects in detail, Weisenstein says, by examining how they interact — both physically and chemically — with different substances in the atmosphere, and making the comparison with sulphates. n the atmosphere, sulphates lead to the production of sulphuric acid, which damages the ozone layer. By absorbing certain wavelengths of light, they also heat up the lower stratosphere; that in turn could affect air-circulation patterns and climate. Sulphates would also diffuse light, an effect that could boost plant growth but would lower the power output of solar panels3. Alumina and diamond dust both lead to fewer problems, says Weisenstein. “You could have significantly less impact on ozone, less heating of the stratosphere and less of an increase in diffuse light at Earth’s surface,” she says. That is because alumina and diamond do not result in the production of sulphuric acid, and they scatter and absorb particular wavelengths of light in a different way. Besides analysing environmental effects, the paper also shows that, pound for pound, alumina dust would achieve a similar cooling effect to that of sulphate sprays — but that diamond dust would be at least 50% more effective.