## 1

#### Interp and violation – 1ACs must use the three-tier process to justify the plan – they haven’t

Reid-Brinkley 8[SHANARA ROSE REID-BRINKLEY- “THE HARSH REALITIES OF “ACTING BLACK”: HOW AFRICAN-AMERICAN POLICY DEBATERS NEGOTIATE REPRESENTATION THROUGH RACIAL PERFORMANCE AND STYLE” Under the Direction of CHRISTINE HAROLD <https://getd.libs.uga.edu/pdfs/reid-brinkley_shanara_r_200805_phd.pdf> 2008] VHS AI

In other words, those with social power within the debate community are able to produce and determine “legitimate” knowledge. These legitimating practices usually function to maintain the dominance of normative knowledgemaking practices, while crowding out or directly excluding alternative knowledge-making 83 practices. The Louisville “framework looks to the people who are oppressed by current constructions of power.”58 Jones and Green offer an alternative framework for drawing claims in debate speeches, they refer to it as a three-tier process: A way in which you can validate our claims, is through the three-tier process. And we talk about personal experience, organic intellectuals, and academic intellectuals. Let me give you an analogy. If you place an elephant in the room and send in three blind folded people into the room, and each of them are touching a different part of the elephant. And they come back outside and you ask each different person they gone have a different idea about what they was talking about. But, if you let those people converse and bring those three different people together then you can achieve a greater truth.59 Jones argues that without the three tier process debate claims are based on singular perspectives that privilege those with institutional and economic power. The Louisville debaters do not reject traditional evidence per se, instead they seek to augment or supplement what counts as evidence with other forms of knowledge produced outside of academia. As Green notes in the doubleocto-finals at CEDA Nationals, “Knowledge surrounds me in the streets, through my peers, through personal experiences, and everyday wars that I fight with my mind.”60 The thee-tier process: personal experience, organic intellectuals, and traditional evidence, provides a method of argumentation that taps into diverse forms of knowledge-making practices. With the Louisville method, personal experience and organic intellectuals are placed on par with traditional forms of evidence. While the Louisville debaters see the benefit of academic research, they are also critically aware of the normative practices that exclude racial and ethnic minorities from policy-oriented discussions because of their lack of training and expertise. Such exclusions 84 prevent radical solutions to racism, classism, sexism, and homophobia from being more permanently addressed. According to Green: bell hooks talks about how when we rely solely on one perspective to make our claims, radical liberatory theory becomes rootless. That’s the reason why we use a three-tiered process. That’s why we use alternative forms of discourse such as hip hop. That’s also how we use traditional evidence and our personal narratives so you don’t get just one perspective claiming to be the right way. Because it becomes a more meaningful and educational view as far as how we achieve our education.61 The use of hip hop and personal experience function as a check against the homogenizing function of academic and expert discourse. Note the reference to bell hooks. Green argues that without alternative perspectives, “radical libratory theory becomes rootless.” The term rootless seems to refer to a lack of grounded-ness in the material circumstances that academics or experts study. In other words, academics and experts by definition represent an intellectual population with a level of objective distance from that which they study. For the Louisville debaters, this distance is problematic as it prevents the development of a social politic that is rooted in the community of those most greatly affected by the status of oppression.

#### Vote for limits – there are an infinite amount of potential plans so you cherry-pick affs with no neg ground and I must prep all affs while they prep one which pigeonholes me to generics but there is a limited amount of ways bodies could affirm.

#### TVA – defend your advocacy but focus on the way the politics you defend are influenced by your identity

#### dtd- to deter future abuse no rvi - illogical shudnt win for being fair or topical ci - reasonability is abrbitaty and bites into judge intervecention f/e/accesbility are voters b/c its theonly way debate can function

## 2

#### Interp: The affirmative must define “outer space” in a delimited text in the 1AC.

#### “Outer Space” is flexible and has too many interps – normal means shows no consensus and makes the round irresolvable since the judge doesn’t know how to compare between types of offense and o/w since it’s a side constraint on decision making – independently turns judicial application.

Leepuengtham 17 [Tosaporn Leepuengtham (Research Judge, Intellectual Property and International Trade Division, Supreme Court of Thailand). "International space law and its implications for outer space activities." 01-27-2017, Accessed 12-9-2021. https://www.elgaronline.com/view/9781785369612/06\_chapter1.xhtml // duongie

Those states which favor the precise demarcation of outer space support the spatial approach, whereas those who oppose to such demarcation prefer the functional approach, as the latter allows more flexibility in terms of the development of space technology.34 This lack of a definition and delimitation of outer space is problematic, since certain particular areas are neither explicitly defined as ‘air space’ or ‘outer space’. For example, it is vague whether an area located between 80 km and 120 km above sea level would be classified as either air space or outer space in the absence of demarcation, since 80 km is the maximum attitude for convention aircraft, and 120 km is the lowest attitude in which space activities could be carried out.35 Satellites which are stationed in a geostationary orbit are a good example of this ambiguity. Owing to this lack of any internationally recognized delimitation, equatorial states claim sovereignty over that part of the geostationary orbit which is located over their respective territories;36 whereas technologically developed countries believe that the geostationary orbit is an integral part of outer space.37 This uncertain status of areas leads to legal jurisdictional problems. According to international law, a state has sovereignty over the airspace above its territory.38 However, national sovereignty does not extend into outer space.39 Thus, it is necessary to determine where a state’s airspace ends to ensure that the appropriate legal regime is applied. One possible scenario which might occur and which is relevant to the subject of this book is the creation or infringement of an intellectual work is in just such an ambiguous location. This would cast doubt on the ‘legal’ location of creation or infringement, and the question of which applicable legal regime arises. Should we apply the law of the underlying state or is there no law to apply? For example, would satellite signals transmitted from a satellite stationed in a geostationary orbit located over equatorial countries be considered as works created or, if intercepted, be infringed, in outer space or in the sovereign air space of those respective countries? These hypothetical examples highlight why a boundary is necessary if unpredictability arising from different legal application is to be avoided. While it might be argued that this issue is being overemphasized at this stage, given increasing use of space technology, this problem is worth considering now rather than later.

#### Violation – you don’t.

#### Prefer –

#### 1] Stable Advocacy – they can redefine in the 1AR to wriggle out of DA’s which kills high-quality engagement and becomes two ships passing in the night – triggers presumption since the aff wasn’t subject to well researched scrutiny. We lose access to Tech Race DA’s, Asteroid DA’s, basic case turns, and core process counter plans that have different definitions and 1NC pre-round prep.

#### OSspec isn’t regressive or arbitrary – its core topic lit for what happens when the aff is implemented and cannot be discounted from policies that require enforcement to function.

## 3

#### Outer space isn’t value neutral but has always been a question of militarization – debates between civilian and military use are two sides of the same coin that affectively polices society, culminating in total war.

Craven 19 [Brackets Original. Matt Craven (Professor of International Law, SOAS University of London, United Kingdom). “‘Other Spaces’: Constructing the Legal Architecture of a Cold War Commons and the Scientific-Technical Imaginary of Outer Space”. European Journal of International Law, Volume 30, Issue 2, May 2019, Pages 547–572, Accessed 1/12/22. <https://academic.oup.com/ejil/article/30/2/547/5536739> //Xu]

There was little doubt to any of the observers of the launch of Sputniks I and II in 1957 that, despite their overtly ‘scientific’ purposes, the arms race had taken a decisive new turn. The exploration of outer space clearly offered a range of potential benefits; alongside the possibility of research into the physics of the atmosphere, it also would facilitate the collection of a host of meteorological, geophysical and cartographic data, enable enhanced capacity for radio communication and television broadcasting, facilitate safe navigation and, finally, open up the possibility of experimental flights to the moon and beyond. No one, however, was blind to the military implications.60 Within the USA, in particular, there was a widespread belief that command over outer space was an imperative that could not be missed: ‘[W]hoever controls outer space’, it was often said, ‘controls the world’.61 In the wilder speculations, thus, it was imagined that a nuclear power might be in a position to launch guided missiles from a space platform to any point on earth with barely any possibility of response, that outer space would be filled with ‘orbiting bombers’ or that the moon would become the site of military rocket installations. ‘Control’ of outer space, thus, was immediately conceived as being vital as a matter of security. Such concerns seemed to place a premium upon ensuring that the ‘use’ of outer space was exclusively peaceful – a view that seemed to be affirmed not merely by the establishment of COPUOS and successive proposals put to the UN by both the USA and Soviet Union. It was also recognized in the US National Aeronautics and Space Act of 1958, which created a civilian space agency (NASA) and declared, in the process, that ‘it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind’.62 This theme was carried through into the code for outer space – UN General Assembly Resolution 1962 recognizing ‘the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes’ and the Outer Space Treaty that added in Article 4 that states should not place nuclear weapons or weapons of mass destruction in orbit and that the moon and other celestial bodies shall be used by all states parties ‘exclusively for peaceful purposes’ (military bases and fortifications, in particular, being prohibited). Indeed, President Lyndon B. Johnson described the Outer Space Treaty as ‘the most important arms-control development since the limited test-ban treaty of 1963’.63 In an immediate sense, then, outer space was configured as a space radically distinct from atmospheric space and was placed at once beyond the field of both sovereignty and of war. These, however, were by no means co-terminous. The preferred analogy when discussing the status of outer space was often that of the high seas – like the seas, outer space should be marked by the principle of freedom of access and movement, a res communis incapable of being ‘enclosed’. In fact, this was the analogy used by the USA when defending its use of satellites for reconnaissance purposes; ‘reconnaissance’ from space, it was argued, was the functional equivalent of surveillance from the high seas.64 It is clear, however, that this analogy was problematic precisely because the high seas themselves were not immune from being brought within the field of military conflict.65 And, with that in mind, alternative modes of analysis were often proffered to ensure that the ‘commons’ was not to be equated with a potential field of battle.66 Nevertheless, there was always a certain equivocation running through discussions within the UN and elsewhere as to whether the military/non-military distinction was one that could be effectively held in place. Not only were the Declaration on Outer Space and Outer Space Treaty silent on certain vital matters – on the equipping of satellites, for example, with conventional weaponry or the militarization of the ‘extracelestial void’ – but the inclusion of Article 3, which instructed states to ‘carry on activities’ in accordance with international law and the UN Charter ‘in the interest of maintaining international peace and security’, gave expression to the idea, vaunted at various moments, that outer space may nevertheless be the site of military action in self-defence.67 ‘Peaceful’ use, on such a measure, was not to be calibrated by reference to the equipment or personnel put into space – whether military or civilian – but, rather, by reference to the ends or motivation of the actors in question.68 In the case of the USA, this was to resolve itself in the idea that ‘peaceful use’ should not be equated with ‘non-military use’ but, instead, with ‘non-aggressive’ use. As Senator Albert Gore was to put it, when speaking before the UN First Committee in 1962: [i]t is the view of the United States that outer space should be used only for peaceful – that is, non-aggressive and beneficial – purposes. The question of military activities in space cannot be divorced from the question of military activities on earth. To banish these activities in both environments we must continue our efforts for general and complete disarmament with adequate safeguards. Until this is achieved, the test of any space activities must not be whether it is military or non-military, but whether or not it is consistent with the United Nations Charter and other obligations of law.69 The same general tenor was maintained in the discussion over Article 4 of the Outer Space Treaty concerning the demilitarization of the moon and celestial bodies. In this treaty, it was admitted that the use of military personnel ‘for scientific research or other peaceful purposes shall not be prohibited’, largely in recognition of the fact that for both space powers it was the military, not civilian agencies, who were responsible for developing rocket and other outer space capabilities. What one might see in this is a straightforward determination, on the part of both space powers, to continue the practice of exploiting outer space for purposes of defence whilst holding on, at the same time, to the general idea that outer space was a space of peaceful endeavour. Defensive militarization, here, was to be conceptualized as the functional equivalent of total demilitarization. Yet ‘defence’ was also an unstable category in circumstances of a bipolar military standoff that depended upon a balance of forces. For not only might an effective defence depend upon first strike capability (as the doctrine of ‘mutually assured destruction’ was to suggest),70 but also, as was later to become evident following the announcement of the US Strategic Defense Initiative in 1983,71 even the construction of an overtly ‘defensive’ system could assume an offensive cast if only one party possessed that capacity.72 There was, however, also a much deeper problematic at work here, which related to the persistence of a governmental rationality that was held over from the earlier decades of the 20th century, that understood the necessity of bringing all social resources – economic, technical, scientific and human – to bear in defence of the state against an existential threat. This was articulated in the interwar years in the theories of total war developed by the likes of Erich Ludendorff73 and Ernst Jünger,74 but was carried forward, well into the aftermath of World War II.75 Even if, at Nuremberg, the tribunal had associated the practice of total war with the pathologies of National Socialism,76 as the likes of Georg Schwarzenberger and Josef Kunz were to observe, it was a method of waging war that was only, in small part, to be associated with the problem of totalitarianism. For both, the phenomenon of total warfare was a much more general one – associated with technological developments in arms, indiscriminate modes of warfare and the mobilization of the civilian population – and was as much in play in the 1950s as it had been in earlier decades.77 If the prospect of nuclear annihilation meant that no element of society would be spared, so also, it seemed to follow, no element of society should be excluded from preparations to ward off that eventuality. Whilst, in the case of the Soviet Union, the ethos of centralized planning and a party bureaucracy equipped with an ideology of collective ownership and class warfare naturally dissolved any operative distinctions between the civil and the military establishment,78 the same was also apparent in the USA where, as was recognized as early as 1945, the ongoing development of new technologies of offence and defence, in conditions of competition, would require ‘the participation of every element of the civilian population’ and, in particular, the enlistment of the countries research capabilities.79 Alongside the development of what Dwight Eisenhower later described as a ‘military-industrial complex’, guided by a ‘scientific-technological elite’,80 the rationalities of the Cold War were to envelop US society in a much more profound way – from the mobilization of the media in defence of free thought, the enlistment of corporations, unions and research establishments in defence of national security and the co-option of cultural institutions (from Hollywood to the universities81) in the affective management and policing of public life.82 The significance of this in the context of outer space was the almost total loss of any way to distinguish effectively between military and civilian activities. Just as the requirements of resourcing a technologically dependent military armature increasingly depended upon a civilian infrastructure of research, industry and economic management,83 so also was it clear that prospective civilian and scientific activities in space (such as meteorology, remote sensing, navigation systems and telecommunications) all had military dimensions. If, for example, developments in meteorological knowledge and environmental science seemed to open up the possibility of weather control for the purposes of combating drought, improving agriculture or the avoidance of natural disasters, so also could that same science assist in the development of military communications and ballistic missile capability (which depended upon information about the lower and upper atmosphere, ionospheric behaviour, geodesy and geomagnetism).84 Such knowledge also opened up new possibilities for manipulating weather systems in order to procure military advantage (such as the manipulation of thunderstorms to disable communication systems or the creation of fog or cloud).85 But it was not just about scientific knowledge enabling new avenues of military innovation; it was also about the purposes to which the same technology might be put. Thus, for example, the camera-equipped satellite programmes (Tiros, CORONA), with the auxiliary systems of information recovery and reproduction, were virtually identical (give or take a few degrees of resolution) whether they were used for the purposes of geodetic measurement and weather prediction or military reconnaissance. In some cases, furthermore – such as the US Galactic Radiation Background satellite – intelligence-gathering electronics was incorporated within the same instrument used for the measurement of solar radiation.86

#### The 1AC is a misdiagnosis of debris – wargames and coverups whitewashes militarism’s recreation of debris.

Reno 20 [Joshua O. Reno (Associate Professor of Anthropology at Binghamton University). February 2020. Accessed 1/15/22. “Military Waste: The Unexpected Consequences of Permanent War Readiness”. UC Press. <https://www.ucpress.edu/book/9780520316027/military-waste> //Xu]

As I write this, in the atmosphere miles above me, hundreds of millions of tiny artificial particles and larger fragments are circling the planet, mostly undetected, moving as fast as speeding bullets. This is orbital space debris—artificial objects and materials launched into orbit that no longer serve a purpose—and it has been accumulating in the sixty years since the Soviet Union sent Sputnik into space and transformed the stakes of the Cold War. In this chapter, I review various attempts to witness and revalue space debris, which expose the historical and ongoing militarization of outer space. At first glance, space debris would seem very different from the other objects discussed in this book. On the one hand, they are not as clearly linked to the military and permanent war preparation, because this connection has been actively foreclosed from public awareness by the US security state. Every space mission creates some debris, and many space missions had covert and classified goals that were not disclosed until later, and some never were. One famous example is the cover story used to account for the U2 incident in 1960. Shot down while conducting covert surveillance of suspected Russian ICBM development from Soviet airspace, the U2 spy plane was initially characterized as a NASA weather vessel. However, two days after the cover story was released, a photo was wired to the US government of Khrushchev holding aerial photographs the U2 had taken, proving the NASA story was a lie.1 If one problem with examining space debris as military waste is a history of secrecy, another concerns the undetectability immanent to space debris as a material object. It is one thing to write with authority about orbital space debris. It is quite another to bear witness to space debris, as one can other forms of American military waste. “To witness,” Michael Taussig writes, “as opposed to see, is to be implicated in a process of judgement. . .such that the mere act of seeing tilts the cosmos and deranges the eyeball” (2011, 71). Yet, with this most cosmic of wastes, witnessing is hard to come by. I cannot swear that I have seen orbital space debris (in orbit, that is) and haven’t met many who can. Amateur astronomers sometimes think they have seen space debris, but do not know for certain if they ever will again or if they’ll even know when they do. And, more importantly, they probably will not care if they do. If this book is about finding people who bear witness to military waste, who not only see it but become invested in this act of perception, then in that sense at least this chapter is premised on a failure. Those I spent the most time with—amateur astronomers and a ham radio operator in the Southern Tier of New York—were not already interested or invested in space debris. I did not trace a preexisting network linking nonhumans with humans (Latour 2005). I did not locate a public affected by an act of contamination, slow violence, or environmental injustice (Marres 2012). That is to say, with few exceptions, I did not succeed in finding a group for whom this object matters and using their interest to direct my own. Instead, I found a problematic object and tried to recruit people who might care to do so. One reason space debris is not very interesting for the people I got to know is that anything so labeled is uninteresting almost by definition. Space debris is perhaps the truest expression of what Mary Douglas (1966) meant when she labeled dirt, “matter out of place.” Almost anything can be considered space debris if it was launched into orbit and people think it should not be there anymore. It may refer to satellites that have aged and become obsolete or can no longer be contacted or controlled from the ground, thus rendering them useless. Space debris also consists of materials of varying size and substance that were purposely released or jettisoned by vessels and satellites to facilitate their ascent or as part of their ongoing maintenance. But whether something counts as space debris depends on who is making this judgment and how. Part of the reason that amateur astronomers might not care about space debris is that anything they do care about may no longer be recognized as debris. Consider NASA’s Cassini probe, which entered Saturn’s atmosphere after completing its twenty-year mission on September 15, 2017. I began hearing about Cassini’s final descent weeks earlier from the members of the Kopernik Astronomical Society (KAS). Cassini was being discarded, but it was difficult to find anyone characterizing it as debris. In early September, KAS members were still sharing their best photographs of the solar eclipse that had captivated the country in August. But soon they began posting links on the group’s public Facebook page related to Cassini’s last mission: September 14: #Live #Coverage: NASA Monitors #Cassini’s #Dive Into #Saturn Friday morning, NASA & #JPL will monitor the Cassini #Spacecraft as it ends its #mission by diving into the #clouds of Saturn. #NASATV and NASA & JPL #Internet #web-sites will provide live #steaming coverage as #scientists #monitor Cassini’s “#GrandFinale,” as well as #news#conferences before (Thursday afternoon) & after (Friday morning) the #event. September 16: A fantastic overview of the Cassini Mission, including it’s [sic] very last image. Such an amazing mission just to tease our wonder a little bit.#FarewellCassini Explore More! September 20: NOVA: Death Dive to Saturn These posts provided hashtags and links one could use to learn about Cassini’s final mission, witness live broadcasts, and honor the lost spacecraft. Cassini was singled out for so much praise by astronomy enthusiasts for good reason. Many knew it had been responsible for some of the best pictures of the solar system ever captured. As a writer for a science and technology website put it: While many uncrewed spacecraft have done an incredible job of revealing our solar neighborhood to us, honestly, none did it better than NASA’s Cassini probe. After exploring Saturn for 13 years, on September 15th at 4:55am PDT, the probe will plunge itself into the planet’s atmosphere, becoming one with the very object of its fascination. (Paoletta 2017) As in many examples that appeared around this time, on- and offline, this writer treats Cassini like a person. It is as if the probe itself were intentionally doing the “exploring,” plunging “itself,” and intentionally merging with “the very object of its fascination.” Such eulogistic prose could be found among many techno-science and astronomy feeds and sites at the time. Consequently, what otherwise might have been seen as just an expensive, floating camera became instead a subject of interest akin to Saturn itself. But objects never mean just one thing, even within the same community of practitioners.2 From another point of view, the disposal of Cassini on Saturn was more like an act of cosmic littering disguised as a funeral. One small but vocal group of Cassini-truthers claimed that there was another, more nefarious purpose behind the destruction of the probe. NASA was, they claimed, trying to accomplish its decade-old goal of creating another sun by detonating a nuclear payload on Saturn. Known as “Project Lucifer,” such a claim had been made before in relation to other space missions. But for every so-called conspiracy theory, there are even more people who delight in debunking and deconstructing them. A decade before Cassini’s final dive, an author for the online publication Universe Today had already set about deconstructing Project Lucifer’s assertions (see O’Neill 2008). It is worth noting, however, that claims and counterclaims such as these, much like narratives of UFO sightings and abductions, are about more than what “really happened.” They are more centrally concerned with whether or not hidden powers are operating in the shadows, just beneath awareness. If they exist, such powers are only visible in momentary glimpses and if one looks carefully enough to see the pattern.3 Whether Cassini is seen as a mournful loss or a frightening conspiracy, it is still not quite “debris” since it has greater purpose than something merely drifting, colliding, orbiting. In other words, whether something counts as debris depends on how astronomical observers (and conspiracists) think about and act towards the things that populate outer space. More than just claims to debunk, conspiracy theories like Project Lucifer raise ethical and political questions surrounding what is otherwise accepted as relatively innocent and harmless civilian science. More to the point, they point toward forgotten and troublesome understories associated with the exploration and exploitation of outer space. It is not so strange to suspect that NASA is concealing the true motivations behind its projects, as it has done in the past and as its less-wellknown sister agency, the National Reconnaissance Office (NRO), has done for the entirety of its existence. Fantasies of hidden nuclear reactions on Saturn are not just conspiratorial paranoia, therefore, but manifestations of a general mistrust around state secrets concerning the militarization of space, which did not end with the Cold War. This chapter explores space debris as openended rubbish (Thompson [1979] 2017) and as an object of militarized fantasies, past and present. The example of Cassini is telling because it represents a situation where what might otherwise be thought of as mere space debris is instead revalued as a sign of discovery and scientific achievement or, alternately, of conspiratorial, cosmic destruction. The intentional generation of space debris becomes more apparent by linking it with the historical and ongoing militarization of space. My argument is not that the US military is directly responsible for all space debris (a claim thatwould be difficult to definitively prove in any case). That being said, antisatellite weapons testing has by all accounts made the problem of space debris worse; furthermore, defense agencies have been at the forefront of studying and proposing solutions to space debris.4 In this chapter, I link both the historical and ongoing creation of space debris, as a problem, and current proposals to solve it to a common source: a tendency to imagine expert knowledge and technical practice as a form of mastery, despite the fact that they lead to new and unanticipated accidents and risks. Here I draw from the Aristotelian argument of Paul Virilio (2007, 5) that the accident reveals the substance. In other words, the invention of any substance is equally the invention of any of its accidental manifestations. The shipwreck is the invention of the ship (see chapter 3) just as the Chernobyl meltdown is the invention of the nuclear power station. So, too, space debris is the invention of the Cold War space race, an invention distinctly different from the way planets ordinarily shed and reabsorb materials. Clearly, orbital space debris is very different from things like planes, ships, and guns. Yet, it is productive to think of all forms of military waste not only as different kinds of things, but as associated with different microworlds of action connected with permanent war preparation. For this reason all of these forms, as rubbish, have elements of indeterminacy associated with them, which lead to disputes about their social and material potential. After all, what is difficult to represent clearly can be even more disturbing to imagine, since this usually makes it harder to control and predict.5 Is space debris polluted and polluting or valuable and meaningful? Is it raw material for a radical new vision or heritage that should be preserved? When objects are simultaneously rare and abundant like space debris, hard to relate to, yet ubiquitous in orbital environments, these questions pose even greater challenges. Acknowledging the militaristic origins of space debris does not make it more accessible or amenable to reuse and rethinking by civilians. As I will explain, even astronomers might only encounter space debris fleetingly, and only for a brief moment as it quickly vanishes out of sight. In some ways, this makes space debris both less visible and more threatening than the other forms of military waste I discuss in this book. When it comes to astronomical phenomena, seeing is believing. But believing is also seeing, insofar as imagined evidence of aliens or government conspiracy involves prior and ongoing attunement toward that which lies concealed beyond familiar experience and official explanation. The idea of cultivating ethical attunement of the senses, especially to listen for signs of otherworldly beings and designs, has been dis-cussed for religious subjects (Luhrmann and Morgain 2012; Hirschkind 2015; Zani 2019). I extend this to include visual attunement of lay astronomers. Astronomical attunement can involve searches for alien life, but it can also be more modest in its scope, associated with wise use of and participation in the Earth’s orbital environment. I was unsuccessful finding many people who already cared about space debris, but getting to know them I came to see their practices of attunement as an alternative to the dominant strategies to address space debris. Unlike the attunement of amateurs, space agencies represent space debris as a problem to address through techno-solutionism. This is a way of valuing the technical fix as an end in itself, and it is deeply connected to the militarization of space and the problem of space debris. the color out of space Space debris comes in the form of subsidiary materials intentionally or inadvertently discarded after helping satellites escape Earth’s gravity, as well as the satellites themselves. Some of these objects are broken down by interactions with other bits of debris and physical processes while in orbit, but may continue orbiting the Earth all the same. There are good records of the over six thousand satellites that have been launched since 1957. But they can be difficult to locate and identify from the ground all the same. Depending on the altitude, lost and disused satellites and their accompanying materials either circle the planet at low Earth orbit (LEO), medium Earth orbit (MEO), or geostationary orbit (GEO), and this also affects their relative velocity, with objects further away moving more slowly. The ISS is located about 250 miles above the surface of the Earth in LEO and moves about 17,500 miles per hour, whereas satellites in GEO are located about a hundred times further above the Earth and travel at less than half that velocity. The difference is that disused space junk has lost attitude control, meaning that its orientation becomes more haphazard as it tumbles through space.6 As different forms of space debris move, sometimes at tens of thousands of miles per hour, they occasionally collide with one another and splinter into additional, smaller fragments. There are an estimated half a million pieces today, a fraction of which can be tracked by space agencies like NASA. Using the publicized data from the DoD’s Space Surveillance Network, there have been numerous models generated to display the problem of space debris as it has accumulated over time. One of the problems with depicting space debris accurately has to do with the conditions of orbital environments. In time-lapse videos, one can visualize the Earth as if it were sloughing off dandruff—hundreds of thousands of tiny flecks that encircle it at various distances. This metaphor is actually more appropriate than it might seem. Like an animal’s scalp, the Earth routinely sheds materials that continue to orbit it or are jettisoned into the universe. As part of this metabolic process orbital environments “self-clean,” meaning that various planetary forces allow materials to leave and rejoin the surface, as well as capture that which other planetary bodies have jettisoned. In a certain sense, for something to be called “orbital space debris” depends entirely on human beings deciding something is no longer valuable, useful, or notable. Yet, what becomes of space debris depends on the power of the Earth itself.7 After all, debris is not something that troubles planets, but defines them. According to Lisa Messeri, the prevailing definition of a planet is an object that is “large enough to have either captured or expelled the debris to other orbits” (2016, 8). If not for Earth’s gravitational force, bending spacetime as it does, it would not require so much expenditure to escape its orbit, nor would so much material fall back to Earth or remain in orbit after the fact. As Lisa Ruth Rand notes, “the geophysical world of outer space” is “a historical actor of equivalent importance to astronauts, engineers, governments, and publics” (2016, 13). The planet’s metabolic relationship to debris is not simply a threat to life, but may help spread it across the cosmos.8 Anthropogenic space debris mixes with the naturally occurring debris of orbital environments to generate new risks and possibilities. Unlike functional satellites, which can be manipulated and brought more or less in sync with the designs of those on the ground, the alternative spatial and temporal rhythms of space debris represent a distinct risk to other things (and persons) in orbit. As such, they also represent a potential barrier to further human exploration and exploitation of space. To begin with, space debris is potentially dangerous to spacecraft. Space debris is partly assessed by treating returning spacecraft in a way they were never intended, as a “hypervelocity impact capture medium” as they are dented more by artificial objects than natural meteorites (Bernhard, Christiansen, and Kessler 1997). The impetus for tracking and modeling space debris thus comes from the temporal possibilities it threatens. This includes a hypothetical feedback process whereby objects continually collide and spread out, converting Earth orbits, especially in LEO, into a hazardous environment filled with tiny fragments. Space debris would then circle eternally overhead like a cloud of bullets awaiting a target, trapping us in fear on the surface. This was used to produce a new element of space horror in the recent science fiction film Gravity (2013), where space debris played a key role and was depicted as a monstrous threat—like a swarm of abiotic locusts—that cycled the Earth with an alien regularity. In this film, without warning debris hurtles into view to annihilate spacecraft or slaughter hapless astronauts.9 Whether this sort of possibility is a likely scenario or not, it reflects anxiety about the unexpected and emergent spacetime of materials orbiting the Earth. The time they threaten is not only the immediate present but future plans, which are increasingly incorporated into fantasies of space travel. At least one of the astronomers I spoke with considered space debris a broader environmental problem. One of the older staff members at the Kopernik Observatory was Nicholas, who grew up in the Southern Tier and designed computer hardware for IBM. When I interviewed Nicholas, he was preparing a talk for the public on the search for life and its creation from inorganic materials, a subject of great personal interest. This gave him a unique view on the ecological risks of space exploration, “I think of debris as sort of garbage. Stuff that’s out there, you don’t know what to do with it so you just leave it laying around, it’s like cluttering on a highway. You know?” For Nicholas, depositing leftover materials from missions, like the Cassini probe, on a foreign planet is about more than the technical junk itself. Even the most sanitized bit of space equipment might carry remnants of the living world it came from. Nicholas had pictures in his Facebook feed of tardigrades (or water bears), the peculiar microbes that seem capable of withstanding the vacuum of space. “To me that’s one of the areas that you could contaminate, if you’re searching for life, you don’t want to contaminate it. NASA scientists are aware of these concerns, which are normally glossed as planetary protection and were included as part of the Outer Space Treaty of 1967. This stipulates the necessity of protecting the Earth from organisms that might exist beyond it, and protecting other planets from contamination by human and nonhuman earthlings. For instance, Cassini was positioned to collide with Saturn so that it would not inadvertently contaminate life that might exist on one of the gas giant’s moons (life which, many astronomical enthusiasts would be quick to point out, Cassini’s photographs had helped demonstrate might exist). And Nicholas was also not alone in thinking that enthusiasm for space exploration could lead to denial about its unforeseen consequences.10 Not everyone agrees, however. In 2018, the SETI institute sponsored a debate over planetary protection between a member of NASA and founder of the Mars Society and author Robert Zubrin. During the debate, Zubrin accused planetary protection of being nonsensical, since planets exchange substances all the time on their own, and dangerous, since it could limit human exploitation and exploration of the universe. Space debris is meaningful as both barrier and bridge to desirable futures. These hoped-for futures involve, for instance, further exploration and exploitation beyond LEO and into the very valuable and legally contested domain of geostationary orbit, where satellites can more easily analyze from and transmit data to the entire planet. This also includes NewSpace initiatives that seek to extend capitalism and empire beyond the limits of the Earth, whether to mine asteroids or colonize Mars.11 Such initiatives demonstrate a clear motivation to clean up the polluted and risk-filled environment in the vicinity of Earth. From this admittedly interested perspective, the presence of space debris limits the utilization of LEO, MEO, and GEO, creating risks for any state and/or capital investment. Insofar as space debris influences assessments concerning the utilization of outer space for various ends, it directly mediates the futures that space agencies and industries imagine possible and desirable. It may be that the risks of orbital debris are being somewhat amplified by filmmakers and the media more broadly. After all, most chunks of space debris burn up completely before descending to Earth, posing little threat to life on the surface. And only those nations and corporations powerful enough to summon the resources to escape the planet’s gravitational pull, to operate the ISS for example, place themselves directly at risk. In this regard, space debris is somewhat analogous to floating Pacific garbage patches in the world’s oceans (see chapter 6). While troubling and aesthetically striking, space debris and garbage patches are located in little-used borderlands rather than directly inhabited landscapes. They would seem to lack an affected public, that is, a collective of interested social actors directly impacted by the problem and thus likely to organize to bring the problem to light. The analogy between the garbage patches and space debris is more than incidental. At the opposite side of the Pacific from the first garbage patch to be discovered is another dumping zone. Known as Point Nemo—the place in the ocean furthest from any land—this stretch of ocean has been used for decades as a convenient place to deposit space debris, when such a thing is possible for space agencies.12 But debris does not always land where one would expect. And the threat of damage from orbital space debris is real. Space debris represents a clear barrier to the continued use of orbital environments. The ISS had to perform approximately eight evasive maneuvers during its first decade of operation in order to avoid collisions with debris. Calculations are normally performed at least three times a day to determine risks of collision over the subsequent seventy-two hours; if the chance of collision with a large enough object is determined to be greater than one in ten thousand, then maneuvers are planned and executed. In late August of 2008, the ISS had to engage in a collision avoidance maneuver when it was nearly struck by just one piece of more than five hundred cataloged bits of debris that resulted from Kosmos 2421’s planned fragmentation earlier that summer (see Johnson and Klinkrad 2009, 5). In this case, the ISS was not dodging anonymous debris, but the specific fragments that are attributable to a Russian spy satellite that was launched in 2006 and began fragmenting two years later. According to widely agreed-upon space policy, if old satellites cannot be sent to the “parking zones” above LEO, then they are sent crashing into the atmosphere to hopefully disintegrate.13 In some ways, concerns over orbital debris can be related to the discourse around climate change, sociologist and historian of science Lisa Ruth Rand argues, insofar as both are global in scope and have been associated with “tipping points” toward certain and perpetual disaster. “With no control over where surviving fragments might land, orbital space became a site from which pollutants could cross geographic boundaries and extraterritorial regions” (Rand 2016, 11). In this sense, orbital regions are not some sort of beyond, disconnected from terrestrial life. Like the atmosphere itself, planetary borderlands are dynamically entangled with life on Earth. Moreover, like the seemingly never-ending threat of nuclear annihilation, they are also associated with the rise of the national security state in the twentieth century.14 When specific entities generate fragments or are threatened by them, orbital space debris begins to resemble other pollution events where there is an alleged perpetrator and a documented victim. More often than not, it is not just any perpetrator accused. Discussions of space debris events frequently single out America’s adversaries as being responsible, as in the episode above, despite the fact that Americans contaminate orbital environments as well and that other countries are frequently responding to and imitating the ongoing American militarization of space. Politicizing space debris in this way fits easily into previous Cold War–era assessments of risk and blame where it is only national rivals to the United States and Europe who break rules and incur risks, namely China and Russia, which implies that Americans are blameless by contrast.15 Space Debris as Military Waste All of the information provided in the section above, outlining orbital space debris as a problem, can be considered entirely without reference to the US military. This not only leaves out an important part of the story of space exploration and exploitation; it also helps further distinctions between civilian science and defense projects, as if the two were completely separate spheres of social action and imagination. In fact, they are continuous. The launch of Sputnik I by the Soviet Union was the beginning of space exploration and the age of satellites. It also set the stage for a new alliance between scientific experts, the federal government, and the DoD. Prior to Sputnik, it was widely believed throughout the US that its Soviet rivals were incapable of launching a satellite into space. When they did, it not only demonstrated a flaw in this chauvinist presumption, but made clear that the Soviet Union had the capacity to launch intercontinental missiles as well. Even though the Eisenhower administration knew, by this time, that there was no “bomber gap” between the two countries, this real embarrassment and virtual threat radically altered relationships between scientists and government and military officials, which had previously been strained by McCarthyism and the Korean War. At least some Americans felt vulnerable to attack, and Eisenhower, who had hoped to reduce what he regarded as wasteful military spending, reevaluated his position on the matter and helped foster the military industrial complex he would later name and criticize.16 If an interpretation of space exploration as militarization is often foreclosed from consideration, one of the reasons is that the intentions behind space discovery have been successfully represented in different ways over the course of NASA’s history. Outer space and space agencies are more popularly represented in terms of discovery, invention, and wonder. This has been a deliberate effort on the part of civilian scientists, government officials, and media organizations to differentiate NASA from military projects. Though NASA was created to be a civilian space agency, the end result of the initial shock and panic surrounding the launch of Sputnik, this was not a foregone conclusion. At the time, all of the technology that might have been used for possible space exploration was in the hands of the US military; consequently, some prominent members of the government scientific advisory, as well as Eisenhower himself, were initially in favor of folding all space exploration within the DoD as part of ARPA. ARPA had itself been recently created in order to consoli- date and reduce waste from interdepartmental competition. Consequently, it only stood to reason that it would also absorb the space agenda, which also had enormous implications for the future of defense. The reason NASA emerged, instead, was the result of fears of the militarization of space, both because of the dangers this would raise for people on Earth but also because it went against the utopian internationalism of many American scientists of the time. It was decided that there would be a civilian space agency, but one that would remain funded by and deeply connected to the military, for fear that the loss of military relevance in space missions would cause it to die on the vine.17 While NASA is a civilian agency, stories of its rise and contemporary relevance illustrate the longstanding relationship its people and projects have had with the DoD. Near-continuous war games in space go back to when the first satellites entered near-Earth orbit and generated ever more debris. According to Rand, “Both superpowers carried out high altitude and exoatmospheric nuclear weapons tests beginning in 1958 and ending in 1963 with the Partial Nuclear Test Ban Treaty” (2016, 10). Secrecy regarding military-related space missions (and the debris they have caused) is most clearly associated with the National Reconnaissance Office (NRO), the “other space agency” that was created in 1961 but kept a secret until 1992 (Paglen 2009, 20–31). As an author from Wired magazine puts it, debris is a legacy of militaristic statecraft: In 2007. . .China decided to de-orbit one of its defunct weather satellites...by firing a missile at it. That certainly took the sat out of its path—but it also created a flume of debris that flung toward the Space Station in 2011. In February 2008, the US Navy launched its own projectile at a spy satellite toward its own satellite. The government claimed to worry that if it let the satellite fall back intact, its hydrazine fuel could release toxic vapors at breathing level. But some, at the time and still, interpret the action militarily. (Scoles 2017) Debris from the NRO was not necessarily from weapons testing, moreover, because weapons are not the only space projects of great military interest. As Rand explains: New kinds of satellites—from giant, shiny inflatable balloons to a ring of hundreds of millions of tiny copper fibers—tested the use of space for communications while spurring controversy over whether such satellites could interfere with astronomy, crowd the electromagnetic spectrum, or present a collision hazard to other spacecraft. (2016, 10) Official histories of space exploration as civilian science tend to demilitarize its relevance. Moreover, when a cover story is needed—as with the U2 spy plane debacle—the official narrative can be called upon to distract or misinform inquiring Americans, allies or rivals. The activities of ARPA and especially the NRO are shrouded in mystery, though that has not stopped amateur astronomers from successfully tracking their activity.18 From the beginning of the space race, nation-states with property in orbit worked out the basic terms of space law (see Beery 2016), which among other things does not allow for the practices of salvage characteristic of maritime law. Instead of seeing these materials as property to be protected, astronomers were historically the first group to mobilize against the contamination of the planetary borderlands with space debris. Sputnik’s launch also began a wave of UFO sightings of all kinds, which would continue over the ensuing decades. As Americans watched the night skies, it was as if their apprehension and mistrust of Soviets somehow turned on their own government. And why not? Space exploration was begun in earnest by competing US and Soviet militaries during the Cold War and continues to be central to the machinations of securitizing states today.19 The ability for anyone with a telescope to track near-Earth objects makes complete secrecy all but impossible. Most recently, space enthusiasts were the first to raise awareness about the possibility of China’s Tiangong-1 space lab tumbling out of the sky, before the Chinese state admitted this was happening. In essence, it was amateur astronomers who first noticed that the space lab was acting more like space debris, against the wishes of a government hoping to keep this from public knowledge. The first story reclassifying the space lab as space debris appeared in June 2016, and was quoted from for the next year and a half by the Guardian and the Washington Post. Eventually the Chinese state admitted that it had lost control of the lab and that it would likely fall to Earth sometime in late 2017 or early 2018 (see David 2016).20

#### The impact is *unending war* and *environmental catastrophe*.

Craven 19 [Matt Craven (Professor of International Law, SOAS University of London, United Kingdom). “‘Other Spaces’: Constructing the Legal Architecture of a Cold War Commons and the Scientific-Technical Imaginary of Outer Space”. European Journal of International Law, Volume 30, Issue 2, May 2019, Pages 547–572, Accessed 1/12/22. <https://academic.oup.com/ejil/article/30/2/547/5536739> //Xu]

Even in the aftermath of the pronounced ‘closure’ of the Cold War, the residue of the formation that was brought into play in space remains very much with us today. On the one hand, outer space has been progressively enveloped within the technological infrastructure of warfare and policing actions – the first Gulf War of 1990 ushering in a new era of ‘smart’ weaponry and GPS-configured surgical violence139 – anticipating, in the process, the ‘remote’ operations of the drone and cyber warfare of the contemporary era. The blurring of the demarcation between the (outer space) technologies of war and peace finds its contemporary parallels in the collapse of a range of other operative distinctions – between the virtual and the real, the combatant and the civilian, the battlefield and the battle space, the interstate and the intra-state. The juridical formations on which these depend, furthermore, have themselves become enveloped within the same strategic operations – ‘lawfare’ becoming the adjunct to a new form of totalized warfare stripped of any spatial determinacy. On the other side, outer space has increasingly become the terrain of speculative capitalism, which, following the growth of space tourism (pioneered by the Russian space administration in the 1990s140), has seen the active development of a range of commercial projects from the construction of sub-orbital ‘space planes’ to asteroid and lunar mining undertaken by both public and private agencies. The imaginative resources for such projects have come from various directions, but a common theme is that impending resource depletion on earth will soon bring such resources within commercial and technological reach, and that outer space will therefore provide a ‘spatial fix’ for a system of global capitalism that might otherwise run into the ground.141 There is, as Katarina Damjanov has noted,142 a deep parallelism here between the juridical opening of the seas (mare liberum), which served to stabilize the system of sovereignty within Europe in the 17th century by extroverting the site of conflict and competition,143 and the opening of outer space three centuries later as another prophylactic measure, even if, in this case, that which was to be guarded against was a planetary-wide, environmental catastrophe. Perhaps the deepest irony, here, is that the mode of salvation on offer is precisely the same as that which is the extant cause of crisis, which one may take to be a remorseless instrumentalization of nature.

#### The alternative is *Worldism* – the refusal of international relations and specialization as dictated by militarism in favor of epistemological interventions into the exercise of Space as a carceral apparatus. Thus the ROB is to *endorse critical geopolitics*.

Agathangelou and Ling 09 Anna M. Agathangelou is an Associate Professor in the Departments of Political Science and Women’s Studies at York University, Canada and co-director of the Global Change Institute, Nicosia, Cyprus, L.H.M. Ling is an Associate Professor in the Graduate Program in Inter- national Affairs at The New School, New York, USA., Transforming World Politics: From empire to multiple worlds, The New International Relations Series, 2009.

MAIN ASPECTS Worldism presents world politics as a site of multiple worlds. These refer to the various and contending ways of being, knowing, and relating that have been passed onto us from previous generations. Histories, languages, myths, and memories institutionalize and embody multiple worlds through simple daily acts like cooking and eating, singing and dancing, joking and playing but also through larger events like trade, development, conflict, and war. Worldism registers not only the “difference” that comes from multiple worlds (see Inayatullah and Blaney 2004) but also their entwinements. Selves and others reverberate,2 producing multi- and trans-subjectivities that leave us legacies of reinforcement and conflict, reconstruction and critique, reconciliation and resistance. Such syncretic engagements belie seeming oppositions and contradictions among multiple worlds to reveal their underlying connections despite hegemony’s violent erasures. On this basis, communities have opportunities to heal and recuperate so they can build for another day, for another generation. Worldism as everyday life enacts self–other reverberations and syncretic engagements, especially by communities at the margins. Worldism as an analytical framework theorizes about them. Both types of worldist activity expose the problematic of empire in practice and logics. Building on the postcolonial notion that all parties make history, albeit with unequal access to power, worldism leads to an undeniable conclusion: our mutual embeddedness makes us mutually accountable. One cannot escape from the other. Mutual accountability brings with it duties and responsibilities, to be sure, but also possibilities: that is, (a) an internal dialectic of constant questioning to check and problematize hegemony, so that (b) we can expand our visions, strategies, and approaches beyond the narrow, hegemonic confines of realism/liberal internationalism, in order to (c) arrive at a more inclusive, conciliatory, and democratic world politics. In brief, worldism consists of two simultaneous processes: descriptive and analytical. Worldism-as-description features the following: (a) multi- and trans-subjectivities that institutionalize the social and structural reverberations between selves and others; (b) the agency of all parties, despite inequities and injustices, to create, build, and articulate multiple worlds; (c) syncretic engagements that consolidate the entwinements of multiple worlds into concrete strategies for change, adjustment, adaptation, refor- mulation, and transformation; and (d) community-building that integrates and accretes these syncretic engagements despite denials of such efforts from hegemonic elites and their ideologies. Worldism-as-analysis draws on the struggles and learning undertaken in worldist daily life to emphasize: (a) accountability as a hallmark of worldist inquiry that ensures (b) an internal criticality to question, contest, and challenge hegemony, so that we may (c) arrive at emancipatory construction even as we critique and resist. The critical reader may interject: Couldn’t “agency” and “accountabil- ity” in worldism be taken as a fancy way of blaming the victim? Are Jews, for example, responsible for the Holocaust; slaves for their enslavement; or any oppressed people for their oppression? Worldism as a politics of multiple relations subsumes this liberal, individualist understanding of responsibility. Multiple relations produce a web of effects and consequences to any kind of decisions and/or set of practices. Accountability in worldism asks: Who’s involved, under what conditions, and through which processes can we redress or transform the violence? What kinds of understanding are generated to account for these relations and/or to make them invisible? Without the painful concession that all of us, “abusers,” “victims,” and “innocent bystanders” alike, contribute to the production of hegemonic violence, whether it results in domestic abuse (see Adler and Ling 1995) or state violence (see Ling 1994), we may never realize how violence is conceived, generated, and sustained. By extension, we will never understand ways to end it. Instead, in our injuries and (self ) alienation, we may reproduce time and again the same conditions of violence or hegemony that afflicted us in the past and which seems the only option for the present. Suspended political ideals, in this case, could also block us from action and change. Worldist agency and accountability compel us to face the complicities (including our own) that sustain violence in the making of history, so that we may, as Marx exhorted, change it. Where do these ideas come from?, our reader may ask. Let us delineate the intellectual precedents to worldism. INTELLECTUAL PRECEDENTS Worldism draws on constructivism and postmodernism but also differs from them. Worldism shares with constructivism its emphasis on intersubject- ivity, and with postmodernism its insights on asymmetrical difference: that is, the norms, institutions, practices, and behaviors that set up certain subjects and subjectivities as more privileged and protected than others. Power, then, cannot be reduced to an objectified, reified condition of who’s “on top” or who “has more” but instead results from agents contributing to macro-political structures like ideology, organization, and capitalist relations. Power redefined in these terms stems from an intersubjective consensus within a context of material conditions and relations. The crux here lies in the framing. Since narration as a process is never complete, the story can always change.3 However, worldism departs from constructivism by asking: What kinds of intersubjectivity are constructed, by whom, and for what purpose, and how do theories of subjectivity restructure the world “otherwise”? And is this how we want the world to be? Not probing into the social relations of intersubjectivity, according to worldism, effectively erases the power politics of meaning, including the political economy behind such constructions. And unlike postmodernism, worldism distinguishes power from the resistance it induces. Contra Foucault (1994), we differentiate between the colonizer and colonized in their experiences of colonial power (see Stoler 2002) and the entwinements that follow, both reinforcing and conflicting complicity (see Ling 2002b). Not doing so implicitly reinforces the imperialist assertion that “this is the way the world is”: that is, it is not open to alternative concepts, discourses, strategies, or ways of being. These gaps in constructivism and postmodernism return us to the conventional treatment of power as domination, pure and simple. Ronen Palan (2000), for instance, finds a strain of conservative realism in Alexander Wendt’s “naturalist” version of constructivism, primarily because he claims to offer a method only, and not an interpretation, of politics. Wendt (2005) himself admits as much. For similar reasons, Samir Amin (2004) calls postmodernism an “ideological accessory” to elite, bourgeois interests just as Aijaz Ahmad (1992) considers post-structuralist theories serve as alibis for imperialism. Both post- modernism and poststructuralism value critique and deconstruction over political action, thereby keeping de facto power intact. We note that although critical theories like postmodernism and con- structivism open up spaces to think about shifting power politics, they fall short of transforming the very asymmetries they critique. Inattention to structural, material interest and lack of integrating the Other analytically – that is, as a substantive maker of the world – undermines their claims of emancipatory social theory. Ultimately, the Other becomes a repository of raw materials for hegemonic actors and sites in the North to process. Worldism acknowledges a deep intellectual debt to postcolonial studies. Here, race, gender, sexuality, class, and nationality serve as analytics and substance in examinations of power relations. Postcolonial studies demystify empire’s boast, like Kipling’s “White Man’s Burden,” that the imperial Self makes the world for all Others. And that world is unidimensional (top- down state power), unilateral (center dominates periphery), and unilinear (past–present–future). Postcolonial studies record a more nuanced and multiple history by problematizing the ways colonial power is imposed on the colonized. That is, colonization involves more than a unilateral and mechanical domination of the subjugated by colonizers and their states. As documented by postcolonial studies, tensions and contradictions emerge from these relations (Said 1979; Spivak 1999), leading to adaptations and integrations between hegemonic selves and subaltern others. From this inter- action, “colonizers” and “colonized” produced something together over the course of time that neither anticipated nor perhaps desired but which all learned to live with, and eventually called their own. Divides along lines of property, race, class, language, religion, and ideology did not disappear. They fused, rather, into hybrid, creole, or mélange cultures that, nonethe- less, contested these categories constantly (Ashcroft, Griffiths, and Tiffin 1995; Lewis and Mills 2003). In recognizing that colonizer and colonized mutually construct their sub- jectivities, postcolonial studies attribute to both the legacies of power that we face today. Note, for example, Britain’s principal instrument of colonial and imperial power: the East India Company. Sudipta Sen (1998) shows that, contrary to claims that the British brought capitalism to India, the East India Company had to adjust to pre-existing market structures and political relations to gain access to the thriving trade already in place in northern India.4 Only through this kind of entry could the East India Company later redirect the trade to its favor. L.H.M. Ling (2002b) traces how institutional elites in East Asia learned syncretically and “interstitially” between two world orders – the agrarian-based, cosmo-moral universe of Confucian governance and the Westphalian inter-state system of commerce and trade – to cumulate into what we know as Asian capitalism today. Walter Mignolo (2000) highlights the “gnosis” of thought and action, Self and Other, that comes from centuries of transgressing and reformulating the colonial boundaries that comprise Latin America. Of course, those subjected to hegemony must accommodate others more than those who perpetrate it. Yet hegemony’s very asymmetry highlights the resilience and creativity of the marginalized. Ordinary people can journey across subjectivities to engage syncretically with others, even under conditions of poverty and inequality, to rebuild, reconstruct, and reorganize communities. Cherrie Moraga and Gloria Anzaldua (1983) characterize their straddling of multiple worlds as life on the “borderlands.” Typically, they point out, women of color from the South must bear the biggest burden of negotiating the multiple worlds of language, culture, class, and gender to survive white- majority society in the North despite systemic discrimination and obstacles. Still, they are able to exercise internal reserves of freedom, thought, and action to sort through hegemony, not simply surrender to it. Similarly, the indigenous populations of the Americas, Australia, and New Zealand have entered into treaties with their white majorities to retain aspects of indigenous ontologies by formalizing them in Western institutions (Shilliam 2008).

#### Interp – the 1AC is a research artifact and its reps come before the passing of the plan.

#### 1] Whitewashing – militaristic discourse is a self-fulfilling prophecy, which proves reps are necessary and absent critique their epistemology should be assumed incorrect.

#### 2] Spillover – voting aff doesn’t pass the plan but the scholastic endeavors in are deployed in debate impact our subjectivity.

## 4

#### Text – Private Appropriation of Outer Space except for Space Elevators is Unjust.

#### Space Elevators constitute Appropriation – they impede orbits.

Matignon 19 Louis de Gouyon Matignon 3-3-2019 "LEGAL ASPECTS OF THE SPACE ELEVATOR TRANSPORTATION SYSTEM" <https://www.spacelegalissues.com/space-law-legal-aspects-of-the-space-elevator-transportation-system/> [PhD in space law (co-supervised by both Philippe Delebecque, from Université Paris 1 Panthéon-Sorbonne, France, and Christopher D. Johnson, from Georgetown University || regularly write articles on the website Space Legal Issues so as to popularise space law and public international law]//Elmer

An Earth-based space elevator would consist of a cable with one end attached to the surface near the equator and the other end in space beyond geostationary orbit. An orbit is the curved path through which objects in space move around a planet or a star. The 1967 Treaty’s regime and customary law enshrine the principle of non-appropriation and freedom of access to orbital positions. Space Law and International Telecommunication Laws combined to protect this use against any interference. The majority of space-launched objects are satellites that are launched in Earth’s orbit (a very small part of space objects – scientific objects for space exploration – are launched into outer space beyond terrestrial orbits). It is important to precise that an orbit does not exist: satellites describe orbits by obeying the general laws of universal attraction. Depending on the launching techniques and parameters, the orbital trajectory of a satellite may vary. Sun-synchronous satellites fly over a given location constantly at the same time in local civil time: they are used for remote sensing, meteorology or the study of the atmosphere. Geostationary satellites are placed in a very high orbit; they give an impression of immobility because they remain permanently at the same vertical point of a terrestrial point (they are mainly used for telecommunications and television broadcasting). A geocentric orbit or Earth orbit involves any object orbiting Planet Earth, such as the Moon or artificial satellites. Geocentric (having the Earth as its centre) orbits are organised as follow: 1) Low Earth orbit (LEO): geocentric orbits with altitudes (the height of an object above the average surface of the Earth’s oceans) from 100 to 2 000 kilometres. Satellites in LEO have a small momentary field of view, only able to observe and communicate with a fraction of the Earth at a time, meaning a network or constellation of satellites is required in order to provide continuous coverage. Satellites in lower regions of LEO also suffer from fast orbital decay (in orbital mechanics, decay is a gradual decrease of the distance between two orbiting bodies at their closest approach, the periapsis, over many orbital periods), requiring either periodic reboosting to maintain a stable orbit, or launching replacement satellites when old ones re-enter. 2) Medium Earth orbit (MEO), also known as an intermediate circular orbit: geocentric orbits ranging in altitude from 2 000 kilometres to just below geosynchronous orbit at 35 786 kilometres. The most common use for satellites in this region is for navigation, communication, and geodetic/space environment science. The most common altitude is approximately 20 000 kilometres which yields an orbital period of twelve hours. 3) Geosynchronous orbit (GSO) and geostationary orbit (GEO) are orbits around Earth at an altitude of 35 786 kilometres matching Earth’s sidereal rotation period. All geosynchronous and geostationary orbits have a semi-major axis of 42 164 kilometres. A geostationary orbit stays exactly above the equator, whereas a geosynchronous orbit may swing north and south to cover more of the Earth’s surface. Communications satellites and weather satellites are often placed in geostationary orbits, so that the satellite antennae (located on Earth) that communicate with them do not have to rotate to track them, but can be pointed permanently at the position in the sky where the satellites are located. 4) High Earth orbit: geocentric orbits above the altitude of 35 786 kilometres. The competing forces of gravity, which is stronger at the lower end, and the outward/upward centrifugal force, which is stronger at the upper end, would result in the cable being held up, under tension, and stationary over a single position on Earth. With the tether deployed, climbers could repeatedly climb the tether to space by mechanical means, releasing their cargo to orbit. Climbers could also descend the tether to return cargo to the surface from orbit.

#### Private Companies are pursuing Space Elevators.

Alfano 15 Andrea Alfano 8-18-2015 “All Of These Companies Are Working On A Space Elevator” <https://www.techtimes.com/articles/77612/20150818/companies-working-space-elevator.htm> (Writer at the Tech Times)//Elmer

Space elevators are solid proof that any mundane object sounds way cooler if you stick the word "space" in front of it. But there's much more than coolness at stake when building a space elevator – this technology has the potential to revolutionize space transportation, and the Canadian private space company Thoth Technology that was recently awarded a patent for its space elevator design isn't the only company in the game. One of the other major players is a U.S.-based company called LiftPort Group, founded by space entrepreneur Michael Laine in 2003. Its plan for a space elevator is vastly different from the one for which Thoth received a patent, however. Whereas Thoth's plans entail tethering a 12-mile-high inflatable space elevator to the Earth, LiftPort is shooting for the moon. Originally, LiftPort had planned to build an Earth elevator, too, but it abandoned the idea in 2007 in favor of building a lunar elevator. The basic design for a lunar elevator is an anchor in the moon that is attached to a cable that extends to a space station situated at a very special point. Known as a Lagrange Point, this is the gravitational tipping point between the Earth and the moon, where their gravitational pulls essentially cancel one another out. A robot could then travel up and down the tether, ferrying cargo between the moon and the station. Out farther in space, a counterweight would balance out the system. Both types of space elevator are intended to increase space access, but in very different ways. Thoth's Earth elevator aims to make launches easier by starting off 12 miles above the Earth's surface. LiftPort's space elevator aims to increase access to the moon in particular, because it is much easier to launch a rocket to the Lagrange Point and dock it at a space station than it is to get to the moon directly. There's a third major company based in Japan called Obayashi Corp. whose plans look like a hybrid of Thoth's and LiftPort's. Obayashi is not a space company, however – it's actually a construction company. Like Thoth, Obayashi plans to build an Earth elevator. But its Earth elevator would consist of a cable tethered to the blue planet, a robotic cargo-carrier, a space station, and a counterweight. It essentially looks like LiftPort's plans, but stuck to the Earth instead of to the moon.

#### Yes Space Elevators – NASA confirms.

Snowden 18 Scott Snowden 10-2-2018 "A colossal elevator to space could be going up sooner than you ever imagined" <https://www.nbcnews.com/mach/science/colossal-elevator-space-could-be-going-sooner-you-ever-imagined-ncna915421> (Scott has written about science and technology for 20 years for publications around the world. He covers environmental technology for Forbes.)//Elmer

For more than half a century, rockets have been the only way to go to space. But in the not-too-distant future, we may have another option for sending up people and payloads: a colossal elevator extending from Earth’s surface up to an altitude of 22,000 miles, where geosynchronous satellites orbit. NASA says the basic concept of a space elevator is sound, and researchers around the world are optimistic that one can be built. The Obayashi Corp., a global construction firm based in Tokyo, has said it will build one by 2050, and China wants to build one as soon as 2045. Now an experiment to be conducted soon aboard the International Space Station will help determine the real-world feasibility of a space elevator. “The space elevator is the Holy Grail of space exploration,” says Michio Kaku, a professor of physics at City College of New York and a noted futurist. “Imagine pushing the ‘up’ button of an elevator and taking a ride into the heavens. It could open up space to the average person.”

#### Regardless of completion, Elevators spur investment in Nanotechnology

Liam O’Brien 16. University of Wollongong. 07/2016. “Nanotechnology in Space.” Young Scientists Journal; Canterbury, no. 19, p. 22.

Nanotechnology is at the forefront of scientific development, continuing to astound and innovate. Likewise, the space industry is rapidly increasing in sophistication and competition, with companies such as SpaceX, Blue Origin and Virgin Galactic becoming increasingly prevalent in what could become a new commercial space race. The various space programs over the past 60 years have led to a multitude of beneficial impacts for everyday society. Nanotechnology, through research and development in space has the potential to do the same. Potential applications of nanotechnology in space are numerous, many of them have the potential to capture and inspire generations to come. One of these applications is the space elevator. By using carbon nanotubes, a super light yet strong material, this concept would be an actual physical structure from the surface of the Earth to an altitude of approximately 36 000 km. The tallest building in the world would fit into this elevator over 42 000 times. The counterweight, used to keep the elevator taught, is proposed to be an asteroid. This would need to be at a distance of 100 000 km, a quarter of the distance to the moon. The benefits of such a structure would be enormous. 95% of a space shuttle's weight at take-off is fuel, costing US$ 20 000 per kilogram to send something into space. However, with a space elevator the cost per kilogram can be reduced to as little as US$ 200. Exploration to other planets can begin at the tower, and travel to and from the moon could become as simple as a morning commute to work. Solar sails provide the means to travel large distances and incredible speeds. Much like sails on a boat use wind, the solar sail uses light as a source of propulsion. Ideally these sails would be kilometres in length and only a few micrometres in thickness. This provides us with the ability to travel at speeds previously unheard of. Using carbon nanotubes once again, a solar sail has the capability to travel at 39 756 km/s which is 13% of the speed of light! This sail could reach Pluto in an astonishing 1.7 days, and Alpha Centauri in just 32 years. Space travel to other planets, other stars, could be possible with solar sails. The Planetary Society is funding for a space sail of itself, and has successfully launched one into orbit. NASA has also sent a sail into orbit, allowing it to burn up in the atmosphere after 240 days. Investing time and resources into nanotechnology for space exploration has benefits for society today. Materials such as graphene are being used in modern manufacturing at an increasing rate as the applications become utilised. Carbon nanotubes will change the way we think about materials and their strength. These nanotubes have a tensile strength one hundred times that of steel, yet are only a sixth of the weight. Imagine light weight vehicles using less petrol and energy as well as being just as strong as regular vehicles. With potentials to revolutionize the way we think about space travel, nanotechnology has a bright future. As a new field of science, it has the capability to push the human race to the outer reaches of our galaxy and hopefully one day to other stars. It will inspire generations of explorers and dreamers to challenge themselves and advance the human race into the next era. As Richard Feynman said in his 1959 talk 'There's Plenty of Room at the Bottom' "A field in which little has been done, but in which an enormous amount can be done. There is still plenty more to achieve.

#### Nano tech solves warming

Bhavya Khullar. September 4, 2017. Nanomaterials Could Combat Climate Change and Reduce Pollution. https://www.scientificamerican.com/article/nanomaterials-could-combat-climate-change-and-reduce-pollution/

The list of environmental problems that the world faces may be huge, but some strategies for solving them are remarkably small. First explored for applications in microscopy and computing, nanomaterials—materials made up of units that are each thousands of times smaller than the thickness of a human hair—are emerging as useful for tackling threats to our planet’s well-being. Scientists across the globe are developing nanomaterials that can efficiently use carbon dioxide from the air, capture toxic pollutants from water and degrade solid waste into useful products. “Nanomaterials could help us mitigate pollution. They are efficient catalysts and mostly recyclable. Now, they have to become economical for commercialization and better to replace present-day technologies completely,” says [Arun Chattopadhyay](http://www.iitg.ac.in/arun/), a member of the chemistry faculty at the Center for Nanotechnology, Indian Institute of Technology Guwahati. To help slow the climate-changing rise in atmospheric CO2levels, researchers have developed nanoCO2 harvesters that can suck atmospheric carbon dioxide and deploy it for industrial purposes. “Nanomaterials can convert carbon dioxide into useful products like alcohol. The materials could be simple chemical catalysts or photochemical in nature that work in the presence of sunlight,” says Chattopadhyay, who has been working with nanomaterials to tackle environmental pollutants for more than a decade. Many research groups are working to address a problem that, if solved, could be a holy grail in combating climate change: how to pull CO2 out of the atmosphere and convert it into useful products. Chattopadhyay isn’t alone. Many research groups are working to address a problem that, if solved, could be a holy grail in combating climate change: how to pull CO2 out of the atmosphere and convert it into useful products. Nanoparticles offer a promising approach to this because they have a large surface-area-to-volume ratio for interacting with CO2 and properties that allow them to facilitate the conversion of CO2into other things. The challenge is to make them economically viable. Researchers have tried everything from metallic to carbon-based nanoparticles to reduce the cost, but so far they haven’t become efficient enough for industrial-scale application. One of the most recent points of progress in this area is work by scientists at the CSIR-Indian Institute of Petroleum and the Lille University of Science and Technology in France. The researchers developed a nanoCO2 harvester that uses water and sunlight to convert atmospheric CO2 into methanol, which can be employed as an engine fuel, a solvent, an antifreeze agent and a diluent of ethanol. Made by wrapping a layer of modified graphene oxide around spheres of copper zinc oxide and magnetite, the material looks like a miniature golf ball, captures CO2 more efficiently than conventional catalysts and can be readily reused, according to Suman Jain, senior scientist of the Indian Institute of Petroleum, Dehradun in India, who developed the nanoCO2harvester. Jain says that the nanoCO2 harvester has a large molecular surface area and captures more CO2 than a conventional catalyst with similar surface area would, which makes the conversion more efficient. But due to their small size, the nanoparticles have a tendency to clump up, making them inactive with prolonged use. Jain adds that synthesizing useful nanoparticle-based materials is also challenging because it’s hard to make the particles a consistent size. Chattopadhyay says the efficiency of such materials can be improved further, providing hope for useful application in the future. CLEANSING WATER Most toxic dyes used in textile and leather industries can be captured with nanoparticles. “Water pollutants such as dyes from human-created waste like those from tanneries could get to natural sources of water like deep tube wells or groundwater if wastewater from these industries is left untreated,” says Chattopadhyay. “This problem is rather difficult to solve.” An international group of researchers led by professor Elzbieta Megiel of the University of Warsaw in Poland reports that nanomaterials have been widely studied for removing heavy metals and dyes from wastewater. According to the research team, adsorption processes using materials containing magnetic nanoparticles are highly effective and can be easily performed because such nanoparticles have a large number of sites on their surface that can capture pollutants and don’t readily degrade in water. Chattopadhyay adds that appropriately designed magnetic nanomaterials can be used to separate pollutants such as arsenic, lead, chromium and mercury from water. However, the nanotech-based approach has to be more efficient than conventional water purification technology to make it worthwhile. In addition to removing dyes and metals, nanomaterials can also be used to clean up oil spills. Researchers led by Pulickel Ajayan at Rice University in Houston, Texas, have developed a reusable nanosponge that can remove oil from contaminated seawater.

#### Warming causes Extinction

Kareiva 18, Peter, and Valerie Carranza. "Existential risk due to ecosystem collapse: Nature strikes back." Futures 102 (2018): 39-50. (Ph.D. in ecology and applied mathematics from Cornell University, director of the Institute of the Environment and Sustainability at UCLA, Pritzker Distinguished Professor in Environment & Sustainability at UCLA)//Re-cut by Elmer

In summary, six of the nine proposed planetary boundaries (phosphorous, nitrogen, biodiversity, land use, atmospheric aerosol loading, and chemical pollution) are unlikely to be associated with existential risks. They all correspond to a degraded environment, but in our assessment do not represent existential risks. However, the three remaining boundaries (**climate change**, global **freshwater** cycle, **and** ocean **acidification**) do **pose existential risks**. This is **because of** intrinsic **positive feedback loops**, substantial lag times between system change and experiencing the consequences of that change, and the fact these different boundaries interact with one another in ways that yield surprises. In addition, climate, freshwater, and ocean acidification are all **directly connected to** the provision of **food and water**, and **shortages** of food and water can **create conflict** and social unrest. Climate change has a long history of disrupting civilizations and sometimes precipitating the collapse of cultures or mass emigrations (McMichael, 2017). For example, the 12th century drought in the North American Southwest is held responsible for the collapse of the Anasazi pueblo culture. More recently, the infamous potato famine of 1846–1849 and the large migration of Irish to the U.S. can be traced to a combination of factors, one of which was climate. Specifically, 1846 was an unusually warm and moist year in Ireland, providing the climatic conditions favorable to the fungus that caused the potato blight. As is so often the case, poor government had a role as well—as the British government forbade the import of grains from outside Britain (imports that could have helped to redress the ravaged potato yields). Climate change intersects with freshwater resources because it is expected to exacerbate drought and water scarcity, as well as flooding. Climate change can even impair water quality because it is associated with heavy rains that overwhelm sewage treatment facilities, or because it results in higher concentrations of pollutants in groundwater as a result of enhanced evaporation and reduced groundwater recharge. **Ample clean water** is not a luxury—it **is essential for human survival**. Consequently, cities, regions and nations that lack clean freshwater are vulnerable to social disruption and disease. Finally, ocean acidification is linked to climate change because it is driven by CO2 emissions just as global warming is. With close to 20% of the world’s protein coming from oceans (FAO, 2016), the potential for severe impacts due to acidification is obvious. Less obvious, but perhaps more insidious, is the interaction between climate change and the loss of oyster and coral reefs due to acidification. Acidification is known to interfere with oyster reef building and coral reefs. Climate change also increases storm frequency and severity. Coral reefs and oyster reefs provide protection from storm surge because they reduce wave energy (Spalding et al., 2014). If these reefs are lost due to acidification at the same time as storms become more severe and sea level rises, coastal communities will be exposed to unprecedented storm surge—and may be ravaged by recurrent storms. A key feature of the risk associated with climate change is that mean annual temperature and mean annual rainfall are not the variables of interest. Rather it is extreme episodic events that place nations and entire regions of the world at risk. These extreme events are by definition “rare” (once every hundred years), and changes in their likelihood are challenging to detect because of their rarity, but are exactly the manifestations of climate change that we must get better at anticipating (Diffenbaugh et al., 2017). Society will have a hard time responding to shorter intervals between rare extreme events because in the lifespan of an individual human, a person might experience as few as two or three extreme events. How likely is it that you would notice a change in the interval between events that are separated by decades, especially given that the interval is not regular but varies stochastically? A concrete example of this dilemma can be found in the past and expected future changes in storm-related flooding of New York City. The highly disruptive flooding of New York City associated with Hurricane Sandy represented a flood height that occurred once every 500 years in the 18th century, and that occurs now once every 25 years, but is expected to occur once every 5 years by 2050 (Garner et al., 2017). This change in frequency of extreme floods has profound implications for the measures New York City should take to protect its infrastructure and its population, yet because of the stochastic nature of such events, this shift in flood frequency is an elevated risk that will go unnoticed by most people. 4. The combination of positive feedback loops and societal inertia is fertile ground for global environmental catastrophes **Humans** are remarkably ingenious, and **have adapted** to crises **throughout** their **history**. Our doom has been repeatedly predicted, only to be averted by innovation (Ridley, 2011). **However**, the many **stories** **of** human ingenuity **successfully** **addressing** **existential risks**

## Case

### Hedge

#### Reasonability on 1AR shells – 1AR theory is very aff-biased because the 2AR gets to line-by-line every 2NR standard with new answers that never get responded to– reasonability checks 2AR sandbagging by preventing really abusive 1NCs while still giving the 2N a chance.

#### DTA on 1AR shells - They can blow up blippy 20 second shells in the 2AR while I have to split my time and can’t preempt 2AR spin which necessitates judge intervention and means 1AR theory is irresolvable so you shouldn’t stake the round on it.

### Case

#### Collision risk is infinitesimally small

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

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

#### Low risk of collisions – it’s overhyped

Albrecht 16 [Mark Albrecht, chairman of the board of USSpace LLC, head of the White House National Space Council from 1989 to 1992, and Paul Graziani, CEO and founder of Analytical Graphics, a company that develops software and provides mission assurance through the Commercial Space Operations Center (ComSpOC), Congested space is a serious problem solved by hard work, not hysteria, 2016, https://spacenews.com/op-ed-congested-space-is-a-serious-problem-solved-by-hard-work-not-hysteria/]

Popular culture has embraced the risks of collisions in space in films like Gravity. Some participants have dramatized the issue by producing graphics of Earth and its satellites, which make our planet look like a fuzzy marble, almost obscured by a dense cloud of white pellets meant to conceptualize space congestion. Unfortunately, for the sake of a good visual, satellites are depicted as if they were hundreds of miles wide, like the state of Pennsylvania (for the record, there are no space objects the size of Pennsylvania in orbit). Unfortunately, this is the rule, not the exception, and almost all of these articles, movies, graphics, and simulations are exaggerated and misleading. Space debris and collision risk is real, but it certainly is not a crisis. So what are the facts? On the positive side, space is empty and it is vast. At the altitude of the International Space Station, one half a degree of Earth longitude is almost 40 miles long. That same one half a degree at geostationary orbit, some 22,000 miles up is over 230 miles long. Generally, we don’t intentionally put satellites closer together than one-half degree. That means at geostationary orbit, they are no closer than 11 times as far as the eye can see on flat ground or on the sea: That’s the horizon over the horizon 10 times over. In addition, other than minute forces like solar winds and sparse bits of atmosphere that still exist 500 miles up, nothing gets in the way of orbiting objects and they behave quite predictably. The location of the smallest spacecraft can be predicated within a 1,000 feet, 24 hours in advance. Since we first started placing objects into space there have been 11 known low Earth orbit collisions, and three known collisions at geostationary orbit. Think of it: 135 space shuttle flights, all of the Apollo, Gemini and Mercury flights, hundreds of telecommunications satellites, 1,300 functioning satellites on orbit today, half a million total objects in space larger than a marble, and fewer than 15 known collisions. Why do people worry?

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

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

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

#### No Escalation over Satellites:

#### 1] Planning Priorities

Bowen 18 Bleddyn Bowen 2-20-2018 “The Art of Space Deterrence” <https://www.europeanleadershipnetwork.org/commentary/the-art-of-space-deterrence/> (Lecturer in International Relations at the University of Leicester)//Elmer

Space is often an afterthought or a miscellaneous ancillary in the grand strategic views of top-level decision-makers. A president may not care that one satellite may be lost or go dark; it may cause panic and Twitter-based hysteria for the space community, of course. But the terrestrial context and consequences, as well as the political stakes and symbolism of any exchange of hostilities in space matters more. The political and media dimension can magnify or minimise the perceived consequences of losing specific satellites out of all proportion to their actual strategic effect.

#### 2] Military Precedent

Zarybnisky 18, Eric J. Celestial Deterrence: Deterring Aggression in the Global Commons of Space. Naval War College Newport United States, 2018. (Senior Materiel Leader at United States Air Force)//Elmer

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

#### Solar flares will end satellites inevitably – no defense

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.

#### Colonization doesn’t reduce existential risk

* Short- and long-term risk assessment should focus on protecting earth
* Earth gets riskier as tech advances which raises the risk that our impact happens before colonization
* Even if tech gets there, future social and economic context prevents missions
* Risk Dynamics Paradox – existential risks are rooted in human psychology, so they’ll follow us to space – Bostrom agrees!

Szocik 19 [Konrad Szocik, University of Information Technology and Management in Rzeszow, Department of Philosophy and Cognitive Science. Should and could humans go to Mars? Yes, but not now and not in the near future. Futures Volume 105, January 2019, Pages 54-66. https://www.sciencedirect.com/science/article/pii/S001632871830199X]

I argue, following other authors (Baum, 2009; Baum, Denkenberger, & Haqq-Misra, 2015; Jebari, 2015; Sandberg, Matheny, & Ćirković, 2008; Turchin & Green, 2017) that human space settlement is not able to reduce and/or to exclude the risk of human extinction. For this reason, it should not be perceived in terms of space refuge. In terms of both short-term and long-term perspectives of risk assessment, it would be better to protect humans on Earth.5 I reject the supportive role which could be played by human space settlement after a catastrophe on Earth, i.e., a recovery coordination mission. Due to so-called the paradox of technological progress discussed in the last section, further putative progress in space technology will be counterbalanced by increasing anthropogenic risks including, among others, overpopulation and limited resources (these anthropogenic threats are unavoidable in near future, in contrast to other risks that are only more or less probable but not unavoidable). Permanent lack of strong rationale for human mission to Mars – both now and in the near future – leads to paradoxical situation. Even if in some point in the future the minimum level of advancement in human deep-space technologies will be achieved, social, political, and economic contexts will gradually decrease the chances for real preparation of this mission. Another paradox, let’s call it the risk dynamics paradox, is that the most probable threats in the near future are, as Bostrom and Cirkovic (2008) argue, anthropogenic threats caused by civilizational and technological progress. The paradox lies in the fact that humans are not able to run from these kinds of risks that are rooted in their way of thinking, style of life, and population dynamics, risks implied by Malthus’ law. The human species can try to protect against natural disaster but not against deleterious effects of its own technological progress. In regard to possible future existential risks, I assume that their deleterious power is a little bit exaggerated, and, in any event, human space settlement is not a right way to cope with them. However, in any case, it is hard to speculate if any human space settlement must repeat the same path of human expansion as it was the case on Earth. It is unclear if human technological expansion and exploration must always lead to deleterious and self-destructive effects. In this paper, I do not discuss ethical and moral concerns which are traditionally considered when discussing the human place in space. They include such topics as the human right to explore space (it means both right to intervene in any extraterrestrial object, and human duty and rationale for space expansionism, mostly in the context of the idea of space refuge and possible catastrophic scenarios on Earth), or the value of human life and space objects.