# Speech 1NC UH Octas vs Vratiin 1-16 12AM

## 1

#### Interp: debaters must record their own speeches.

#### Violation: They didn't record, that was cx

#### A~ Cheating – debaters can fake internet drop offs and then steal prep which decks reciprocity. O/Ws since it destroys competitive incentives and educational value.

#### B~ Accidents – debaters could drop off from the call which makes the debate irresolvable for the judge and is a sequencing question to engaging in debate since you literally cant debtae

## 2

#### Interp – debaters must disclose all theory interpretations. To clarify, summaries don’t solve.

#### Violation – screenshots

Text

Description automatically generated with medium confidence

Graphical user interface, text, application

Description automatically generated

#### 1] norming – a] scope b] qualitative

#### 2] predictability – a] shiftiness b] substance crowdout

**Fairness – you conceded the judge will fairly evaluate your argument**

**Education – it’s the only portable impact to debate**

**CI – a) brightlines are arbitrary and self-serving which doesn’t set good norms**

**b) it collapses since weighing between brightlines rely on offense defense**

**Neg theory is drop the debater – a) Prep skew – infinite prep means they frontline every shell enough to be efficient at DA and skew substance enough**

**b) 1AR Flex –you moot 6 min of my offense and restart on unpredictable layers while kicking the args.**

**No RVI’s- a) logic – you shouldn’t win for being fair**

**b) clash – people go all in on theory which decks substance engagement**

**c) chilling effect – people will be too scared to read theory because RVI’s encourage baiting theory**

**d] Norm-setting—I shouldn’t be forced to keep advocating for a bad norm if I realize it’s bad in the middle of the round.**

**e] Flex—RVIs make theory uncondo so I always have to go for that route to the ballot, but both debaters should get multiple relevant layers and collapse options.**

**1NC theory first - 1] Abuse was self-inflicted- They started the chain of abuse and forced me down this strategy**

**2] Norming- We have more speeches to norm over whether it’s a good idea since the shell was read earlier**

**Neg abuse outweighs Aff abuse – 1] Infinite prep time before round to frontline 2] 2AR judge psychology and 1st and last speech 3] Infinite perms and uplayering in the 1AR.**

**No new 1ar theory paradigm issues- A] the 1NC has already occurred with current paradigm issues in mind so new 1ar paradigms moot any theoretical offense**

**B] introducing them in the aff allows for them to be more rigorously tested which o/w’s on time frame since we can set higher quality norms.**

## 3 – holden’s favorite

#### The role of the ballot is to evaluate the desirability of resolutional action under the best normative framework. Prefer

#### 1] Philosophy – only our role of the ballot incentivizes nuanced discussions over the interactions of different ethical theories.

#### 2] Collapses – any framing presupposes a motivation to vote one way or another which means all framings concede the validity of normativity

#### 3] no new 1AR ROB

#### A] time skew

#### B] shiftiness

#### Presumption/permissibility negates –

#### a] real world policies require positive justification before being adopted

#### b] Unjust[[1]](#footnote-1) is “contrary to conscience or morality or law” so they need to prove the negative obligation

#### c] resolved[[2]](#footnote-2) indicates “firmly determined” which means they proactively did something, to negate that means that they aren’t resolved

#### d] permissibility can’t affirm since then anything would be ok which would justify racism – we should be safe and do nothing.

#### I contend that monism – or the idea that only one thing exists, as opposed to multiple objects – is true –

#### 1] The Multiple Worlds Interpretation is cosmological consensus and best explains the wave function.

Gribbin 20 [John Gribbin (described by the Spectator as “one of the finest and most prolific writers of popular science around,” is the author of, among other books, “In Search of Schrödinger’s Cat,” “The Universe: A Biography,” and “Six Impossible Things,” from which this article is excerpted. He is a Visiting Fellow in Astronomy at the University of Sussex, UK). “The Many-Worlds Theory, Explained”. The MIT Press. May 20, 2020. Accessed 12/11/21. <https://thereader.mitpress.mit.edu/the-many-worlds-theory/> //Xu]

Most quantum computer scientists prefer not to think about these implications. But there is one group of scientists who are used to thinking of even more than six impossible things before breakfast — the cosmologists. Some of them have espoused the Many Worlds Interpretation as the best way to explain the existence of the Universe itself. Their jumping-off point is the fact, noted by Schrödinger, that there is nothing in the equations referring to a collapse of the wave function. And they do mean the wave function; just one, which describes the entire world as a superposition of states — a Multiverse made up of a superposition of universes. The first version of Everett’s PhD thesis (later modified and shortened on the advice of Wheeler) was actually titled “The Theory of the Universal Wave Function.” And by “universal” he meant literally that, saying: Since the universal validity of the state function description is asserted, one can regard the state functions themselves as the fundamental entities, and one can even consider the state function of the whole universe. In this sense this theory can be called the theory of the “universal wave function,” since all of physics is presumed to follow from this function alone. … where for the present purpose “state function” is another name for “wave function.” “All of physics” means everything, including us — the “observers” in physics jargon. Cosmologists are excited by this, not because they are included in the wave function, but because this idea of a single, uncollapsed wave function is the only way in which the entire Universe can be described in quantum mechanical terms while still being compatible with the general theory of relativity. In the short version of his thesis published in 1957, Everett concluded that his formulation of quantum mechanics “may therefore prove a fruitful framework for the quantization of general relativity.” Although that dream has not yet been fulfilled, it has encouraged a great deal of work by cosmologists since the mid-1980s, when they latched on to the idea. But it does bring with it a lot of baggage. The universal wave function describes the position of every particle in the Universe at a particular moment in time. But it also describes every possible location of those particles at that instant. And it also describes every possible location of every particle at any other instant of time, although the number of possibilities is restricted by the quantum graininess of space and time. Out of this myriad of possible universes, there will be many versions in which stable stars and planets, and people to live on those planets, cannot exist. But there will be at least some universes resembling our own, more or less accurately, in the way often portrayed in science fiction stories. Or, indeed, in other fiction. Deutsch has pointed out that according to the MWI, any world described in a work of fiction, provided it obeys the laws of physics, really does exist somewhere in the Multiverse. There really is, for example, a “Wuthering Heights” world (but not a “Harry Potter” world). That isn’t the end of it. The single wave function describes all possible universes at all possible times. But it doesn’t say anything about changing from one state to another. Time does not flow. Sticking close to home, Everett’s parameter, called a state vector, includes a description of a world in which we exist, and all the records of that world’s history, from our memories, to fossils, to light reaching us from distant galaxies, exist. There will also be another universe exactly the same except that the “time step” has been advanced by, say, one second (or one hour, or one year). But there is no suggestion that any universe moves along from one time step to another. There will be a “me” in this second universe, described by the universal wave function, who has all the memories I have at the first instant, plus those corresponding to a further second (or hour, or year, or whatever). But it is impossible to say that these versions of “me” are the same person. Different time states can be ordered in terms of the events they describe, defining the difference between past and future, but they do not change from one state to another. All the states just exist. Time, in the way we are used to thinking of it, does not “flow” in Everett’s MWI.

#### Implications –

#### A] predictions fail – the multiverse of all different possibilities illustrates the impossibility of predicting consequences – Newtonian and linear interpretations fail since every possibility occurs.

#### B] aggregation fails – a literal infinite number of universes with infinite life-forms and hedonic experiences renders aggregation nonsensical when calculating ethical implications.

#### Quantum Monism solves and is verifiable.

Päs 19 [Heinrich Päs (Professor of Theoretical Physics at TU Dortmund University). “Quantum Monism Could Save the Soul of Physics”. Scientific American. March 5, 2019. Accessed 12/10/21. <https://blogs.scientificamerican.com/observations/quantum-monism-could-save-the-soul-of-physics/> //Xu]

This is where “quantum monism,” as championed by Rutgers University philosopher Jonathan Schaffer, enters the stage. Schaffer has mused over the question of what the universe is made of. According to quantum monism, the fundamental layer of reality is not made of particles or strings but the universe itself—understood not as the sum of things making it up but rather as a single, entangled quantum state. Similar thoughts have been expressed earlier, for example by the physicist and philosopher Carl Friedrich von Weizsäcker. Taking quantum mechanics seriously predicts a unique, single quantum reality underlying the multiverse. The homogeneity and the tiny temperature fluctuations of the cosmic microwave background, which indicate that our observable universe can be traced back to a single quantum state, usually identified with the quantum field that fuels primordial inflation, support this view. Moreover, this conclusion extends to other multiverse concepts such as different laws of physics in the various valleys of the “string theory landscape” or other “baby universes” popping up in eternal cosmological inflation. Since entanglement is universal, it doesn’t stop at the boundary of our cosmic patch. Whatever multiverse you have, when you adopt quantum monism they are all part of an integrated whole. There always is a more fundamental layer of reality underlying the many universes within the multiverse, and that layer is unique.

#### 2] The litmus test is non-arbitrariness – blurry guidelines allows agents to inconsistently understand morality which renders ethics useless since it can’t serve as a guide to action.

#### A priori rationality comes first –

#### A] Cartesian Skepticism – I could be dreaming, hallucinating, or controlled by a demon so empirical knowledge is unreliable. The only thing I know is that I am doubting and reasoning.

#### B] Causal Determinism – the physical world removes culpability from the agent – agential action occurs because of an antecedent NOT their will – only the a priori world assumes a rational agent not subject to physical side constraints.

#### C] Hume’s Guillotine – descriptive claims cannot prescribe action – “arsenic is poison” doesn’t mean “one ought not drink arsenic” because it doesn’t ought to be that way. Only the a priori can form ought statements.

#### Space must exist between things to distinguish between them as multiple since otherwise, objects aren’t separate but A] the a priori world isn’t subject to empirical contingencies like spatial separation B] all minds must be fundamentally identical given the mind is not a spatial entity.

#### Monism negates –

#### 1] by means

Lexico. Oxford Dictionary. By. https://www.lexico.com/en/definition/by

Identifying the agent performing an action.

#### 1AC Of – “indicating an association between two entities, typically one of belonging”.

Google<https://www.google.com/search?q=of+definition&rlz=1C1CHBF_enUS877US877&oq=of+definition&aqs=chrome..69i57j69i60.1494j0j7&sourceid=chrome&ie=UTF-8>

#### Per the 1AC but monism proves agents and groups cannot exist

#### That o/w – the rez cant prescribe value statements if the object of an obligation is incoherent

#### 2] ethics requires conduct between agents ie private entities to outer space– even if one has a duty for them self, it assumes a difference between the self and the mind; otherwise it’s not a duty since its just self-imposed

## 4

#### OST Credibility is high now – no violations.

Stuart 17 Jill Stuart 1-27-2017 "The Outer Space Treaty has been remarkably successful – but is it fit for the modern age?" <https://theconversation.com/the-outer-space-treaty-has-been-remarkably-successful-but-is-it-fit-for-the-modern-age-71381> (Visiting Fellow, Department of Government, London School of Economics and Political Science)//Elmer

Space exploration is governed by a complex series of international treaties and agreements which have been in place for years. The first and probably most important of them celebrates its 50th anniversary on January 27 – The Outer Space Treaty. This treaty, which was signed in 1967, was agreed through the United Nations, and today it remain as the “constitution” of outer space. It has been signed and made official, or ratified, by 105 countries across the world. The treaty has worked well so far but challenges have increasingly started to crop up. So will it survive another 50 years? The Outer Space Treaty, like all international law, is technically binding to those countries who sign up to it. But the obvious lack of “space police” means that it cannot be practically enforced. So a country, individual or company could simply ignore it if they so wished. Implications for not complying could include sanctions, but mainly a lack of legitimacy and respect which is of importance in the international arena. However it is interesting that, over the 50 years of it’s existence, the treaty has never actually been violated. Although many practical challenges have been made – these have always been made with pars of the treaty in mind, rather than seeking to undermine it entirely.

#### Normal Means requires amending the OST – that’s 1AC enforcement and wrecks the OST.

Melroy 17 Pamela Melroy 5-23-2017 “Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space” <https://www.hsdl.org/?abstract&did=807259> (Retired NASA Astronaut)//Elmer

There are many exciting activities and proposals in commercial space. With respect to the Outer Space Treaty, I am deeply concerned that we would be opening a Pandora’s Box by attempting to change it. My concern is that the likely outcome would be a lack of consensus, resulting in no amendments. Instead, we will have a weakened dedication to the Principles of the Treaty and the sustainability of space. Great changes are occurring and many countries are developing capabilities that previously were the purview of only a few nation states. Our ability to compete both economically and technologically in space is crucial. These Principles form the basis for the dialog that we have with other countries about what is appropriate and what is not. Without them, the dialog becomes chaos.

#### Credible OST solves Space War.

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

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

# AC

#### New 2nr responses -they didn’t tell me changes which means I cant predict minute shifts

A screenshot of a computer screen

Description automatically generated with medium confidence

## FW

## Adv

#### Squo debris thumps

**Wall 21** [Mike Wall, Michael Wall is a Senior Space Writer with [Space.com](http://space.com/) and joined the team in 2010. He primarily covers exoplanets, spaceflight and military space. He has a Ph.D. in evolutionary biology from the University of Sydney, Australia, a bachelor's degree from the University of Arizona, and a graduate certificate in science writing from the University of California, Santa Cruz. 11/15/21, "Kessler Syndrome and the space debris problem," Space, [https://www.space.com/kessler-syndrome-space-debris accessed 12/10/21](https://www.space.com/kessler-syndrome-space-debris%20accessed%2012/10/21)] Adam

Earth orbit is getting more and more crowded as the years go by. Humanity has launched about 12,170 satellites since the dawn of the space age in 1957, [according to the European Space Agency](https://www.esa.int/Safety_Security/Space_Debris/Space_debris_by_the_numbers) (ESA), and 7,630 of them remain in orbit today — but only about 4,700 are still operational. That means there are nearly 3,000 defunct spacecraft zooming around Earth at tremendous speeds, along with other big, dangerous pieces of debris like upper-stage rocket bodies. For example, orbital velocity at 250 miles (400 kilometers) up, the altitude at which the ISS flies, is about 17,100 mph (27,500 kph). At such speeds, even a tiny shard of debris can do serious damage to a spacecraft — and there are huge numbers of such fragmentary bullets zipping around our planet. ESA estimates that Earth orbit harbors at least 36,500 debris objects that are more than 4 inches (10 centimeters) wide, 1 million between 0.4 inches and 4 inches (1 to 10 cm) across, and a staggering 330 million that are smaller than 0.4 inches (1 cm) but bigger than 0.04 inches (1 millimeter). These objects pose more than just a hypothetical threat. From 1999 to May 2021, for example, the ISS conducted 29 debris-avoiding maneuvers, including three in 2020 alone, [according to NASA officials](https://www.nasa.gov/mission_pages/station/news/orbital_debris.html). And that number continues to grow; the station performed [another such move in November 2021](https://www.space.com/space-station-dodging-chinese-space-junk-spacex-crew-3), for example. Many of the smaller pieces of space junk were spawned by the explosion of spent rocket bodies in orbit, but others were more actively emplaced. In January 2007, for instance, China intentionally destroyed one of its defunct weather satellites in a much-criticized test of anti-satellite technology that generated [more than 3,000 tracked debris objects](https://swfound.org/media/9550/chinese_asat_fact_sheet_updated_2012.pdf) and perhaps 32,000 others too small to be detected. The vast majority of that junk remains in orbit today, experts say. Spacecraft have also collided with each other on orbit. The most famous such incident occurred in February 2009, when Russia's defunct Kosmos 2251 satellite slammed into the operational communications craft Iridium 33, producing [nearly 2,000 pieces of debris](https://swfound.org/media/6575/swf_iridium_cosmos_collision_fact_sheet_updated_2012.pdf) bigger than a softball. That 2009 smashup might be evidence that the Kessler Syndrome is already upon us, though a cataclysm of "Gravity" proportions is still a long way off. "The cascade process can be more accurately thought of as continuous and as already started, where each collision or explosion in orbit slowly results in an increase in the frequency of future collisions," [Kessler told Space Safety Magazine in 2012](http://www.spacesafetymagazine.com/space-debris/kessler-syndrome/don-kessler-envisat-kessler-syndrome/).

#### The debris propagation model is a process not an event---timeframe is decades and intervening actors check.

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

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

#### Collision risk is infinitesimally small

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

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

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

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

In any crisis that threatens to escalate into major power conflict, political and military leaders will face uncertainty about the effectiveness of their plans and decisions. This uncertainty will be compounded when potential conflict extends to the space and cyber domains, where weapon effectiveness is largely untested and uncertain, infrastructure interdependencies are unclear, and damaging an adversary could also harm oneself or one’s allies. Unless the stakes become very high, no country will likely want to gamble its well-being in a “single cosmic throw of the dice,” in Harold Brown’s memorable phrase. 96 The novelty of space and cyber warfare, coupled with risk aversion and worst-case assessments, could lead space adversaries into a situation of what can be called “hysteresis,” where each adversary is restrained by its own uncertainty of success. This is conceptually shown in Figures 1 and 2 for offensive counter-space capabilities, though it applies more generally. 97 These graphs portray the hypothetical differences between perceived and actual performance capabilities of offensive counter-space weapons, on a scale from zero to one hundred percent effectiveness. Where uncertainty and risk aversion are absent for two adversaries, no difference would exist between the likely performance of their offensive counter-space assets and their confidence in the performance of those weapons: a simple, straight-line correlation would exist, as in Figure 1. The more interesting, and more realistic, case is notionally presented in Figure 2, which assumes for simplicity that the offensive capabilities of each adversary are comparable. In stark contrast to the case of Figure 1, uncertainty and risk aversion are present and become important factors. Given the high stakes involved in a possible large-scale attack against adversary space assets, a cautious adversary is more likely to be conservative in estimating the effectiveness of its offensive capabilities, while more generously assessing the capabilities of its adversary. Thus, if both side’s weapons were 50% effective and each side had a similar level of risk aversion, each may conservatively assess its own capabilities to be 30% effective and its adversary’s weapons to be 70% effective. Likewise, if each side’s weapons were 25% effective in reality, each would estimate its own capabilities to be less than 25% effective and its adversary’s to be more than 25% effective, and so on. In Figure 2, this difference appears, in oversimplified fashion, as a gap that represents the realistic worry that a country’s own weapons will under-perform while its adversary’s weapons will over-perform in terms of effectiveness. If both countries face comparable uncertainty and exhibit comparable risk aversion, each may be deterred from initiating an attack by its unwillingness to accept the necessary risks. This gap could represent an “island of stability,” as shown in Figure 2. In essence, given the enormous stakes involved in a major strike against the adversary’s space assets, a potential attacker will likely demonstrate some risk aversion, possessing less confidence in an attack’s effectiveness. It is uncertain how robust this hysteresis may prove to be, but the phenomenon may provide at least some stabilizing influence in a crisis. In the nuclear domain, the immediate, direct consequences of military use, including blast, fire, and direct radiation effects, were appreciated at the outset. Nonetheless, significant uncertainty and under-appreciation persisted with regard to the collateral, indirect, and climatological effects of using such weapons on a large scale. In contrast, the immediate, direct effects of major space conflict are not well understood, and potential indirect and interdependent effects are even less understood. Indirect effects of large-scale space and cyber warfare would be virtually impossible to confidently calculate, as the infrastructures such warfare would affect are constantly changing in design and technology. Added to this is a likely anxiety that if an attack were less successful than planned, a highly aggrieved and powerful adversary could retaliate in unanticipated ways, possibly with highly destructive consequences. As a result, two adversaries facing potential conflict may lack confidence both in the potential effectiveness of their own attacks and in the ineffectiveness of any subsequent retaliation. Such mutual uncertainty would ultimately be stabilizing, though probably not particularly robust. This is reflected in Figure 2, where each side shows more caution than the technical effectiveness of its systems may suggest. Each curve notionally represents one state’s confidence in its offensive counter-space effectiveness relative to their actual effectiveness. Until true space asset resilience becomes a trusted feature of space architectures, deterrence by risk aversion, and cross-domain deterrence, may be the only means for deterrence to function in space.

#### 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.

#### 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?

#### 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.

1. https://www.vocabulary.com/dictionary/unjust [↑](#footnote-ref-1)
2. https://www.google.com/search?q=resolved+definition&rlz=1C1CHBF\_enUS877US877&oq=resolved+definition&aqs=chrome..69i57.2078j0j7&sourceid=chrome&ie=UTF-8 [↑](#footnote-ref-2)