### fw

**My value is morality because the use of the word ought the resolution implies moral obligation**

#### Governments and agents can only evaluate generalities

**Goodin 90.** Robert Goodin 90, [professor of philosophy at the Australian National University college of arts and social sciences], “The Utilitarian Response,” pgs 141-142 //RS

My larger argument turns on the proposition that there is something special about the situation of public officials that makes utilitarianism more probable for them than private individuals. Before proceeding with the large argument, I must therefore say what it is that makes it so special about public officials and their situations that make it both more necessary and more desirable for them to adopt a more credible form of utilitarianism. Consider, first, the argument from necessity. Public officials are obliged to make their choices under uncertainty, and uncertainty of a very special sort at that. All choices – public and private alike – are made under some degree of uncertainty, of course. But in the nature of things, private individuals will usually have more complete information on the peculiarities of their own circumstances and on the ramifications that alternative possible choices might have for them. Public officials, in contrast, are relatively poorly informed as to the effects that their choices will have on individuals, one by one. What they typically do know are generalities: averages and aggregates. They know what will happen most often to most people as a result of their various possible choices, but that is all. That is enough to allow public policy-makers to use the utilitarian calculus – assuming they want to use it at all – to choose general rules or conduct.

#### Thus, the standard is maximizing expected well being.

#### Prefer:

#### 1] Actor specificity:

#### A – governments have to aggregate since collective actions necessarily benefit some

#### people while hurting others either due to resource tradeoffs or scope of effect,

#### deontic side constraints freeze action.

#### 2] Util is a lexical pre-requisite to any other framework: Threats to bodily security and

#### life preclude the ability for moral actors to effectively utilize and act upon other moral

#### theories since they are in a constant state of crisis – that inhibits the ideal moral

#### conditions which other theories presuppose.

#### Resolved: appropriation of outer space by private entities is unjust

### Contention 1: Space Debris

#### Rocket Launches, Satellites and Human Activity all inevitably create space debris

**Polyakov**, M. (20**21**, **May 5**). Where does space junk come from – and how do we clean it up? World Economic Forum. Retrieved December 6, 2021, from <https://www.weforum.org/agenda/2021/05/why-we-need-to-clean-up-space-junk-debris-low-earth-orbit-pollution-satellite-rocket-noosphere-firefly/> //ear Dr. Max Polyakov is the Founder of Noosphere Ventures, Firefly Aerospace, and EOS Data Analytics

**As long as humans launch objects into orbit, space debris is inevitable**. **Rocket launches leave boosters, fairings, interstages, and other debris in LEO.** **So do rocket explosions, which currently account for seven of the top 10 debris-creating events. Human presence also creates orbital flotsam** – such as cameras, pliers, an astronaut’s glove, a wrench, a spatula, even a tool bag lost during space walks. **Some debris is created naturally from the impacts of micrometeoroids** – dust-sized fragments of asteroids and comets. **With limited lifetimes, operational satellites can become space debris. Satellites run out of maneuvering fuel, batteries wear out, solar panels degrade – causing an orbital debris feedback loop, in which the problem is exacerbated when solar panels are sandblasted by micrometeoroids and tiny debris**. **As with rocket debris, spent satellites eventually re-enter Earth’s atmosphere and burn up, but the process can take years** – **and the higher they orbit above Earth, the longer those orbits take to decay**.

#### Already, expansion of private entities in space creates more space debris with no legal consequences.

**McMillan**, A. (20**21**, July 14). *The final frontier - 21st century space race*. International Bar Association. Retrieved December 14, 2021, from <https://www.ibanet.org/the-final-frontier>. Anne McMillan is a legally trained journalist and a fan of law, language, swimming and chai. //ech

Another UN body, the International Telecommunication Union, manages space telecommunications, assigning satellite ‘slots’ and coordinating shared global use of the radio spectrum. Its dispute settlement mechanism is optional and, in reality, not used, with negotiated solutions between States being the norm. Nacimiento highlights the inadequacy of the current legal regime. ‘**There are no binding international rules governing space traffic management to avoid [crashes] and, if [they] happen, to regulate responsibilities and liabilities.** So this is an area where **international rules are needed in order to avoid conflicts between states using satellites for civilian and military purposes**.’ **The numbers of satellites being launched, or planned to be launched, is exploding** with the development of new and cheaper technology, and so more legal disputes are likely. And yet again private companies are at the centre of this expansion. Smaller satellites in low Earth orbit, running internet services or engaged in Earth observation, are predicted to balloon in numbers in the coming years. Compared to the approximately 3,500 active satellites currently orbiting the Earth, we can expect 40-50,000 after a decade. **With such expansion comes an increased risk of collisions which create more space debris, thus heightening the risk to rockets, manned vehicles, space stations and other space traffic.** A tiny speck of unidentified paint, or space debris, travels at such a high velocity in space that it could disable a spacecraft. The inadequacy of both hard and soft law in this area brings with it not just the possible loss of services, equipment and human life, but also **the risk of conflict. ‘We have seen a crash in 2009 between a US communications satellite and a Russian intelligence satellite in space**,’ says Nacimiento. ‘In 2019 a Starlink satellite forced a satellite operated by the European Space Agency into an evasive maneuver to avoid a crash. **Such incidents could easily provoke conflicts between states, in particular when satellites for intelligence or military uses are concerned**.’ Claims under the 1972 Space Liability Convention’s fault-based liability system have proved impractical, **as there are very few legally binding duties in outer space to establish fault against**. As such, the Convention has never been tested in court. And the risk escalates if not all incidents are accidental. China, India, Russia and the US have all demonstrated their anti-satellite capability by deploying anti-satellite weapons (ASATs) in space. In 2019 India created a massive cloud of space debris by using an ASAT to destroy one of its own satellites, yet faced no legal consequences. The OST provisions on the military use of space are limited in scope, precluding only the placing in space of certain types of weapons (such as nuclear weapons or other weapons of mass destruction). The use of civilian satellites for military purposes easily evades the treaty. The OST also allows the deployment of military personnel in space for scientific or ‘other peaceful purposes’.

#### Privatization of space leads to unchecked debris.

Muelhaupt et al. 19 – Theodore, Marlon Sorge, Jamie Morin, and Robert Wilson, 6/18/19, Center for Orbital and Reentry Debris Studies, Center for Space Policy and Strategy, The Aerospace Corporation, 30 year Space Systems Analyst and Operator, [“Space traffic management in the new space era,” Journal of Space Safety Engineering, <https://www.sciencedirect.com/science/article/pii/S246889671930045X?via%3Dihub>] justin recut by ha

The last decade has seen rapid growth and change in the space industry, and an explosion of commercial and private activity. Terms like NewSpace or democratized space are often used to describe this global trend to develop faster and cheaper access to space, distinct from more traditional government-driven activities focused on security, political, or scientific activities. The easier access to space has opened participation to many more participants than was historically possible. This new activity could profoundly worsen the space debris environment, particularly in low Earth orbit (LEO), but there are also signs of progress and the outlook is encouraging. Many NewSpace operators are actively working to mitigate their impact. Nevertheless, NewSpace represents a significant break with past experience and business as usual will not work in this changed environment. New standards, space policy, and licensing approaches are powerful levers that can shape the future of operations and the debris environment. 2. Characterizing NewSpace: a step change in the space environment In just the last few years, commercial companies have proposed, funded, and in a few cases begun deployment of very large constellations of small to medium-sized satellites. These constellations will add much more complexity to space operations. Table 1 shows some of the constellations that have been announced for launch in the next decade. Two dozen companies, when taken together, have proposed placing well over 20,000 satellites in orbit in the next 10 years. For perspective, fewer than 8100 payloads have been placed in Earth orbit in the entire history of the space age, only 4800 [1] remain in orbit and approximately 1950 [2] of those are still active. And it isn't simply numbers – the mass in orbit will increase substantially, and long-term debris generation is strongly correlated with mass. Table 1. Some announced NewSpace constellations. Operator Number of satellites Altitude (km) Country SpaceX V-band 7518 335–345 US Capella 48 350–650 US Planet Swift 6 350–650 US Black Sky 60 450 US Satellogic NuSat 300 500 Argentina Kepler 140 550 US SpaceX Starlink 1584 550 US Skybox 30 576 US Fleet 100 580 Australia Amazon Kuiper 3236 590–630 US Commsat 800 600 China Kineis 20 600 France Yalini 135 600 Canada Spire 100 651 US Planet Doves 150 675 US Orbcomm 31 750 US Iridium 72 780 US Theia 112 800 US Lucky Star 156 1000 China Telesat LEO 72 1000 Canada Hongyan 300 1100 China Xinwei 32 1100 China SpaceX Starlink 2825 1110–1325 US OneWeb 720 1200 ESA Telesat LEO 45 1248 Canada Astrome Tech 600 1400 India LeoSat 108 1400 US Globalstar 40 1412 US This table is in constant flux. It is based largely on U.S. filings with the Federal Communications Commission (FCC) and various press releases, but many of the companies here have already altered or abandoned their original plans, and new systems are no doubt in work. Although many of these large constellations may never be launched as listed, the traffic created if just half are successful would be more than double the number of payloads launched in the last 60 years and more than 6 times the number of currently active satellites. Current space safety, space surveillance, collision avoidance (COLA) and debris mitigation processes have been designed for and have evolved with the current population profile, launch rates and density of LEO space. By almost any metric used to measure activity in space, whether it is payloads in orbit, the size of constellations, the rate of launches, the economic stakes, the potential for debris creation, the number of conjunctions, NewSpace represents a fundamental change. 3. Compounding effects of better SSA, more satellites, and new operational concepts The changes in the space environment can be seen on this figurative map of low Earth orbit. Fig. 1 shows the LEO environment as a function of altitude. The number of objects found in each 10 km “bin” is plotted on the horizontal axis, while the altitude is plotted vertically. Objects in elliptical orbits are distributed between bins as partial objects proportional to the time spent in each bin. Some notable resident systems are indicated in blue text on the right to provide an altitude reference. The (dotted) red line shows the number of objects in the current catalog tracked by the U.S. Space Surveillance Network (SSN). All the COLA alerts and actions that must be taken by the residents are due to their neighbors in the nearby bins, so the currently visible risk is proportional to the red line.



Fig. 1. Objects in LEO orbit by altitude per 10 km altitude bin. Elliptical orbit objects distributed by portion spent in each bin. Some notable existing resident systems are listed on the right. New residents, including some replacement systems, are on the left. (For interpretation of the references to color in this figure, the reader is referred to the web version of this article.) The red line of the current catalog does not represent the complete risk; it indicates the risk we can track and perhaps avoid. A rule of thumb is that the current SSN LEO catalog contains objects about 10 cm or larger. It is generally accepted that an impact in LEO with an object 1 cm or larger will cause damage likely to be fatal to a satellite's mission. Therefore, there is a large latent risk from unobserved debris. While we cannot currently track and catalog much smaller than 10 cm, experiments have been performed to detect and sample much smaller objects and statistically model the population at this size [3]. The (solid) blue line represents the model of the 1 cm and larger debris that is likely mission-ending, usually called lethal but not trackable. If LEO operators avoid collisions with all the objects in the red line, they are nonetheless inherently accepting the risk from the blue line. This risk is already present. The (dashed) orange line is an estimate of the population at 5 cm and larger and is thus an estimate of what the catalog might conservatively be a few years after the Space Fence, a new radar system being built by the Air Force, comes on line (currently planned for 2019) [4]. Commercial companies offering space surveillance services, such as LeoLabs, ExoAnalytics, Analytic Graphics Inc., Lockheed, and Boeing, might also add to the number of objects currently tracked. Space Policy Directive 3 (SPD-3) [13] specifically seeks to expand the use of commercial SSA services. Existing operators can expect a sharp increase in the number of warnings and alerts they will receive because of the increase in the cataloged population. Almost all the increase will come from newly detected debris [5]. The pace of safety operations for each satellite on orbit will significantly change because of the increase in the catalog from the Space Fence. This effect is compounded because the NewSpace constellations described in Table 1 will drastically change the profile of satellites in LEO. The green bars in Fig. 1 represent the number of objects that will be added to the catalog (red or orange lines) from only the NewSpace large LEO constellations at their operational altitudes. This does not include the rocket stages that launch them, or satellites in the process of being phased into or removed from the operational orbits. Neighbors of one of these new constellations may face a radically different operations environment than their current practices were designed to address. Satellites in these large LEO constellations typically have planned operational lifetimes of 5–10 years. Some companies have proposed to dispose of their satellites using low thrust electric propulsion systems, which would spiral satellites down over a period of months or years from operating altitudes as high as 1500 km through lower orbits where the Hubble Space Telescope, the International Space Station, and other critical LEO satellites operate [6]. Similar propulsive techniques would raise replacement satellites from lower launch injection orbits to higher operational orbits. These disposal and replenishment activities will add thousands of satellites each year transiting through lower altitudes and posing a risk to all resident satellites in those lower orbits. More importantly, failures will occur both among transiting satellites and operational constellations, potentially leaving hundreds more stranded along the transit path. Aerospace studies [7–9] have shown that failed satellites, whether they fail during operations or fail during disposal, can pose as great or even greater risk than the many thousands of operational satellites (Fig. 2). Given the rapid flux in the proposed large LEO constellations (LLC), we created a Future Constellations Model (FCM) with elements that represented the characteristics of the different systems being proposed. In our models, almost all the collisions and the resulting debris from those collisions occur because of failed systems. Most large constellation operators intend to perform active collision avoidance for active systems, whether operational or in some stage of check-out or disposal, but failed satellites are assumed to be incapable of maneuver. Fig. 2 also shows that satellites in the disposal phase can contribute to collisions similarly to satellites in the operational phase. Fig 2 Download : Download full-size image Fig. 2. Collisions during operations and disposal over 10 years for various NewSpace Future Constellation Models (FCMs). 4. A notional illustration of workload The highest risk to operational satellites comes from the lethal but non-trackable debris that is depicted in the blue line in Fig. 2. However, operators perform collision avoidance only on the objects that can be tracked and cataloged. Advances in tracking and NewSpace launches will both act to increase this workload. A key element of the problem is that an increase in the LEO population will lead to an increase in close approaches to existing satellites [5], and the potential for accidental collisions. Conjunction prediction, collision probability (Pc), and maneuver planning for most existing satellite operators is a time- and personnel-intensive operation. Orbit analysts, and propulsion, navigation, and communications systems personnel are involved in evaluating and planning maneuvers over several days and must do so even if the ultimate decision is to “fly through” a close approach. Since most existing systems have small numbers of vehicles and the number of conjunctions any given operator experiences is relatively small, COLA remains a manual process. For systems not designed with automated maneuver planning, a COLA assessment that progresses all the way to a maneuver plan can consume considerable effort, whether or not the maneuver is executed. If a large constellation is deployed next to an existing resident system, the existing system may experience many conjunctions and alerts due to its close proximity of the dense new constellation. A sufficiently large constellation will, in effect, form a “shell” where frequent opportunities for conjunctions will be created. For example, Fig. 3 depicts a fictional scenario where 1225 “New” satellites are distributed in 35 planes in circular orbits at 1000 km altitude, at 98° inclination. These are placed near a hypothetical “Old” six-satellite constellation operating in a nearly circular orbit at the same altitude and 63° inclination. Following a common operations practice, we assume that the Old satellite operators flag a conjunction at Pc> 10−7, start COLA assessment with additional tracking at Pc> 10−6, and plan a COLA maneuver when the Pc> 10−5. A conjunction with Pc > 10−4 would typically be considered a significant risk leading most operators to maneuver. Fig 3 Download : Download full-size image Fig. 3. “New” large LEO constellation at same average altitude as “Old” existing constellation. Currently, the Old system in this example would typically see a warning (Pc > 10−6) a few times a month at this altitude, and of those, a few per year might cross the maneuver threshold. For the operations center, this would be multiplied by the number of satellites in the constellation. When the New system parks nearby, the number of COLA alerts jumps substantially. But the number of alerts depends entirely on the error bubble, (covariance) used. If the typical errors of the public external tracking data and the orbit propagation methods that are widely available (General Perturbations, or GP) are used for both constellations, over a 30-day period we see 129 conjunctions that cross the threshold for COLA assessment (Pc> 10−6), and 53 that cross the maneuver planning threshold (Pc> 10−5) (Fig. 4). This is nearly 2 per day. This could be an enormous workload for a manual process. If a high accuracy catalog (Special Perturbations, or “SP”) and a high-fidelity propagator with its typical covariances is used, the number of conjunctions goes from 129 to a more manageable 10. SP data is maintained by the Air Force, but it is not widely available. It is interesting to note that nine of those 10 crossed the maneuver-planning threshold, and of those, four crossed the Pc> 10−4 where many operators would choose to execute a maneuver. Compared to GP, the SP-quality data resulted in far fewer warnings and flagged four very close conjunctions. The operations center would have been able to concentrate on fewer “false alarms”. We also computed the case where GPS-quality owner-operator data was used for both systems, in which we assumed near-real-time owner-operator position data of very high quality was provided by both operators and used in the collision analysis. In this case, NONE of the conjunctions resulted in a warning and no COLA alerts were generated. The closest approach was 99 m, with a Pc of 3.7 × 10−7 using SP. But because of the quality of the GPS-based position data, this conjunction did not raise an alert because the fully-informed operators could be confident that a collision would not occur. Fig 4 Download : Download full-size image Fig. 4. Number of COLA alerts in 30 days for various qualities of position knowledge when a fictional new system is deployed near an existing one. In the example, an operations center for the Old constellation of six satellites could go from about one COLA assessment a week to nearly one per day per satellite, if only the published satellite catalog is available. If a new constellation operates too close to an existing system, the operator workload may become unreasonable using existing processes. But high accuracy data makes this manageable, and GPS-quality owner-operator data for both systems makes the problem vanish. Since these constellations are likely to be operated by different companies or governments, sharing high-quality position data would likely require an active space traffic management organization. Existing operators will not necessarily have large constellations parked nearby, but they will nonetheless be affected by the new activity. The new large constellations’ satellites typically will have relatively short lifetimes and will need frequent replenishment. The traffic transiting up and down will be substantial, and failures could leave stranded objects at intermediate altitudes, permanently increasing the collision risk. 5. Conjunction warning overload NewSpace operators will face a different challenge due to the vast increase in numbers of satellites. While there are likely as many operational plans as there are operators, a large constellation must consider close approaches with itself. Even if there are no neighboring systems, self-conjunctions can occur between two members of the same constellation. Depending on the configuration, a given operator could see hundreds to thousands of self-conjunctions that cross typical warning thresholds each day using current practices. This could be an issue for a space traffic management (STM) agency, even if it is not an issue for the operator. Aerospace models show that for one possible NewSpace constellation, more than 500,000 self-conjunctions each year could result that cross the typical Pc > 10−6 warning threshold. If no action were taken, we would expect 2–3 collisions per year. This is clearly unacceptable. Thus, current tracking accuracy and processes might produce millions of warnings per year for NewSpace operators to prevent half a dozen actual collisions. Under current practices operators would need to sort through an enormous haystack to find the needles, and because a handful of actual collisions will occur, the warnings cannot be ignored.

#### (Impact 1) Space debris creates uncertainty about involvement of adversaries which can create armed conflict, the more space debris, the increased likelihood of conflict.

**Sample**, I. (20**16**, January 22). *Rise in space junk could provoke armed conflict say scientists*. The Guardian. Retrieved December 14, 2021, from <https://www.theguardian.com/science/2016/jan/22/rise-in-space-junk-could-provoke-armed-conflict-say-scientists>. Ian Sample is science editor of the Guardian. Before joining the newspaper in 2003, he was a journalist at New Scientist and worked at the Institute of Physics as a journal editor. He has a PhD in biomedical materials from Queen Mary's, University of London. Ian also presents the [Science Weekly podcast](https://www.theguardian.com/science/series/science). //ech

**The steady rise in space junk that is floating around the planet could provoke a political row and even armed conflict, according to scientists, who warn that even tiny pieces of debris have enough energy to damage or destroy military satellites**. **Researchers said fragments of spent rockets and other hurtling hardware posed a “special political danger” because of the difficulty in confirming that an operational satellite had been struck by flying debris and had not fallen victim to an intentional attack by another nation.** Space agencies in the US and Russia track more than 23,000 pieces of space junk larger than 10cm, but estimates suggest there could be half a billion fragments ranging from one to 10cm, and trillions of even smaller particles. The junk poses the greatest danger to satellites in low Earth orbit, where debris can slam into spacecraft at a combined speed of more than 30,000mph. This realm of space, which stretches from 100 to 1200 miles above the surface, is where most military satellites are deployed. **In a report to be published in the journal Acta Astronautica, Vitaly Adushkin at the Russian Academy of Sciences in Moscow writes that impacts from space junk, especially on military satellites, posed a “special political danger” and “may provoke political or even armed conflict between space-faring nations. The owner of the impacted and destroyed satellite can hardly quickly determine the real cause of the accident.”** Adushkin adds that in recent decades there have been repeated sudden failures of defence satellites which have never been explained. But there are only two possibilities, he claims: either unregistered collisions with space debris, or an aggressive action by an adversary. **“This is a politically dangerous dilemma,”** he writes. The warning comes after an incident in 2013 when a Russian satellite, Blits, was disabled after apparently colliding with debris created when China shot down one of its own old weather satellites in 2007. The Chinese used a missile to destroy its satellite, an act that demonstrated its anti-satellite capabilities, and left 3,000 more pieces of debris in orbit. According to the report, the amount of debris cluttering low Earth orbit has risen dramatically in half a century of spacefaring. Without efforts to clean up the space environment, Adushkin warns of a “cascade process” in which chunks of debris crash into one another and produce ever more smaller fragments. Data in the study from the Russian space agency show that the International Space Station took evasive action five times in 2014 to avoid space debris. Even small flecks of paint that have flaked off spacecraft can be hazardous. Nasa’s space shuttle was struck by flying paint several times in orbit, forcing ground staff to replace some of the spaceship’s windows. The report follows a report commissioned by Nasa in 2011 which warned that **the level of space junk was rising exponentially, and had reached a “tipping point” in the threat it posed to satellites and the International Space Station.**

#### Space Debris infinitely cascades due to the Kessler effect, making entire orbits unusable

**Matignon**, L. D. G. (2019, June **18**). The Kessler syndrome and space debris. Space Legal Issues. //ear <https://www.spacelegalissues.com/space-law-the-kessler-syndrome/> Louis de Gouyon Matignon has a PhD in space law (co-supervised by both Philippe Delebecque, from Université Paris 1 Panthéon-Sorbonne, France, and Christopher D. Johnson, from Georgetown University, Washington D.C.);

**The Kessler syndrome is a theory** proposed by NASA scientist Donald J. Kessler in 1978, **used to describe a self-sustaining cascading collision of space debris in LEO**. In an article published on June 1, 1978 in the American Journal of Geophysical Research, a peer-reviewed – the evaluation of work by one or more people with similar competences as the producers of the work – scientific journal, containing original research on the physical, chemical, and biological processes that contribute to the understanding of the Earth, Sun, and Solar System, **authors Donald J. Kessler and Burton G. Cour-Palais, two NASA experts, identified the risk of an exponential increase in the number of space debris or orbital debris under the effect of mutual collisions**. **The two authors believed that a belt formed by these objects or fragments of objects around the Earth would soon form. Eventually threatening space activities, this phenomenon will be popularized a few years later under the name of Kessler syndrome**. **The Kessler syndrome, also called the Kessler effect, collisional cascading or ablation cascade, is a scenario in which the density of objects in Low Earth Orbit (LEO) is high enough that collisions between objects could cause a cascade where each collision generates space debris that increases the likelihood of further collisions**. **One implication is that the distribution of debris in orbit could render space activities and the use of satellites in specific orbital ranges impractical for many generations.** **Every satellite, space probe, and manned mission has the potential to produce space debris**. **A cascading Kessler syndrome becomes more likely as satellites in orbit increase in number.** The most commonly used orbits for both manned and unmanned space vehicles are Low Earth Orbit (LEO). **Clearly, the number of space debris that naturally falls back into the atmosphere is less than the number of those generated by the collision of existing space debris.** Even if all space activity and launch were halted tomorrow, the debris population would continue to increase exponentially, leading to a situation in which some orbits would become impassable in the long run. “As the number of artificial satellites in earth orbit increases, the probability of collisions between satellites also increases. **Satellite collisions would produce orbiting fragments, each of which would increase the probability of further collisions, leading to the growth of a belt of debris around the earth**. This process parallels certain theories concerning the growth of the asteroid belt. The debris flux in such an earth-orbiting belt could exceed the natural meteoroid flux, affecting future spacecraft designs. Amathematical model was used to predict the rate at which such a belt might form. Under certain conditions the belt could begin to form within this century and could be a significant problem during the next century. The possibility that numerous unobserved fragments already exist from spacecraft explosions would decrease this time interval. However, early implementation of specialized launch constraints and operational procedures could significantly delay the formation of the belt” – Collision frequency of artificial satellites: The creation of a debris belt, Journal of Geophysical Research, Volume 83, Issue A6, p. 2637-2646 (1978).

#### Space Debris would destroy internet and GPS access worldwide

**IBERDROLA**. (20**21**, **June 30**). Space Debris. Retrieved December 7, 2021, //ear from <https://www.iberdrola.com/sustainability/space-debris> //ear Iberdrola SA is a holding company, which engages in the generation, distribution, trading, and marketing of electricity. It operates through the following businesses: Networks, Liberalized, Renewables and Other Businesses.

According to the ESA, since 1961 there have been more than 560 fragmentation incidents, most of them caused by fuel explosions in rocket stages. As for direct collisions, there have only been seven, the most serious of which destroyed an inactive Russian satellite called Kosmos 2251 and the operational satellite Iridium 33. However, **it is the small fragments that pose the greatest danger**. **Micrometeorites** like paint flakes and solidified droplets of antifreeze **can damage** solar panels on **active satellites**. **Other dangerous debris includes vestiges of solid fuel which float about** in space **and are highly flammabl**e. They can cause damage and disperse pollutants into the atmosphere if they explode. Some Russian satellites contain nuclear batteries with radioactive material that could cause dangerous contamination if they returned to Earth. In any case, the heat of reentry destroys the majority of this space debris before it reaches the Earth. On rare occasions, larger fragments have reached the surface and caused considerable damage. SOLUTIONS TO SPACE DEBRIS **The main challenge is not to produce more space waste, particularly since swarms of small satellites are now circulating at low orbits to give high-speed internet access all over the planet.** When it comes to the debris already in orbit, many satellites, as well as the International Space Station, are equipped with Whipple Shields, an outer shell that protects the walls of the object from a possible collision. Here are some of the other strategies used to avoid this problem:

#### Space Debris contaminates environments on earth

**Luke**, C. (20**21**, **September 6**). What is Space Junk and How Does It Affect the Environment? Earth.Org - Past | Present | Future. Retrieved December 6, 2021, from <https://earth.org/space-junk-what-is-it-what-can-we-do-about-it/> //ear Earth.Org is a not-for-profit environmental organization based in Hong Kong. Their aim is to bring attention to what is happening to natural ecosystems worldwide. ... Climate change and environmental degradation create existential risks, caused by our decision to gamble on the outcomes of unsustainable activity.

The >4700 launches that have been conducted across the globe since Sputnik 1 in 1957 [have resulted in a steep upward trend in material mass in Earth orbit](https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20160012733.pdf), which has exceeded 700 metric tons and shows no signs of relenting. According to computer simulations focusing on the next 200 years, over this time [debris larger than approximately 20 cm across will multiply 1.5 times](https://www.nationalgeographic.co.uk/space/2019/04/space-junk-huge-problem-and-its-only-getting-bigger). Debris between 10 inches and 20 cm is set to multiply 3.2 times, and debris smaller than 10 cm will increase by a factor of 13 to 20. The risk this poses to satellites such as the ISS, [which as of 2016 has had to perform 25 debris collision avoidance manoeuvres since 1999,](https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20160012733.pdf) is considerable. **The problem is not confined to the risk posed to space exploration. A proportion of the space junk in low Earth orbit** [**will gradually lose altitude and burn up in Earth’s atmosphere**](https://www.nationalgeographic.co.uk/space/2019/04/space-junk-huge-problem-and-its-only-getting-bigger)**; larger debris, however, can occasionally impact with Earth and have detrimental effects on the environment. For example, debris from Russian Proton rockets,** launched from the Baikonur cosmodrome in Kazakhstan, [**litters the Altai region of eastern** **Siberia**](https://www.bbc.co.uk/news/world-europe-19127713)**.** **This includes debris from old fuel tanks containing highly toxic fuel residue,** unsymmetrical dimethylhydrazine (UDMH), **a carcinogen which is harmful to plants and animals**. While efforts are made to contain fallout from launches within a specified area, [it is extremely difficult to achieve completely](https://ui.adsabs.harvard.edu/abs/2013EGUGA..15.4537A/abstract). Anatoly Kuzin, deputy director of Khrunichev State Research and Production Space Centre, which manufactures Proton rockets, [maintains that thorough testing shows no correlation between reported illnesses in affected areas and the rocket launches](https://www.bbc.co.uk/news/world-europe-19127713). **Testimonies from locals, however, refer to a disproportionate number of cancer cases in the area which many believe is related to the UDMH in the fuel tank debris**; **in 2007, 27 people** [**were hospitalised**](https://www.universetoday.com/13196/space-junk-toxic-fuel-rains-down-on-siberian-region/) **in the Ust-Kansky District of Altai with cancer-related complications, many of them citing the rocket fuel as the suspected cause.**

### Contention 2: Space Elitism

#### Private space exploitation is neoliberal requires the state to support it – props up capitalism on Earth and facilitates it’s expansion in space

Sam Wolfe, March 26, 2020, Asteroid Mining and Capitalism in Space, https://www.samwoolfe.com/2020/03/asteroid-mining-space-capitalism.html

Shammas and Holen argue that space will become a ‘spatial fix’, a concept developed by the Marxist thinker David Harvey which involves “the geographic modulation of capital accumulation, consisting in the outward expansion of capital onto new geographic terrains, or into new spaces, with the aim of filling a gap in the home terrains of capital.” But as Harvey contends, **the geographical expansion and restructuring of the spatial fix is only a temporary solution, as new appropriated spaces (in this case, asteroids) will also be exhausted of their profitability**. Thus, in relation to the question of how far space capitalism will extend, Shammas and Holen assert that “this outwards drive of capitalism is inherently limitless: there is no end point or final destination for capitalism. Instead, capitalism must continuously propel itself onwards in search of pristine sites of renewed capital accumulation.” Shammas and Holen note that **the ambitions of SpaceX and other similar ventures “are not so very different from maritime colonialists and the trader-exploiters of the British East India Company.”** SpaceX and other ventures are also like the British East India Company in that they are semi-private corporations. Just as the latter received a Royal Charter from Queen Elizabeth I to carry out its trading operations, so too is SpaceX being supported by the state (the United States in, this case): in the words of Shammas and Holen, “it, too, depends on the infrastructure, contracts, and regulatory environment that thus far only a state seems able to provide.” As Peter Lothian Nelson and Walter E. Block highlight in their book Space Capitalism (2018): **If there’s a consistent charge against Elon Musk and his high-flying companies…it’s that they’re not really examples of independent, innovative market capitalism. Rather, they’re government contractors, dependent on taxpayer money to stay afloat**. **Under a system of neoliberalism**, this is to be expected. In the words of French sociologist Pierre Bourdieu: “The economic field is, more than any other, inhabited by the state, which contributes at every moment to its existence and persistence, and also to the structure of the relations of force that characterize it.” Neoliberalism, unlike capitalism per se, supports and facilitates market exchanges. The philosopher Gilles Deleuze and psychoanalyst Félix Guattari make the same point in their book A Thousand Plateaus: Capitalism and Schizophrenia (1980); they say “it is the modern state that gives capitalism its models of realization.” In a system of neoliberalism, the state is integrated with the market, and for capitalism to thrive in space, it will rely on the state’s funding, subsidisation of infrastructure, regulatory frameworks, contracts, and symbolic support. The state would prop up space capitalism by making outer space legally, technically, and economically accessible. In their paper, Shammas and Holen also underscore the position of the United Nations Office for Outer Space Affairs (UNOOSA) when it comes to the privatisation of space: Even the UNOOSA spoke vociferously in favor of the commercialization of space, appealing variously to the ‘industry and private sector’ and elevating the ‘space economy’ to a central pillar in its Space2030 Agenda (including the ‘use of resources that create and provide value and benefits to the world population in the course of exploring, understanding and utilizing space’), even as the UN agency falls back on a humanistic, almost social-democratic vision of the equitable distribution of benefits (and profits) from space mining, exploration, and colonization (UNOOSA, 2018) From the point of view of Shammas and Holen, as well as other critics of capitalism, **it seems unlikely that NewSpace will have the humanising effects that the UNOOSA and space capitalists are trying to convince us it will have. It is not humanity venturing forth into outer space in the era of NewSpace, but rather “a specific set of capitalist entrepreneurs” (**Shammas & Holen).

#### Corporations universalize humanity and use that for their quest to take capitalism into space

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The trope of humanity plays a key role in the rhetoric of the adherents of NewSpace. To fulfill the objectives of NewSpace, including profit maximization and the exploitation of celestial bodies, the symbolic figure of a shared humanity serves a useful purpose, camouflaging the conquest of space by capitalism with a dream of humanity boldly venturing forth into the dark unknown, thereby also providing the legitimacy and enthusiasm needed to support bolster the legitimacy of NewSpace. So long as the stargazers and SpaceX watchers are permitted their fill of ‘collective effervescence', to use Durkheim’s (1995, p. 228) concept, capitalist entrepreneurs will be able to pursue their business interests more or less as they please. The spectacle of outer space is crucial in this regard. Crucially, however, and despite this spectacle, SpaceX’s technology might not necessarily be more sophisticated than its competitors or predecessors. Some industry insiders have rebuffed some of the more the spectacular claims of NewSpace’s proponents, arguing that launch vehicle reusability requires a (perhaps prohibitively) expensive refurbishing of the rocket engines involved in launches: ‘The economics will depend on how many times a booster can be flown, and how much the individual expense will be to refurbish the booster…each time' (Chang, 2017). Reusability may be a technological dead-end because of the inherently stressful effects of a rocket launch on the launch vehicle’s components, with extreme limitations on reusability beyond second-use as well as added risks of malfunctions that customers and insurers are likely to wish to avoid. Furthermore, the Falcon Heavy still has not matched the power and payload capacity of NASA’s Saturn V, a product of 1960s military-industrial engineering and Fordist state spending programs. What SpaceX and other NewSpace corporations do with great ingenuity, however, is to manage the spectacle of outer space, producing outpourings of public fervor, aided by a widespread adherence to the ‘Californian Ideology' (Barbrook and Cameron, 1996), or post-statist techno-utopianism, in many postindustrialized societies. The very centrality of these maneuvers has initiated a new phase in the history of capitalist relations, that of ‘charismatic accumulation'—certainly not in the sense of any ‘objective' or inherent charismatic authority, but with a form of illusio, to speak with Bourdieu, vested in the members of capitalistkind by their uncanny ability to spin mythologizing self-narratives. This has always been part of the capitalist game, from Henry Ford and onwards, but the charismatic mission gains a special potency in the grandiose designs of NewSpace’s entrepreneurs. Every SpaceX launch is a quasi-religious spectacle, observed by millions capable of producing a real sense of wonder in a condition of (legitimizing) collective effervescence. Outer space necessarily reduces inter-human difference to a common denominator or a shared species-being. An important leitmotiv in many Hollywood science fiction movies, including Arrival (2016), is that a first encounter with an alien species of intelligent beings tends to flatten all human difference (including ethnoracial and national categories), thereby restoring humankind to its proper universality (see also Novoa, 2016). Ambassadors of Earth as a whole, not representatives of particular nations, step forth to meet alien emissaries. But even in the absence of such an encounter, the search for habitable domains (or rather, profitable locales) beyond Earth will necessarily forge a shared conception of the human condition, initiated with the Pale Blue Dot photograph in 1990. Typical of this sentiment are the words of the astronomer Carl Sagan, who famously observed of this photograph: ‘On it everyone you love, everyone you know, everyone you ever heard of, every human being who ever was, lived out their lives'. This naïvely humanistic vision has been one of the dominant tropes in the discourse on space since the 1950s, and it remains strong today, as with the claims of the United Nations Office for Outer Space Affairs (UNOOSA) that their task is to ‘uphold the vision of a more equitable future for all humankind through shared achievements in space'. This representational tendency mobilizes humanism to generate enthusiasm about space-related activities. But such representations are increasingly being recuperated by capitalist enterprise, so that it is not humankind but its modulation by space capitalists that will launch into the dark unknown. It is not humankind but capitalistkind that ventures forth. In early 2018, NASA was set to request $150 million in its 2019 budget to ‘enable the development and maturation of commercial entities and capabilities which will ensure that commercial successors to the ISS…are operational when they are needed', only one of many signs that space is becoming a space for capitalism. According to one estimate, the value of just one single asteroid would be more than $20 trillion in rare earth and platinum-group metals (Lewis, 1996), a precious prize indeed for profit-hungry corporations. Even the UNOOSA spoke vociferously in favor of the commercialization of space, appealing variously to the ‘industry and private sector' and elevating the ‘space economy' to a central pillar in its Space2030 Agenda (including the ‘use of resources that create and provide value and benefits to the world population in the course of exploring, understanding and utilizing space'), even as the UN agency falls back on a humanistic, almost social-democratic vision of the equitable distribution of benefits (and profits) from space mining, exploration, and colonization (UNOOSA, 2018). We find evidence of this strategic humanism in all manner of pronouncements from NewSpace entrepreneurs. To take but one example: Naveen Jain, the chairman and co-founder of MoonEx, a lunar commercialization firm, has claimed that ‘from an entrepreneur’s perspective, the moon has never truly been explored'. The moon, Jain has claimed, ‘could hold resources that benefit Earth and all humanity' (Hennigan, 2011). We should note the recourse to the trope of all of humanity by this NewSpace entrepreneur, mimicked in the 1979 Moon Agreement, a UN treaty, which also held that the Moon’s resources are ‘the common heritage of mankind' (Tronchetti, 2013, p. 13).Footnote11 In a purely factual sense, of course, Jain is wrong: Google Moon offers high-resolution images of the lunar surface,Footnote12 and the moon has already been explored, in the sense of being mapped, albeit rudimentarily and with room for further data collection. Crucially, however, these cartographic techniques have not been put to capitalist uses: mapping minerals, for instance, or producing detailed schemata that might one day turn the Moon into a ‘gas station' for commercial space ventures, as Wilbur Ross, Trump’s Secretary of Commerce, has proposed (Bryan, 2018). What is lacking, in short, are capitalist maps of the Moon, i.e., a cartography for capital. But as Klinger (2017: 199) notes, even though no one is ‘actively mining the Moon' at present, at least ‘six national space programs, fifty private firms, and one graduate engineering program, are intent on figuring out how to do so'; furthermore, Klinger draws attention to mapping efforts that have revealed high an abundance of rare earth metals, thorium, and iron in the Moon’s ‘Mare Procellarum KREEP' region (Klinger, 2017, p. 203). We have already noted that it is not humanity, conceived as species-being, a Gattungswesen, that makes its way into space. The term Gattungswesen, of course, has a long intellectual pedigree, harking back to Hegel, Feuerbach, Marx, and others. The term can ‘be naturally applied both to the individual human being and to the common nature or essence which resides in every individual man and woman', Allan Wood (2004, p. 17) writes, as well as ‘to the entire human race, referring to humanity as a single collective entity or else to the essential property which characterizes this entity and makes it a single distinctive thing in its own right'. Significantly, the adherents of NewSpace often resort to the idea of humanity in its broad universality (e.g., Musk, 2017), but this denies and distorts the modulation of humanity by its imbrication with the project of global (and post-global, i.e., space-bound) capitalism. It is precisely the sort of false universality implied in the humanism of the supporters of NewSpace that Marx subjected to a scathing critique in the sixth of his Theses on Feuerbach. Here Marx noted that the human essence is not made up of some ‘abstraction inherent in each single individual' (1998, p. 570). Instead, humans are defined by the ‘ensemble of social relations' in which they are enmeshed. Under NewSpace, it is not humanity, plain and simple, that ventures forth, but a specific set of capitalist entrepreneurs, carrying a particular ideological payload, alongside their satellites, instruments, and supplies, a point noted by other sociologists of outer space, or ‘astrosociologists' (Dickens and Ormrod, 2007a, 2007b).

#### The pursuit of space colonization continues and reinforces existing patterns of exclusion

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4. Utopia “What's the payoff to go? Even if it's sometime soon or in the next decade or so…just to say you've been there? … **Sometimes I wonder what else is at play**…” [75]. Another discourse that contributes to the romanticization of space is the idea that many problems will disappear once we colonize and in turn, everyone will feel united. SchulzeMakuch and Davies suggest, “…establishing a permanent multicultural and multinational human presence on another world would have major beneficial political and social implications for Earth, and serve as a strong unifying and uplifting theme for all humanity” [98:3621]. **Where is the evidence for this**? Would there truly be a sudden collapse of racist attitudes around the world due to a multi-national presence on Mars? Mars One [70] also feeds into this utopian ideal by stating on their website, “[e]xploring the solar system as a united humanity will bring us all closer together.” **How so**? And in what ways? If we look at the historical evidence of colonization on Earth, there is no reason to believe the colonization of Mars will unify humanity. In an academic conception of a future society, human nature is a huge, confounding variable. Sociologist B.J. Bluth suggests that when people moved to the New World “[a]ttitudes, values, and ways of living underwent significant alteration, and societies evolved with many members who could not be happy or comfortable in their old homes” [13]. **In truth, a small few British colonizers went back to England after settling in Jamestown because their lives were not as they imagined**, with many of their fellow colonizers dying from disease [106]. Despite this, space advocates hold onto that colonial story for reference, asserting that the New World was better. According to Journalist, Jeff Clowers [105], Mars One has currently whittled down the Canadian applicants to just 54 (from 8243 and over 200,000 including other nations) that are on standby for the mission. The youngest short-listed candidate for Mars One, at 19-year-old, is Paige Hunter. She justifies taking the trip to Mars by asserting, “if you think about it, when people moved from Europe to the Americas, they didn't know if they were going to be able to come back. They just were exploring. That's what we're doing” [21]. There was an element of exploration, but Christopher Columbus was also trying to find a more direct route to China and India in order to gain wealth of the East [42]. As for the colonists, some left England in order to practice their religions freely. Time Team Host, Tony Robinson, explains another important motivation for the European colonizers, “…in Jamestown, the colonists were to build a settlement, find gold and precious metals and send it back for sale. **These guys were there to make money**” [106]. As Mars One Founder, Bas Lansdorp, fully admits, “I started Mars One when I found out the revenue numbers for the Olympic games. In just three weeks of broadcasting…the International Olympic Committee has revenues of around 4 billion U.S. dollars…” [83]. Despite Mars One listing itself as a non-profit organization, money is a clear motivator behind this venture. Moreover, “Columbus opened up a whole continent to Spanish expansion, founded on the drive for gold and the Catholic dream of converting the world to the Christian faith” [42:283]. What of Ferdinand Magellan? “Europeans wanted silks, gems and spices from the East” [81]. These explorers were not expanding their empires solely for the sake of exploration. SchulzeMakuch and Davies suggest: “[t]here are many reasons why a human colony on Mars is a desirable goal…to attain it would require not only major international cooperation, but a return to the exploration spirit and risk-taking ethos of the great period of Earth exploration, from Columbus to Amundsen, but which has nowadays been replace with a culture of safety and political correctness” [98:3619]. The “great period of Earth exploration” was not great. Any history book can tell you that this time period involved war, genocide, rape, murder, pillaging, mass disease transfer and slavery. The explorers themselves encountered turmoil. An example is the La Condamine expedition of 1735, which “produced continual sickness, damaged instruments, lost specimens…” [88:17]. Despite this ideal of a utopian society, humans still carry with them their egos, drive for power and their possible aggressive tendencies for wealth and resources. The Red Colony Website says, “[w]hen we become united in a goal, not just as Americans or as Russians but as mankind, all of humanity puts aside its differences” [93]. The idea that if people have a common goal to colonize Mars, humanity will put aside their differences is highly questionable. As Anthropologist, Ben Finney, suggests, “[s]ettling the Moon, Mars or even farther into space represents an extension of our terrestrial behaviour, not a departure from it” [37:189]. Perhaps space advocates can find new narratives to inspire space travel, not ones that are based on tragic histories and false information. The concept of inclusivity is also a romanticized ideal carried over to the narrative of space colonization. In the marketing world, there is an issue with a lack of diversity in advertising. Angus Tucker was quoted in Strategy magazine as saying: “[t]here are tons of white men [in the advertising industry] Yeah, I'd say that is a problem. It can be a fairly narrow socio-economic vision through which you evaluate work. In any kind of country, that would be problematic, but I think in a multicultural society like ours, the risk is you end up speaking with a voice that is ultimately relevant to a much narrower group of people” (2013:22). Knowing that the marketing industry is not inclusive, how can space marketers claim to be inclusive to humanity when the majority of decision makers are white men? Alice Gorman asserts that, “[t]he interests of largely white, male Americans are assumed to be universal human goals” [40:164]. The consequence of this can lead to an incredibly limited perspective, not to mention when the rhetoric includes that colonization is best for humanity. However, **not all of humanity is represented**, only a very small demographic of limited genders and races. Jenny Reardon and Kim Tallbear suggest, “it is commonplace to believe that if one is doing “scientific” work, then it will benefit all humans. It is not the norm to suggest that practices must be responsive to the possibility of causing social harms” [92:S241]. There may be practices that ideologically seem to help others, but in reality, could be detrimental. To create a more balanced perspective, perhaps listening to the points of view of those who are not in power might be more effective in creating an inclusive atmosphere. Bluth writes that, “…developing countries often have different desires and respond to different goals, all of which are an intrinsic part of their emotional make up” [13]. Where are the non-space faring nations in these decisions? How about the under-privileged and those who are marginalized? **Where is their voice in this “inclusive” narrative?** During the 1700s “[c]ommercial prospects placed science arguably within the general public interest, though in fact the benefits of mercantile expansion and imperialism accrued overwhelmingly to small elites” [88:34]. Those who are in power (whether government organizations or corporations) that make claims that humanity can be united are they themselves far from being diverse or inclusive. When Philosopher, Stephen Cave, talks about the pursuit of immortality he says, “…**a time when millions do not even have clean drinking water, can seem like just another expression of the selfish ideology of exploitation that teaches that the whole world exists only to shore up the survival of a few privileged individuals**” [19:77]. Therefore, claiming that the pursuit of colonizing Mars is for the benefit of all humanity is a falsehood.

#### This means that resources do not maximize well being and it only favors a certain group, this is bad because it sustains inequality

#### Thus I urge an affirmative ballot