### 1

#### Text: Revenue from private appropriation of outer space should be taxed under a corporate tax scheme and ought to be used to fund sustainable development initiatives at the United Nations for the benefit of people on Earth

#### It competes – it explicitly keeps private appropriation – anything else is severance which is a voter for predictability, and it can't solve the NB because the UN needs reliable and consistent fundin

#### Taxing Private space companies allows for viable long-term funding for the UN

#### Illopoulos & Esteban 20 Iliopoulos, Nikolaos; Esteban, Miguel  (2020). Sustainable space exploration and its relevance to the privatization of space ventures. Acta Astronautica, 167(), 85–92.     doi:10.1016/j.actaastro.2019.09.037 (Graduate Program in Sustainability Science– Global Leadership Initiative, The University of Tokyo, Building of Environmental Studies, 5-1-5 Kashiwanoha, Kashiwa City, Chiba 277-8563 Japan. Miguel Esteban has published 41 articles on ScienceDirect) //Aadit

4. International space law Francis Lyall and Paul B. Larsen [84] assert that the concept of space law has been a subject of debate since as early as 1926. According to these authors the very scope of space law was initially ill-defined, was limited to dealing with the practical problems of venturing towards outer space, and could technically be applied to everything from commercial contracts to more general issues such as a state's behavior in space [84]. An important precedent for the development of international space law was the 1959 Antarctic Treaty which sets aside Antarctica as a scientific preserve, establishes freedom of scientific investigation and bans all military activities on the continent [85]. These objectives were exactly what the world leaders were concerned about during the era of the space race and were interested in accomplishing through an international agreement governing space activities. This became evident when the launch of the Soviet Union's Sputnik 1 on October 4, 1957 and Sputnik 2 on November 5th acted as a catalyst for the establishment of NASA by the U.S congress [86]. President Eisenhower proposed to use the principles of the Antarctic Treaty as a stepping stone in order to design an independent agency that regulates all space activities within the United States [87]. The United Nations then established the UN Office of Outer Space Affairs (UNOOSA) to promote international cooperation in space [88], and founded COPUOS in 1959 to oversee future treaties and agreements and generally ensure the peaceful use of outer space. At present, five international treaties and a number of other agreements have laid the framework of space law under the jurisdiction of COPUOS [89]. These five major treaties have been designed to produce some semblance of order by taking into account the different legal systems, values, interests and debates of the parties involved in space activities [90]: 1. The 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty or “OST”) 2. The 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement) 3. The 1972 Convention on International Liability for Damage Caused by Space Objects (Liability Convention) 4. The 1976 Convention on Registration of Objects Launched into Outer Space (Registration Convention) 5. The 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Treaty). The Outer Space Treaty (OST), which forms the basis of international space law entered force on October 1967 and was signed by 104 nations across the globe. Article I of the OST provides that “exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interest of all mankind alike” [91]. However, at the time of the Treaty's adoption two states held a monopoly on space activities, namely the United States and the former Soviet Union [92]. Thus, the true source of interest for the rest of the nations to sign such a treaty stemmed from the fear that the two space powers would exploit outer space to gain a decisive advantage over other nations [93]. Additionally, some parties to the treaty, particularly the old Soviet Union, wanted space activities to be the sole preserve of governments. However, after several negotiations with the United States a compromise was achieved in article VI of the treaty that “Paved the way for the private sector to conduct space activities side by side with the government and the intergovernmental organizations” [1]. The treaties following the OST extended it to reflect the pace of technological evolution and applied its generalities to particular situations. Particularly, the Rescue Agreement (1968) requires that any state party of the convention that becomes aware that the personnel of a spacecraft are in distress must notify the launching authority and the Secretary General of the United Nations [94]. The Liability Convention (1972) [95] defined terms such as “damage”, “launching” and “space object” among others, and highlights who will be responsible for the damage caused by the launching of objects into outer space (a treaty that was widely accepted by states that were not capable of space flight). The Registration Convention (1976) stated that all objects launched into earth orbit or beyond must be recorded by an appropriate space authority [96]. Another important piece of legislation was the Moon treaty, which does not only apply to the Earth's satellite but to all celestial bodies in the solar system and which entered into force in 1984 [97]. The principle behind this treaty is centered around the idea that the resources or territories that are outside the boundaries of Earth are the common heritage of mankind and as such their exploitation would have to be governed by the international community. Due to its severe stance against the ownership of property in space it has been referred to as the “arch-enemy of space exploration” [98] and is considered a failure, as of 2019 it has not been ratified by any state that engages in self-launched manned space exploration missions or has future plans to do so (i.e. the United States, European Space Agency, Russia, People's Republic of China, Japan and India) [99]. Nevertheless, this document remains important as it is the only treaty that contemplates at all the issue of ownership of property in space. Despite the existence of the aforementioned international legislation, as with all international laws the actual efficacy of these treaties is debatable as nations often ignore their precepts or disagree on the N. Iliopoulos and M. Esteban Acta Astronautica 167 (2020) 85–92 89 meaning of their substance [84]. In the specific context of international space law, the legal debate over the regulations regarding private property in space is indeed intricate. Although the OST sets out a number of general principles to be expanded upon, it did not mention specifically any guidance with respect to the ownership of extraterrestrial property. Even when the OST strictly mentions that no member of the treaty shall own celestial bodies, it does not mention anything about private entities per se. According to Stephen Gorove's comment in 1969, “The Outer Space Treaty in its present form appears to contain no prohibition regarding individual appropriation or acquisition by a private association or an international organization” [100]. Further, the very existence of the Moon Treaty indicates that its predecessor, the Outer Space Treaty, did not outlaw private ownership of extra-terrestrial bodies, for if it did there would be no need to ratify the Moon treaty in the first place. Thus, it can be noted that currently the Outer Space Treaty does not explicitly prohibit private property in space. Despite such evidence, the international community is still puzzled by the concept of private ownership in space as many governmental and non-governmental agencies maintain that the Outer Space Treaty specifically states that appropriation of space property is not permitted [101], on the grounds that the private sector is an extension of the state that they represent and as such private ownership in the realm of outer space is prohibited [102]. Others assess that this ambiguity constitutes a “loophole” that allows the private sector to utilize the resources of outer space freely and for personal benefit [100]. Furthermore, the increasing number of claims and attempts to sell, buy or even keep extraterrestrial properties illustrate the problem of ambiguity regarding ownership of property in space [103]. The legal premise of the Eros Project is a fine example of this, portraying the complexity of the matter [104]. Gregory Nemitz claimed ownership of a near Earth asteroid called 433 Eros on the Archimedes Institute's Private Property Rights Registry in 2000. Eleven months after the incident, NASA permanently parked the NEAR shoe-maker probe on the asteroid on February 12, 2001 [105]. Mr Nemitz, being aware that the probe had no way of removing itself from the asteroid by utilizing its own propulsion system, charged NASA twenty dollars as a fee for parking the probe on his property. NASA, as was expected, refused to pay the fees by claiming that such a request has no foundation in law. Another similar example portraying the complexity of the issue involves the Apollo astronauts. When the mission's crew brought moon rocks back to Earth NASA declared them to be property of the U.S government. Ever since their landing, the international community has acquiesced to the United States claim of ownership over rocks harvested from the Moon [63]. In light of such ambiguity and the fact that regulatory certainty is a vital component for the success of non-traditional space ventures, the United States' Senate Commerce, Science, and Transportation space subcommittee held a number of hearings in an attempt to identify which legislative alterations could foster growth in the commercial space industry [106,107]. The results indicated that although there was consensus regarding the general preservation of the 50-year old OST, there was indeed a need for “light hand” adjustments [106]. The hearings culminated in the establishment of Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act of 2015, which among other legislative changes, allowed US citizens to: “engage in commercial exploration for and commercial recovery of space resources (including water and minerals, but excluding biological life)” [108]. Although this act reiterates that the United States has no sovereignty over objects in space, it has ignited a heated controversy amongst scholars with respect to whether the law truly conforms to international space law, specifically the OST. The U.S House Committee on Science, Space and Technology denies such allegations on the ground that the right to extract natural resources from extraterrestrial bodies is: “Affirmed by the State practice and by the U.S State Department in Congressional testimony and written correspondence” [109]. Further, Frans von der Dunk, a law professor at the University of Nebraska, claims that although the Act does not explicitly violate any laws, it as of yet unclear whether private efforts towards space mining are legal [110]. On the other side of the spectrum, Fabio Tronchetti, a professor at the Harbin Institute of Technology, argues that the SPACE Act constitutes an unlawful act of sovereignty, as it violates the provisions in OST which prohibit the ownership of extraterrestrial property [111]. It thus seem that a “light” revision of the current international space law with respect to private property rights in space is necessary to stimulate growth in the private space industry and encourage private entities to take on the risks involved with the development of space technologies [112]. Essentially, the endorsement of a given law is often contingent on its ability to set coherent goals and requisite targets. As stated by Lyall and Larsen, who use the Law of the Sea as an informative analogy, “the practice [of a law] need not be wholly uniform, but must be undertaken in the belief that it is binding and required by law as opposed to being merely convenient or mutually beneficial” [84]. Particularly, the international community could utilize one of the existing laws (i.e. OST or Moon Treaty) as a steppingstone towards explicitly recognizing the extra-terrestrial property claims of corporations that meet certain specified conditions, thus paving the way for a sustainable privatization of outer space. However, questions would nevertheless arise as to which country should these corporations be paying tax to, given that their extraterrestrial activities take place in an environment of ambiguous geopolitical boundaries. To that end the authors would like to venture the possibility of establishing a platform which enables such commercial entities to forward wholly or partially their corporate tax to the United Nations directly. This would ensure that the profits of such ventures could clearly be channeled to the sustainable development of mankind on planet Earth, and provide a viable long-term source of funding to the U.N. 5. Concluding remarks Although the concept of the “Earth's environment” is one with which most people feel some affinity, many would find it rather difficult to identify with an unfamiliar topic such as “space environment”, let alone its sustainable development. Additionally, given the confusion within the scientific community surrounding the term “space sustainability”, to say that sustainable space exploration is not well understood would be an understatement. Sustainability in the context of space exploration is at the bare minimum understood as an activity of contentious importance that depending on the author, limits the risk of human extinction, minimizes space pollution or environmental degradation in space (such as space debris) and/or increases the welfare of humanity on Earth (by technological advancements in fields such as medicine or environmental management). However, regardless of its perceived importance, the budget of individual space actors (both public and private) is severely constrained and as such tend to focus only on what is strictly necessary to remain operational (such as abiding by technical specifications, government policy and other strictly defined requirements). Therefore, if sustainability is not quickly identified as a requirement it is more likely than not that it will not be provided for. Thus, a coordinated effort to develop a strategy to ensure the sustainability of space exploration activities is required, and the first step towards achieving that goal would be to make space relevant to problems on Earth in a way that it can be understood by the general public. Moreover, a phenomenon that can significantly affect the financial sustainability of space exploration (which can, as explained earlier, affect the long-term sustainability of the human race on Earth) is the issue of privatization of space which is itself dependent on current N. Iliopoulos and M. Esteban Acta Astronautica 167 (2020) 85–92 90 international space laws. As of today, space treaties and agreements strive to address a variety of matters, such as the preservation of space and Earth's environment, liability for damages caused by space objects, the settlement of disputes, the use of space-related technologies and international cooperation. However, despite the attempt of the United Nations and the international community to reach a mutual agreement on the controversial domain of property ownership, the treaties remain a potential disincentive to the economic utilization of space and find the major spacefaring countries in disagreement. The envisioned legal regime to encourage private firms to undertake the high risk and high cost involved in activities of space exploration would have to explicitly recognize extra-terrestrial property claims of individuals and corporations that meet specified conditions. As such, based on the conclusions made through this paper, it is considered that with the right negotiation terms, the current treaties can be revised so as to become steppingstones for the advancement of space exploration that could potentially bring forth significant changes to the environment surrounding planet Earth. Finally, one way that such privatization efforts could be seen to benefit of mankind as a whole is that any taxation resulting from it should be paid directly to the United Nations, or that at least some fraction of the profits should fund this organization.

#### US Funding is key to UN functionality – constant shifts destabilize it

**Shendruk and Rosenthal 21** Shendruk, A., & Rosenthal, Z. (2021, August 4). *How much does the U.S. contribute to the UN?* Council on Foreign Relations. <https://www.cfr.org/article/funding-united-nations-what-impact-do-us-contributions-have-un-agencies-and-programs> //Aadit

The United Nations is the world’s main organization for deliberating matters of peace and security, but its work encompasses far more than peacekeeping and conflict prevention. The UN system includes scores of entities dedicated to a range of areas including health and humanitarian needs and economic and cultural development. As a founding member of the United Nations and the host for its headquarters, the United States has been a chief guide and major funder of the organization for more than seventy years.*More From Our Experts*[Stewart M. Patrick](https://www.cfr.org/expert/stewart-m-patrick)[A New Year’s Resolution on Democracy Promotion](https://www.cfr.org/blog/new-years-resolution-democracy-promotion)[Miles Kahler](https://www.cfr.org/expert/miles-kahler)[Global Governance to Combat Illicit Financial Flows](https://www.cfr.org/report/global-governance-combat-illicit-financial-flows)The United States remains the largest donor to the United Nations, contributing roughly $11 billion in 2019, which accounted for just under one-fifth of funding for the[body’s collective budget](https://unsceb.org/fs-revenue). Although President Donald Trump had sought major funding cuts to UN agencies, Congress by and large approved higher contributions than requested by his administration, and overall U.S. funding remained on par with prior years. The Joe Biden administration is expected to maintain a similar level of funding.How is the United Nationsfunded?*More on:*[United Nations](https://www.cfr.org/united-nations)[Global Governance](https://www.cfr.org/diplomacy-and-international-institutions/global-governance)[Donald Trump](https://www.cfr.org/donald-trump)[Foreign Aid](https://www.cfr.org/diplomacy-and-international-institutions/foreign-aid)[Joe Biden](https://www.cfr.org/search?keyword=Joe+Biden)All 193 members of the United Nations are required to make payments to certain parts of the organization as a condition of membership. The amount each member must pay, known as its assessed contribution, varies widely and is determined by a complex formula that factors in gross national income and population.The World This WeekA weekly digest of the latestfrom CFR on the biggest foreign policy stories of the week, featuring briefs, opinions, and explainers.Every Friday.These mandatory contributions help fund the United Nations’ regular budget, which covers administrative costs and a few programs, as well as peacekeeping operations. In 2019, the United States paid for 22 and 25 percent of these budgets, respectively. Assessed dues also finance other UN bodies, including the International Atomic Energy Agency and the[World Health Organization (WHO).](https://www.cfr.org/backgrounder/world-health-organization)Members may also make voluntary contributions. Many UN organizations, such as the United Nations Children’s Fund (UNICEF), the Office of the United Nations High Commissioner for Refugees (UNHCR), and the World Food Program (WFP), rely mainly on discretionary funding.Funding the UN: Assessed and Voluntary ContributionsThe United Nations is a vast, complex intergovernmental organization. This chart is a simplified representation of the UN system, including its largest and most influential bodies.Entities with assessed budgets (either entirely or partially)Entities with voluntary budgetsUnited NationsGeneral AssemblySecretariatEconomic and Social CouncilUN Development Program (UNDP)UN Environment Program (UNEP)UN Population Fund (UNFPA)UN Children's Fund (UNICEF)World Food Program (WFP)UN Regular BudgetInternational Trade Center (ITC)Office of the UN High Commissioner for Refugees (UNHCR)UN Relief and Works Agency for Palestine Refugees in the Near East (UNRWA)UN Entity for Gender Equality and the Empowerment of Women (UN WOMEN)UN Office for Project Services (UNOPS)International Atomic Energy Agency (IAEA)World Trade Organization (WTO)Department of Peacekeeping Operations (DPKO)UN Office on Drugs and Crime (UNODC)Food and Agriculture Organization (FAO)International Civil Aviation Organiation (ICAO)International Labor Organization (ILO)International Monetary Fund (IMF)International Maritime Organization (IMO)International Telecommunication Union (ITU)UN Educational, Scientific and Cultural Organization (UNESCO)World Health Organization (WHO)World Intellectual Property Organization (WIPO)World Meteorological Organization (WMO)Joint UN Program on HIV/AIDS (UNAIDS)How much does the United States pay?The U.S. government contributed[just over $11 billion](https://unsceb.org/financial-statistics)to the United Nations in 2019, the most recent fiscal year with full data available. About 30 percent of this total was assessed and 70 percent was voluntary. This represents about one-fifth of the roughly $50 billion the United States spends annually on[foreign aid](https://www.cfr.org/backgrounder/how-does-us-spend-its-foreign-aid). By comparison, that is about what the government allocates annually to the U.S. Coast Guard.Where Does U.S. Funding Go?The United States paid about $11 billion to UN entities in 2019.Entities with assessed budgets (either entirely or partially)Entities with voluntary budgetsWFP$3.37 BILLIONDPKO$1.9 BILLIONUNHCR$1.7 BILLIONUN BUDGET$0.8 BILLIONUNICEF$0.75 BILLIONIOM$0.6 BILLIONWHO$0.5 BILLIONFAOUNDPIAEAILOPAHOSources: UN System Chief Executives Board for Coordination (CEB); UN Secretariat.Notes: This includes most of the major agencies and programs that receive support from the United States.What funding did the Trump administration cut?Overall U.S. contributions to the United Nations have remained steady in recent years, but the Trump administration sought to pare down payments, in particular targeting peacekeeping operations and several specialized agencies.For many agencies, especially those that depend on voluntary funding, cuts in U.S. contributions can be quite painful. For example, the UN agency for Palestinian refugees, UNRWA, which relied on the United States for about one-third of its budget, said it would be forced to[cut hundreds of jobs](https://www.theguardian.com/global-development/2018/jul/25/trump-cuts-cause-250-job-losses-at-un-agency-for-palestinian-refugees)in 2018 after the Trump administration halted contributions. In a[2018 letter](https://fas.org/sgp/crs/mideast/RS22967.pdf)[PDF], a group of U.S. senators warned the administration that cuts to UNRWA’s budget could prevent tens of thousands of people from receiving food aid and accessing clean water. Worst-case predictions did not not bear out, as European and Gulf donors helped to[make up some of the funding shortfall](https://www.voanews.com/a/un-palestinian-refugee-agency-narrows-shortfall-after-us-cuts/4590407.html). However, as part of cost-saving measures, UNRWA laid off staff and reduced its health, education, and food assistance; as of late 2020, the agency was still[struggling to pay its staff](https://www.reuters.com/article/israel-palestinians-unrwa-int/u-n-refugee-agency-for-palestinians-appeals-for-money-to-pay-salaries-idUSKBN27P22W).The Trump administration suspended all funding for the UN Population Fund (UNFPA) in 2017, after expanding a ban on U.S. contributions to organizations that perform or promote abortions as a method of family planning. The following year, UNAIDS and the WHO also experienced significant cuts, losing about 30 percent and 20 percent of their U.S. funding, respectively. And in 2020, amid the COVID-19 pandemic, the Trump administration announced that the United States would[withdraw from the WHO completely](https://www.vox.com/2020/5/29/21274949/coronavirus-trump-world-health-organization-withdraw)over concerns about Chinese influence.In his[2021 budget proposal](https://fas.org/sgp/crs/row/IF10354.pdf)[PDF], Trump sought to slash aid to UN peacekeeping efforts by close to half a billion dollars; cut by half a billion dollars funding of the Contributions to International Organizations account, which includes assessed contributions to the United Nations and funds for specialized agencies; and completely eliminate an account for voluntary contributions to many UN programs. While Congress largely rejected proposed cuts, it agreed in 2017 to enforce a[mandated cap on U.S. contributions](https://fas.org/sgp/crs/row/R45206.pdf)[PDF] to the UN Department of Peacekeeping Operations (DPKO) that had been waived since 1994.At the same time, China has expanded its contributions in recent years, including by committing in 2015 to a[$1 billion UN peacekeeping fund](https://chinapower.csis.org/china-un-mission/)over the next decade. In 2019, China contributed just under $1.7 billion to the United Nations, more than half of which went to DPKO.How Critical Is U.S. Funding to the UN?U.S. contributions often represent a significant percentage of an entity’s revenue. Explore the portion of agencies’ total revenue provided by the United States in 2019.Entities with assessed budgets (either entirely or partially)Entities with voluntary budgetsWFPDPKOUNHCRUNICEFUN BUDGETIOMWHOUNDPFAOIAEAILOPAHOUNESCOUNODCUNRWAUNAIDSUNEPWTOWMOICAOUN WOMENITUIMOWIPOITCLARGEST PORTIONU.S. contributions made up40 percent of UNHCR's revenue.COSTLIEST CONTRIBUTIONThe United States gives moremoney to the World Food Program—$3.37 billion—than it does to any other UN body.GROWING PORTIONU.S. contributions to UNODCincreased by almost $46 millionbetween 2018 and 2019.REGULAR BUDGETThe U.S. assessment for the2019 regular budget, whichcovers core administrative costsincluding the General Assemblyand Security Council, wasabout $825 million.SMALLEST PORTIONU.S. contributions made upjust under 0.0003% of UNESCO's revenue.Portion of agency’srevenue funded by U.S.0%10%20%30%Sources: UN System Chief Executives Board for Coordination (CEB); UN Secretariat.Notes: This data includes most of the major agencies and programs that receive support from the United States.Has Biden restored funding to these agencies?After his inauguration in 2021, Biden began refunding some of the agencies that saw cuts under Trump. Biden also halted the[planned U.S. exit from the WHO](https://www.cfr.org/in-brief/bidens-first-foreign-policy-move-reentering-international-agreements), with U.S. contributions to the agency continuing uninterrupted. “It reflects our renewed commitment to ensuring the WHO has the support it needs to lead the global response to the pandemic even as we work to reform it for the future,” Secretary of State Antony Blinken told the UN Security Council in February.The administration also moved to restart funding to UNFPA: Blinken said his department would[appropriate $32.5 million](https://www.theguardian.com/global-development/2021/jan/29/biden-move-to-refund-un-population-agency-is-ray-of-hope-for-millions)for the agency in 2021, about the same amount appropriated five years earlier.In addition, the administration[resumed funding](https://www.cfr.org/backgrounder/what-us-policy-israeli-palestinian-conflict)for UNRWA, announcing more than $230 million in assistance to Palestinians, $150 million of which would go to the UN agency.Has the United States sought to cut UN funding before?Past U.S. presidents and lawmakers have sought to decrease payments to the United Nations. In the late 1990s, for example, Senator Jesse Helms (R-NC) led an effort to force reforms at the United Nations by withholding U.S. contributions. The United States nearly lost its vote in the General Assembly as millions of dollars in unpaid assessments accrued. The instability ended in 2001 with a[compromise](https://www.washingtonpost.com/news/josh-rogin/wp/2016/12/28/inside-the-coming-war-between-the-united-states-and-the-united-nations/?utm_term=.80a3a128414e)between Congress and the United Nations. The deal, struck by Helms and then Senator Biden (D-DE), reduced the U.S. share of the UN administrative budget from 25 percent to 22 percent.

#### Self-Sustainable UN prevents Chinese influence and US China Tensions – Also solves warming

**Associated Press 20** Associated Press. (2020, September 21). *United Nations turns at 75 amid deeply polarized world*. NBC News. [https://www.nbcnews.com/news/world/born-prevent-war-u-n-75-faces-deeply-polarized-world-n1240582 //](https://www.nbcnews.com/news/world/born-prevent-war-u-n-75-faces-deeply-polarized-world-n1240582%20//)Aadit

UNITED NATIONS — Born out of World War II’s devastation to save succeeding generations from the scourge of conflict, the [United Nations](https://www.un.org/en/) officially marks its 75th anniversary Monday at an inflection point in history, navigating a polarized world as it faces a [pandemic](https://www.nbcnews.com/health/coronavirus), regional conflicts, a shrinking economy and [growing inequality](https://www.nbcnews.com/news/world/u-n-chief-says-world-breaking-point-global-inequalities-n1234294). Criticized for spewing out billions of words and achieving scant results on its primary mission of ensuring global peace, the U.N. nonetheless remains the one place that its 193 member nations can meet to talk. And as frustrating as its lack of progress often is, especially when it comes to preventing and ending crises, there is also strong support for its power to bring not only nations but people of all ages from all walks of life, ethnicities and religions together to discuss critical issues like climate change. Secretary-General [Antonio Guterres](https://www.nbcnews.com/news/world/united-nations-appoints-portugal-s-guterres-next-u-n-chief-n665736), looking back on the U.N.’s history in an AP interview in June, said its biggest accomplishment so far is the long period during which the most powerful nations didn’t go to war and nuclear conflict was avoided. Its biggest failing, he said: its inability to prevent medium and small conflicts. United Nations Secretary-General Antonio Guterres poses for a photograph during an interview with Reuters at U.N. headquarters in New York last week. Mike Segar / Reuters Monday’s mainly virtual official commemoration will not be a celebration. It will include a declaration on the U.N.’s 75th anniversary, approved by diplomats from all U.N. member states after sometimes heated negotiations. Then, representatives from over 180 countries are expected to deliver pre-recorded speeches lasting three minutes. The declaration recalls the U.N.’s successes and failures over more than seven decades and vows to build a post-pandemic world that is more equal, works together, and protects the planet. “The urgency for all countries to come together, to fulfill the promise of the nations united, has rarely been greater,” it says, while praising the United Nations as the only global organization that “gives hope to so many people for a better world and can deliver the future we want.” Even at times of great tension, it says, the U.N. promoted decolonization, freedom, development, [human rights](https://www.nbcnews.com/feature/nbc-out/past-decade-has-seen-human-rights-backlash-u-n-official-n1108556) and equality for women and men, “and worked [to eradicate disease](http://www.nbcnews.com/id/11127819/ns/health-infectious_diseases/t/un-says-polio-eradicated-egypt-niger/).” And it “helped mitigate dozens of conflicts, saved hundreds of thousands of lives through humanitarian action and provided millions of children with the education that every child deserves.” As for disappointments, the declaration says the world “is plagued by growing inequality, poverty, hunger, armed conflicts, terrorism, insecurity, [climate change](https://www.nbcnews.com/climate-in-crisis) and pandemics.” It says the poorest and least developed countries are falling behind, decolonization is not complete, and people are forced to make [dangerous journeys in search of refuge](https://www.nbcnews.com/news/world/crisis-humanity-migrants-take-treacherous-journey-france-britain-n1239652). “It’s very unfortunate that it’s going to be a pretty gloomy celebration for the U.N,” said Richard Gowan, U.N. director for the Crisis Group, a Brussels-based think tank. He said the declaration was weakened by U.S. opposition to strong language on climate change, and negotiations were delayed because the United Kingdom and others objected to [China](https://www.nbcnews.com/news/china) trying to insert language into the document, a reference to Beijing’s now hallmark phrase “win-win” which was not included. “Although it was pretty minor, that captures the real question that has emerged over the U.N. in 2020, exacerbated by COVID, which is how is this organization going to navigate an era of [U.S.-China tension](https://www.nbcnews.com/news/world/china-u-s-tensions-display-south-china-sea-rnc-n1238384),” Gowan said. “There is a real sense that China has taken advantage of the Trump administration’s relative disengagement from the U.N. to increase its influence here,” he told a media briefing. **Download the** [NBC News app](https://smart.link/5c939bef304c7) **for the latest news on the coronavirus** To mark its 75th anniversary, the United Nations launched “a global conversation” in January using surveys, polls, online and in-person gatherings to find out what all kinds of people were thinking about the future. The results, which secretary-general called “striking,” were released Monday. According to the results, over one million people from all 193 U.N. member nations took part, including 50,000 people in 50 diverse countries who were part of a scientific poll. “People are thinking big — about transforming the global economy, accelerating the transition to zero carbon, ensuring universal health coverage, ending racial injustice and ensure that decision-making is more open and inclusive,” the U.N. chief said. “And people are also expressing an intense yearning for international cooperation and global solidarity - and rejecting go-it-alone nationalist approaches and divisive populist appeals.” Guterres said the 75th anniversary is an ideal time to realize these aims. “We face our own 1945 moment,” he said. “We must meet that moment. We must show unity like never before to overcome today’s emergency, get the world moving and working and prospering again.”

#### **US–China war goes nuclear – crisis mis-management ensures conventional escalation - extinction**

Kulacki 20 [Dr. Gregory Kulacki focuses on cross-cultural communication between the United States and China on nuclear and space arms control and is the China Project Manager for the Global Security Program at the Union of Concerned Scientists, 2020. Would China Use Nuclear Weapons First In A War With The United States?, Thediplomat.com, https://thediplomat.com/2020/04/would-china-use-nuclear-weapons-first-in-a-war-with-the-united-states/] srey

Admiral Charles A. Richard, the head of the U.S. Strategic Command, recently told the Senate Armed Service Committee he “could drive a truck” through the holes in China’s no first use policy. But when Senator John Hawley (R-MO) asked him why he said that, Commander Richard backtracked, described China’s policy as “very opaque” and said his assessment was based on “very little” information. That’s surprising. **China** has been exceptionally **clear** **about** its **intentions** **on** the possible **first** **use** **of** **nuclear** **weapons**. On the day of its first nuclear test on October 16, 1964, China declared it “will never at any time or under any circumstances be the first to use nuclear weapons.” That **unambiguous** **statement** **has** **been** a **cornerstone** **of** **Chinese** **nuclear** **weapons** policy for 56 years and has been repeated frequently in authoritative Chinese publications for domestic and international audiences, including a highly classified training manual for the operators of China’s nuclear forces. Richard should know about those publications, particularly the training manual. A U.S. Department of Defense translation has been circulating within the U.S. nuclear weapons policy community for more than a decade. The commander’s comments to the committee indicate a familiarity with the most controversial section of the manual, which, in the eyes of some U.S. analysts, indicates there may be some circumstances where **China** **would** **use** **nuclear** **weapons** **first** **in** a **war** **with** **the** **U**nited **S**tates. This U.S. misperception is understandable, especially given the difficulties the Defense Department encountered translating the text into English. The language, carefully considered in the context of the entire book, articulates a strong reaffirmation of China’s no first use policy. But it also reveals **Chinese** military planners are **struggling** **with** **crisis** **management** **and** **considering** **steps** **that** could **create** **ambiguity** **with** **disastrous** **consequences**. Towards the end of the 405-page text on the operations of China’s strategic rocket forces, in a chapter entitled, “Second Artillery Deterrence Operations,” the authors explain what China’s nuclear forces train to do if **“**a strong military power possessing nuclear‐armed missiles and an absolute advantage in high‐tech conventional weapons is carrying out intense and continuous attacks against our major strategic targets and we have no good military strategy to resist the enemy.**”** The military power they’re talking about is the United States. The authors indicate China’s nuclear missile forces train to take specific steps, including increasing readiness and conducting launch exercises, to “dissuade the continuation of the strong enemy’s conventional attacks.” The manual refers to these steps as an “adjustment” to China’s nuclear policy and a “lowering” of China’s threshold for brandishing its nuclear forces. Chinese leaders would only take these steps in extreme circumstances. The text highlights several triggers such as U.S. conventional bombing of China’s nuclear and hydroelectric power plants, heavy conventional bombing of large cities like Beijing and Shanghai, or other acts of **conventional** **warfare** **that** “**seriously** **threatened**” the “safety and **survival**” of the nation. U.S. Misunderstanding Richard seems to believe this planned adjustment in China’s nuclear posture means China is **preparing** **to** **use** **nuclear** **weapons** first under these circumstances. He told Hawley that there are a “number of situations where they may conclude that first use has occurred that do not meet our definition of first use.” The head of the U.S. Strategic Command appears to assume, as do other U.S. analysts, that the **Chinese** would **interpret** **these** types of U.S. conventional **attacks** **as** **equivalent** **to** a **U.S. first use** **of** **nuclear** **weapons** against China. But that’s not what the text says. “Lowering the threshold” refers to China putting its nuclear weapons on alert — it does not indicate Chinese leaders might lower their threshold for deciding to use nuclear weapons in a crisis. Nor does the text indicate Chinese nuclear forces are training to launch nuclear weapons first in a war with the United States. China, unlike the United States, keeps its nuclear forces off-alert. Its warheads are not mated to its missiles. China’s nuclear-armed submarines are not continuously at sea on armed patrols. The manual describes how China’s nuclear warheads and the missiles that deliver them are controlled by two separate chains of command. Chinese missileers train to bring them together and launch them after China has been attacked with nuclear weapons. All of these behaviors are consistent with a no first use policy. The “adjustment” Chinese nuclear forces are preparing to make if the United States is bombing China with impunity is to place China’s nuclear forces in a state of readiness similar to the state the nuclear forces of the United States are in all the time. This step is intended not only to end the bombing, but also to convince U.S. decision-makers they cannot expect to destroy China’s nuclear retaliatory capability if the crisis escalates. Chinese Miscalculation Unfortunately, alerting Chinese nuclear forces at such a moment could have terrifying consequences. Given the relatively small size of China’s nuclear force, a U.S. president might be tempted to try to limit the possible damage from a Chinese nuclear attack by destroying as many of China’s nuclear weapons as possible before they’re launched, especially if the head of the U.S. Strategic Command told the president China was preparing to strike first. One study concluded that if the United States used nuclear weapons to attempt to knock out a small fraction of the Chinese ICBMs that could reach the United States it may kill tens of millions of Chinese civilians. The authors of the text assume alerting China’s nuclear forces would “create a great shock in the enemy’s psyche.” That’s a fair assumption. But they also assume this shock could “dissuade the continuation of the strong enemy’s conventional attacks against our major strategic targets.” That’s highly questionable. There is a **substantial** **risk** **the** **U**nited **S**tates **would** **respond** **to** this implicit **Chinese** **threat** **to** **use** **nuclear** **weapons** **by** **escalating**, rather than halting, its **conventional** **attacks**. If China’s nuclear forces were targeted, it would put even greater strain on the operators of China’s nuclear forces. A **slippery** **slope** **to** **nuclear** **war** Chinese military planners are aware that attempting to coerce the United States into halting conventional bombardment by alerting their nuclear forces could fail. They also know it might trigger a nuclear war. But if it does, they are equally clear China won’t be the one to start it. Nuclear attack is often preceded by nuclear coercion. Because of this, in the midst of the process of a high, strong degree of nuclear coercion we should prepare well for a nuclear retaliatory attack. The more complete the preparation, the higher the credibility of nuclear coercion, the easier it is to accomplish the objective of nuclear coercion, and the lower the possibility that the nuclear missile forces will be used in actual fighting. They assume if China demonstrates it is well prepared to retaliate the United States would not risk a damage limitation strike using nuclear weapons. And even if the United States were to attack China’s nuclear forces with conventional weapons, China still would not strike first. In the opening section of the next chapter on “nuclear retaliatory attack operations” the manual instructs, as it does on numerous occasions throughout the entire text: According to our country’s principle, its stand of no first use of nuclear weapons, the Second Artillery will carry out a nuclear missile attack against the enemy’s important strategic targets, according to the combat orders of the Supreme Command, only after the enemy has carried out a nuclear attack against our country. Richard is wrong. There are no holes in China’s no first use policy. But the worse-case planning articulated in this highly classified military text is a significant and deeply troubling departure from China’s traditional thinking about the role of nuclear weapons. Mao Zedong famously called nuclear weapons “a paper tiger.” Many assumed he was being cavalier about the consequences of nuclear war. But what he meant is that they would not be used to fight and win wars. U.S. nuclear threats during the Korean War and the Taiwan Strait Crisis in the 1950s – threats not followed by an actual nuclear attack – validated Mao’s intuition that nuclear weapons were primarily psychological weapons. Chinese leaders decided to acquire nuclear weapons to free their minds from what Mao’s generation called “**nuclear** **blackmail**.” A former director of China’s nuclear weapons laboratories told me China developed them so its leaders could “sit up with a straight spine.” Countering nuclear blackmail – along with compelling other nuclear weapons states to negotiate their elimination – were the only two purposes Chinese nuclear weapons were meant to serve. Contemporary Chinese military planners appear to have added a new purpose: compelling the United States to halt a conventional attack. Even though it only applies in extreme circumstances, it **increases** the **risk** **that** a **war** between the United States and China **will** **end** **in** a nuclear exchange with unpredictable and **catastrophic** **consequences**. Adding this new purpose could also be the first step on a slippery slope to an incremental broadening the role of nuclear weapons in Chinese national security policy. Americans would be a lot safer if we could avoid that. The United States government should applaud China’s no first use policy instead of repeatedly calling it into question. And it would be wise to adopt the same policy for the United States. If both countries declared they would never use nuclear weapons first it may not guarantee they can avoid a nuclear exchange during a military crisis, but it would make one far less likely.

#### Climate change destroys the world.

Brandon Specktor 19 [Brandon writes about the science of everyday life for Live Science, and previously for Reader's Digest magazine, where he served as an editor for five years] 6-4-2019, "Human Civilization Will Crumble by 2050 If We Don't Stop Climate Change Now, New Paper Claims," livescience, <https://www.livescience.com/65633-climate-change-dooms-humans-by-2050.html> JW

\*\*Cites and talks about the Spratt and Dunlop study

The current climate crisis, they say, is larger and more complex than any humans have ever dealt with before. General climate models — like the one that the [United Nations' Panel on Climate Change](https://www.ipcc.ch/sr15/) (IPCC) used in 2018 to predict that a global temperature increase of 3.6 degrees Fahrenheit (2 degrees Celsius) could put hundreds of millions of people at risk — fail to account for the **sheer complexity of Earth's many interlinked geological processes**; as such, they fail to adequately predict the scale of the potential consequences. The truth, the authors wrote, is probably far worse than any models can fathom. How the world ends What might an accurate worst-case picture of the planet's climate-addled future actually look like, then? The authors provide one particularly grim scenario that begins with world governments "politely ignoring" the advice of scientists and the will of the public to decarbonize the economy (finding alternative energy sources), resulting in a global temperature increase 5.4 F (3 C) by the year 2050. At this point, the world's ice sheets vanish; brutal droughts kill many of the trees in the [Amazon rainforest](https://www.livescience.com/57266-amazon-river.html) (removing one of the world's largest carbon offsets); and the planet plunges into a feedback loop of ever-hotter, ever-deadlier conditions. "Thirty-five percent of the global land area, and **55 percent of the global population, are subject to more than 20 days a year of** [**lethal heat conditions**](https://www.livescience.com/55129-how-heat-waves-kill-so-quickly.html), beyond the threshold of human survivability," the authors hypothesized. Meanwhile, droughts, floods and wildfires regularly ravage the land. Nearly **one-third of the world's land surface turns to desert**. Entire **ecosystems collapse**, beginning with the **planet's coral reefs**, the **rainforest and the Arctic ice sheets.** The world's tropics are hit hardest by these new climate extremes, destroying the region's agriculture and turning more than 1 billion people into refugees. This mass movement of refugees — coupled with [shrinking coastlines](https://www.livescience.com/51990-sea-level-rise-unknowns.html) and severe drops in food and water availability — begin to **stress the fabric of the world's largest nations**, including the United States. Armed conflicts over resources, perhaps culminating in **nuclear war, are likely**. The result, according to the new paper, is "outright chaos" and perhaps "the end of human global civilization as we know it."

### 2

#### Text: Private appropriation of outer space except for mega constellations is unjust. The internet capabilities resulting from the satellites should be distributed evenly throughout the world in a communist manner.

#### It competes – it doesn’t ban a form of private appropriation – anything else would-be severance which is a voter for shiftiness and moots the nb to zero

#### Internet is open to massive vulnerabilities now

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

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

#### SpaceX satellites are key to internet access

James Pethokoukis 11/30 [James Pethokoukis, a columnist and an economic policy analyst, is the Dewitt Wallace Fellow at the American Enterprise Institute, where he writes and edits the AEIdeas blog and hosts a weekly podcast, “Political Economy with James Pethokoukis.” He is also a columnist for The Week and an official contributor to CNBC. “Why a SpaceX bankruptcy would hurt the global poor” Faster, Please! November 30, 2021 <https://fasterplease.substack.com/p/-why-a-spacex-bankruptcy-would-hurt>

I don’t have enough deep knowledge about SpaceX’s business or financials to reliably gauge the actual bankruptcy risk here, and the piece’s reporter is skeptical. I will note, however, that although the company is currently valued at around $100 billion, the bank Morgan Stanley assigns it a valuation “of somewhere between $5bn and $200bn, with uncertainty about its success accounting for the wide range,” according to The Economist. Starship and Starlink are key to that upper bound. (Also: A Morgan Stanley survey of “institutional investors and industry experts” expect SpaceX to become more valuable than Tesla, currently a trillion-dollar company. We’ll see.) So it’s not surprising that Musk emphasizes the importance of the Starlink internet satellite venture here, especially its next incarnation. Now go and Twitter search on the terms “Musk,” “ruining,” and “sky,” and you’ll find plenty of complaints about the Starlink constellation — with currently more than 1,700 satellites in low-Earth orbit. For many of these keyboard critics, Starlink is nothing more than an uberbillionaire's reckless effort to become an even wealthier uberbillionaire. Or maybe it’s just another Muskian vanity project, like building rockets to Mars. Either way, these diehard anti-Muskers see a cluttered sky for visual astronomers, both amateur and professional, as a horrific tradeoff just so the entrepreneur can sell global internet access. Now, the extreme version of this critique is unserious, little more than anti-billionaire emoting. The profit potential of Starlink is unclear, though it seems to be Musk’s goal that the telecom business will one day help fund his Mars ambitions. But the venture isn’t there yet. Last summer, Musk estimated that Starlink would likely need between $20 billion and $30 billion in investment. "If we succeed in not going bankrupt, then that'll be great, and we can move on from there," Musk said. For now, Starlink aims to add another 1,000 satellites a year, even more when Starship is operational. That is, assuming Starship become operational. But the astronomy issue is a real one, as SpaceX has acknowledged. And after astronomer complaints about the brightness of the first group of 60 satellites launched in 2019, SpaceX developed a work-around to minimize the glare from solar reflection on subsequent launches. Of course, some scientists don’t want to rely on the goodwill of SpaceX and other satellite companies. They see an international regulatory agreement, perhaps a new protocol under the Outer Space Treaty, as a necessity. But as such an add-on is unlikely to happen anytime soon, notes The Economist, “not least because other issues raised by the mega constellations, such as risks from debris, will doubtless seem more pressing.” Here’s one of the many pictures floating around the Internet showing the impact of Starlink satellites — “the 333-second exposure shows at least 19 satellites passing overhead” — on astronomical observations, via the IFLScience website: Of course, framing the trade-off as the above picture vs. “better global internet” doesn’t quite capture the benefits of the latter. And they are considerable. There remains a stark digital divide in global internet access. As the World Economic Forum notes: “Globally, only just over half of households (55 percent) have an internet connection, according to UNESCO. In the developed world, 87 percent are connected compared with 47 percent in developing nations, and just 19 percent in the least developed countries.” It seems pretty clear that broadband internet access brings considerable economic gains, particularly to poorer countries. (Musk has specifically said this is a goal of Starlink.) Here are a few examples from the August 2021 analysis “The Economic Impact of Internet Connectivity in Developing Countries” by Jonas Hjort (Columbia University) and Lin Tian (INSEAD): Quite a few studies convincingly estimate the effect on consumption of specific internet-enabled technologies (rather than internet connectivity itself) through model-based approaches, and a few do so more directly. Jack & Suri (2014) show that access to mobile money decreased consumption poverty by two percentage points in Kenya. In contrast, Couture et al. (2021) finds that expansion of e-commerce in China has little effect on income to rural producers and workers. Different areas of Sub-Saharan Africa got access to basic internet at different times starting in the early 2000s. Exploiting variation arising from the gradual arrival of submarine cable connections and using nighttime satellite image luminosity as a proxy for economic activity, Goldbeck & Lindlacher (2021) estimate that basic internet availability leads to about a two percentage point increase in economic growth. As we briefly discussed in Sub-section 3.1.1, Bahia et al. (2020) show evidence that the gradual roll-out of mobile broadband in Nigeria between 2010 and 2016 increased labor force participation and employment. The paper also shows that household consumption simultaneously increased and poverty decreased. Households that had at least one year of mobile broadband coverage experienced an increase in total consumption of about 6 percent. Masaki et al. (2020) document a similarly striking result. Combining household expenditure surveys with data on the location of fiber-optic transmission nodes and coverage maps of 3G mobile technology, they show that 3G coverage is associated with a 14 percent increase in total consumption and a 10 percent decline in extreme poverty in Senegal. Finally, Bahia et al. (2021) use a similar empirical approach to study the effect of mobile broadband roll-out in Tanzania and find a comparable increase in household consumption and decline poverty in this setting. The eventual endgame here is that there are going to be many tens of thousands more satellites in orbit, enabling total global internet coverage. And they will be joined by all manner of human-occupied installations for tourist, commercial, and scientific endeavors. (You may have missed the late October announcement that Blue Origin, the space company owned by Jeff Bezos, is teaming up with other firms to build a space station in Earth orbit.) Stargazing from Earth will never be the way it used to be. Then again, people still complain about shadows from skyscrapers even as humanity continues to build them. But recall one of the running themes of this newsletter: Technology solves one problem, creates another, then solves that one — rinse and repeat — even as the overall direction is forward. More astronomy in the future will be space based. And if all those space objects and structures make even low-Earth orbit astronomy difficult, more of it will need to be performed further out, as with the James Webb Space Telescope. Or maybe via telescopes on the Moon, such as the proposed Lunar Crater Radio Telescope, which would deploy robots to transform a half-mile wide crater into an observatory by attaching a wire mesh along the crater walls. And once there are lots of satellites around a fully colonized Moon, off to Mars — which might be accessible thanks to Starlink funding Musk’s deep-space ambitions. Meanwhile, there will be a lot less global poverty here on Earth than otherwise.

#### Internet access checks multiple existential threats

Eagleman ’10 [Dr. David; 11/9/2010; PhD in Neuroscience @ Baylor University, Adjunct Professor of Neoroscience @ Stanford University, Former Guggenheim Fellow, Director of the Center for Science and Law, BA @ Rice University; “Six Ways The Internet Will Save Civilization”; https://www.wired.co.uk/article/apocalypse-no]

Many great civilisations have fallen, leaving nothing but cracked ruins and scattered genetics. Usually this results from: natural disasters, resource depletion, economic meltdown, disease, poor information flow and corruption. But we’re luckier than our predecessors because we command a technology that no one else possessed: a rapid communication network that finds its highest expression in the internet. I propose that there are six ways in which the net has vastly reduced the threat of societal collapse.

Epidemics can be deflected by telepresence

One of our more dire prospects for collapse is an infectious-disease epidemic. Viral and bacterial epidemics precipitated the fall of the Golden Age of Athens, the Roman Empire and most of the empires of the Native Americans. The internet can be our key to survival because the ability to work telepresently can inhibit microbial transmission by reducing human-to-human contact. In the face of an otherwise devastating epidemic, businesses can keep supply chains running with the maximum number of employees working from home. This can reduce host density below the tipping point required for an epidemic. If we are well prepared when an epidemic arrives, we can fluidly shift into a self-quarantined society in which microbes fail due to host scarcity. Whatever the social ills of isolation, they are worse for the microbes than for us.

The internet will predict natural disasters

We are witnessing the downfall of slow central control in the media: news stories are increasingly becoming user-generated nets of up-to-the-minute information. During the recent California wildfires, locals went to the TV stations to learn whether their neighbourhoods were in danger. But the news stations appeared most concerned with the fate of celebrity mansions, so Californians changed their tack: they uploaded geotagged mobile-phone pictures, updated Facebook statuses and tweeted. The balance tipped: the internet carried news about the fire more quickly and accurately than any news station could. In this grass-roots, decentralised scheme, there were embedded reporters on every block, and the news shockwave kept ahead of the fire. This head start could provide the extra hours that save us. If the Pompeiians had had the internet in 79AD, they could have easily marched 10km to safety, well ahead of the pyroclastic flow from Mount Vesuvius. If the Indian Ocean had the Pacific’s networked tsunami-warning system, South-East Asia would look quite different today.

Discoveries are retained and shared

Historically, critical information has required constant rediscovery. Collections of learning -- from the library at Alexandria to the entire Minoan civilisation -- have fallen to the bonfires of invaders or the wrecking ball of natural disaster. Knowledge is hard won but easily lost. And information that survives often does not spread. Consider smallpox inoculation: this was under way in India, China and Africa centuries before it made its way to Europe. By the time the idea reached North America, native civilisations who needed it had already collapsed. The net solved the problem. New discoveries catch on immediately; information spreads widely. In this way, societies can optimally ratchet up, using the latest bricks of knowledge in their fortification against risk.

Tyranny is mitigated

Censorship of ideas was a familiar spectre in the last century, with state-approved news outlets ruling the press, airwaves and copying machines in the USSR, Romania, Cuba, China, Iraq and elsewhere. In many cases, such as Lysenko’s agricultural despotism in the USSR, it directly contributed to the collapse of the nation. Historically, a more successful strategy has been to confront free speech with free speech -- and the internet allows this in a natural way. It democratises the flow of information by offering access to the newspapers of the world, the photographers of every nation, the bloggers of every political stripe. Some posts are full of doctoring and dishonesty whereas others strive for independence and impartiality -- but all are available to us to sift through. Given the attempts by some governments to build firewalls, it’s clear that this benefit of the net requires constant vigilance.

Human capital is vastly increased

Crowdsourcing brings people together to solve problems. Yet far fewer than one per cent of the world’s population is involved. We need expand human capital. Most of the world not have access to the education afforded a small minority. For every Albert Einstein, Yo-Yo Ma or Barack Obama who has educational opportunities, uncountable others do not. This squandering of talent translates into reduced economic output and a smaller pool of problem solvers. The net opens the gates education to anyone with a computer. A motivated teen anywhere on the planet can walk through the world’s knowledge -- from the webs of Wikipedia to the curriculum of MIT’s OpenCourseWare. The new human capital will serve us well when we confront existential threats we’ve never imagined before.

Energy expenditure is reduced

Societal collapse can often be understood in terms of an energy budget: when energy spend outweighs energy return, collapse ensues. This has taken the form of deforestation or soil erosion; currently, the worry involves fossil-fuel depletion. The internet addresses the energy problem with a natural ease. Consider the massive energy savings inherent in the shift from paper to electrons -- as seen in the transition from the post to email. Ecommerce reduces the need to drive long distances to purchase products. Delivery trucks are more eco-friendly than individuals driving around, not least because of tight packaging and optimisation algorithms for driving routes. Of course, there are energy costs to the banks of computers that underpin the internet -- but these costs are less than the wood, coal and oil that would be expended for the same quantity of information flow.

The tangle of events that triggers societal collapse can be complex, and there are several threats the net does not address. But vast, networked communication can be an antidote to several of the most deadly diseases threatening civilisation. The next time your coworker laments internet addiction, the banality of tweeting or the decline of face-to-face conversation, you may want to suggest that the net may just be the technology that saves us.

#### Starlink solves internet monopolies

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

Throughout college and well into my teaching career, I’ve spent several hundred dollars sitting in coffee shops, drinking a latte or a Frappuccino while I completed work using their Wi-Fi until closing. Once I arrived home, I opened YouTube on my phone and played a video at the lowest resolution, 144p. I waited for several minutes as the video buffered. This became a daily occurrence when living in a rural area. Millions still don’t have access to fast internet at home As of [2019](https://www.digitaltrends.com/web/31-percent-us-households-no-broadband-internet/), a third of households nationwide do not have a reliable internet connection. The only way those families can access the internet is to leave their homes and go to a public library, school, or Starbucks. A week before schools transitioned to virtual learning in 2020, I remember some of my students stared at their phones under their desks. When I caught them and asked them to turn it in, they refused. For many students, the only internet access they had available was at school. [As of September 2020](https://usafacts.org/articles/internet-access-students-at-home/), 3.7 million children still did not have access to an internet connection at home. In August of 2020, teachers were expected to provide live (synchronous) classes to students via Zoom. I panicked. I still did not have access to the internet in my rural home. I immediately went on apartments.com and searched for a decent apartment that would have access to the internet. Once school started, many students could not log in to Google Classroom or Zoom and attend class. Of the seventy or so students I see every other day, less than half log in to Zoom. All the other students have never logged in, nor have they turned in a single assignment since school began. As a result, teachers, schools, and [districts nationwide failed them](https://apnews.com/article/distance-learning-coronavirus-pandemic-oregon-7fde612c3dbfd2e21fab9673ca49ad89). Corporations control who gets access to the internet In the United States, only two companies control a majority of the internet service available in the country. Those are Spectrum (also known as Comcast) and Charter (also known as Xfinity). Both companies decided they wouldn’t compete against each other. Instead, they would each claim one area and be the only internet service provider available. By doing so, they could raise prices and provide data caps. Customers have no choice other than to agree to the terms and conditions. In the U.S., [83.3 million people](https://ilsr.org/report-most-americans-have-no-real-choice-in-internet-providers/" \t "_blank) are controlled by an internet monopoly: either Charter or Spectrum. Since both corporations have no other competition, they have no incentive to innovate or expand their services to other areas, namely rural areas. Spectrum and Charter see no benefit in laying out hundreds or thousands of feet of underground cable and spend tens of thousands of dollars to provide internet to a rural home, as the customer would only pay $50-$100 a month. Meanwhile, their “competitors” provide poor services and fail to offer any sort of competition to Charter or Spectrum. ViaSat, for example, offers limited data plans — its most expensive plan offers 150GB for $200 per month. In a family of four or five people, where children are connected to Zoom meetings, that data plan will reach its limit very quickly. This data plan also can’t compare to Spectrum, which offers unlimited internet for a quarter of the price of ViaSat. However, ViaSat and HughesNet are the only internet service providers available to rural areas. Since ViaSat and HughesNet face no competition from Spectrum and Charter, they have no incentive to provide fast speeds for their consumers. The average speed of ViaSat clocks in at [11.7Mbps](https://testmy.net/hoststats/viasat), or 1.4 Megabytes per second. At that speed, a YouTube video has to be played at the lowest resolution and would still buffer. Google Fiber failed to disrupt the market Roughly ten years ago, Google announced it would become an internet service provider. Google planned to disrupt Spectrum and Charter’s current control of the market by offering internet using fiber-cable. This new technology would allow for faster speeds. [As of 2020](https://support.google.com/fiber/answer/6250056?hl=en), it is about five times faster than Spectrum internet. Today, a majority of the U.S. population still does not have access to Google Fiber. According to Google, Fiber is [only available in twelve cities](https://fiber.google.com/) in the country. Rural customers still don’t have a solution, nor do city people have access to more than one or two options. Starlink will do what Google couldn’t A few years ago, Elon Musk announced Starlink, a division of SpaceX. Musk intends on providing internet access to everyone around the world wirelessly through the use of satellites. So far, SpaceX has launched over a thousand satellites into low-Earth orbit, though the FCC has approved SpaceX to launch over 12,000 satellites for Starlink usage. As more satellites are launched into space, internet coverage will expand around the world. Whether you live in an urban, suburban, or rural area, you will have access to high-speed internet. Many YouTubers who have preordered the Starlink service have already received their installation package and are testing it out in remote areas. As of [a few days ago](https://www.cnbc.com/2021/02/22/elon-musk-spacex-will-double-starlink-internet-speed-later-this-year.html), Elon Musk made a few promises. People would have access to 300Mbps speed internet, and coverage will be available worldwide by the end of 2021. This timeline beats Google Fiber, as Google is only providing coverage to a dozen cities in the U.S. For people who lack internet access or want something other than Spectrum or Charter, Starlink will be the answer.

### 3

#### Private entities are necessary for space-to-space market development which spurs unlimited innovation

**Weinzierl and Sarang 21**; Matt Weinzierl and Mehek Sarang, 2-12-2021, "The Commercial Space Age Is Here," Harvard Business Review,  https://hbr.org/2021/02/the-commercial-space-age-is-here ([Matt Weinzierl](https://hbr.org/search?term=matt%20weinzierl&search_type=search-all) is the Joseph and Jacqueline Elbling Professor of Business Administration at HBS and a Research Associate at the NBER. His research and teaching focus on the design of economic policy and the economics and business of space. [Mehak Sarang](https://hbr.org/search?term=mehak%20sarang&search_type=search-all) is a Research Associate at Harvard Business School and the Lunar Exploration Projects Lead for the MIT Space Exploration Initiative.) //Aadit

There’s no shortage of hype surrounding the commercial space industry. But while tech leaders promise us moon bases and settlements on Mars, the space economy has thus far remained distinctly local — at least in a cosmic sense. Last year, however, we crossed an important threshold: For the first time in human history, humans accessed space via a vehicle built and owned not by any government, but by a private corporation with its sights set on affordable space settlement. It was the first significant step towards building an economy both in space and for space. The implications — for business, policy, and society at large — are hard to overstate. In 2019, [95%](https://brycetech.com/reports) of the estimated $366 billion in revenue earned in the space sector was from the **space-for-earth** economy: that is, goods or services produced in space for use on earth. The space-for-earth economy includes telecommunications and internet infrastructure, earth observation capabilities, national security satellites, and more. This economy is booming, and though [research shows](https://hbsp.harvard.edu/product/716037-PDF-ENG) that it faces the challenges of overcrowding and monopolization that tend to arise whenever companies compete for a scarce natural resource, [projections for its future](https://hbsp.harvard.edu/product/720027-PDF-ENG) are optimistic. Decreasing costs for launch and space hardware in general have enticed new entrants into this market, and companies in a variety of industries have already begun leveraging satellite technology and access to space to drive innovation and efficiency in their earthbound products and services. In contrast, the **space-for-space** economy — that is, goods and services produced in space for use in space, such as mining the Moon or asteroids for material with which to construct in-space habitats or supply refueling depots — has struggled to get off the ground. As far back as the 1970s, [research](https://ntrs.nasa.gov/citations/19780004167) commissioned by NASA predicted the rise of a space-based economy that would supply the demands of hundreds, thousands, even millions of humans living in space, dwarfing the space-for-earth economy (and, eventually, the entire terrestrial economy as well). The realization of such a vision would change how all of us do business, live our lives, and govern our societies — but to date, we’ve never even had more than [13 people](https://www.space.com/6503-population-space-historic-high-13.html) in space at one time, leaving that dream as little more than science fiction. Today, however, there is reason to think that we may finally be reaching the first stages of a true space-for-space economy. SpaceX’s [recent achievements](https://www.nasa.gov/press-release/nasa-s-spacex-crew-1-astronauts-headed-to-international-space-station/) (in cooperation with NASA), as well as upcoming efforts by [Boeing](https://www.nasa.gov/feature/boeing-s-starliner-makes-progress-ahead-of-flight-test-with-astronauts), [Blue Origin](https://www.blueorigin.com/news/nasa-selects-blue-origin-national-team-to-return-humans-to-the-moon), and [Virgin Galactic](https://spacenews.com/virgin-galactic-prepares-to-transition-to-operations) to put people in space sustainably and at scale, mark the opening of a new chapter of spaceflight led by private firms. These firms have both the intention and capability to bring private citizens to space as passengers, tourists, and — eventually — settlers, opening the door for businesses to start meeting the demand those people create over the next several decades with an array of space-for-space goods and services. Welcome to the (Commercial) Space Age In our [recent research](https://www.hbs.edu/faculty/Publication%20Files/jep.32.2.173_Space,%20the%20Final%20Economic%20Frontier_413bf24d-42e6-4cea-8cc5-a0d2f6fc6a70.pdf), we examined how the model of centralized, government-directed human space activity born in the 1960s has, over the last two decades, made way for a new model, in which public initiatives in space . Centralized, government-led space programs will inevitably focus on space-for-earth activities that are in the public interest, such as national security, basic science, and national pride. This is only natural, as expenditures for these programs must be justified by demonstrating benefits for citizens — and the citizens these governments represent are (nearly) all on earth. In contrast to governments, the private sector is eager to put people in space to pursue their own personal interests, not the state’s — and then supply the demand they create. This is the vision driving SpaceX, which in its first twenty years has entirely upended the rocket launch industry, securing 60% of the global commercial launch market and building ever-larger spacecraft designed to ferry passengers not just to the International Space Station (ISS), but also to its own promised [settlement on Mars](https://www.spacex.com/media/making_life_multiplanetary_transcript_2017.pdf). Today, the space-for-space market is limited to supplying the people who are already in space: that is, the handful of astronauts employed by NASA and other government programs. While SpaceX has grand visions of supporting large numbers of private space travelers, their current space-for-space activities have all been in response to demand from government customers (i.e., NASA). But as decreasing launch costs enable companies like SpaceX to leverage economies of scale and put more people into space, growing private sector demand (that is, tourists and settlers, rather than government employees) could turn these proof-of-concept initiatives into a sustainable, large-scale industry. This model — of selling to NASA with the hopes of eventually creating and expanding into a larger private market — is exemplified by SpaceX, but the company is by no means the only player taking this approach. For instance, while SpaceX is focused on space-for-space transportation, another key component of this burgeoning industry will be manufacturing. [Made In Space, Inc.](https://madeinspace.us/capabilities-and-technology/archinaut/) has been at the forefront of manufacturing “in space, for space” since 2014, when it 3D-printed a wrench onboard the ISS. Today, the company is exploring other products, such as high-quality fiber-optic cable, that terrestrial customers may be willing to pay to have manufactured in zero-gravity. But the company also recently received a [$74 million contract](https://www.nasa.gov/press-release/nasa-funds-demo-of-3d-printed-spacecraft-parts-made-assembled-in-orbit) to 3D-print large metal beams in space for use on NASA spacecraft, and future private sector spacecraft will certainly have similar manufacturing needs which Made In Space hopes to be well-positioned to fulfill. Just as SpaceX has begun by supplying NASA but hopes to eventually serve a much larger, private-sector market, Made In Space’s current work with NASA could be the first step along a path towards supporting a variety of private-sector

#### Strong Innovation solves Extinction.

Matthews 18 Dylan Matthews 10-26-2018 “How to help people millions of years from now” <https://www.vox.com/future-perfect/2018/10/26/18023366/far-future-effective-altruism-existential-risk-doing-good> (Co-founder of Vox, citing Nick Beckstead @ Rutgers University)//Re-cut by Elmer

If you care about improving human lives, you should overwhelmingly care about those quadrillions of lives rather than the comparatively small number of people alive today. The 7.6 billion people now living, after all, amount to less than 0.003 percent of the population that will live in the future. It’s reasonable to suggest that those quadrillions of future people have, accordingly, hundreds of thousands of times more moral weight than those of us living here today do. That’s the basic argument behind Nick Beckstead’s 2013 Rutgers philosophy dissertation, “On the overwhelming importance of shaping the far future.” It’s a glorious mindfuck of a thesis, not least because Beckstead shows very convincingly that this is a conclusion any plausible moral view would reach. It’s not just something that weird utilitarians have to deal with. And Beckstead, to his considerable credit, walks the walk on this. He works at the Open Philanthropy Project on grants relating to the far future and runs a charitable fund for donors who want to prioritize the far future. And arguments from him and others have turned “long-termism” into a very vibrant, important strand of the effective altruism community. But what does prioritizing the far future even mean? The most literal thing it could mean is preventing human extinction, to ensure that the species persists as long as possible. For the long-term-focused effective altruists I know, that typically means identifying concrete threats to humanity’s continued existence — like unfriendly artificial intelligence, or a pandemic, or global warming/out of control geoengineering — and engaging in activities to prevent that specific eventuality. But in a set of slides he made in 2013, Beckstead makes a compelling case that while that’s certainly part of what caring about the far future entails, approaches that address specific threats to humanity (which he calls “targeted” approaches to the far future) have to complement “broad” approaches, where instead of trying to predict what’s going to kill us all, you just generally try to keep civilization running as best it can, so that it is, as a whole, well-equipped to deal with potential extinction events in the future, not just in 2030 or 2040 but in 3500 or 95000 or even 37 million. In other words, caring about the far future doesn’t mean just paying attention to low-probability risks of total annihilation; it also means acting on pressing needs now. For example: We’re going to be better prepared to prevent extinction from AI or a supervirus or global warming if society as a whole makes a lot of scientific progress. And a significant bottleneck there is that the vast majority of humanity doesn’t get high-enough-quality education to engage in scientific research, if they want to, which reduces the **odds that we have enough trained scientists to come up with the breakthroughs** we need as a civilization to survive and thrive. So maybe one of the best things we can do for the far future is to improve school systems — here and now — to harness the group economist Raj Chetty calls “lost Einsteins” (potential innovators who are thwarted by poverty and inequality in rich countries) and, more importantly, the hundreds of millions of kids in developing countries dealing with even worse education systems than those in depressed communities in the rich world. What if living ethically for the far future means living ethically now? Beckstead mentions some other broad, or very broad, ideas (these are all his descriptions): Help make computers faster so that people everywhere can work more efficiently Change intellectual property law so that technological innovation can happen more quickly Advocate for open borders so that people from poorly governed countries can move to better-governed countries and be more productive Meta-research: improve incentives and norms in academic work to better advance human knowledge Improve education Advocate for political party X to make future people have values more like political party X ”If you look at these areas (economic growth and technological progress, access to information, individual capability, social coordination, motives) a lot of everyday good works contribute,” Beckstead writes. “An implication of this is that a lot of everyday good works are good from a broad perspective, even though hardly anyone thinks explicitly in terms of far future standards.” Look at those examples again: It’s just a list of what normal altruistically motivated people, not effective altruism folks, generally do. Charities in the US love talking about the lost opportunities for innovation that poverty creates. Lots of smart people who want to make a difference become scientists, or try to work as teachers or on improving education policy, and lord knows there are plenty of people who become political party operatives out of a conviction that the moral consequences of the party’s platform are good. All of which is to say: Maybe effective altruists aren’t that special, or at least maybe we don’t have access to that many specific and weird conclusions about how best to help the world. If the far future is what matters, and generally trying to make the world work better is among the best ways to help the far future, then effective altruism just becomes plain ol’ do-goodery.

### Case

#### Reject 1ar theory

### Part 1

#### 1] OST Fails

**Evanoff 17** [Kyle Evanoff, Kyle is a research associate in international economics and U.S. foreign policy at the Council on Foreign Relations 10/10/17, "The Outer Space Treaty’s Midlife Funk," Council on Foreign Relations [https://www.cfr.org/blog/outer-space-treatys-midlife-funk accessed 12/11/2021](https://www.cfr.org/blog/outer-space-treatys-midlife-funk%20accessed%2012/11/2021)] Adam

Half a century later, however, the Outer Space Treaty has entered something of a funk. Despite the universal aspirations of the UN Committee on the Peaceful Uses of Outer Space, which molded the document into its completed form, many of the principles enshrined within the text are less suited to the present than they were to their native Cold War milieu. While the anachronism has not reached crisis levels, current and foreseeable developments do present challenges for the treaty, heightening the potential for disputes. At the crux of the matter is the ongoing democratization of space. During the 1950s and ‘60s, when the fundamental principles of international space law took shape, only large national governments could afford the enormous outlays required for creating and maintaining a successful space program. In more recent decades, technological advances and new business models have broadened the range of spacefaring actors. Thanks to innovations such as reusable rockets, micro- and nanosatellites, and inflatable space station modules, costs are decreasing and private companies are crowding into the sector. This flurry of activity, known as New Space, promises nothing less than a complete transformation of the way that humans interact with space. Asteroid mining, for example, could eliminate the need to launch many essential materials from Earth, lowering logistical hurdles and enabling largescale in-space fabrication. Companies like Planetary Resources and Deep Space Industries, by extracting and selling useful resources in situ, could help to jumpstart a sustainable space economy. They might also profit from selling valuable commodities back on terra firma. As a recent (bullish) Goldman Sachs report noted, a single football-field-sized asteroid could contain $25 to $50 billion worth of platinum—enough to upend the terrestrial market. With astronomical sums at stake and the commercial sector kicking into high gear, legal questions are becoming a major concern. Many of these questions focus on Article II of the Outer Space Treaty, which prohibits national appropriation of space and the celestial bodies. Since another provision (Article VI) requires nongovernmental entities to operate under a national flag, some experts have suggested that asteroid mining, which would require a period of exclusive use, may violate the agreement. Others, however, contend that companies can claim ownership of extracted resources without claiming ownership of the asteroids themselves. They cite the lunar samples returned to Earth during the Apollo program as a precedent. Hoping to promote American space commerce, Congress formalized this more charitable legal interpretation in Title IV of the 2015 U.S. Commercial Space Launch Competitiveness Act. Luxembourg, which announced a €200 million asteroid mining fund last year, followed suit with its own law in August. Controversies like the one surrounding asteroid mining are par for the course when it comes to the Outer Space Treaty. The agreement’s insistence that space be used “for peaceful purposes” has long been the subject of intense debate. During the treaty-making process, Soviet jurists argued that peaceful meant “non-military” and that spy satellites were illegal; Americans, who enjoyed an early lead in orbital reconnaissance, interpreted peaceful to mean “non-aggressive” and came to the opposite conclusion. Decades later, the precise meaning of the phrase remains a matter of contention. While the Outer Space Treaty has survived past disputes intact, some experts and policymakers believe that an update is in order. Senator Ted Cruz (R-TX), for instance, worries that legal ambiguity could undermine the nascent commercial space sector—a justifiable concern. Russia and Brazil, among other countries, hold asteroid mining operations to constitute de facto national appropriation. And while there are plenty of asteroids to go around for now (NASA has catalogued nearly 8,000 near earth objects larger than 140 meters in diameter), more supply-side saturation could lead to conflicts over choice space rocks. The absence of clear property rights makes this prospect all the more likely. Plans to establish outposts on the moon and Mars present a bigger challenge still. Last week, prior to the first meeting of the revived National Space Council, Vice President Mike Pence described the need for “a renewed American presence on the moon, a vital strategic goal” in an op-ed for the Wall Street Journal. His piece came on the heels of SpaceX Founder and Chief Executive Officer Elon Musk’s announcement at the 2017 International Astronautical Congress of a revised plan to colonize the red planet, with the first human missions slated for 2024. Musk hopes for the colony to house one million inhabitants within the next fifty years. While mining might require only temporary use of the celestial bodies, full-fledged colonies would necessarily be more permanent affairs. With some national governments arguing that mining operations would constitute territorial claims, lunar and Martian bases are almost certain to enter the legal crosshairs. And, even under the favorable U.S. interpretation of the Outer Space Treaty, states and private companies would need to avoid making territorial claims. If viable colony locations are relatively few and far between, fierce competition could make asserting control a practical necessity. Even so, policymakers should avoid hasty attempts to overhaul the Outer Space Treaty. The uncertainties associated with altering the fundamental principles of international space law are greater than any existing ambiguities. Commercial spacefaring already entails high levels of risk; adding new regulatory hazards to the mix would jeopardize investment and could slow progress in the sector. While the current property rights regime may be untenable over longer timelines, it remains workable for now.

#### 2] Bastani’s Luxury Communism is an idealistic fantasy that fails horribly

**Whitlock 19** Whitlock, R. (2019, July 2). *Fully automated luxury communism isn’t our future*. Medium. <https://onezero.medium.com/fully-automated-luxury-communism-isnt-our-future-1e4c9fb9c602> (Robert Whitlock is a UK freelance journalist interested in climate change, renewable energy and transport, and various political and current affairs issues. Lives in South West UK.) // Aadit

“This is not a book about the future but about a present that goes unacknowledged,” Bastani begins. “The outline of a world immeasurably better than our own, more equal, prosperous, and creative, is there to see if only we dare to look. But insight alone is not enough. We must have the courage — for that is what is required — to argue, persuade, and build. There is a world to win.” Immense wealth will be generated, he explains, by the “extreme supply” of valuable resources generated by new space industries such as asteroid mining. Advancements in robotics and automation on Earth will, in turn, mean that humans are largely liberated from manual work. And the new-found wealth from this space exploration and the liberation of our time will enable us all to live in luxury and abundance. All this, I’ll remind you, in a book categorized as non-fiction. “It turns out that Marx’s early suspicion that the countries set to lead the revolution would be those at the cutting edge of capitalist modernity was right. Only now we know that means technology as much as politics.” During this transition, capitalism will collapse because both automation and the “extreme supply” of resources will make all goods and services permanently cheaper. Once that happens, Bastani argues, this new system of Fully Automated Luxury Communism (FALC) will be overseen by an elected, populist, left-wing government. Talking to *OneZero*, Bastani explained that Marx saw automation as central to his communist vision. Rather than being the threat it’s often characterized as, mechanization actually liberates workers. “It turns out that Marx’s early suspicion that the countries set to lead the revolution would be those at the cutting edge of capitalist modernity was right. Only now we know that means technology as much as politics,” says Bastani. He adds that the goal is Marx’ well-known maxim: “From each according to his ability, to each according to his needs.” The FALC manifesto has captured the imagination of some in the left, especially in Britain. But how realistic is this vision? Assumption one: Most jobs will be automated, and soon Bastani describes the creeping automation of manufacturing, retail, transport, and health care. For businesses, the incentives are higher productivity, lower costs, and, in the case of self-driving cars, safety. Avoiding the complexities of managing human beings is also attractive to some; the CEO of Chinese electronics firm Foxconn [complained](https://news.ycombinator.com/item?id=14353567) that managing 1 million employees “gave him a headache,” and three years later replaced 60,000 workers with robots at a factory in Kunshan, China. “[Automation] is the leading edge of a transformation which will mean not only the loss of countless jobs, but entire professions,” Bastani writes. While [some academics](http://theautomatedeconomy.com/erik-brynjolfsson/) have asserted that creativity and idea generation will be uniquely valuable in a world of automation, Bastani is not so sure: “This may well prove the case in some areas, but surely not for a world of nearly 10 billion people” — as level UN demographers [project](https://www.treehugger.com/environmental-policy/un-revises-population-projections-downward-yet-again.html) the world may reach by the end of the century. Bastani is tapping popular concern about automation taking over jobs, particularly manual labor. Yet research shows that automation is both a long way off and not necessarily displacing jobs. The U.S. Bureau of Labor Statistics estimates that skilled manufacturing jobs currently represent 8.5% of the U.S. workforce, or 12.75 million jobs, yet [89%](https://www2.deloitte.com/insights/us/en/industry/manufacturing/manufacturing-skills-gap-study.html?mod=djemRTE_h) of manufacturers report that they can’t find skilled applicants to fill vacant positions. This could mean 2.4 million vacant jobs by 2028, costing the manufacturing industry $454 billion. Increasingly, manufacturing work involves managing new and advanced technologies, indicating that technology is creating new jobs rather than simply replacing them. Research by [McKinsey Digital](https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/where-machines-could-replace-humans-and-where-they-cant-yet) found that automation will eliminate very few occupations entirely over the next decade. In about 60% of jobs, about a third of the tasks involved can be automated, which means that less than 5% of jobs could be fully automated. In addition, the [costs](https://www.sptechnology.co.uk/cost-of-industrial-automation/) of automating businesses are significant, and [prohibitive for small businesses](http://www3.weforum.org/docs/WEF_White_Paper_Technology_Innovation_Future_of_Production_2017.pdf), at least for now. A 2017 [report](http://www3.weforum.org/docs/WEF_White_Paper_Technology_Innovation_Future_of_Production_2017.pdf) by the World Economic Forum found very limited awareness of automated production technologies among small businesses, who will rely on government support and incentives to adapt. Google, meanwhile, [spent](https://spectrum.ieee.org/cars-that-think/transportation/self-driving/google-has-spent-over-11-billion-on-selfdriving-tech) at least $1.1 billion on its self-driving car project between 2009 and 2015, and the project still faces many [logistical](https://www.technologyreview.com/s/530276/hidden-obstacles-for-googles-self-driving-cars/) and [regulatory](https://www.eetimes.com/document.asp?doc_id=1331598) hurdles before it can move beyond the test phase. Assumption two: The new space industries will be economically viable Pricing within the capitalist structure is based on finite supply, Bastani says, so the opening up of space mining industries will dramatically expand our supply of valuable materials, pushing prices down. “The limits of the earth won’t matter anymore — because we’ll mine the sky instead,” Bastani says. This idea — of the extreme supply of resources collapsing the value system of capitalism and liberating the workers — is central to FALC. And yet, even with achievements in robotics, automation, and commercial space exploration as foundations for its realization, we are still light-years away from reliable, affordable space mining. There are three main challenges in space mining: cost, identification of suitable asteroids for potential mining, and the problems of extraction. Though the potential returns on investment are unknown, there is active research in this area from a range of mostly privately funded elite interests. Planetary Resources, a privately funded asteroid mining company, says it will take [a decade](https://www.wsj.com/articles/SB10001424052702303459004577364110378178038) to identify which asteroids are suitable for commercial mining. Logistical challenges include setting up equipment on a moving asteroid with a low gravitational field, how to mine the resources themselves, and getting into space in the first place. And the struggling company itself was [acquired](https://spacenews.com/asteroid-mining-company-planetary-resources-acquired-by-blockchain-firm/) last year by a blockchain firm. As well as complexity, the costs will be vast. Prior to its [bankruptcy](https://spacenews.com/mars-one-company-goes-bankrupt/) in February, private space exploration project Mars One estimated that the cost of [sending four people to Mars](https://www.mars-one.com/faq/finance-and-feasibility/what-is-mars-ones-mission-budget) would be $6 billion, with every subsequent mission costing $4 billion. NASA itself hasn’t published estimates of a Mars trip, though two veteran space scientists have [estimated](https://spacenews.com/op-ed-mars-for-only-1-5-trillion/) that a technically complex traveling space station would cost at least $130 billion, translating into $230 billion for just one manned space flight. Put simply, the cost of obtaining any minerals from asteroids will far outweigh their potential value on Earth. Profitable asteroid mining is likely to remain a technological and economic fantasy for decades, if not centuries to come. It makes FALC’s case for space resources and extreme supply speculative, at best. Assumption three: We don’t want to work Let’s assume, however, that humans do eventually manage to unlock an unprecedented wealth of resources from asteroids, and that everyone on Earth would feel the economic benefit. With machines to replicate human work, we will be freed all manual and intellectual effort. Leaving aside, too, that many people enjoy the sociability and purpose of work, what will we all do with our newfound time and freedom? If we look at the most successful technology companies today, it seems hard to imagine how a future that demands immense investment and expertise could be anything other than privately owned. Perhaps rather oddly, Bastani describes something that sounds like the “gentlefolk of leisure” of a 19th century English novel: “Under FALC we will see more of the world than ever before, eat varieties of food we have never heard of, and lead lives equivalent — if we so wish — to those of today’s billionaires. Luxury will pervade everything as a society based on waged work becomes as much a relic of history as the feudal peasant and medieval knight.” And yet, if we look at the most successful technology companies today — the vast, online empires that are some of the wealthiest companies ever created — it seems hard to imagine how a future that demands immense investment and expertise could be anything other than privately owned. The companies that build the automation — and asteroid mining — of the future are likely to be private empires, too. At what point do these companies give away all their wealth to the workers of the world? Unless Bastani is proposing a revolution to take it back by force? But that’s not what he’s calling for here. FALC, he says, must be embedded within a “luxury populism” and engage with mainstream electoral politics. So populist far-left parties would propose this future, and we could vote for it. They’d propose that worker-owned businesses and cooperatives would be favored over multinationals. A “One Planet Tax” would shift wealth from richer to poorer countries. A system of [universal basic services](https://en.wikipedia.org/wiki/Universal_basic_services) would offer government-funded housing, food, and health care to everyone who needed it. “You can only live your best life under FALC and nothing else, so fight for it and refuse the yoke of an economic system which belongs in the past,” says Bastani. Bastani has been bold enough to label his book a manifesto. He’s not hiding the fact that he is laying the theoretical groundwork for a distant revolution. He offers an imaginative, alternative outcome to the inevitable disruption that technology is having on our society. These are important issues to consider. However, FALC is clearly and simply fully-fledged communism, remarketed for the 21st century. History shows us that communism fails because of natural human hierarchies and desires, and there’s no reason to think that complex technological systems and the space-mining companies of the future should make that any different. The FALC vision may rest on the foundations of realism, but it is so impossibly utopian and idealistic as to be whimsical. The science is far too expensive and too theoretical to ever make this a reality, certainly within our lifetimes, however enticing it might be to think of a future without work. We need to look for solutions to our global problems with the technologies we have today, and Fully Automated Luxury Communism cannot offer us anything but an illusory utopia.

#### 3] Mining fails and can’t efficiently establish an earth-bound market that allows for solvency of their impacts – empirics flow aff and should ow

**Abrahamian 19** Abrahamian, A. A. (2019, June 26). *How the asteroid-mining bubble burst*. MIT Technology Review. <https://www.technologyreview.com/2019/06/26/134510/asteroid-mining-bubble-burst-history/> (MIT Technology review attempts to bring about better-informed and more conscious decisions about technology through authoritative, influential, and trustworthy journalism.) //Aadit

It was sci-fi come to life—and everybody loved it. “Space mining could become a real thing!” headlines squealed. A[mazon CEO Jeff Bezos](https://www.technologyreview.com/silicon-valley/amazon/) began speaking of a future in which all heavy industry took place not on Earth, but above it. NASA funded asteroid-mining research; the Colorado School of Mines offered an asteroid-mining degree program; Senator Ted Cruz predicted that Earth’s first trillionaire would be made in space. “There was a lot of excitement and tangible feeling around all of these things that we’ve been dreaming about,” says Chad Anderson (no relation to Eric), the CEO of [Space Angels](https://www.spaceangels.com/), a venture capital fund that invests in space-related companies. Also crucial to the money-making opportunities was the burgeoning commercial space sector’s lobbying, which shepherded the SPACE Act through Congress in 2015. This not--uncontroversial bill included a “finders, keepers” rule whereby private American companies would have all rights to the bounty they extracted from celestial bodies, no questions asked. (Before that, property rights and mining concessions in space, which belongs to no country, were not a given.) That, in turn, would make it possible to work toward a goal that Eric Anderson predicted could be reached by the mid-2020s: extracting ice from asteroids near Earth and selling it in space as a propellant for other missions. Water can be broken into hydrogen and oxygen to make combustible fuel, or—as in DSI’s technology—just heated up and expelled as a jet of steam. “Both companies believed one of the early products would be propellant itself—that is, water,” says Grant Bonin, the former chief technology officer of Deep Space Industries. “What DSI had been doing is developing propulsion systems to run on water. And everyone who buys one is creating an ecosystem of users now that can be fueled by resources of the future.” By the spring of 2017, Planetary Resources was operating a lab in a warehouse in Redmond, Washington, decorated with NASA paraphernalia and vintage pinball machines. Engineers tinkered with small cube satellites behind thick glass walls, crafting plans to launch prospecting machines. Luxembourg had given the company a multimillion-dollar grant to open a European office. Japan, Scotland, and the United Arab Emirates announced their own asteroid-mining laws or investments. The stars had burned through their red tape. The heavens were ready for Silicon Valley. Then things started going south. Last summer, Planetary failed to raise the money it was counting on. Key staffers, including Peter Marquez, the firm’s policy guy in Washington, had already jumped ship. “We were all frustrated about the revenue prospects, and the business model wasn’t working out the way we’d hoped,” recalls Marquez, who now works for a Washington, DC, advisory shop called Andart Global. “There was more of a focus on the religion of space than the business of space,” Marquez adds. “There’s the religious [segment] of space people who believe that almost like manifest destiny, we’re supposed to be exploring the solar system—and if we believe hard enough, it’ll happen. But the pragmatists were saying there’s no customer base for asteroid mining in the next 12 to 15 years.” Amid rumors that it was auctioning off its gear, Planetary Resources was acquired last year by ConsenSys, a blockchain software company based in Brooklyn that develops decentralized platforms for signing documents, selling electricity, and managing real estate transactions, among other things. Anderson Tan, an early investor in Planetary Resources, was baffled by the acquisition—and he’s the kind of blockchain guy who promotes other blockchain guys’ blockchain ventures on LinkedIn. “I honestly have no idea … I was shocked. I think they wanted to acquire the equipment and assets,” he says. “For what? I’m not so sure.” DSI, in turn, was acquired by an aeronautics company named Bradford Space. These acquisitions aren’t taking the companies anywhere. “They’re gone; they’re done. They don’t exist,” says Chad Anderson. What went wrong? Predictably, ex--employees and investors tell slightly different stories. Bonin blames DSI’s demise on investors’ unwillingness to take long-term risks. “We had a plan that would take off after a certain point, and we didn’t get to that point,” he explains. “And we were only $10 million away from hitting that point, but our planning was decades long, and a VC fund’s life cycle is one decade long. They’re incompatible.” Meagan Crawford, who worked with Bonin and is now starting her own venture capital fund for commercial space startups, concurs: “A traditional VC time line is 10 years, when they have to give money back to investors, so in seven years they want to exit. A 15-year business plan isn’t going to fit in.” On the money side, the story is a little less forgiving. “They did not deliver on their promises to investors,” says Chad Anderson, whose Space Angels invested in PR. “Both companies were really good at storytelling and marketing and facilitating this momentum around a vision that their technology never really substantiated.” He adds, “I think that these weren’t the right teams to do it.” There were also bigger structural obstacles—such as, in former employees’ telling, the lack of any infrastructure for an asteroid--mining industry. That put investors off, too: “If you mine an asteroid, mostly likely you’ll [have to] send it to the moon to process it. It wouldn’t be processed on Earth, because the cost would be tremendous,” says Anderson Tan. “So then it’s like a chicken-and-egg problem: do we mine first and then develop a moon base, or invest in building up the moon and then go to asteroid mining?” On the money side, the story is a little less forgiving. Finally, asteroid miners had to compete for funding with a proliferating number of other space-related ventures. Between 2009—“the dawn of the entrepreneurial space age”—and today, “we’ve gone from a world with maybe a dozen privately funded space companies serving one client, the government, to one with more than 400 companies worth millions of bucks,” Chad Anderson says. So if commercial space startups seemed like an out-there proposition in 2012, by 2018 VCs who wanted space in their portfolios could have their pick of companies with better short-term prospects: telecom startups selling internet access, for instance, or firms analyzing the much-more-accessible moon. “The bottom line is that space is hard,” says Henry Hertzfeld, the director of the Space Policy Institute at George Washington University. (Hertzfeld advised Planetary Resources on legal matters; the space world, on Earth, is still very small.) “It’s risky, it’s expensive; lots of high up-front costs. And you need money. You can get just so much money for so long.”

#### 4] They have read no inherency that says communal space mining is coming or even possible now – they just say that private appropriation could prevent it which means the aff has no inhereny and means u negate on presumption bc the aff is missing a stock issue

### Part 2

#### 1] The Role of the Judge is to vote for the Best Debater – any other Role of the Judge is self-serving and slants the Judge to be pre-disposed to any particular understanding of the world which brackets out coalitions that have different theories i.e. Racism v Capitalism which your RoTJ prevents

### Fw

#### There is no standard so you should default to the standard of maximizing expected well being

#### Extinction first –

#### 1 – Forecloses future improvement – we can never improve society because our impact is irreversible

#### 2 – Turns suffering – mass death causes suffering because people can’t get access to resources and basic necessities

#### 3 – Moral obligation – allowing people to die is unethical and should be prevented because it creates ethics towards other people

#### 4 – Objectivity – body count is the most objective way to calculate impacts because comparing suffering is unethical

#### 5 – Moral uncertainty – if we’re unsure about which interpretation of the world is true – we ought to preserve the world to keep debating about it

#### AT Method – 1] forcing everyone to constantly push for capitalist reduction can make people tired and give up or turn on the movement which moots aff solvency 2] They have no offense under their own rob – the aff just doesn’t make everyone a billionaire 3] what does this actually mean – ask yourself what functions as offense

AT dean 19

1. their roll of the ballot can make a shared horizon impossible

2. assumes cap is bad

3. beoing solely focused on things lets u avoid or not see other bad things

### Part 3

#### 1] AT Bastani – concedes that tech can solve capitalism – their only il to cap is that the benefits of the tech aren’t distributed which the counterplan would resolve

#### 2] Cap sustainable---profit motive drives tech innovation and makes resources infinite---only way to solve environmental collapse and extinction.

McAfee 19—cofounder and codirector of the MIT Initiative on the Digital Economy at the MIT Sloan School of Management, former professor at Harvard Business School and fellow at Harvard’s Berkman Center for Internet and Society (Andrew, “Looking Ahead: The World Cleanses Itself This Way,” *More from Less: The Surprising Story of How We Learned to Prosper Using Fewer Resources—and What Happens Next*, Chapter 14, pg 278-292, Kindle, dml)

As today’s poor countries get richer, their institutions will improve and most will eventually go through what Ricardo Hausmann calls "the capitalist makeover of production." This makeover doesn't enslave people, nor does it befoul the earth. As today’s poor get richer, they'll consume more, but they'll also consume much differently from earlier generations. They won't read physical newspapers and magazines. They'll get a great deal of their power from renewables and (one hopes) nuclear because these energy sources will be the cheapest. They’ll live in cities, as we saw in chapter 12; in fact, they already are. They'll be less likely to own cars because a variety of transportation options will be only a few taps away. Most important, they'll come up with ideas that keep the growth going, and that benefit both humanity and the planet we live on. Predicting exactly how technological progress will unfold is much like predicting the weather: feasible in the short term, but impossible over a longer time. Great uncertainty and complexity prevent precise forecasts about, for example, the computing devices we’ll be using thirty years from now or the dominant types of artificial intelligence in 2050 and beyond. But even though we can't predict the weather long term, we can accurately forecast the climate. We know how much warmer and sunnier it will be on average in August than in January, for example, and we know that global average temperatures will rise as we keep adding greenhouse gases to the atmosphere. Similarly, we can predict the "climate" of future technological progress by starting from the knowledge that it will be heavily applied in the areas where it can affect capitalism the most. As we've seen over and over, tech progress supplies opportunities to trim costs (and improve performance) via dematerialization, and capitalism provides the motive to do so. As a result, the Second Enlightenment will continue as we move deeper into the twenty-first century. I'm confident that it will accelerate as digital technologies continue to improve and multiply and global competition continues to increase. We’ll see some of the most striking examples of slim, swap, evaporate, and optimize in exactly the places where the opportunities are biggest. Here are a few broad predictions, spanning humanity's biggest industries. Manufacturing. Complex parts will be made not by the techniques developed during the Industrial Era, but instead by three- dimensional printing. This is already the case for some rocket engines and other extremely expensive items. As 3-D printing improves and becomes cheaper, it will spread to automobile engine blocks, manifolds and other complicated arrangements of pipes, airplane struts and wings, and countless other parts. Because 3-D printing generates virtually no waste and doesn't require massive molds, it accelerates dematerialization. We'll also be building things out of very different materials from what we're using today. We're rapidly improving our ability to use machine learning and massive amounts of computing power to screen the huge number of molecules available in the world. Well use this ability to determine which substances would be best for making flexible solar panels, more efficient batteries, and other important equipment. Our search for the right materials to use has so far been slow and laborious. That's about to change. So is our ability to understand nature's proteins, and to generate new ones. All living things are made out of the large biomolecules known as proteins, as are wondrous materials such as spiders' silk. The cells in our bodies are assembly lines for proteins, but we currently understand little about how these assembly lines work—how they fold a two-dimensional string of amino acids into a complicated 3-D protein. But thanks to digital tools, we're learning quickly. In 2018, as part of a contest, the AlphaFold software developed by Google DeepMind correctly guessed the structure of twenty-five out of forty-three proteins it was shown; the second-place finisher guessed correctly three times. DeepMind cofounder Demis Hassabis says, "We [haven't] solved the protein-folding problem, this is just a first step... but we have a good system and we have a ton of ideas we haven't implemented yet." As these good ideas accumulate, they might well let us make spider-strength materials. Energy. One of humanity's most urgent tasks in the twenty-first century is to reduce greenhouse gas emissions. Two ways to do this are to become more efficient in using energy and, when generating it, to shift away from carbon-emitting fossil fuels. Digital tools will help greatly with both. Several groups have recently shown that they can combine machine learning and other techniques to increase the energy efficiency of data centers by as much as 30 percent. This large improvement matters for two reasons. First, data centers are heavy users of energy, accounting for about 1 percent of global electricity demand. So efficiencies in these facilities help. Second, and more important, these gains indicate how much the energy use of all our other complicated infrastructures— everything from electricity grids to chemical plants to steel mills—can be trimmed. All are a great deal less energy efficient than they could be. We have both ample opportunity and ample incentive now to improve them. Both wind and solar power are becoming much cheaper, so much so that in many parts of the world they're now the most cost-effective options, even without government subsidies, for new electrical generators. These energy sources use virtually no resources once they're up and running and generate no greenhouse gases; they're among the world champions of dematerialization. In the decades to come they might well be joined by nuclear fusion, the astonishingly powerful process that takes place inside the sun and other stars. Harnessing fusion has been tantalizingly out of reach for more than half a century—the old joke is that it's twenty years away and always will be. A big part of the problem is that it's hard to control the fusion reaction inside any human- made vessel, but massive improvements in sensors and computing power are boosting hope that fusion power might truly be only a generation away.

#### 3] Physical limits aren’t absolute---laundry list of warrants.

Bailey 18 [Ronald; February 16; B.A. in Economics from the University of Virginia, member of the Society of Environmental Journalists and the American Society for Bioethics and Humanities, citing a compilation of interdisciplinary research; Reason, “Is Degrowth the Only Way to Save the World?” https://reason.com/2018/02/16/is-degrowth-the-only-way-to-save-the-wor; RP]

Unless us folks in rich countries drastically reduce our material living standards and distribute most of what we have to people living in poor countries, the world will come to an end. Or at least that's the stark conclusion of a study published earlier this month in the journal Nature Sustainability. The researchers who wrote it, led by the Leeds University ecological economist Dan O'Neill, think the way to prevent the apocalypse is "degrowth."

Vice, pestilence, war, and "gigantic inevitable famine" were the planetary boundaries set on human population by the 18th-century economist Robert Thomas Malthus. The new study gussies up old-fashioned Malthusianism by devising a set of seven biophysical indicators of national environmental pressure, which they then link to 11 indicators of social outcomes. The aim of the exercise is to concoct a "safe and just space" for humanity.

Using data from 2011, the researchers calculate that the annual per capita boundaries for the world's 7 billion people consist of the emission of 1.6 tons of carbon dioxide per year and the annual consumption of 0.9 kilograms of phosphorus, 8.9 kilograms of nitrogen, 574 cubic meters of water, 2.6 tons of biomass (crops and wood), plus the ecological services of 1.7 hectares of land and 7.2 tons of material per person.

On the social side, meanwhile, the researchers say that life satisfaction in each country should exceed 6.5 on the 10-point Cantril scale, that healthy life expectancy should average at least 65 years, and that nutrition should be over 2,700 calories per day. At least 95 percent of each country's citizens must have access to good sanitation, earn more than $1.90 per day, and pass through secondary school. Ninety percent of citizens must have friends and family they can depend on. The threshold for democratic quality must exceed 0.8 on an index scale stretching from -1 to +1, while the threshold for equality is set at no higher than 70 on a Gini Index where 0 represents perfect equality and 100 implies perfect inequality. They set the threshold for percent of labor force employed at 94 percent.

So how does the U.S. do with regard to their biophysical boundaries and social outcomes measures? We Americans transgress all seven of the biophysical boundaries. Carbon dioxide emissions stand at 21.2 tons per person; we each use an average of 7 kilograms of phosphorus, 59.1 kilograms of nitrogen, 611 cubic meters of water, and 3.7 tons of biomass; we rely on the ecological services of 6.8 hectares of land and 27.2 tons of material. Although the researchers urge us to move "beyond the pursuit of GDP growth to embrace new measures of progress," it is worth noting that U.S. GDP is $59,609 per capita.

On the other hand, those transgressions have provided a pretty good life for Americans. For example, life satisfaction is 7.1; healthy life expectancy is 69.7 years; and democratic quality stands at 0.8 points. The only two social indicators we just missed on were employment (91 percent) and secondary education (94.7 percent).

On the other hand, our hemisphere is home to one paragon of sustainability—Haiti. Haitians breach none of the researchers' biophysical boundaries. But the Caribbean country performs abysmally on all 11 social indicators. Life satisfaction scores at 4.8; healthy life expectancy is 52.3 years; and Haitians average 2,105 calories per day. The country tallies -0.9 on the democratic quality index. Haiti's GDP is $719 per capita.

Other near-sustainability champions include Malawi, Nepal, Myanmar, and Nicaragua. All of them score dismally on the social indicators, and their GDPs per capita are $322, $799, $1,375, and $2,208, respectively.

The country that currently comes closest to the researchers' ideal of remaining within its biophysical boundaries while sufficient social indicators is…Vietnam. For the record, Vietnam's per capita GDP is $2,306.

"Countries with higher levels of life satisfaction and healthy life expectancy also tend to transgress more biophysical boundaries," the researchers note. A better way to put this relationship is that more wealth and technology tend to make people happier, healthier, and freer.

O'Neill and his unhappy team fail drastically to understand how human ingenuity unleashed in markets is already well on the way toward making their supposed planetary boundaries irrelevant. Take carbon dioxide emissions: Supporters of renewable energy technologies say that their costs are already or will soon be lower than those of fossil fuels. Boosters of advanced nuclear reactors similarly argue that they can supply all of the carbon-free energy the world will need. There's a good chance that fleets of battery-powered self-driving vehicles will largely replace private cars and mass transit later in this century.

Are we about to run out of phosphorous to fertilize our crops? Peak phosphorus is not at hand. The U.S. Geological Survey (USGS) reports that at current rates of mining, the world's known reserves will last 266 years. The estimated total resources of phosphate rock would last over 1,140 years. "There are no imminent shortages

#### AT Frase 1] corporate interests also flow neg – companies that make disruptive tech will push for climate change solutions 2] Card concedes that green tech will occur means you err neg against answers to McAfee 3] Solutions to warming can’t be demographic specific – if you have tech that stops warming its universal

#### AT Frase 2 1] This card is actually horrible – it compares workers to humans and says that they will become useless like horses did after the automobile – that only happened because the breeding of them was no longer necessary – humans don’t get bred 2] no method for the rich to just kill poor people – supranational bodies would definitely step in

AT margaridge 98

1. assumes they win their impacts on the cap debate

2. ethics can be derived in a world of capitalism - eocnomic reasons why we should do good things

AT dean 13

1. we arent pessimisstic

2. counterplans are optsimsistic

3. we wont be stuck theoritiz