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#### CP: The appropriation of outer space by private entities except for Large Satellite Constellations in Lower Earth Orbit is unjust.

#### Terrestrial Internet Cables are vulnerable now – risks access.

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.”

#### Mega-constellations provide fast, affordable internet that bridges digital divide – independently, competition lowers prices across the board.

Novo 21 Paula Novo 3-31-2021 "Will Starlink Change the Internet?' <https://www.highspeedoptions.com/resources/insights/will-starlink-change-the-internet> (With over four years of broadband experience, Paula Novo is the Site Editor and Senior Writer for HighSpeedOptions. She has helped develop the criterion by which HighSpeedOptions reviews and recommends internet service providers, striving to simplify and guide the user’s decision toward the best communications services. Paula also leads HighSpeedOptions coverage of the digital divide, ISP reviews, and broadband policy.)//Elmer

While it’s not the first – and won’t be the last – company to test low Earth orbit satellites, Starlink, the satellite internet division of SpaceX, is making waves in the telecommunications industry for its residential beta program launched in 2020. As the first U.S.-based firm to successfully bring LEO internet to market, Starlink shows promise where others have heroically failed. Every satellite company in history to launch a low Earth orbit (LEO) constellation has gone bankrupt, except for Starlink, that is. Said best in a tweet by Elon Musk, founder and CEO of this venture, “Starlink is a staggeringly difficult technical and economic endeavor. However, if we don’t fail, the cost to end-users will improve every year.” In the span of a decade, broadband moved from a “nice-to-have” to a “must-have” – the COVID-19 pandemic simply speeding up the clock on its shift towards a utility. Yet, we’re a far cry away from total connectivity. Due to availability and cost issues (to name a few), millions of Americans don’t have access to reliable internet, which further widens the education and wealth gaps. If successful, Starlink – and LEO satellite internet as a whole – may be the first real solution for billions of people missing out on the benefits of broadband. Current State of the Telecom Industry Despite advances in technology, the telecom industry is lagging behind. And, contrary to what internet service providers and the media report, the United States’ internet options are still very limited. The three biggest hurdles standing in the way of real progress include access, affordability, and lack of competition. Access According to the Federal Communications Commission’s (FCC) 2020 Broadband Deployment Report, roughly 6% of all Americans have zero access to fixed broadband at home. And, of those without access, a majority live in rural areas. That’s about 19 million people who, even if they could afford to subscribe to internet service, are out of luck. The FCC defines broadband speeds as just 25 Mbps down and 3 Mbps up, which may be fast enough to check emails but won’t reliably support your Breaking Bad marathon. You can see how living in an underserved area, then, can severely limit a person’s job prospects, schooling, and social connections. Still, we can’t rate internet access without also looking at affordability. While some 19 million Americans do not have access at all, as many as one in three Americans choose to not subscribe to internet service, citing cost as a leading factor. Affordability FCC data shows that nearly 35% of Americans, or about 114 million people, do not subscribe to broadband service at their homes. Affordability – or lack thereof – is often cited as the main driver for this decision. Despite government intervention via efforts like the FCC Lifeline Program and ISP subsidies to incentivize network expansions, America still seems to lag behind other developed countries when it comes to internet cost. In a 2020 study by New America, it turns out that we pay quite a bit more for internet service than most developed countries in Asia and Europe, regardless of speed. Before factoring in data caps and other ancillary ISP fees, we pay “nearly twice as much as European countries for high-speed internet.” Naturally, the ballooning question pops up – How did we fall behind? Lack of Competition The lack of competition today may be the single greatest obstacle preventing the telecom industry (read: ISPs and consumers) from thriving. A long history of privately-owned infrastructures and government regulations has enabled monopolies to quash competition in the marketplace and ignore the demand for innovation. Unsurprisingly, the Institute of Self-Reliance released a new report finding that two of the largest broadband companies in the U.S. – Comcast and Charter Spectrum – maintain a monopoly over 47+ million American households. It also sheds light on an additional 33 million homes only serviceable by one or two DSL providers. While these are just a few examples of the current market, you can easily see how large segments of the population lack the competitive supply needed to drive down costs and push for more development. What if there was a solution to address these pitfalls with the internet? What if Americans (or, really, anyone in the world) could circumvent some of the physical and political barriers stopping us from connecting from seemingly anywhere? These are questions Starlink is attempting to answer. Ways Starlink May Change the Internet First, what is Starlink and how is it different from other internet providers? It’s an Elon Musk satellite internet company bringing life to the telecom industry. In the last year, Starlink launched over 1,000 satellites into low orbit with the goal of offering a new type of broadband. If successful, this LEO service could not only supersede traditional satellite internet like HughesNet or Viasat but also rival the likes of fiber internet in rural and remote communities. Unlike GEO satellite providers who use a few hundred large satellites orbiting over 35,000 kilometers from Earth, Starlink plans to use up to 42,000 small satellites in low orbit no higher than 1,200 kilometers. Because of these key differences, Starlink is anticipated to offer reliable speeds up to 1 Gbps with lower latency of 20ms to 40ms worldwide. Essentially, it’d combine the performance of grounded internet with the geographical freedom of traditional satellite internet so people can live anywhere on Earth while staying connected. In general, LEO satellite service represents a real chance at solving connectivity issues for anyone outside city limits. Starlink may also pave the way for tangible changes to the industry as a whole, including lower prices, faster speeds, and better economic opportunities. Pricing of Internet As Starlink enters new markets, the added competition has the potential to drive down the cost of internet over time. In a study by the Analysis Group, they calculated that when just one new competitor joins a designated market area (DMA), the price of plans with speeds ranging from 50 Mbps to 1 Gbps sees a monthly decline of $1.50. That’s it? McDonald’s saves me more than that. Not so fast, though. Remember how we said Starlink isn’t the only company testing low orbit satellites? With other ventures like Blue Origin, OneWeb, and Telesat itching to launch their own LEO constellations, it won’t be long before new players enter the market. At which point, the Analysis Group guesstimates an 8% reduction in monthly broadband prices, or about $7.50. For low-income households, that may be the difference needed to break even on bills. And, even though Starlink itself is quite expensive, its presence in the market has the potential to still benefit consumers who could choose a (now) cheaper internet provider. Internet Speeds Similarly, the buzz around LEO internet speeds has industry heads raising their eyebrows as well. While Starlink is only testing speeds of 50 Mbps to 150 Mbps right now, in time it’s expected to offer speeds up to 1 Gbps with low latency. Normally these speeds are reserved for grounded connections like fiber or cable internet. So, if Starlink manages to deliver, we may no longer be limited by our geography. Even further, the Analysis Group reports that the availability of higher internet speeds in a DMA “increases the likelihood that other providers will introduce high-speed plans to match […] their competition.” In particular, they found that broadband providers are 4 to 17 percent more likely to increase their speeds on an annual basis because of competition. This goes to show that a little healthy rivalry in the marketplace first and foremost benefits the consumer. Economic Opportunity If Starlink is successful, we expect to see economic opportunity improve for billions with a B as well. With global availability, more people will have the means to compete for jobs in today’s digital age. To put things into perspective, consider the world population. Of the current 7.8 billion people, a little under half of them (40%) lack regular internet access. That’s nearly one out of every two people. If LEO satellite service can make it to where geography, price, and speeds aren’t roadblocks anymore, what happens? In general, more people with internet access equates to more job access. And, as jobs continue to transition online, it’s safe to assume that people won’t be as limited by obstacles such as disabilities, poor education, and wealth disparities when they compete for openings. In these ways, Starlink has the potential to help offset poverty where many governments have failed.

#### It's comparably faster than current competitors.

Lumanlan 21 August Dominic M Lumanlan 8-14-2021 "How Elon Musk’s Starlink will be the future of the Internet" <https://medium.com/@augustlumanlan2017/how-spacexs-starlink-will-be-the-future-of-the-internet-8f07adb4eb2> (Engineering Author)//Elmer

Internet speeds, satellite equipment, and user feedback Starlink has very high internet speeds, higher than the speed of internet we currently have in our homes. Speeds average around 100 mbps but it could go as far as 200 mbps, or even 300 mbps. It has a latency of 20 milliseconds. Latency just means the time it takes for the satellite to transmit the data packets (YouTube videos, Facebook messages, Google searches, etc.) from the ground station, to the nearest Starlink satellite, which then transmits it to other nearby satellites and whichever one is closest above the user will transmit it downward to the Starlink dish that receives the data packets, which can finally reach your home router and now you’re connected to the internet and received the data packets. The process can repeat vice versa. This means that the internet connection with Starlink is much faster than our current internet connection which has around 60 milliseconds of latency. A lot of beta testers have shared their experiences online and have been picked up by the media to know more about the Starlink internet program’s capabilities and the user’s feedback about them. What they say is true: They are so happy about it, they think it’s worth it. Because its so fast and reliable to many places around the world, you can easily connect to the internet and be able to do multiple things like watch YouTube or Google search, or even work conveniently anywhere you wish, as long as you have a ground Starlink dish with you.

#### Internet solves extinction

**Eagleman 10** [David Eagleman is a neuroscientist at Baylor College of Medicine, where he directs the Laboratory for Perception and Action and the Initiative on Neuroscience and Law and author of Sum (Canongate). Nov. 9, 2010, “ Six ways the internet will save civilization,”  
 http://www.wired.co.uk/magazine/archive/2010/12/start/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.

#### Independently, Starlink bridges the Splinternet – that solves Fake News and Disinformation propagated from censorship – affordable, un-blockable, and accessible internet is key.

Koetsier 20 John Koetsier 1-9-2020 "Elon Musk's 42,000 StarLink Satellites Could Just Save the World" <https://archive.is/K6Lq0#selection-3087.0-3131.123> (I've been a journalist, analyst, and corporate executive, and have chronicled the rise of the mobile economy. I built the VB Insight research team at VentureBeat)//Elmer

Elon Musk’s other company, SpaceX, is building Starlink, a global communications constellation that could approach a staggering 42,000 satellites. And it could be all that stands between us and a fragmented world living in virtually — and actually — different realities. How? World War II can tell us the answer. In the early 1940s a tyrannical power using fake news, hate speech, military might and hegemonic power controlled most of Europe: the Nazis. They controlled public life, news and local economies. Resistance groups dotted the European mainland, with one lifeline for non-official communication from free countries: radio. As such, radios were contraband and confiscated. One of the activities the allies undertook to support resistance fighters was shipping in radios for communication and outside news. Today, radios aren’t at risk of being confiscated. But the internet is. And as a cloud-delivered service, hijacking the internet happens largely out of public sight, in servers and routers that enable services like Netflix and the BBC and Facebook and Google. It’s called splinternet, and it’s the ongoing division of a worldwide interconnected internet into separate and isolatable fiefdoms, each of which can be controlled and managed so that governing powers can control what their populations see. The Great Firewall of China is the most well-known example, but Iran, Syria and Vietnam also control significant portions of the internet for their populations. Russia just completed technology to wall off its internal networks, servers and internet users from the wider internet. And India, in its attempt to control unrest following its anti-Muslim citizenship law, has employed a particularly heavy-handed approach: simply blocking the internet entirely. (One unintended result: contractors in India can’t reach their employers in the U.S.) Another country, United Arab Emirates, took a different approach: outlawing all messengers except one that it built a digital backdoor into: Totok. However it happens, it allows governments to control what people see, read and hear from outside sources — and censor what their own people say. Starlink can change all of that. Elon Musk recently revealed details about how people will access StarLink. It will be incredibly simple, and it will enable access to the relatively free global internet from anywhere on the planet. Starlink Terminal has motors to self-adjust optimal angle to view sky. Instructions are simply: plug in socket, point at sky. These instructions work in either order. No training required. Elon Musk What that means is that anyone can access the internet from anywhere. Chinese citizens will be able to access Google and information about Tiananmen Square. Russian citizens will be able to see external analysis of Putin’s financial dealings if even Russia blocks outside sources. Indian protesters can’t be cut off from the internet. Of course, governments will make the Starlink Terminal illegal. But that in itself will be a victory. Censorship works best when it is invisible: when people don’t even know that there is alternate information, other understandings of reality. (Chinese teenage exchange students at a relative’s house last year, for example, had never heard of Tiananmen Square, and refused to believe stories that, they felt, painted China in a negative light.) But when a device to connect to the outside world becomes contraband, the glass walls become opaque. People realize that walls have been erected to prevent them from seeing other opinions. And that is at least one step to maintaining a free, open and accessible internet globally, which should help combat fake news, propaganda and information deprivation aimed at controlling populations. And it’s a step towards making the splinternet harder to achieve. 1,000 satellites will be enough to enable basic service, Musk has said. SpaceX just launched a third batch of 60 satellites, and is expected to continue launching that many every two weeks through the rest of 2020. (For context, only about 9,000 satellites have been launched in all of space history, about 5,000 of which are still in orbit. And only 2,000 are actually still operational. So even at a quarter or a fifth of total capacity, Starlink is a ridiculously large satellite constellation and unprecedented in human history — and astronomers have legitimate concerns about light pollution.) While Musk has applied for launch permission for up to 42,000 satellites, he’s unlikely to launch them all. But at the current pace, a global and unblockable internet service should be available in less than a year. This doesn’t mean that all will instantly be rosy. Governments, of course, can try to jam satellite signals. That’s unlikely to work — or even be possible — in all places and all times, however. They’re also likely to continue to try to engage in false flag and other misinformation projects. And people seem to be pretty good at fooling themselves these days: locking themselves in reality bubbles that block dissenting narratives. But any gaps in the emerging splinternet are opportunities for different perspectives and, hopefully, true facts to emerge.

#### Fake News is an existential threat – hurts global cooperation on every significant issue and results in geopolitical conflict spirals.

Al-Rodhan 17 Nayef Al-Rodhan 6-7-2017 "Post-Truth Politics, the Fifth Estate and the Securitization of Fake News" <https://www.globalpolicyjournal.com/blog/07/06/2017/post-truth-politics-fifth-estate-and-securitization-fake-news> (Prof Nayef Al-Rodhan is an Honorary Fellow at St Antony’s College, University of Oxford, and Senior Fellow and Head of the Geopolitics and Global Futures Programme at the Geneva Centre for Security Policy)//Elmer

Even so, what we are witnessing today, in the “post-truth” era is more menacing because of the multiplication of channels of communication. Information now can circulate freely and unverified on the Internet, providing possibilities of misinformation and propaganda on a scale that was previously virtually impossible. In effect, it is now possible to share fake news more frequently than verified news, also due to the fact that social media has enabled the proliferation of authentic-looking or misleading fake accounts that help spread lies, most often directed against the liberal public. What is truth anyway? The Oxford Dictionaries dates the first use of the term to a 1992 essay by Steve Tesich, a Serbian-American playwright writing in The Nation following the Iran/Contra scandal. Tesich reflected that after the Watergate revelations and reporting of atrocities from Vietnam, Americans had become contemptuous of uncomfortable truths. He noted: “we came to equate the truth with bad news (…). We looked to our government to protect us from the truth”. Journalist David Roberts also used the term “post-truth” more than two decades ago to refer to the response of some US politicians refuting scientific claims about climate change. In 2004, Ralph Keyes proclaimed we had reached the age of “post-truth”. In his 2004 book, “The Post-Truth Era: Dishonesty and Deception in Contemporary Life”, Keyes expressed the concern that we are losing the stigma attached to lying, meaning that lies can be told with impunity. For Keyes, such times of “post truthfulness” represent an ethical twilight zone. The common theme running across the history of the term is that post-truth is defined by lies spread routinely by politicians, with little or no significant consequences for their legitimacy and reputation. But there are inevitable consequences for the future of democracy and the future of humanity: a future in which scientific facts are repudiated cannot be anything but insecure. Veritas, or truth, and facts are crucial for humanity, and indispensible for effective decision-making and ultimately, for human progress. Moreover, facts-based policies are also important in an existential sense and indispensible to our own survival – the case of the debate on climate change being a prime example. Geopolitics and Fake News Geopolitics in the era of fake-news is also complicated because post-truth disrupts a fundamental element of diplomacy and international politics, namely communication. Unsubstantiated allegations and groundless claims will distort diplomatic relations and lead political and military processes astray. False claims about the money ‘extorted’ from the UK by the European Union helped build the case for Brexit, with its ensuing implications for stability in Europe and elsewhere. The Russian state used social media to spread allegations that the Ukranian government crucified a child – a claim later debunked, yet telling of how fake news can help fuel wars. Similarly, populist rhetoric about NATO’s inadequacy and misinformation about its funding mask ignorance about the real benefits of the alliance for its members’ common security. Although unsubstantiated, such comments are enough to create anxiety in political quarters and prompt some Eastern European nations to see their state security in a wholly different geopolitical light. In the post-truth era, a complete lack of understanding of military strategy and the intricacies of warfare will be less relevant in devising policies, and this comes at the risk of dismantling security communities and the foundations of the liberal order. The possibility of hijacking national elections also has profound geopolitical and security implications. This has been a particularly key topic in the aftermath of the US elections. The stakes are especially high in France, which is a key member of the European Union and NATO, and where the winning candidate can, quite unequivocally, impact the future of the liberal order.

#### 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/) 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.

### 2

#### Statesought to call a global constitutional convention and establish a constitution reflecting intergenerational concern with exclusive authority to ban appropriation of outer space by private entities and bind participating bodies to its result

#### That solves the aff – it addresses shared anxieties while building political consensus

Gardiner 14 1 [Stephen M. Gardiner, Professor of Philosophy and Ben Rabinowitz Endowed Professor of Human Dimensions of the Environment at the University of Washington, Seattle, “A Call for a Global Constitutional Convention Focused on Future Generations,” 2014, *Ethics & International Affairs*, Vol. 28, Issue 3, pp. 299-315, https://doi.org/10.1017/S0892679414000379, EA]

A Constitutional Convention

In my view, the above line of reasoning leads naturally to a more specific proposal: that we—concerned individuals, interested community groups, national governments, and transnational organizations—should initiate a call for a global constitutional convention focused on future generations. This proposal has two components. The first component is procedural. The proposal takes the form of a “call to action.” It is explicitly an attempt to engage a range of actors, based on a claim that they have or should take on a set of responsibilities, and a view about how to go about discharging those responsibilities. The second component is substantive. The main focus for action is a push for the creation of a constitutional convention at the global level, whose role is to pave the way for an overall constitutional system that appropriately embodies intergenerational concern.

The substantive idea rests on several key ideas. Still, for the purposes of a basic proposal, I suggest that these be understood in a relatively open way that, as far as is practicable, does not prejudge the outcome of the convention, and especially its main recommendations. First, the convention itself should be understood as “a representative body called together for some occasional or temporary purpose” and “constituted by statute to represent the people in their primary relations.”14 Second, a constitutional system should be thought of in a minimalist sense as “a set of norms (rules, principles or values) creating, structuring, and possibly defining the limits of government power or authority.”15 Third, the “instigating” role of the convention should be to discuss, develop, make recommendations toward, and set in motion a process for the establishment of a constitution. Fourth, its primary subject matter should be the need to adequately reflect and embody intergenerational concern, where this would include at least the protection of future generations, the promotion of their interests (where “interests” is to be broadly conceived so as to include rights, claims, welfare, and so on), and the discharging of duties with respect to them. It may also (and in my view should) include some way of reflecting concern for past generations, including responsiveness to at least certain of their interests and views. However, I will leave that issue aside in what follows.

The proposal to initiate a call for a global constitutional convention has at least two attractive features. First, it is based in a deep political reality, and does not underplay the challenge. It acknowledges the problem as it is, both specific and general, and calls attention to the heart of that problem, including to the failures of the current system, the need for an alternative, and the background issue of responsibility. Moreover, though the proposal is dramatic and rhetorically eye-catching, it is so in a way that is appropriately responsive to the seriousness of the issue at hand, the persistent political inertia surrounding more modest initiatives, and the fact that (grave though concerns about it are) climate change is only one instance of the tyranny of the contemporary (and the wider perfect moral storm), and we should expect others to arise over the coming decades and centuries.

The second attractive feature of the proposal is that, though ambitious, it is not alienating. While it does not succumb to despair in the face of the challenge, neither does it needlessly polarize and divide from the outset (for example, by leaping to specific recommendations about how to fill the institutional gap). Instead, it acknowledges that there are fundamental difficulties and anxieties, but uses them to start the right kind of debate, rather than to foreclose it. As a result, the proposal is a promising candidate to serve as the subject of a wide and overlapping political consensus, at least among those who share intergenerational concern.

Selective Mirroring

To quell some initial anxieties, it is perhaps worth clarifying the open-ended and non-alienating character of the proposal. One temptation would be to view the call for a global constitutional convention as a fairly naked plea for world government, a prospect that would be deeply alienating—indeed anathema—to many. However, that is not my intention. Though it is possible that a global constitutional convention would lead in this direction, it is by no means certain.

At a minimum, no such body could plausibly recommend any form of “world government” without simultaneously advancing detailed suggestions about how to avoid the standard threats such an institution might pose. Moreover, it seems perfectly conceivable, even likely under current ways of thinking, that a global constitutional convention would pursue what we might call a selective mirroring strategy. Specifically, a convention would seek to develop a broader system of institutions and practices that reflected the desirable features of a powerful and highly centralized global authority but neutralized the standing threats posed by it (for example, it might employ familiar strategies such as the separation of powers). In all likelihood, one feature of a selective mirroring approach would be the significant preservation of existing institutions to serve as a bulwark against the excesses of any newly created ones. Whether and how such a strategy might be made effective against the perfect moral storm, and whether something closer to a “world government” would do better, would be a central issue for discussion by the convention.

#### It spills over to foster broader intergenerational representation, but independence is key

Gardiner 14 2 [Stephen M. Gardiner, Professor of Philosophy and Ben Rabinowitz Endowed Professor of Human Dimensions of the Environment at the University of Washington, Seattle, “A Call for a Global Constitutional Convention Focused on Future Generations,” 2014, *Ethics & International Affairs*, Vol. 28, Issue 3, pp. 299-315, https://doi.org/10.1017/S0892679414000379, EA]

One set of guidelines concerns how the global constitutional convention relates to other institutions. The first guideline concerns relative independence:

(1) Autonomy: Any global constitutional convention should have considerable autonomy from other institutions, and especially from those dominated by factors that generate or facilitate the tyranny of the contemporary (and the perfect moral storm, more generally).

Thus, for example, attempts should be made to insulate the global constitutional convention from too much influence from short-term and narrowly economic forces.

The second guideline concerns limits to that independence:

(2) Mutual Accountability: Any global constitutional convention should be to some extent accountable to other major institutions, and they should be accountable to it.

Thus, for example, though the global constitutional convention should not be able to decide unilaterally that national institutions should be radically supplanted, nevertheless such institutions should not have a simple veto on the recommendations of the convention, including those that would result in sharp limits to their powers.

A third guideline concerns adequacy:

(3) Functional Adequacy: The global constitutional convention should be constructed in such a way that it is highly likely to produce recommendations that are functionally adequate to the task.

Thus, for example, the tasks of the global constitutional convention should not be assigned to any currently existing body whose design and authority is clearly unsuitable. In my view, this guideline rules out proposals such as the Royal Society’s suggestion that governance of geoengineering should be taken up by the United Nations’ Commission on Sustainable Development,20 or the Secretary-General’s recommendation of a new United Nations’ High Commissioner for Future Generations.21 Though such proposals may have merit for some purposes (for example, as pragmatic, incremental suggestions to highlight the importance of intergenerational issues), they are too modest, in my opinion, to reflect the gravity of the threats posed by climate change in particular, and the perfect moral storm more generally.

Aims

A second set of guidelines concerns the aims of the global constitutional convention. Here, the perfect moral storm analysis would suggest:

(4) Comprehensiveness: The convention should be under a mandate to consider a very broad range of global, intergenerational issues, to focus on such issues at a foundational level, and to recommend institutional reform accordingly.

(5) Standing Authority: Though the convention may recommend the establishment of some temporary and issue-specific bodies, its focus should be on the establishment of institutions with standing authority over the long term.

These guidelines are significant in that they stand against existing issue-specific approaches to global and intergenerational problems, and encourage not only a less ad hoc but also a more proactive approach. In particular, the global constitutional convention might be expected to recommend institutions that would be charged with identifying, monitoring, and taking charge of intergenerational issues as such. For example, such institutions should address not only specific policy issues (such as climate change, large asteroid detection, and long-term nuclear waste) but also the need to identify similar threats before they arise.

#### Proactive measures mitigate a laundry list of emerging catastrophic risks – extinction

Beckstead et al. 14 [Nick Beckstead, Nick Bostrom, Niel Bowerman, Owen Cotton-Barratt, William MacAskill, Seán Ó hÉigeartaigh, Toby Ord, \* Future of Humanity Institute, University of Oxford, \*\* Director, Future of Humanity Institute, University of Oxford, \*\*\* Global Priorities Project, Centre for Effective Altruism; Department of Physics, University of Oxford, \*\*\*\* Global Priorities Project, Centre for Effective Altruism; Future of Humanity Institute, University of Oxford, \*\*\*\*\* Uehiro Centre for Practical Ethics, University of Oxford, \*\*\*\*\*\* Cambridge Centre for the Study of Existential Risk; Future of Humanity Institute, University of Oxford, \*\*\*\*\*\*\* Programme on the Impacts of Future Technology, Oxford Martin School, University of Oxford, “Policy Brief: Unprecedented Technological Risks,” 2014, *The Global Priorities Project, The Future of Humanity Institute, The Oxford Martin Programme on the Impacts of Future Technology, and The Centre for the Study of Existential Risk*, https://www.fhi.ox.ac.uk/wp-content/uploads/Unprecedented-Technological-Risks.pdf, Accessed: 03/13/21, EA]

In the near future, major technological developments will give rise to new unprecedented risks. In particular, like nuclear technology, developments in synthetic biology, geoengineering, distributed manufacturing and artificial intelligence create risks of catastrophe on a global scale. These new technologies will have very large benefits to humankind. But, without proper regulation, they risk the creation of new weapons of mass destruction, the start of a new arms race, or catastrophe through accidental misuse. Some experts have suggested that these technologies are even more worrying than nuclear weapons, because they are more difficult to control. Whereas nuclear weapons require the rare and controllable resources of uranium-235 or plutonium-239, once these new technologies are developed, they will be very difficult to regulate and easily accessible to small countries or even terrorist groups.

Moreover, these risks are currently underregulated, for a number of reasons. Protection against such risks is a global public good and thus undersupplied by the market. Implementation often requires cooperation among many governments, which adds political complexity. Due to the unprecedented nature of the risks, there is little or no previous experience from which to draw lessons and form policy. And the beneficiaries of preventative policy include people who have no sway over current political processes — our children and grandchildren.

Given the unpredictable nature of technological progress, development of these technologies may be unexpectedly rapid. A political reaction to these technologies only when they are already on the brink of development may therefore be too late. We need to implement prudent and proactive policy measures in the near future, even if no such breakthroughs currently appear imminent.

#### Maintaining sustainable use of outer space is key to future generations

**Islam 18** [Mohammad Saiful Islam, Mohammad works for the Institute of Advanced Judicial Studies and the Beijing Institute of Technology. 4-27-2018, "The Sustainable Use of Outer Space: Complications and Legal Challenges to the Peaceful Uses and Benefit of Humankind," Beijing Law Review, <https://www.scirp.org/journal/paperinformation.aspx?paperid=85201> accessed 12/12/21] Adam

4.2. Ensure the Rights of Future Generations in Outer Space

Sustainable development is the establishing principle for achieving present human needs without damaging the demands of future generations maintaining integrity and constancy of the natural systems. The modern idea of sustainable development is derived from the Brundtland Report in 1987. Generally considered in modern application and exploration of outer space, fundamental elements are the area must be dedicated to peaceful purposes; and the area must be preserved for future generations [(Heim, 1990)](https://www.scirp.org/journal/paperinformation.aspx?paperid=85201#ref17). It is an indispensable and inordinate challenge to confirm uphold the healthy environment and make sure development without destroying the rights of future generations in space. Article IX of The Outer Space Treaty provided, in the exploration and use of outer space, States should pursue studies and conduct exploration of outer space so as to avoid harmful contamination and also adverse changes in the environment of the Earth [(Outer Space Treaty, 1967)](https://www.scirp.org/journal/paperinformation.aspx?paperid=85201#ref35). The issues of what constitutes harmful contamination in Earth’s environment have yet to be interpreted. The legal definition of “adverse” and “harmful” will also modification as Earth, indigenous sciences progress, separately or in concert, with the planetary exploration space sciences [(Robinson, 2005)](https://www.scirp.org/journal/paperinformation.aspx?paperid=85201#ref38). As a result of multifaceted political, economic, scientific, technological, educational, and other global problems, there has been practicing exclusively only international cooperation for sustainable space development among the developed countries [(Noichim, 2005)](https://www.scirp.org/journal/paperinformation.aspx?paperid=85201#ref34). The space faring nations should promote a supportive environment for peaceful and sustainable use of space, decrease environmental effects on Earth and protect the terrestrial environment. We should escape a regime that will ultimately reflect the over-exploitation of resources and environmental havoc [(Fountain, 2002)](https://www.scirp.org/journal/paperinformation.aspx?paperid=85201#ref9).

## Case

### Solvency

#### Growth is sustainable.

Harford, 20—economics columnist for the Financial Times, citing Diane Coyle, Bennett Professor of Public Policy at the University of Cambridge, Vaclav Smil, Distinguished Professor Emeritus in the Faculty of Environment at the University of Manitoba, Chris Goodall, English businessman, author and expert on new energy technologies, alumnus of St Dunstan's College, University of Cambridge, and Harvard Business School, and Jesse Ausubel, Director and Senior Research Associate of the Program for the Human Environment of Rockefeller University (Tim, “Two cheers for the dematerialising economy,” <https://www.ft.com/content/04858216-322e-11ea-9703-eea0cae3f0de>, dml)

If past trends continue, the world’s gross domestic product will be about twice as big by 2040 as it is today. That’s the sort of growth rate that translates to 30-fold growth over a century, or by a factor of a thousand over two centuries.

Is that miraculous, or apocalyptic? In itself, neither. GDP is a synthetic statistic, invented to help us put a measuring rod up against the ordinary business of life. It measures neither the energy and resource consumption that might worry us, nor the things that really lead to human flourishing.

That disconnection from what matters might be a problem if politicians strove to maximise GDP, but they don’t — otherwise they would have hesitated before imposing austerity in the face of a financial crisis, launching trade wars or getting Brexit done. Economic policymaking has flaws, but an obsession with GDP is not one of them.

Nevertheless the exponential expansion of GDP is indirectly important, because GDP growth is correlated with things that do matter, good and bad. Economic growth has long been associated with unsustainable activities such as carbon dioxide emissions and the consumption of metals and minerals.

But GDP growth is also correlated with the good things in life: in the short run, an economy that is creating jobs; in the long run, more important things. GDP per capita is highly correlated with indicators such as the Social Progress Index. The SPI summarises a wide range of indicators from access to food, shelter, health and education to vital freedoms of choice and from discrimination. All the leading countries in the Social Progress database are rich. All the strugglers are desperately poor.

So the prospect of a doubling of world GDP matters, not for its own sake, but for what it implies — an expansion of human flourishing, and the risk of environmental disaster.

So here’s the good news: we might be able to enjoy all the good stuff while avoiding the unsustainable environmental impact. The link between economic activity and the use of material resources is not as obvious as one might think. There are several reasons for this.

The first is that for all our seemingly insatiable desires, sometimes enough is enough. If you live in a cold house for lack of money, a pay rise lets you take off the extra cardigan and turn up the radiators. But if you win the lottery, you are not going to celebrate by roasting yourself alive.

The second is that, while free enterprise may care little for the planet, it is always on the lookout for ways to save money. As long as energy, land and materials remain costly, we’ll develop ways to use less. Aluminium beer cans weighed 85 grammes when introduced in the late 1950s. They now weigh less than 13 grammes.

The third reason is a switch to digital products — a fact highlighted back in 1997 by Diane Coyle in her book The Weightless World. The trend has only continued since then. My music collection used to require a wall full of shelves. It is now on a network drive the size of a large hardback book. My phone contains the equivalent of a rucksack full of equipment.

Dematerialisation is not automatic, of course. As Vaclav Smil calculates in his new book, Growth, US houses are more than twice as large today as in 1950. The US’s bestselling vehicle in 2018, the Ford F-150, weighs almost four times as much as 1908’s bestseller, the Model T. Let’s not even talk about the number of cars; Mr Smil reckons the global mass of automobiles sold has increased 2,500-fold over the past century.

Still, there is reason for hope. Chris Goodall’s research paper “Peak Stuff” concluded that, in the UK, “both the weight of goods entering the economy and the amounts finally ending up as waste probably began to fall from sometime between 2001 and 2003”. That figure includes the impact of imported goods.

In the US, Jesse Ausubel’s article “The Return of Nature” found falling consumption of commodities such as iron ore, aluminium, copper, steel, and paper and many others. Agricultural land has become so productive that some of it is being allowed to return to nature.

In the EU, carbon dioxide emissions fell 22 per cent between 1990 and 2017, despite the economy growing by 58 per cent. Only some of this fall is explained by the offshoring of production. (For a good summary of all this research, try Andrew McAfee’s book More From Less.)

Can we, then, relax? No. To pick a single obvious problem, global carbon dioxide emissions may be rising more slowly than GDP — but they are rising nevertheless, and they need to fall rapidly.

Yet the fact that dematerialisation is occurring is heartening. We all know what the basic policies are that would tilt the playing field in favour of smaller, lighter, lower-emission products and activities. Adopting those policies means we might actually be able to save the planet, preserve human needs, rights and freedoms — and still have plenty of fun into the bargain.

#### Capitalism is on a zero-growth trajectory now – it overcomes ecological damage and inequality – the aff causes spiking natural resource demand that destroys the environment

Saunders ’16 (Harry Saunders – Senior Fellow at the Breakthrough Institute and managing director of Decision Processes Incorporated, International Expert on energy efficiency and consumption. “Does Capitalism Require Endless Growth?” Summer 2016, http://thebreakthrough.org/index.php/journal/issue-6/does-capitalism-require-endless-growth)

But it is important to distinguish these challenges from the sweeping claims made originally by Sweezy, Magdoff, and Foster and repeated today by prominent intellectuals and activists such as Naomi Klein and Bill McKibben. In the pages that follow, I will demonstrate that both neoclassical growth theory and empirical evidence suggest that capitalist economies do not require endless growth but are rather much more likely to evolve toward a steady state once consumption demands of the global population have been satisfied. Those demands demonstrably saturate once economies achieve a certain level of affluence. For these reasons, a capitalist economy is as likely as any other to see stable and declining demands on natural resources and ecological services. Indeed, with the right policies and institutions, capitalist economies are more likely to achieve high living standards and low environmental impacts than just about any other economic system.

1.

From the window of his Manchester home in the mid-1840s, Marx’s colleague and contemporary Friedrich Engels looked out on a horrifying microcosm of what was happening in England and throughout the newly industrializing world — a stark imbalance between the luxurious wealth of capital owners and the miserable poverty of the workers they employed. Marx himself had witnessed firsthand this same imbalance, and over several decades of intense study came to propose that a core flaw of capitalism resides in excessive claims placed by privately owned capital as against labor on the economic value created by their combination.

Herein lay the fundamental contradiction, in Marx’s view, which would bring an end to capitalism. As capitalists invested in ever-newer technologies, Marx predicted that their dependence on labor would decline. As this occurred, returns to labor in the form of earned wages would decline. If there were no return to households for their labor, there would be no income with which to consume goods produced by capital owners, nor savings that households might reinvest in new capital. An economic system in which declining returns to labor due to technological change immiserated most households was a system in which the market for goods sold by capital owners could not long survive.

Notably, Marx did not dispute the necessity of capital for producing what households need, only who in society need control this resource. The problem, as Marx saw it, was that the surplus value created by labor was being unfairly conscripted by capital owners.

In the first decades of the twenty-first century, a number of prominent analyses have suggested that Marx’s prophecy is perhaps coming true. MIT economists Erik Brynjolfsson and Andrew McAfee5 in recent years have suggested that continuing automation and rising labor productivity threaten mass unemployment, a problem foreseen by Keynes in 1930.6 Thomas Piketty, in his much-lauded book Capital in the Twenty-first Century7, finds that returns to capital have exceeded real economic growth in the industrialized world in recent decades, attributing that shift to ever-increasing concentration of limited capital in the hands of the few.

The economist Robert Gordon8,9 finds that growth rates slow dramatically as societies become wealthier. The growth associated with the enormous rise in economic productivity and output associated with the transition from agrarian to industrial societies cannot be sustained as societies shift from industrial to post-industrial economies. Meanwhile, Paul Mason and others in the “post capitalism" movement contend that “an economy based on the full utilization of information cannot tolerate the free market.”10 His argument is that capitalist corporations will not prove capable of capturing value from the technology they deliver, value adequate to sustain them over time.

Before considering whether these various challenges to advanced capitalist economies portend their collapse, it is important to note what none of these analyses suggest, which is that capitalism’s unquenchable demand for growth has run up against fundamental biophysical limits. If anything, these analyses suggest the opposite: that the limits to continuing growth in capitalist economies are social or technological, not biophysical. Brynjolfsson and McAfee, and Piketty, through technically different mechanisms, ultimately raise concerns that center around the immiseration of labor. Whether due to technological change, growing returns to capital, or both, all three centrally focus on declining wages and employment as the central challenge that threatens robust and equitable growth in capitalist economies.

Mason, conversely, projects that technological change threatens returns to capital. The commodification of everything — material goods, knowledge, and information — ultimately brings with it an end to profits and hence both capital accumulation and capital reinvestment.11 Gordon, meanwhile, observes that there is simply no further techno-economic revolution that can replicate the one-time boost in economic productivity that comes with the shift from agrarian to industrial economies.12 If there is a common theme in these challenges to capitalist economies it is that all find their way, to one degree or another, back to Marx, not Malthus. The long-term challenge for capitalist economies, these analyses suggest, is too little growth, not too much.

2.

The headwinds facing advanced industrial economies — stagnant growth and rising inequality — tell us something about the prospects for low- or zero-growth capitalist economies. Gordon’s analysis suggests that industrialized economies in relatively short order achieve a “satisficing” level of household consumption. Once that level is achieved, and once societies have built out the basic infrastructure of modernity — cities, roads, electrical grids, water and sewage systems, and the like — the growth rates characterized by the early stages of industrialization cannot be sustained by the knowledge and service sectors that increasingly dominate post-industrial societies.

World Bank data clearly show this. Economic growth rates decline as countries become richer. Growth in GDP per capita in OECD countries slowed from an average of about 3 percent per year in the period 1961–1985 to about half of that in the period 1986–2014.13 Gordon’s analysis is supported not only by the long-term slowing of growth in industrialized economies but also by saturating household consumption in those economies. According to the World Bank, OECD growth in real household consumption per capita (consumption of both goods and services) has shown steady decline each decade from around 3 percent per year in the 1970s to around 1 percent per year since 2000.14

Brynjolfsson and McAfee, and Piketty, suggest that declining returns to households from their labor will drive worsening inequality and stagnant or declining wages. But that does not imply a declining material standard of living. The same technology gains and capital mobility that have eroded the power of labor in developed world labor markets have also persistently reduced the real prices of goods and services, making them ever more affordable.

Even as nominal wage growth has slowed or stagnated in the US and other advanced developed economies, households are able to buy more with less of their incomes. This is because the cost of goods and services has grown even more anemically, inflation nearly disappearing in these countries over the same time period, meaning wages have grown in real terms. OECD data show that real wages OECD-wide have grown by about 1 percent per year between 2000 and 2014, including real growth in the United States, the United Kingdom, France, and Germany.15 Growth in the Scandinavian economies (Norway, Denmark, Sweden, and Finland) has exceeded this.16

This is true even at the bottom of the income distribution. Virtually all low-income homes in the United States today boast a refrigerator, modern heating and cooling, and electricity. Large majorities have dishwashers, washers and dryers, computers, cable television, and large-screen displays. Consumer goods and services once considered luxuries in the United States and other developed countries are today widely available and utilized by all citizens. That is mostly because home appliances and other goods today cost a small fraction, measured in the work time necessary to purchase them, of what they did thirty years ago.17,18

Of course, rising economic inequality raises a range of concerns beyond those related to access to goods and services. Higher rates of inequality may threaten social mobility, social cohesion, and perhaps even democratic governance. Even so, inequality appears to decline as nations industrialize and become wealthier. In rich Scandinavian countries (Sweden, Denmark), inequality has essentially halved since World War II.19 Declines recently are less impressive in the United States, United Kingdom, and other parts of Europe20, but, nonetheless, inequality remains reliably lower than in most developing economies21, where aggressive but still insufficient capital formation in the presence of large labor forces tends to result in higher levels of inequality.

Moreover, increased capital mobility has driven declining inequality between countries, even as it may be worsening inequality within them. Thanks to global trade and international supply chains, firms have become increasingly able to locate production facilities in the developing world, where labor with the requisite skills can be employed at lower wages.

As might be expected, labor in industrialized countries is not happy with this turn of events. But the result has been a long-term convergence of wages between producing and consuming countries, declining inequality globally, and a dramatic decline in absolute levels of poverty. The ILO reports that between 2000 and 2011, real average wages approximately doubled in Asia.22 In Latin America, the Caribbean, and Africa they also rose substantially, well above the developed world average23, while in developed economies they increased by only about 5 percent, far below the world average24, leading to what leading ILO observer Patrick Belser has dubbed “the great convergence”25 — a dynamic that was incidentally predicted many decades ago on theoretical grounds by famed economist Paul Samuelson.26 Meanwhile, according to the World Bank, the global share of people living on less than $1.90 per day (the World Bank definition of extreme poverty) fell from 44 percent in 1981 to 13 percent in 2012.27

Taken together, then, the dynamics transforming the global economy, while not without challenges, paint an interesting picture of slowing growth, converging global incomes, falling cost, and saturating demand for goods and services. Should these dynamics hold, it is not hard to imagine a future in which the global economy gravitates toward a prosperous and equitable zero-growth economy placing relatively modest demands on the biocapacity of the planet.

#### Income growth and tech diffusion pursuant to trade are good for the environment. Race to the bottom thesis is false.

Irwin 15 – Douglas, John Sloan Dickey Third Century Professor in the Social Sciences in the Economics Department at Dartmouth College (“FREE TRADE UNDER FIRE” Copyright © 2015 by Princeton University Press Library of Congress Control Number 2015936929 ISBN 978- 0- 691- 16625- 4 pp 65-67)

Fortunately, the objectives of free trade and a cleaner environment often work together. For example, numerous studies have traced the relationship between pollution emissions and a country’s per capita income. They have generally found a relationship shaped like an inverted U: as per capita incomes rise from low levels, pollution increases, but beyond a certain point (about $5,000), further increases in income tend to diminish pollution.70 The initial increase in pollution is due to industrialization, while the decrease is due to cleaner production technologies and more effective environmental regulation that come with higher incomes. Both Delhi and New York City have traffic jams, for example, but the locally made cars and scooters in developing countries tend to belch out worse fumes than those with cleaner exhaust systems in the United States. Beyond the threshold, higher incomes do not mean more pollution and lower incomes do not mean less pollution. To the extent that trade increases a country’s income beyond the turning point in the inverted U relationship, it helps indirectly to improve the environment. More directly, new technology is cleaner technology and trade facilitates the diffusion of new technology. Furthermore, the “dirty industry migration” hypothesis, that polluting industries will move to developing countries where environmental regulations are lax, has received little empirical support. There is no “race to the bottom” in environmental standards because the costs of abating pollution are not a significant determinant of industries’ location, and consequently not a significant determinant of trade flows.71

One important study examined three channels by which trade can affect sulfur dioxide (SO2) emissions: the scale effect (increases in economic activity increase SO2 emissions), the technique effect (increases in income lead to cleaner production methods and reduce emissions), and the composition effect (trade alters the composition of activity and hence the average pollution intensity of national output). The authors were surprised to conclude that free trade is good for the environment because, as an empirical matter, the technique effect outweighs the scale and composition effects.72 The effect of income growth on pollution depends largely on the underlying source of growth: growth achieved through capital accumulation tends to raise pollutants, while growth achieved by trade and technological change appears to reduce pollutants. This could also account for the inverted- U- shaped relationship of pollution to income—developing countries initially tend to achieve growth through (dirtier) capital accumulation, whereas growth in developed countries is based on human capital accumulation and technology (cleaner methods). Another study focused on the issue of causality in estimating the effect of trade on the environment for a given level of income.73 This study looked at the links between trade and seven measures of environmental quality and found that trade had a strongly beneficial impact in reducing SO2 emissions, and a less significant but still positive impact in reducing NO2 emissions and total suspended particulate matter. Trade also reduced energy depletion and increased access to clean water, while having no impact on deforestation. The one exception was CO2 emissions, where increased openness was related to greater emissions, perhaps because of the free- rider problem afflicting countries that seek to limit greenhouse gas emissions. But the study found no evidence for a “race to the bottom” in environmental standards or the “pollution haven” hypothesis, in which trade encourages some countries to specialize in dirtier industries.

In terms of the United States, real manufacturing output has increased by more than 70 percent over the past thirty years, while pollution emissions have fallen significantly (ranging from 30 percent for nitrogen oxides to 66 percent for sulfur dioxides). The United States even reduced its carbon dioxide emissions from energy sources by 12 percent between 2005 and 2012, although those emissions rose 2 percent in 2013. Most of this overall decline is due to improved production technology or abatement processes, not importing dirtier products from abroad to avoid domestic regulation. Indeed, the average pollution content of U.S. imports has fallen over time, and the United States does not seem to have been offshoring pollution by importing polluting goods.74

### Space Col

#### The Private Industry is the only avenue for Space Colonization – Governments have no incentive and are bound by I-Law.

Eure 16 (, J., 2016. Space… the final frontier. [online] Campbell Law Observer. Available at: <http://campbelllawobserver.com/space-the-final-frontier/> [Accessed 28 December 2021] Jonathan Eure is a 2017 graduate of Campbell Law School, winner of the 2017 J. Bryan Boyd Award for Excellence in Legal Journalism, and served as a senior staff writer for the Campbell Law Observer. He lived in Morganton, in the foothills of North Carolina, before moving to Raleigh for law school. He earned BA’s in Political Science and History from the University of North Carolina at Chapel Hill, graduating in 2014. The summer after his first year of law school, Jonathan worked as a legislative research intern with Representative Rob Bryan in the North Carolina General Assembly. Jonathan now interns with the Honorable Paul Newby at the North Carolina Supreme Court. Jonathan is the Secretary for the Campbell Public Interest Law Student Association (CPILSA).)-rahulpenu

Space… the final frontier With the recent discovery of a new earth-like planet, many countries are beginning serious talks about inhabiting and colonizing a planet in outer space. We very soon might turn on the news and hear stories of interstellar exploration and colonization. We might even hear about voyages of a starship named Enterprise. This probably sounds like wild speculation, or the contents of a cheesy science fiction novel. However, after a European research team announced the discovery of an earth-like planet circling the inhabitable zone of Proxima Centauri in August, 2016, we may soon see more discussions of the logistics and technology required to reach out into the stars. The part of that discussion we ultimately must address is the legal ramifications of colonization, essentially what are the laws to which nations and private individuals must adhere, when claiming portions of a new planet, moon, or asteroid. Proxima Centauri is the closest star to our own, lying a mere 4.54 light years from the Sun. In interstellar terms, that is a stone’s throw away, though clearly still an impossible journey for a civilization who has yet to visit another planet in our own Solar System. Still, Proxima Centauri’s vicinity to Earth has garnered a fair amount of interest from parties who hope to discover an inhabitable, one day reachable, planet. Guillem Anglada-Escudé led a research team of 31 scientists from eight different countries for months studying Proxima Centauri through the European Southern Observatory’s HARPS spectrograph and 3.6 meter telescope in La Silla, Chile. While investigating a tiny wobble Proxima Centauri experiences, the team discovered that the cause of the wobble is an Earthlike planet, promptly named “Proxima b.” “…overall, Proxima b is the best opportunity we have ever had for an inhabitable planet that may be reachable in the foreseeable future.” To be classified as “Earthlike,” Proxima b was studied based on likely mass, position, and orbit around Proxima Centauri, and the effects of Proxima Centauri on Proxima b. The researchers believe Proxima b has a similar mass to Earth, possibly indicating a similar, rocky makeup. Though Proxima Centauri, as a red dwarf star, releases less energy than our Sun, Proxima b is located in the so-called “goldilocks zone” of Proxima Centauri; in other words, not too hot, not too cold. Therefore, the researchers believe the basic elements for human life, heat, oxygen, and water could exist on Proxima b. There is some concern that the amount of solar radiation expelled by Proxima Centauri could make Proxima b uninhabitable, but overall, Proxima b is the best opportunity we have ever had for an inhabitable planet that may be reachable in the foreseeable future. “A ratified treaty is then given the full force of domestic law in the U.S., and the U.S. government would generally be bound to uphold the tenets of that treaty. Being bound to a treaty in this case means the U.S. could not claim any portion of Proxima b as U.S. property.” Obviously we have to get there first, and at this very moment, some of the most brilliant minds on Earth are attempting to develop interstellar travel. Ideas such as asteroid mining and economic incentives of resources available in space are already pushing us toward the day when we might visit another planet. Once we do, our current legal framework may make colonization difficult, at least on a national level. The best starting place for understanding space law is the “Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies,” better known as the “Outer Space Treaty.” Signed in 1967 by the member nations of the UN, including space race powerhouses the U.S. and U.S.S.R., the Outer Space Treaty created a series of broad principles controlling the manner in which nations would explore space. These principles include provisions that exploration is permitted in all states, that no celestial bodies may be appropriated by individual states, that nations take responsibility for the environments of space and celestial bodies, and that non-governmental space activities must be authorized and continually supervised by the states which have jurisdiction over such activities. In order to have ratified such a treaty in the U.S., the President would have sent the treaty to Congress for their “advice and consent,” and the treaty would have to be approved by a two-thirds majority. The treaty would then be sent back to the President to be ratified, as described in Article II, Section 2 of the U.S. Constitution. A ratified treaty is then given the full force of domestic law in the U.S., and the U.S. government would generally be bound to uphold the tenets of that treaty. Being bound to a treaty in this case means the U.S. could not claim any portion of Proxima b as U.S. property. Fortunately, this is also true for Russia and China, the U.S.’s primary competitors in space, and none of these nations can violate the treaty without risking adverse reactions from the others. The Outer Space Treaty is the only one of the U.N.’s treaties on outer space to which the U.S. or any other major space-faring nation belongs, and is therefore the only treaty that really matters, though the U.N. has passed other resolutions on the issue. “**Private** **exploration** of space **becomes** **more** of a **reality** each day, with private corporations such as SpaceX, Blue Origin, and Virgin Galactic testing **new** **platforms** for space travel.” As a policy matter, though the **O**uter **S**pace **T**reaty uses lofty ideals to **bind** **nations** into mutual respect and perhaps even unity of purpose, focusing solely on those ideals discounts a key ingredient of the original space race. Promulgation of national ideology was the original motivator of the space race between the U.S. and the U.S.S.R. Without national ideology, prestige, or power as a motivating factor, there is really **no** **incentive** **for** the **governments** of major spacefaring nations **to** **spend** massive amounts of money over long periods of time **on** such risky endeavors as space **colonization**. For this reason, the **colonization** of Proxima b would more likely **fall** **to** private **corporations** with much to gain from the resources other worlds might offer. Private exploration of space becomes more of a reality each day, with private corporations such as SpaceX, Blue Origin, and Virgin Galactic testing new platforms for space travel. A **movement** has **grown** **up** **alongside** these private spacefaring **companies** **claiming** planets such as Proxima b might become a **new** **frontier**, where private citizens can stake their own personal claims. This movement has even **proposed** **legislation** in Congress. The “Space Settlement Prize Act,” which would **ultimately** **guarantee** that **any** **settlement** built privately on other planets, moons, asteroids, etc., would be **owned** **by** the private citizens or **corporations** **who** **claim** **them**. This act would likely function similarly to the Homestead Acts, which allowed settlers who worked unclaimed land, to buy that land at very little cost. Furthermore, these groups claim that they are **not** **subject** **to** the **O**uter **S**pace **T**reaty, as the treaty’s provisions only govern nations. “The language of the Outer Space Treaty does not forbid private claims on and settlement of celestial bodies, only national appropriations\. Furthermore, nations themselves are answerable in case of any environmental damages.” It is an interesting theory, and these 21st century frontiersmen and women might be correct. The Outer Space Treaty does not only govern nations themselves, but national oversight of non-governmental organizations as well. As all private attempts at space colonization on Proxima b and any other celestial body would be through corporate entities. These corporate entities would certainly fall under the national mandate to authorize and continually supervise the operation of such groups. But just because governments must have some form of oversight in place to manage private space exploration corporations, does not mean there is a mandate to control the legal operation of such corporations. The language of the Outer Space Treaty does not forbid private claims on and settlement of celestial bodies, only national appropriations. Furthermore, nations themselves are answerable in case of any environmental damages. Nations can certainly pass laws regulating the actions of private corporations consistent with the Outer Space Treaty’s mandate, and in fact the U.S. is already considering and attempting to create policies governing private space craft and travel. The problem is that none of this law has become official yet. The reality behind this entire discussion is that it will not become truly important until either nations or private corporations prove they can travel to another planet. Until then, the laws of space colonization are nothing more than an academic exercise. However, they have been proven important in one sense: protection of our moon. Prohibitions on national appropriation, military use, or exploitation have certainly been effective in keeping the moon unmolested (though technological and financial constraints also played a major role). So perhaps there is a reasonable groundwork for the future laws of space colonization. Proxima b may not be the first place they are exercised, but the discovery of a relatively nearby Earthlike planet is sure to hasten the need for such laws to be in place before we land. The law now needs to boldly go where no law has gone before.

#### Space colonization solves extinction

Filling Space 19, 4-19, "Deflecting Existential Risk with Space Colonization," Filling Space, https://filling-space.com/2019/04/19/deflecting-existential-risk-with-space-colonization/

The first living organism on Earth emerged approximately three and a half billion years ago. Since then, life has evolved into countless forms and colonized the planet. But the story of life is not a rosy one. At least five mass extinctions have occurred, and nearly all species that have ever existed on our planet are now dead. One of the most well-understood mass extinctions occurred when the Alvarez asteroid impacted Earth and, likely combined with other factors, killed many dinosaurs and other species. Life then had no tools to detect the coming asteroid or to be able to plan proactively to ensure its survival.

In order to avoid sharing the same fate as the dinosaurs, scholars argue that humans should become a multi-planetary species. We spoke with Professor Gonzalo Munevar, Emeritus Professor at Lawrence Technical University, to hear his thoughts on the existential risks we face and how colonization of the cosmos can help us address them. He has written extensively about the philosophy of space exploration and human consciousness.

Why do you argue that “failure to move into the cosmos would condemn us to oblivion”?

By having a significant presence in the solar system in the next few thousands of years and beyond, we will be in a better position to deflect asteroids and comets that might bring the end of humanity, and much other Earth life, in a horrible collision. And if perchance one such catastrophe proves inevitable (e.g. a rogue planet passing through the solar system), humanity would still survive by having colonized Mars and other bodies, as well as by having built artificial space colonies of the type advocated by Gerard O’Neill.

Once the sun begins to turn into a red giant in a few billion years, we must have long moved into the outer solar system. In the very long run, we have to move into other solar systems. Relativistic-speed starships would be nice, but they are not necessary for the task of moving humanity to the stars. We can reach them, slowly but surely, by propelling some of our space colonies away from the sun, carrying perhaps millions of human beings. They would take advantage of the many resources to be found in the Oort Cloud, and then of equivalent clouds in other solar systems. Even interstellar space has resources to offer. Nuclear energy, probably fusion, would likely be required. It may take us tens of thousands of years, but in the cosmic time scale, that is but a blink in the eye.

What are these catastrophic threats? Are there any records of catastrophic events happening before humans appeared on Earth?

I have already mentioned collisions with asteroids and comets. Although the active geology of our planet tends to erase the record of many collisions, we can find a well-preserved record on the Moon and Venus, the two closest bodies to Earth. On the 600-million-years-old Venusian surface, the spacecraft Magellan discovered about one thousand impact craters at least twice the diameter of meteor craters on Earth. This impact record makes it reasonable to estimate a catastrophic impact on Earth every half a million years or so. Collisions with bodies of 5 km across would happen, on the average, every 20 million years. Apart from the Alvarez asteroid (crater near Yucatan) that led to the extinction of the dinosaurs and the majority of species on Earth 65 million years ago, there have been at least two more impacts by asteroids 10 km or larger in the last 300 million years.

How could human colonization of outer space save other terrestrial life?

On both O’Neill types of colonies as well as on colonies on other planets, and particularly on terraformed planets, we would need all sorts of organisms like bacteria and plants for food, medicine, and ornamentation, as well as many animals for food and other purposes. We cannot have a proper colony without an Earthly environment to surround and nourish us. So, we have to take much other terrestrial life with us in order to survive and flourish. And given the value of biodiversity we would make it a point to take a great variety of organisms that contribute to our biosphere. Of course, we should heed Mark Twain and be sure not to include mosquitoes in our future space arks. I myself would keep out tarantulas and some other obnoxious viruses, bacteria, plants, and animals.

#### Space exploration key to scientific innovation

Keusen 21 Tanya, "Space Exploration and Innovation," United Nations Office for Outer Affairs, https://www.unoosa.org/oosa/en/ourwork/topics/space-exploration-and-innovation.html

Since the beginning of time, exploring the Universe has been a dream of humankind. Human curiosity has fuelled interest in exploring and discovering new worlds, pushing the boundaries of the known, and expanding scientific and technical knowledge.

States and [space agencies](https://www.unoosa.org/oosa/en/ourwork/space-agencies-OLD.html) have been engaging in space exploration  since the first space launch. The first space launch led to the first human space flight, which led to the first moonwalk. Nowadays focus has shifted to joint human and robotic missions, near-Earth asteroids, Mars and destinations beyond our own solar system.

Space exploration and the innovation it entails are essential drivers for opening up new domains in space science and technology. They trigger new partnerships and develop capabilities that create new opportunities for addressing global challenge\

s. Space exploration also motivates young people to pursue education and careers in science, technology, engineering and mathematics (the STEM disciplines).

Though the precise nature of future benefits from space exploration is not easily predefined, current trends suggest that significant advantage may be found in areas such as new materials, health and medicine, transportation and computer technology. As the benefits of space exploration and innovation become better known, increasingly more countries and non-governmental entities are interested in engaging in exploration and innovation.

Recent COPUOS and UNOOSA Efforts

In 2016, seven thematic priorities were endorsed by the Committee on the Peaceful Uses of Outer Space in the context of preparations for the fiftieth anniversary of the United Nations Conference on the Exploration and Use of Outer Space (UNISPACE+50), the first of which was global partnership in space exploration and innovation. The Committee established an action team as the mechanism to drive the topic. Twenty-two States and seven permanent observer organizations joined the [Action Team on Exploration and Innovation](https://www.unoosa.org/res/oosadoc/data/documents/2018/aac_105c_12018crp/aac_105c_12018crp_3_0_html/AC105_C1_2018_CRP03E.pdf), producing a report including a series of recommendations ( [A/AC.105/1168)](https://www.unoosa.org/oosa/en/oosadoc/data/documents/2018/aac.105/aac.1051168_0.html). The Action Team Co-Chairs underscored the significance of the report, "which represented the first time the United Nations had examined, in a comprehensive way, human and robotic exploration beyond low-Earth orbit, and provided a basis for further consideration of how the United Nations system may contribute to a new era in the peaceful exploration and use of outer space".

In 2018, on the basis of the Action Team recommendation, the Committee added "Space exploration and innovation" as an item on its agenda ( [A/73/20](https://www.unoosa.org/oosa/en/oosadoc/data/documents/2018/a/a7320_0.html), para. 364).

Under this agenda item, first considered at the Committee session in 2019, States share information on, among other things: research and development activities; astronaut programmes; a space exploration innovation hub centre; the planned establishment of a Mars scientific city; activities in connection with the International Space Station and the China Space Station; the use of a satellite as a multi-wavelength observatory; various missions to the Moon, Mars, Venus, Jupiter and asteroids; the planned Lunar Orbital Platform-Gateway; a new spacecraft that has the potential to be utilized as a deep-space logistics carrier to the cis-lunar region; a dedicated solar mission with a focus on studying the inner solar corona; a tracker of electromagnetic counterparts of binary neutron star merger events; a mission to examine the atmospheric composition of exoplanets; and satellites launched for the purpose of deep space exploration. Much of this information is available in [technical presentations](https://www.unoosa.org/oosa/en/ourwork/copuos/technical-presentations.html).

#### Space innovation solves extinction

Sadedin 17 (Suzanne, PhD in Evolutionary Biology, 10-9, "Will Human Innovation Save Us From Future Extinction?," Forbes, <https://www.forbes.com/sites/quora/2017/10/09/will-human-innovation-save-us-from-future-extinction/?sh=773a4f276c65>) TDI

Does the human ability to innovate suggest an immunity to total extinction? Yes and no. Currently, innovation reduces our chance of extinction in some ways, and increases it in others. But if we innovate cleverly, we could become just about immune to extinction. The species that survive mass extinctions tend to share three characteristics. They're widespread. This means local disasters don't wipe out the entire species, and some small areas, called refugia, tend to be unaffected by global disasters. If you're widespread, it's more likely that you have a population that happens to live in a refugium. They're ecological generalists. They can cope with widely varying physical conditions, and they're not fussy about food. They're r-selected. This means that they breed fast and have short generation times, which allows them to rapidly grow their populations and adapt genetically to new conditions. Innovation gives humans the ability to be widespread ecological generalists. With technology, we can live in more diverse conditions and places than any other species. And while we can't (currently) grow our populations rapidly like an r-selected species, innovation does allow us to adapt quickly at the cultural level. Technology also increases our connections to one another and connectivity is a two-edged sword. Many species consist of a network of small, local populations, each of which is somewhat isolated from the others. We call this a metapopulation. The local populations often go extinct, but they are later re-seeded by others, so the metapopulation as a whole survives. Humans used to be a metapopulation, but thanks to innovation, we're now globally connected. Archaeologists believe that many past civilizations, such as the Easter Islanders, fell because of unsustainable ecological and cultural innovations. The impact of these disasters was limited because these civilizations were small and disconnected from other such civilizations. These days, a useful innovation can spread around the world in weeks. So can a lethal one. With many of the technologies and chemicals we're currently inventing, we can't be certain about their long-term effects; human biology is complex enough that we often can't be absolutely certain something won't kill us in a decade until we've waited a decade to see. We try to be careful and test things before they're released, and the probability that any particular invention could kill us all is tiny, but since we're constantly innovating, it's a real possibility. Pandemics pose the same problem for a well-connected species. There are certain possibilities where species extinction is really hard to avoid; fortunately, they're also very unlikely, but we are definitely not immune from this. The most likely cause of our extinction, in my opinion, is innovation in machine learning/AI. This could destroy the planet, but even if it doesn't, humans will be ultimately redundant to the dominant systems. They might keep us alive in a zoo somewhere, but I doubt it. A happier scenario (to me at least) is transhumanism, where humans become extinct in a sense because we've managed to liberate ourselves from biology. So how could innovation prevent our extinction? We seed the galaxy with independently evolving human populations to create a new metapopulation. These local populations would hopefully be sufficiently isolated that some would survive an innovation or disaster that wipes out the rest. They would, of course, evolve in response to local conditions, perhaps creating several new species. So you could say this is still extinction, but it's as close as we'll come to persistence in our ever-changing universe.