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#### Private entities should establish internally binding policies that mandate:

#### Removing debris pieces from orbit, prioritizing the most volatile and largest debris pieces in the most congested orbits

#### Collaborating on techniques to track and display the location of objects in real time and AI to automate debris-avoidance maneuvers

#### Banning private space colonization, and

#### Banning private space tourism.

#### That solves satellites, miscalc, Kessler, and debris collisions

Nature 8/11 [(Nature Editorial Board, peer-reviewed, comprises experimental scientists and data-standards experts from across different fields of science) “The world must cooperate to avoid a catastrophic space collision,” Nature, 8/11/2021] JL

But there are no traffic cops in space, nor international borders with clearly delineated areas of responsibility. To avoid further damage, it’s crucial that satellite operators have an accurate and up-to-date list of where objects are in space. At present, the main global catalogue of space objects is published at Space-Track.org by the US Space Command, a branch of the military. The catalogue is the most widely used public listing available, but it lacks some satellites that countries — including the United States, China and Russia — have not acknowledged publicly. In part because of this lack of transparency, other nations also track space objects, and some private companies maintain commercially available catalogues.

Rather than this patchwork of incomplete sources, what the world needs is a unified system of space traffic management. Through this, spacefaring nations and companies could agree to share more of their tracking data and cooperate to make space safer. This might require the creation of a new global regime, such as an international convention, through which rules and technical standards could be organized. One analogy is the International Telecommunication Union, the United Nations agency that coordinates global telecommunications issues such as who can transmit in which parts of the radio spectrum.

It won’t be easy to create such a system for space traffic. For it to succeed, questions of safety (such as avoiding smashing up a satellite) will need to be disentangled from questions of security (such as whether that satellite is spying on another nation) so that countries can be assured that participating in such an effort would not compromise national security. Countries could, for instance, share information about the location of a satellite without sharing details of its capabilities or purpose for being in space.

One near-term move that would help would be for the United States to complete a planned shift of responsibility for the Space-Track.org catalogue from the military to the civilian Department of Commerce. Because this catalogue has historically been the most widely used around the world, shifting it to a civilian agency could start to defuse geopolitical tensions and so improve global efforts to manage space debris. It might one day feed into a global space-traffic agreement between nations; even the nascent space superpower China would have a big incentive to participate, despite rivalries with the United States. The transition was called for in a 2018 US presidential directive that recognizes that companies are taking over from national governments as the dominant players in space, but it has yet to occur, in part because Congress has not allocated the necessary funds.

On 25 August, the UN Committee on the Peaceful Uses of Outer Space will meet to discuss a range of topics related to international cooperation in space. The UN is the right forum through which spacefaring nations can work together to establish norms for responsible space behaviour, and that should include how the world can track objects to make space safer. It should continue recent work it has been doing emphasizing space as a secure and sustainable environment, which at least brings countries such as the United States and China into the same conversation.

Basic research has a role, too: innovations such as techniques to track and display the locations of orbiting objects in real time, and artificial intelligence to help automate debris-avoidance manoeuvres, could bolster any global effort to monitor and regulate space.

If governments and companies around the world do not take urgent action to work together to make space safer, they will one day face a catastrophic collision that knocks out one or more satellites key to their safety, economic well-being or both. Space is a global commons and a global resource. A global organization responsible for — and capable of — managing the flow of space traffic is long overdue.

#### Removing the largest debris solves and is possible for private companies

Khlystov 18 [Nikolai Khlystov](https://www.weforum.org/agenda/authors/nikolai-khlystov) Lead, Space, and lead, Global Future Council on Space, World Economic Forum. 3 April, 2018 “We have a space debris problem Here’s how to solve it” [We have a space debris problem. Here’s how to solve it | World Economic Forum (weforum.org)](https://www.weforum.org/agenda/2018/04/we-have-a-space-debris-problem-heres-how-to-solve-it/) Accessed 12-19, photos omitted // gord0

The first Chinese space station, Tiangong-1, crashed on 1 April over the Southern Pacific, after uncontrollably re-entering the Earth’s atmosphere.

In fact, the station most likely all but burned up on re-entry, ironically very close to the location called ‘spacecraft cemetery’, where space agencies purposefully guide their old spacecraft to crash as it is the most isolated location in the ocean.

The Chinese authorities lost contact with the station back in 2016 and could not guide it since then.

Tiangong-1 is one example of space debris that ended up coming back to Earth and burning up, just like most other debris that re-enters Earth’s atmosphere. That is not a bad thing.

But large quantities of space junk end up staying in various orbits around Earth, threatening satellites, the International Space Station (ISS), as well as future missions beyond Earth's vicinity – to asteroids, the Moon and Mars.

Somewhat similar to pieces of tyres that litter the highways on Earth, debris can be parts of old satellites, from paint chips, to bolts, larger sections, and entire defunct satellites; it can also include spent rocket bodies, the sections of rockets that don’t fall back to Earth after a rocket's launch. The total number of debris pieces larger than a marble counts more than half a million.

[photo omitted]

The key difference is that while it would be dangerous for your car to hit a piece of garbage on the highway at 100 km/h, in orbit, things are moving at the much faster speed of 28,000 km/h – the speed required by the laws of physics for objects to stay in orbit and not fall back to the ground.

At that speed, even a small bolt could destroy an entire satellite, or even endanger the entire Space Station. That is the reason why astronauts or cosmonauts on board the ISS have to huddle into the escape capsules several times a year, when a piece of debris is being tracked close to the Space Station. Currently only the Russian Soyuz offers a way of getting to and from the ISS for humans.

The most polluted orbits in general are considered to be those between 200-2000 km above Earth (Lower Earth Orbits or LEO), and the 36,000 km orbit (Geosynchronous).

This is a growing issue, which has become more widely known to the public through the movie ‘Gravity’.

Out-of-control space junk in LEO orbit – the so-called Kessler Syndrome – in real life would not be quite as dramatic as in the movie; however, it does pose a serious and an ever-growing threat, nonetheless.

There are two key elements to addressing this global risk.

First, we need to start removing the most volatile and biggest pieces from the most congested orbits.

A number of companies, such as Astroscale and Saber Astronautics, are looking at this very complicated and technical solution already. The idea is essentially to grab a piece of debris with a special satellite and de-orbit both of them, in the process burning up both objects above the aforementioned ‘spacecraft cemetery’.

Other technologies include moving objects with a powerful laser beam. It is important to start doing that soon – current scientific estimates predict that without active debris removal, certain orbits will become unusable over the coming decades.

Though it is hard to capture objects that are moving as fast as this debris, it is certainly possible. After all, spacecraft dock with the ISS all the time.

The bigger issues are financing and international cooperation. The question of who pays for these ‘garbage collection’ missions is a tricky one. Perhaps even trickier, is negotiating the international diplomatic space and persuading, for example Russia, that their old military satellite needs to be de-orbited by a technology company.

[photo omitted]

The second part of the puzzle to ensure the long-term accessibility of orbits is to adjust our current behaviour in space in order to minimize the creation of new debris. We need to be more careful with existing operational satellites and new missions.

The UN guidelines on space debris mitigation are among the key international efforts to get different actors to follow proper rules of the road, but they are voluntary.

There are over 1,500 active satellites in various orbits, but this figure is set to grow dramatically over the coming years.

Large constellations that number hundreds and thousands of satellites, such as OneWeb and SpaceX, are being developed currently (mostly for LEO orbits), and promise to provide affordable connectivity to all parts of the world.

New governments are also entering the race to get access to space. The question is, with such an increase in traffic, how do we get all the private and public actors to think more sustainably?

The [Global Future Council on Space Technologies](https://www.weforum.org/communities/the-future-of-space-technologies) is working on an industry framework to incentivize private actors to step up their act. Other efforts are needed.

Orbits are a critical part of the Earth environment, a global commons just like the oceans, and we need to protect this resource for future generations.

#### Their only internal link to debris that they read in the Munoz-Patchen card is space tourism, which the CP bans.

#### The CP also bans private space col which is their only internal link to their second advantage.

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#### Congress is inching towards a funding deal—but, it’s a deliberate dance to keep them focused on funding while avoiding political complications

Romm 2/2 [Tony Romm is the congressional economic policy reporter at The Washington Post, tracking infrastructure reform, government spending and the financial impacts of federal decision-making nationwide, "Democrats, GOP inch ahead toward potential deal to fund government, avert shutdown", 2/2/22, https://www.washingtonpost.com/us-policy/2022/02/02/democrats-republicans-spending-shutdown-covid/]

Top Democrats and Republicans inched forward Wednesday in pursuit of a deal that could fund the federal government for the remainder of the fiscal year, hoping to stave off a shutdown while potentially pumping new spending into health care, education, science and defense.

The continued negotiations marked the second consecutive day of developments on Capitol Hill, as lawmakers who oversee the federal purse increasingly have come to express a measure of confidence that they can act before an upcoming Feb. 18 deadline — and overcome months of prior political disputes and delays.

Since President Biden took office, the U.S. government has operated under short-term measures that sustain key federal agencies and programs largely at their existing spending levels. The stopgaps have kept the government running, but they have also delayed Democrats from delivering on some of the White House’s top priorities, from expanding affordable housing to confronting climate change.

Republicans appeared content to continue in that vein, essentially dealing a political blow to Biden’s agenda in the process. But the two sides have come to see mutual benefit in striking a longer-term resolution, putting aside their differences at a moment when the United States continues to confront the pandemic at home and faces new diplomatic challenges abroad. The omicron variant of the coronavirus has sparked fresh discussions about the need for another round of federal aid, while the intensifying standoff between Russia and Ukraine has emboldened a Republican-led push to spend more on defense.

Both spending priorities could be appended to any new government funding measure, provided the two sides can reach a deal in the first place. In a sign of progress, Republicans on Wednesday presented a counter-offer for federal spending over the rest of the 2022 fiscal year, which Democrats are reviewing. The GOP move had the effect of temporarily delaying a planned afternoon meeting of the House and Senate’s top appropriators, but it still reflected a new seriousness among negotiators who until now hadn’t traded such proposals.

Yet new political fault lines also emerged Wednesday. Taking to the chamber floor earlier in the day, Senate Minority Leader Mitch McConnell (R-Ky.) foreshadowed what could be staunch GOP opposition to another round of pandemic relief, as he cited roughly $6 trillion in spending that has been approved since the start of the public health emergency in 2020.

“Let’s start the discussion by talking about repurposing the hundreds of billions already sitting in the pipeline,” McConnell said.

Lawmakers begin discussing government spending deal as Democrats eye virus aid, paid leave

The promises and platitudes nonetheless amounted to noteworthy progress on Capitol Hill, a place where partisan disagreements these days have come to transform all but the most basic debates into intractable conflicts.

Twice in recent months, the appropriations process has nearly brought federal agencies to a screeching halt, threatening to shut down the government and hamstring the country’s response to the pandemic. Republicans at the end of last year even held up a swift resolution to the funding fight to launch an ill-fated political campaign against Biden’s vaccination and testing mandates targeting businesses. The Supreme Court later struck down some of the administration’s policies.

This year, lawmakers from both parties have pledged to steer clear of the same brinkmanship that characterized negotiations in fights past. Instead they have aimed for a deal that covers spending through the fiscal year, which concludes at the end of September. But they already face a race against the clock to act by Feb. 18, the date by which lawmakers must adopt another short-term measure or broker the sort of compromise that has so far eluded them during Biden’s presidency.

With the clock ticking, Democrats huddled Tuesday morning to discuss their political strategy. Emerging from the gathering, House Speaker Nancy Pelosi (D-Calif.) and Senate Majority Leader Charles E. Schumer (D-N.Y.) each offered their public, formal blessings for the nascent talks around a longer-term spending deal. Schumer added that the party’s negotiators are “on the same page,” though he and Pelosi noted they had not yet received an official counteroffer from their GOP counterparts.

The leaders of the House and Senate’s top panels overseeing appropriations then gathered on their own late Tuesday to try to put pen to paper. One of the participants in the bipartisan session, Sen. Richard C. Shelby (R-Ala.), later told reporters that lawmakers are still seeking an “agreement on our principles, then the [spending] top line will follow.”

Shelby acknowledged at the time that a slew of policy gaps still separate the parties, including the balance between “social spending versus national security.” But he joined his Democratic counterparts in maintaining that “we all want to try to get to yes,” adding: “We’re not there yet.”

Democrats seek significant boosts in federal domestic spending, now that the country for the first time in a decade is not bound to strict budget caps. Writing to her caucus last month, Pelosi endorsed the need for a “strong omnibus” that would “address critical priorities for our country, including for our national security and for communities at home.”

Yet some of the Democrats’ proposed spending increases and policy tweaks have troubled Shelby and his fellow Republicans. Beginning last year, they pointed to a series of “poison pills” — from Democratic plans to enhance the IRS to the party’s effort to loosen a long-standing ban on federal funding for abortion services — that could sink any talks on a deal. GOP lawmakers also have called for parity in defense and nondefense spending, a move that historically has troubled some Democrats, who have sought greater cuts to the Pentagon than even Biden has proposed.

“We’re looking for parity. We live in a troubled world and a lot of us think national security is important for this country,” Shelby, who leads the GOP on the Senate’s appropriations panel, stressed on Tuesday.

Democrats and Republicans otherwise appeared to downplay any potential disagreements following their flurry of meetings. Sen. Patrick J. Leahy (D-Vt.), the chairman of the chamber’s appropriations panel, described himself as “always optimistic.” Rep. Rosa L. DeLauro (D-Conn.), his counterpart in the House, declined to specify any timelines or expectations for the follow-up session set for Wednesday afternoon.

“The goal is to get an agreement,” DeLauro said.

But such a deal, known in congressional parlance as an omnibus, is likely to carry additional significance this year. The compromise could pave the way for billions of dollars to flow toward projects that would improve the nation’s roads, bridges, pipes, ports and Internet connections. Lawmakers approved the money as part of a bipartisan infrastructure law finalized in 2021, but the package requires them to complete the act of writing the check, so to speak, before the real work can begin.

The must-pass spending measure also could serve as a legislative vehicle for lawmakers to advance a slew of other critical priorities. That includes new disaster aid in response to recent hurricanes and the tornadoes in and around Kentucky last year, for example, along with billions of dollars to augment the country’s efforts to combat the coronavirus.

With cases still rampant from the omicron variant, Democrats in recent weeks have renewed their calls for more federal spending to boost testing, therapeutics and vaccine access, especially abroad. Others have sought to provide additional benefits to workers, including the revival of a program that offers limited, pandemic-related paid family and medical leave. And still other Democrats have joined with a small but growing crop of Republicans who hope to give the green light to new assistance targeting restaurants, gyms, stages and other small businesses.

Lawmakers begin talks on another round of coronavirus relief for businesses

Publicly, the White House has maintained in recent months that significant money remains as part of the roughly $1.9 trillion American Rescue Plan that Biden signed into law last spring. White House officials, meanwhile, have quietly started preparing a supplemental request focused on outstanding public health needs.

But the Biden administration by Tuesday afternoon had not transmitted any official request to the Capitol, Democratic leaders said. “We’re waiting for the administration to send us something. They haven’t sent us anything yet,” Schumer told reporters.

Some party aides acknowledged it had become a deliberate, delicate dance, reflecting an attempt to keep Congress focused on solidifying government funding levels without adding any other political complications.

#### Space policy causes immense partisan backlash that wrecks the delicate balance

Dreier 16 [Casey Dreier, Chief Advocate & Senior Space Policy Adviser for The Planetary Society, April 13, 2016. “Does Presidential Intervention Undermine Consensus for NASA?” https://www.planetary.org/blogs/casey-dreier/2016/0413-does-a-strong-president-help-or-hurt-consensus-on-NASA.html]

To see how this happens, I recommend reading the book “[Beyond Ideology](http://smile.amazon.com/Beyond-Ideology-Politics-Principles-Partisanship/dp/0226470768/ref=smi_www_rco2_go_smi_g2243582042?_encoding=UTF8&*Version*=1&*entries*=0&ie=UTF8)” by Frances Lee. The author’s larger premise is that issues having no intrinsic relation to stated party ideology have become increasingly polarized in recent years. This is a function of the two party nature of our political system. If your party coalition wins, the other one loses. It’s [It is] zero-sum. Your party can win in one of two ways: you can make a better pitch to voters by demonstrating the superiority of your agenda; or you can undermine and stymie the agenda of the opposition party, making them unpopular with voters, and pick up the seats that they lose. Since you’re the only other political party, you gain in either scenario. I’m not sure if you’ve noticed, but the “undermine and stymie” approach has been popular for quite some time now in the U.S. Congress. Given this situation, the President and their policies naturally become the symbolic target of the opposition party. Anything promoted by the President effectively induces opposition by association. Lee demonstrates the magnitude of this induced polarization on various types of issues. For highly polarized issues like the role of government in the economy, or social issues, the impact is minimal—the opposition has already been clearly defined and generally falls into clearly defined ideologies of the Republican and Democratic parties. But for issues that do not fit readily into a predefined political ideology—like space—the induced polarization by the President can be significant. In fact, Lee showed that space, science, and technology issues incur the greatest increase in partisanship based on their inclusion in the Presidential agenda. One need only look to at the responses by political operatives of the opposing party to the strong human spaceflight proposals by [Barack Obama in 2010](http://www.shelby.senate.gov/public/index.cfm/mobile/newsreleases?ID=25F3AD2E-802A-23AD-4960-F512B9E205D2), [George W. Bush in 2004](http://www.nbcnews.com/id/3950099/ns/technology_and_science-space/t/bush-sets-new-course-moon-beyond/#.Vw3UMRMrKHo), and [George H.W. Bush in 1989](http://www.nytimes.com/1989/07/21/us/president-calls-for-mars-mission-and-a-moon-base.html) to see this reflected in recent history. This isn’t to say that Presidents can’t have a significant impact on the space program. Clearly they can. But the broad consensus needed for stability after their departure from office may be undermined by the very priority they gave it during their tenure. It what amounts to a mixed blessing for NASA, the U.S. space program does have an unusually strong bipartisan group of politicians who support the program due to NASA centers in a variety of states throughout the union. Berger notes this throughout his article, and it does, in a way, act as force that is resistant to change for good and bad. This mitigates somewhat the pure polarization seen on other science and technology issues. But for a Journey to Mars—a major effort that would, at best, require stability and significant funding over many Presidential administrations—that may not be enough. Perhaps the solution is for the next President to maintain a light touch on space. Maybe they should speak softly through the budget process, and avoid the Kennedyesque speeches and declarations to Congress that induce the types of partisanship we so dearly need to avoid.

#### Bipart’s key—otherwise, yearlong CR ruins defense industrial base and military modernization

Gould 1/22 [Joe Gould is senior Pentagon reporter for Defense News, “Defense industry frets as funding talks crawl”, 1/21/2022, https://www.defensenews.com/congress/budget/2022/01/21/defense-industry-frets-as-funding-talks-crawl/]

Despite repeated warnings from uniformed Pentagon leaders and lawmakers of both parties that a full-year continuing resolution will hurt national security, some defense industry advocates are still worried about an impasse.

On Thursday, both chambers of Congress left town on recess until the week of Jan. 31, after making scant progress on a deal for an omnibus federal spending package. Amid partisan divisions over funding levels and policy provisions, House Speaker Nancy Pelosi, D-N.Y., warned that a full-year CR would create a national security crisis ― in an effort to pressure Republicans.

“It is a national security issue of the highest priority, with the threats that exist out there. To go to a continuing resolution instead of a decision-making omnibus bill is to weaken our security and our stability,” Pelosi told reporters Thursday. “The Republicans should know that, so we hope we will be able to bring that legislation to the floor before [the current CR] expires.”

With fiscal 2022 spending bills four months overdue, lawmakers and the Pentagon have warned against a yearlong CR that would freeze defense spending at the level of 2021 appropriations. CRs continue funding at the previous year’s level, preventing the Pentagon from starting new acquisition programs and ramping up production quantities.

And without a 2022 spending deal to set a new baseline, the president’s budget submission is in limbo and expected to come months late, which is sowing uncertainty for the military and its vendors.

President Joe Biden signed a defense policy bill that boosts his $753 billion national defense budget request for FY22 to $778 billion, a 3% increase. But Republicans have said they want more for defense, less than the 16% increase proposed by Democrats and an agreement on some politically charged policy riders.

By the reckoning of National Defense Industrial Association Chairman Arnold Punaro, lawmakers could meet somewhere in the middle with 8% increases for both defense and nondefense, but that’s far from a certainty. Democrats have raised fears some Republicans see budget gridlock as an advantage heading into midterm elections and don’t want a deal at all.

“We’re still in budget chaos,” Punaro told Defense News this week. “China’s on the march, Russia’s on the move and North Korea’s on the advance, and yet Congress is sitting on their duff, not passing a spending bill. It’s disgraceful.”

The lack of a 2022 deal as a baseline for defense amid escalating inflation presents a huge challenge for Pentagon planners crafting the FY23 budget request, Punaro said. He worried the administration could make a flat budget request, potentially costing the Pentagon billions of dollars in buying power.

Meanwhile, a full-year CR would yield $11 billion of lost growth, while 7% inflation would mean another $50 billion in lost buying power, according to defense consultant Jim McAleese, the founder of McAleese & Associates.

Though the current CR runs out on Feb. 18., recent negotiations in Congress have sparked some optimism.

Lead appropriators in the Senate met Jan. 13 with Senate Majority Leader Chuck Schumer and Senate Minority Leader Mitch McConnell to set the guidelines for negotiations. From there, lead House and Senate appropriators met to kick off talks, and Pelosi has said she’s been in discussions with House Appropriations Committee Chairwoman Rosa DeLauro, D-Conn.

Asked Thursday whether it’s realistic to get an agreement by Feb. 18, as Congress was about to leave town Senate Appropriations Committee Vice Chairman Richard Shelby, R-Ala., said: “That’s a good question. It’d be hard to get it by the 18th, but if we can make huge progress, we can probably get done soon.”

It’s unclear whether looming international crises with Russia and Ukraine, China and Taiwan, and North Korean missile tests would add pressure to pass defense spending. When asked about Pelosi’s comments, Shelby seemed to dig in.

“She’s right on that, but to underfund defense as some people would like to do, that would be a bigger challenge,” he said.

At a House Appropriations Committee hearing Jan. 12 about the effects of a potential full-year CR, the top officers of the Army, Navy, Air Force, Marine Corps and Space Force warned such a move would sabotage the military’s efforts to compete with China by stalling new weapons like hypersonic missiles.

“CRs effectively prevent modernization at speed,” said Marine Corps Commandant Gen. David Berger. “We actually stand to be outpaced by China — not because of their speed but because of our failure to comply with our own budgetary processes.”

The president and CEO of the Aerospace Industries Association, Eric Fanning, has warned that budget unpredictability is inefficient for the defense industry, which has to idle while the Pentagon waits for its projects to be funded. Amid the Capitol Hill activity, Fanning said he is “hopeful that the momentum continues.”

“The hearing painted a concerning picture of additional and unnecessary costs, as well risks to capabilities and to the industrial base in the short and long-terms. There was bipartisan agreement on how devastating a year-long CR could be,” Fanning said in a statement Thursday. “Over the last few days, there are positive signs that the message is getting through and the top appropriators from both parties are coming to the table.”

Lead Pentagon officials have talked for years about the need to harness the innovation of small tech firms. But CRs stifle those efforts, an executive at one of those firms, Anduril Industries, wrote in an essay this week.

#### Impact’s cyber and deterrence crash

Manchester ’19, [Josh, Founder of Champion Hill and General Partner at Foundation Capital, Venture-backed Startups Will Build the Defense Technology the Free World Needs Right Now, https://medium.com/@joshmanchester/venture-backed-startups-will-build-the-defense-technology-the-free-world-needs-right-now-d2cefa2b2196]

With U.S. defense spending exceeding $700 billion per year, how could the United States be on the brink of a national security emergency? Simply put, America’s national security competitors are outflanking an Industrial-Age U.S. military machine that, like a lumbering dinosaur, is not adapting fast enough to its changing environment. The Pentagon desperately needs rapid innovation. Yet the current defense industry structure is not compatible with U.S. venture capital and high-growth technology industries for several reasons: · The U.S. military’s industrial base is centered on a few huge oligopoly suppliers known within the Beltway as “the Primes” — Lockheed Martin, Boeing, Raytheon, General Dynamics, and Northrop Grumman. These companies, ancient by tech startup standards, have optimized themselves to sustain a 20th century Industrial Age World War II-style force structure which supports the political decision-makers across the country who appropriate the funding that industrial base receives. The Primes are great at building very large platforms that cost billions of dollars and take 15–30 years to field. The Primes are also historically heavy on hardware talent and much lighter on software talent. · The Primes receive the vast majority of defense spending. Defense budgets have historically not unlocked for startups. While a defense private equity industry exists to aggregate small companies and flip them downstream to the Primes, venture capital investors, who have a much higher return threshold, know that it’s hard to have venture outcomes (in other words, to make money) when a company can’t win large market share or survive as a stand-alone business. · Venture-backed tech industries have matured as an asset class in peacetime and most mainstream U.S. venture firms in existence today do not have institutional cultures or histories that include defense innovation, apart from cybersecurity. · Major tech companies, like the FAANGs (Facebook, Apple, Amazon, Netflix, Google and Microsoft too), are generally unwilling to work on defense related projects, and sometimes must deal with employee protests when they do. · Many observers perceive this as an indicator that software engineers generally don’t want to work on defense-related innovation. · Finally, in a bizarre set of twists, some of the organizations that comprise the Limited Partners of venture capital firms (the blue chip endowments and foundations of the U.S. Eastern establishment, often founded on the fortunes of great American industrialists from decades ago, along with public pension funds throughout the country) are [sometimes accidentally funding Chinese defense technology](https://www.buzzfeednews.com/article/ryanmac/us-money-funding-facial-recognition-sensetime-megvii) while often restricting their U.S. venture managers from making defense investments. Foundations and endowments in particular often have negotiated Limited Partnership Agreements with the venture firms they finance precluding them from investing in anything that could have military usage. The irony is that these same tax-exempt pools of capital are frequently investors in Chinese venture funds which provide software to make smarter and more deadly Chinese weapons and to the advanced surveillance systems that have turned China’s Xinjiang province into a virtual Uighur prison camp and a human rights disaster. No single individual or entity has caused this state of events to transpire; it is simply the accumulation of various cultural aspects of the capital formation process of the venture industry and its portfolio companies. Fortunately, we believe that almost all these characteristics will rapidly change over the next few years. But first let’s discuss some additional background. Venture capital has come of age in a time of unprecedented peace The U.S. venture capital industry is about 100 years old. Bessemer Ventures was formed in 1911 and originally had just the family fortune of Henry Phipps Jr., a co-founder of Carnegie Steel, as its sole limited partner. Despite these deep roots, the U.S. venture industry has only institutionalized as an asset class since the mid-1990s. Until then it was extremely clubby and very small. Sequoia Capital, KPCB, Charles River Ventures, and NEA were all founded in the 1970s and Accel Partners in the 1980s. But it has really only been since the mid-1990s (Benchmark Capital was founded in 1995, as was my own former firm, Foundation Capital) that the industry has institutionalized and grown substantially, first in the desktop computing and internet boom, and second during the combination of platform shifts over the last ten years that have given us mobile computing, social media, e-commerce, cloud computing, software-as-a-service and all of their associated new business models. For a quarter of a century, the institutional, mainstream venture investing ecosystem, at the startup, venture firm and limited partner levels, developed business processes, mental models, networks, and expertise in certain technical areas and heuristics — in aggregate, an industry culture — that have created one of the most dynamic parts of the U.S. economy. The U.S. tech industry is also one of the most unique aspects of American life — and a powerful, difficult-to-replicate form of “soft power,” featuring an inclusivity for aspirational immigrant founders — a feature perhaps unequalled in human history. From a long-term U.S. historical viewpoint, it is striking that the venture industry’s maturation has occurred during a unique period in American history when the United States had no major great power competitor, either ideologically or technologically. The Cold War ended in 1991, the Soviet Union dissolved, and Russia was in disarray for the next 15 years. This period of peace was not without its own unique trials, but the security challenges associated with terrorism, counterinsurgency, and lower-intensity military activity have not required the sort of Herculean societal and political efforts that were drawn upon during the Cold War or World War II. We should all be grateful every day that this has been the reality of the last 25 years. A useful analogy might be made with gold. In 1933, President Roosevelt made it illegal for U.S. citizens to own gold. In 1934, Benjamin Graham published the first edition of Security Analysis. In January 1975 it became legal to own gold again. Graham died in 1976. It was therefore illegal to own gold during key years of the development of modern security analysis. From this gap came gold bugs — the weirdos who seemed to always talk about nothing else, and didn’t get invited to key social events. No analogies are perfect but this captures some of the similarities between venture and defense today. Cybersecurity investors understand the cybersecurity parts of U.S. defense. But most mainstream Silicon Valley venture firms do not spend time on other parts of defense due to the industry’s institutionalization during this recent period of relative peace and American dominance — which has also been a time when the lion’s share of defense spending has gone to the Primes, as discussed. Sadly, peace is ahistorical. Great power competitions are a feature of humanity, not a bug. Periods of time when a major power, or superpower, are not challenged in some profound fashion by one or more other powers, regardless of whether they are driven by fear, prestige, economic interest, or ideology — are, in short, rare when looking back on the sojourn of homo sapiens on planet earth. The period when the free world had a monopoly on power has now ended. The tech-defense status quo is inverting The only previously delineated area where we don’t expect much change is from the FAANGs. These massive companies are best viewed as small nation-states themselves with global stakeholders. For example, many of their employees are not U.S. citizens and may not want their employers engaged in U.S. defense work. We think everything else will invert. · We believe defense budgets will begin unlocking for young startups. Many key national security decision-makers in Washington are now seeking better, faster alternatives to the byzantine Pentagon acquisitions process. Thought leaders like Will Roper, in charge of the U.S. Air Force’s $40 billion annual research and acquisition budget, are [eagerly welcoming the contributions that smaller, nimble venture-capital funded entrepreneurs can make](https://federalnewsnetwork.com/dod-reporters-notebook-jared-serbu/2019/03/air-force-looks-to-build-big-idea-pipeline-to-expand-its-industrial-base/). Roper, and others in the Pentagon, are reforming their practices to make it easier for genuine innovators to compete against the legacy defense oligopoly. When recently asked at a conference what problem keeps him up at night, Roper replied, “The industrial base.” · Given the hardware roots of the Primes, they are ill-suited to provide solutions to many of the most pressing problems today. The Defense Department will increasingly allocate resources to startups solving software problems for which the Primes have no existing stock of machine learning engineers. · As this happens some venture firms will experience cultural shifts toward more defense investing. As venture capitalists see that startups are receiving large purchase orders from various Defense Department units, they will develop strategies to deploy capital toward defense innovation. A good example is [last week’s award by the Air Force of $121 million to Pivotal Software in San Francisco](https://dod.defense.gov/News/Contracts/Contract-View/Article/1861753/source/GovDelivery/). · Institutional limited partners as a group will likely slowly allocate away from any China-based manager who could be investing in Chinese military technologies. Some LPs with the freedom to do so may remove restrictions on defense investing from limited partnership agreements. · We believe it is a myth that software engineers do not want to work on defense. This is a classic case of preference falsification, the social phenomenon in which people do not speak their true minds about a given topic, though their actions often indicate otherwise. We believe that talented engineers are often very attracted to defense-related work because it often offers the hardest problems to solve. An enormous opportunity therefore exists for startups: to hire the engineers who don’t want to work for ancient and outdated Primes, and who aren’t very welcome at the FAANGS, but who wish to create the technologies that an increasingly eager democratic government needs to defend itself and its allies. Companies in our own portfolio, like [SpaceX](https://www.spacex.com/), [Rigetti Computing](https://www.rigetti.com/), [Anduril Industries](https://www.anduril.com/), and [Umbra Lab](https://umbralab.com/) are executing this strategy. The hardest technical problems today are defense-related How can data from satellites, drones, land-based radar, ships, and other sources be stitched together, in real time, to find long-range missiles on mobile transporters, hiding among the background in cities, forests, and mountains? How can friendly troops, who have separated into very small units in order to hide and survive, be connected to each other electronically, and be resupplied from historically long ranges? How and to what degree and in what conditions should an adversary’s sensor networks be spoofed? What type of false electronic picture can be painted? The aggregation of targeting data for an air wing takes 72 hours today and has a heavy human component. Can this complex optimization problem be solved autonomously, such that the targeting list for pilots is developed in 15 minutes? How does a deployed force of perhaps 50,000 personnel, with planes, ships, and land forces, continue to fight when satellite links have been knocked out, and “reachback” to the U.S., for data processing, is no longer possible? Can deep learning be used for crisis diplomacy? Put another way, since DeepMind’s AlphaZero can teach itself to move pieces forward on a board to win a game, can it learn to move them backwards, to de-escalate a crisis? These problems, and many others, are asking to be solved by entrepreneurs. Phase change There is a looming breakdown in deterrence. If the U.S. defense establishment is unable to adapt to the new great power competitive environment, then adversaries will be tempted to grab for a fait accompli, with war the result. This has been the pattern since Homer wrote The Iliad; there is no evidence to conclude human behavior is different in the 21st Century. We believe the prevention of this scenario involves rapid technical innovation. The defense environment is more favorable now for upstart firms than anytime in the past several decades. If you are a founder building technology to ensure the survival of government by consent, our firm would like to talk to you.

## t

#### Interp: Interp – the aff must only defend that the private appropriation of outer space is unjust

#### Violation – they defend public governance of outer space through a “global commons” as per their Vollmer card

#### Vote neg for limits and ground: extra-topicality allows them to tack on infinite planks to artificially improve aff solvency and spike out of DA impacts—e.g., impacts to the economy. Also key to education and advocacy – they never have to test their aff against well-researched objections which o/w since it's the only portable skill in debate.

#### Drop the debater because the round has been irreparably skewed.

#### Use competing interps because reasonability is arbitrary and forces judge intervention.

#### No RVIs – they’re illogical bc they shouldn’t win for being topical

#### At best for the aff, there’s no risk of spillover from whole rez to a global commons because states still have economic and political/military incentives to exploit space individually

## Case

### fw

#### Extinction outweighs---it’s the utmost moral evil and disavowal of the risk makes it more likely.

Burns 2017 (Elizabeth Finneron-Burns is a Teaching Fellow at the University of Warwick and an Affiliated Researcher at the Institute for Futures Studies in Stockholm, What’s wrong with human extinction?, <http://www.tandfonline.com/doi/pdf/10.1080/00455091.2016.1278150?needAccess=true>, Canadian Journal of Philosophy, 2017)

Many, though certainly not all, people might believe that it would be wrong to bring about the end of the human species, and the reasons given for this belief are various. I begin by considering four reasons that could be given against the moral permissibility of human extinction. I will argue that only those reasons that impact the people who exist at the time that the extinction or the knowledge of the upcoming extinction occurs, can explain its wrongness. I use this conclusion to then consider in which cases human extinction would be morally permissible or impermissible, arguing that there is only a small class of cases in which it would not be wrong to cause the extinction of the human race or allow it to happen. 2.1. It would prevent the existence of very many happy people One reason of human extinction might be considered to be wrong lies in the value of human life itself. The thought here might be that it is a good thing for people to exist and enjoy happy lives and extinction would deprive more people of enjoying this good. The ‘good’ in this case could be understood in at least two ways. According to the first, one might believe that you benefit a person by bringing them into existence, or at least, that it is good for that person that they come to exist. The second view might hold that if humans were to go extinct, the utility foregone by the billions (or more) of people who could have lived but will now never get that opportunity, renders allowing human extinction to take place an incidence of wrongdoing. An example of this view can be found in two quotes from an Effective Altruism blog post by Peter Singer, Nick Beckstead and Matt Wage: One very bad thing about human extinction would be that billions of people would likely die painful deaths. But in our view, this is by far not the worst thing about human extinction. The worst thing about human extinction is that there would be no future generations. Since there could be so many generations in our future, the value of all those generations together greatly exceeds the value of the current generation. (Beckstead, Singer, and Wage 2013) The authors are making two claims. The first is that there is value in human life and also something valuable about creating future people which gives us a reason to do so; furthermore, it would be a very bad thing if we did not do so. The second is that, not only would it be a bad thing for there to be no future people, but it would actually be the worst thing about extinction. Since happy human lives have value, and the number of potential people who could ever exist is far greater than the number of people who exist at any one time, even if the extinction were brought about through the painful deaths of currently existing people, the former’s loss would be greater than the latter’s. Both claims are assuming that there is an intrinsic value in the existence of potential human life. The second claim makes the further assumption that the forgone value of the potential lives that could be lived is greater than the disvalue that would be accrued by people existing at the time of the extinction through suffering from painful and/or premature deaths. The best-known author of the post, Peter Singer is a prominent utilitarian, so it is not surprising that he would lament the potential lack of future human lives per se. However, it is not just utilitarians who share this view, even if implicitly. Indeed, other philosophers also seem to imply that they share the intuition that there is just something wrong with causing or failing to prevent the extinction of the human species such that we prevent more ‘people’ from having the ‘opportunity to exist’. Stephen Gardiner (2009) and Martin O’Neill (personal correspondence), both sympathetic to contract theory, for example, also find it intuitive that we should want more generations to have the opportunity to exist, assuming that they have worth-living lives, and I find it plausible to think that many other people (philosophers and non-philosophers alike) probably share this intuition. When we talk about future lives being ‘prevented’, we are saying that a possible person or a set of possible people who could potentially have existed will now never actually come to exist. To say that it is wrong to prevent people from existing could either mean that a possible person could reasonably reject a principle that permitted us not to create them, or that the foregone value of their lives provides a reason for rejecting any principle that permits extinction. To make the first claim we would have to argue that a possible person could reasonably reject any principle that prevented their existence on the grounds that it prevented them in particular from existing. However, this is implausible for two reasons. First, we can only wrong someone who did, does or will actually exist because wronging involves failing to take a person’s interests into account. When considering the permissibility of a principle allowing us not to create Person X, we cannot take X’s interest in being created into account because X will not exist if we follow the principle. By considering the standpoint of a person in our deliberations we consider the burdens they will have to bear as a result of the principle. In this case, there is no one who will bear any burdens since if the principle is followed (that is, if we do not create X), X will not exist to bear any burdens. So, only people who do/will actually exist can bear the brunt of a principle, and therefore occupy a standpoint that is owed justification. Second, existence is not an interest at all and a possible person is not disadvantaged by not being caused to exist. Rather than being an interest, it is a necessary requirement in order to have interests. Rivka Weinberg describes it as ‘neutral’ because causing a person to exist is to create a subject who can have interests; existence is not an interest itself.3 In order to be disadvantaged, there must be some detrimental effect on your interests. However, without existence, a person does not have any interests so they cannot be disadvantaged by being kept out of existence. But, as Weinberg points out, ‘never having interests itself could not be contrary to people’s interests since without interest bearers, there can be no ‘they’ for it to be bad for’ (Weinberg 2008, 13). So, a principle that results in some possible people never becoming actual does not impose any costs on those ‘people’ because nobody is disadvantaged by not coming into existence.4 It therefore seems that it cannot be wrong to fail to bring particular people into existence. This would mean that no one acts wrongly when they fail to create another person. Writ large, it would also not be wrong if everybody decided to exercise their prerogative not to create new people and potentially, by consequence, allow human extinction. One might respond here by saying that although it may be permissible for one person to fail to create a new person, it is not permissible if everyone chooses to do so because human lives have value and allowing human extinction would be to forgo a huge amount of value in the world. This takes us to the second way of understanding the potential wrongness of preventing people from existing — the foregone value of a life provides a reason for rejecting any principle that prevents it. One possible reply to this claim turns on the fact that many philosophers acknowledge that the only, or at least the best, way to think about the value of (individual or groups of) possible people’s lives is in impersonal terms (Parfit 1984; Reiman 2007; McMahan 2009). Jeff McMahan, for example, writes ‘at the time of one’s choice there is no one who exists or will exist independently of that choice for whose sake one could be acting in causing him or her to exist … it seems therefore that any reason to cause or not to cause an individual to exist … is best considered an impersonal rather than individual-affecting reason’ (McMahan 2009, 52). Another reply along similar lines would be to appeal to the value that is lost or at least foregone when we fail to bring into existence a next (or several next) generations of people with worth-living lives. Since ex hypothesi worth-living lives have positive value, it is better to create more such lives and worse to create fewer. Human extinction by definition is the creation of no future lives and would ‘deprive’ billions of ‘people’ of the opportunity to live worth-living lives. This might reduce the amount of value in the world at the time of the extinction (by killing already existing people), but it would also prevent a much vaster amount of value in the future (by failing to create more people). Both replies depend on the impersonal value of human life. However, recall that in contractualism impersonal values are not on their own grounds for reasonably rejecting principles. Scanlon himself says that although we have a strong reason not to destroy existing human lives, this reason ‘does not flow from the thought that it is a good thing for there to be more human life rather than less’ (104). In contractualism, something cannot be wrong unless there is an impact on a person. Thus, neither the impersonal value of creating a particular person nor the impersonal value of human life writ large could on its own provide a reason for rejecting a principle permitting human extinction. It seems therefore that the fact that extinction would deprive future people of the opportunity to live worth-living lives (either by failing to create either particular future people or future people in general) cannot provide us with a reason to consider human extinction to be wrong. Although the lost value of these ‘lives’ itself cannot be the reason explaining the wrongness of extinction, it is possible the knowledge of this loss might create a personal reason for some existing people. I will consider this possibility later on in section (d). But first I move to the second reason human extinction might be wrong per se. 2.2. It would mean the loss of the only known form of intelligent life and all civilization and intellectual progress would be lost A second reason we might think it would be wrong to cause human extinction is the loss that would occur of the only (known) form of rational life and the knowledge and civilization that that form of life has created. One thought here could be that just as some might consider it wrong to destroy an individual human heritage monument like the Sphinx, it would also be wrong if the advances made by humans over the past few millennia were lost or prevented from progressing. A related argument is made by those who feel that there is something special about humans’ capacity for rationality which is valuable in itself. Since humans are the only intelligent life that we know of, it would be a loss, in itself, to the world for that to end. I admit that I struggle to fully appreciate this thought. It seems to me that Henry Sidgwick was correct in thinking that these things are only important insofar as they are important to humans (Sidgwick 1874, I.IX.4).5 If there is no form of intelligent life in the future, who would there be to lament its loss since intelligent life is the only form of life capable of appreciating intelligence? Similarly, if there is no one with the rational capacity to appreciate historic monuments and civil progress, who would there be to be negatively affected or even notice the loss?6 However, even if there is nothing special about human rationality, just as some people try to prevent the extinction of nonhuman animal species, we might think that we ought also to prevent human extinction for the sake of biodiversity. The thought in this, as well as the earlier examples, must be that it would somehow be bad for the world if there were no more humans even though there would be no one for whom it is bad. This may be so but the only way to understand this reason is impersonally. Since we are concerned with wrongness rather than badness, we must ask whether something that impacts no one’s well-being, status or claims can be wrong. As we saw earlier, in the contractualist framework reasons must be personal rather than impersonal in order to provide grounds for reasonable rejection (Scanlon 1998, 218–223). Since the loss of civilization, intelligent life or biodiversity are per se impersonal reasons, there is no standpoint from which these reasons could be used to reasonably reject a principle that permitted extinction. Therefore, causing human extinction on the grounds of the loss of civilization, rational life or biodiversity would not be wrong. 2.3. Existing people would endure physical pain and/or painful and/or premature deaths Thinking about the ways in which human extinction might come about brings to the fore two more reasons it might be wrong. It could, for example, occur if all humans (or at least the critical number needed to be unable to replenish the population, leading to eventual extinction) underwent a sterilization procedure. Or perhaps it could come about due to anthropogenic climate change or a massive asteroid hitting the Earth and wiping out the species in the same way it did the dinosaurs millions of years ago. Each of these scenarios would involve significant physical and/or non-physical harms to existing people and their interests. Physically, people might suffer premature and possibly also painful deaths, for example. It is not hard to imagine examples in which the process of extinction could cause premature death. A nuclear winter that killed everyone or even just every woman under the age of 50 is a clear example of such a case. Obviously, some types of premature death themselves cannot be reasons to reject a principle. Every person dies eventually, sometimes earlier than the standard expected lifespan due to accidents or causes like spontaneously occurring incurable cancers. A cause such as disease is not a moral agent and therefore it cannot be wrong if it unavoidably kills a person prematurely. Scanlon says that the fact that a principle would reduce a person’s well-being gives that person a reason to reject the principle: ‘components of well-being figure prominently as grounds for reasonable rejection’ (Scanlon 1998, 214). However, it is not settled yet whether premature death is a setback to well-being. Some philosophers hold that death is a harm to the person who dies, whilst others argue that it is not.7 I will argue, however, that regardless of who is correct in that debate, being caused to die prematurely can be reason to reject a principle when it fails to show respect to the person as a rational agent. Scanlon says that recognizing others as rational beings with interests involves seeing reason to preserve life and prevent death: ‘appreciating the value of human life is primarily a matter of seeing human lives as something to be respected, where this involves seeing reasons not to destroy them, reasons to protect them, and reasons to want them to go well’ (Scanlon 1998, 104). The ‘respect for life’ in this case is a respect for the person living, not respect for human life in the abstract. This means that we can sometimes fail to protect human life without acting wrongfully if we still respect the person living. Scanlon gives the example of a person who faces a life of unending and extreme pain such that she wishes to end it by committing suicide. Scanlon does not think that the suicidal person shows a lack of respect for her own life by seeking to end it because the person whose life it is has no reason to want it to go on. This is important to note because it emphasizes the fact that the respect for human life is person-affecting. It is not wrong to murder because of the impersonal disvalue of death in general, but because taking someone’s life without their permission shows disrespect to that person. This supports its inclusion as a reason in the contractualist formula, regardless of what side ends up winning the ‘is death a harm?’ debate because even if death turns out not to harm the person who died, ending their life without their consent shows disrespect to that person. A person who could reject a principle permitting another to cause his or her premature death presumably does not wish to die at that time, or in that manner. Thus, if they are killed without their consent, their interests have not been taken into account, and they have a reason to reject the principle that allowed their premature death.8 This is as true in the case of death due to extinction as it is for death due to murder. However, physical pain may also be caused to existing people without killing them, but still resulting in human extinction. Imagine, for example, surgically removing everyone’s reproductive organs in order to prevent the creation of any future people. Another example could be a nuclear bomb that did not kill anyone, but did painfully render them infertile through illness or injury. These would be cases in which physical pain (through surgery or bombs) was inflicted on existing people and the extinction came about as a result of the painful incident rather than through death. Furthermore, one could imagine a situation in which a bomb (for example) killed enough people to cause extinction, but some people remained alive, but in terrible pain from injuries. It seems uncontroversial that the infliction of physical pain could be a reason to reject a principle. Although Scanlon says that an impact on well-being is not the only reason to reject principles, it plays a significant role, and indeed, most principles are likely to be rejected due to a negative impact on a person’s well-being, physical or otherwise. It may be queried here whether it is actually the involuntariness of the pain that is grounds for reasonable rejection rather than the physical pain itself because not all pain that a person suffers is involuntary. One can imagine acts that can cause physical pain that are not rejectable — base jumping or life-saving or improving surgery, for example. On the other hand, pushing someone off a cliff or cutting him with a scalpel against his will are clearly rejectable acts. The difference between the two cases is that in the former, the person having the pain inflicted has consented to that pain or risk of pain. My view is that they cannot be separated in these cases and it is involuntary physical pain that is the grounds for reasonable rejection. Thus, the fact that a principle would allow unwanted physical harm gives a person who would be subjected to that harm a reason to reject the principle. Of course the mere fact that a principle causes involuntary physical harm or premature death is not sufficient to declare that the principle is rejectable — there might be countervailing reasons. In the case of extinction, what countervailing reasons might be offered in favour of the involuntary physical pain/ death-inducing harm? One such reason that might be offered is that humans are a harm to the natural environment and that the world might be a better place if there were no humans in it. It could be that humans might rightfully be considered an all-things-considered hindrance to the world rather than a benefit to it given the fact that we have been largely responsible for the extinction of many species, pollution and, most recently, climate change which have all negatively affected the natural environment in ways we are only just beginning to understand. Thus, the fact that human extinction would improve the natural environment (or at least prevent it from degrading further), is a countervailing reason in favour of extinction to be weighed against the reasons held by humans who would experience physical pain or premature death. However, the good of the environment as described above is by definition not a personal reason. Just like the loss of rational life and civilization, therefore, it cannot be a reason on its own when determining what is wrong and countervail the strong personal reasons to avoid pain/death that is held by the people who would suffer from it.9 Every person existing at the time of the extinction would have a reason to reject that principle on the grounds of the physical pain they are being forced to endure against their will that could not be countervailed by impersonal considerations such as the negative impact humans may have on the earth. Therefore, a principle that permitted extinction to be accomplished in a way that caused involuntary physical pain or premature death could quite clearly be rejectable by existing people with no relevant countervailing reasons. This means that human extinction that came about in this way would be wrong. There are of course also additional reasons they could reject a similar principle which I now turn to address in the next section. 2.4. Existing people could endure non-physical harms I said earlier than the fact in itself that there would not be any future people is an impersonal reason and can therefore not be a reason to reject a principle permitting extinction. However, this impersonal reason could give rise to a personal reason that is admissible. So, the final important reason people might think that human extinction would be wrong is that there could be various deleterious psychological effects that would be endured by existing people having the knowledge that there would be no future generations. There are two main sources of this trauma, both arising from the knowledge that there will be no more people. The first relates to individual people and the undesired negative effect on well-being that would be experienced by those who would have wanted to have children. Whilst this is by no means universal, it is fair to say that a good proportion of people feel a strong pull towards reproduction and having their lineage continue in some way. Samuel Scheffler describes the pull towards reproduction as a ‘desire for a personalized relationship with the future’ (Scheffler 2012, 31). Reproducing is a widely held desire and the joys of parenthood are ones that many people wish to experience. For these people knowing that they would not have descendants (or that their descendants will endure painful and/or premature deaths) could create a sense of despair and pointlessness of life. Furthermore, the inability to reproduce and have your own children because of a principle/policy that prevents you (either through bans or physical interventions) would be a significant infringement of what we consider to be a basic right to control what happens to your body. For these reasons, knowing that you will have no descendants could cause significant psychological traumas or harms even if there were no associated physical harm. The second is a more general, higher level sense of hopelessness or despair that there will be no more humans and that your projects will end with you. Even those who did not feel a strong desire to procreate themselves might feel a sense of hopelessness that any projects or goals they have for the future would not be fulfilled. Many of the projects and goals we work towards during our lifetime are also at least partly future-oriented. Why bother continuing the search for a cure for cancer if either it will not be found within humans’ lifetime, and/or there will be no future people to benefit from it once it is found? Similar projects and goals that might lose their meaning when confronted with extinction include politics, artistic pursuits and even the type of philosophical work with which this paper is concerned. Even more extreme, through the words of the character Theo Faron, P.D. James says in his novel The Children of Men that ‘without the hope of posterity for our race if not for ourselves, without the assurance that we being dead yet live, all pleasures of the mind and senses sometimes seem to me no more than pathetic and crumbling defences shored up against our ruins’ (James 2006, 9). Even if James’ claim is a bit hyperbolic and all pleasures would not actually be lost, I agree with Scheffler in finding it not implausible that the knowledge that extinction was coming and that there would be no more people would have at least a general depressive effect on people’s motivation and confidence in the value of and joy in their activities (Scheffler 2012, 43). Both sources of psychological harm are personal reasons to reject a principle that permitted human extinction. Existing people could therefore reasonably reject the principle for either of these reasons. Psychological pain and the inability to pursue your personal projects, goals, and aims, are all acceptable reasons for rejecting principles in the contractualist framework. So too are infringements of rights and entitlements that we accept as important for people’s lives. These psychological reasons, then, are also valid reasons to reject principles that permitted or required human extinction.

### Adv1

#### Squo solves debris – private tracking, surveillance, in-orbit servicing and green satellite tech all happening now – private sector and P3s are key and outpacing government monitoring

CSTP 20 – OECD Committee, The strategic objectives of the Committee as defined in its Mandate and by the work priorities agreed by Member countries' Ministers responsible for science and technology provide the framework for the Secretariat's proposals for activities to be developed or initiated under the aegis of the Committee itself or its subsidiary bodies (NESTI, TIP, GSF, BNCT and IPSO) [This paper was approved and declassified by written procedure by the Committee for Scientific and Technological Policy (CSTP) on 11 March 2020 and prepared for publication by the OECD Secretariat, “SPACE SUSTAINABILITYTHE ECONOMICS OF SPACE DEBRIS IN PERSPECTIVE,” OECD Science, Technology and Industry Policy Papers, April 2020, No. 87, https://www.oecd-ilibrary.org/science-and-technology/space-sustainability\_a339de43-en]

An emerging “space debris economy”?

* Will we see a more intensive use of cubesats and miniaturised technologies in lower orbits? Cubesats have been the fastest-growing category of launched satellites in the last years and, when launched at lower altitudes, are naturally compliant with debris mitigation guidelines. They are also ever more performant and affordable, and dedicated launch opportunities become more widespread. Furthermore, they increasingly receive preferential treatment in risk-based national legislations (e.g. introduction of sliding scale in the UK Outer Space Act for insurance requirements).
* Space surveillance and tracking capabilities, in both GEO and LEO: New (private) sources of situational awareness data are becoming increasingly important, with data analytics and modelling fuelled by advances in digital technologies. Private sector debris catalogues and tracking capabilities for the geostationary orbit may now be almost as good as government capabilities (IDA, 2016[76]), while solutions for the low-earth orbit are emerging. Start-ups such as LeoLabs provide data and services based on low-cost ground equipment and sophisticated data analysis. The company, which in October 2019 had three radars in the United States and New Zealand, has developed a cloud-based “Space Regulatory and Sustainability Platform” for the New Zealand Space Agency, a first of its kind, destined to track objects launched from New Zealand to ensure compliance with permit conditions (MBIE, 2019[77]). A novel project called TruSat intends to use blockchain technology to crowdsource and validate satellite orbital positions worldwide via open source software (TruSat, 2019[78]). The US Air Force Research Laboratory has signed agreements with several commercial space situational awareness data providers (e.g. Numerica, LeoLabs, ExoAnalytics) to get access to sensor networks and algorithms (Numerica, 2019[79]). The Space Situational Awareness (SSA) open-architecture data-sharing platform under development by the US Department of Commerce, including data from different government agencies, is also expected to spur innovative value-added products and services.
* In-orbit servicing solutions: Several governmental agencies and commercial companies have developed, or are in the process of acquiring, some capabilities for in-orbit servicing (e.g. NASA, DARPA, ESA, JAXA). In-orbit servicing involves a number of complex operations in space: the servicing of space platforms (e.g. satellite, space station) to replenish consumables and degradables (e.g. propellants, batteries, solar array); replacing failed functionality; and/or enhancing the mission through software and hardware upgrades. This is a major challenge as, when on orbit, space platforms can move at speeds of several kilometres a minute. The first commercial in-orbit servicing mission was launched in 2019, by a MEV-1 spacecraft developed by Orbital ATK for an Intelsat geostationary satellite. The main short-term market is seen in the life extension of geostationary satellites, with some 300 potential candidates, at least in theory (Kennedy, 2018[80]). However, the key benefits of in-orbit servicing are expected in the future. Satellite design is currently heavily restricted by extreme launch conditions, but the possibility of servicing could enable a much more flexible and modular satellite design, able to take advantage of the latest advances in materials and electronics, beyond software upgrades (Jaffart, 2018[81]). Market forecasts estimate a USD 3 billion market for in-orbit servicing over the 2017-27 period, mainly driven by life extension services (Northern Sky Research, 2018[82]).
* Active debris removal solutions: Active debris removal is at a less mature technological level, but several firms are preparing demonstration missions (e.g. Astroscale in 2020). Potential candidates for removal include more than 200 critical debris objects (3-9 tonnes); mainly rocket bodies, but also the European Envisat satellite. JAXA, has formally launched a project to remove a large piece of debris by 2025 (a Japanese rocket body) in a public-private partnership (Japanese Delegation to UNCOPUOS, 2019[83]). Both Airbus and Thales Alenia Space are developing in-orbit servicing vehicles with debris removal functions, some of which have been tested on the RemoveDEBRIS mission (Surrey Space Centre, 2019[84]; OECD, 2019[11]).

• “Green” satellite design and technology: The demand for space-environment friendly satellite design is picking up. This includes features to reduce or avoid debris creation (explosion-safe batteries, deorbit technologies) and/or facilitating active removal (e.g. markers or grapple fixtures). One example is OneWeb, which is installing grapple fixtures on their satellites. In Europe, all future Sentinel satellites will be designed for demise. Affordable deorbit technologies are already being tested on orbit. Canada’s three-kilo CanX-7 satellite was launched in 2016 and is currently using its four 1 m2 drag sails to deorbit at a significantly faster rate than it would have without the sails. Amazon’s Kuiper constellation intends to use unpressurised and non-explosive propellant to mitigate accidental explosions, and satellites losing contact with ground control would automatically deactivate themselves, first by self-passivation and orbit-lowering, then depleting all energy reservoirs and switching off charging circuits (FCC, 2019[85]). SpaceX’ Starlink satellites are equipped with automated collision avoidance systems (although it is unclear which role the system played in the near-collision with the ESA Aeolus satellite).

A recent promising initiative is the “Space Sustainability Rating” scheme, originally conceived by teams from the MIT Media Lab, European Space Agency, and World Economic Forum. The initiative intends to be similar to the most widely used green building rating system in the construction industry, called the LEED certification for Leadership in Energy and Environmental Design. The objective is to promote mission designs and operational concepts that mitigate debris creation, and create a label that can encourage operators to behave more responsibly.

a huge effect.

I’m removing Kessler Syndrome from my list of things to worry about.

### Adv 2

No spillover from neo lib in space

#### 1] they don’t solve their impact – their Werlhof card is about cap in the squo on Earth being bad, and there’s zero risk of regulating space spilling over to broadly getting rid of cap terrestrially

#### Space Colonization causes novel species generation and spreads humanity too wide – both make communication and intergalactic governance impossible – inevitably results in colony wars and galactic extinction from new superweapons

Torres 18, Phil. Phil Torres is the director of the Project for Human Flourishing and the author of Morality, Foresight, and Human Flourishing: An Introduction to Existential Risks."Why We Should Think Twice About Colonizing Space." Nautilus, 23 July 2018, nautil.us/blog/why-we-should-think-twice-about-colonizing-space.

In a recent article in Futures, which was inspired by political scientist Daniel Deudney’s forthcoming book Dark Skies, I decided to take a closer look at this question. My conclusion is that in a colonized universe the probability of the annihilation of the human race could actually rise rather than fall. The argument is based on ideas from evolutionary biology and international relations theory, and it assumes that there aren’t any other technologically advanced lifeforms capable of colonizing the universe (as a recent study suggests is the case). Consider what is likely to happen as humanity hops from Earth to Mars, and from Mars to relatively nearby, potentially habitable exoplanets like Epsilon Eridani b, Gliese 674 b, and Gliese 581 d. Each of these planets has its own unique environments that will drive Darwinian evolution, resulting in the emergence of novel species over time, just as species that migrate to a new island will evolve different traits than their parent species. The same applies to the artificial environments of spacecraft like “O’Neill Cylinders,” which are large cylindrical structures that rotate to produce artificial gravity. Insofar as future beings satisfy the basic conditions of evolution by natural selection—such as differential reproduction, heritability, and variation of traits across the population—then evolutionary pressures will yield new forms of life. But the process of “cyborgization”—that is, of using technology to modify and enhance our bodies and brains—is much more likely to influence the evolutionary trajectories of future populations living on exoplanets or in spacecraft. The result could be beings with completely novel cognitive architectures (or mental abilities), emotional repertoires, physical capabilities, lifespans, and so on. In other words, natural selection and cyborgization as humanity spreads throughout the cosmos will result in species diversification. At the same time, expanding across space will also result in ideological diversification. Space-hopping populations will create their own cultures, languages, governments, political institutions, religions, technologies, rituals, norms, worldviews, and so on. As a result, different species will find it increasingly difficult over time to understand each other’s motivations, intentions, behaviors, decisions, and so on. It could even make communication between species with alien languages almost impossible. Furthermore, some species might begin to wonder whether the proverbial “Other” is conscious. This matters because if a species Y cannot consciously experience pain, then another species X might not feel morally obligated to care about Y. After all, we don’t worry about kicking stones down the street because we don’t believe that rocks can feel pain. Thus, as I write in the paper, phylogenetic and ideological diversification will engender a situation in which many species will be “not merely aliens to each other but, more significantly, alienated from each other.” But this yields some problems. First, extreme differences like those just listed will undercut trust between species. If you don’t trust that your neighbor isn’t going to steal from, harm, or kill you, then you’re going to be suspicious of your neighbor. And if you’re suspicious of your neighbor, you might want an effective defense strategy to stop an attack—just in case one were to happen. But your neighbor might reason the same way: she’s not entirely sure that you won’t kill her, so she establishes a defense as well. The problem is that, since you don’t fully trust her, you wonder whether her defense is actually part of an attack plan. So you start carrying a knife around with you, which she interprets as a threat to her, thus leading her to buy a gun, and so on. Within the field of international relations, this is called the “security dilemma,” and it results in a spiral of militarization that can significantly increase the probability of conflict, even in cases where all actors have genuinely peaceful intentions. So, how can actors extricate themselves from the security dilemma if they can’t fully trust each other? On the level of individuals, one solution has involved what Thomas Hobbes’ calls the “Leviathan.” The key idea is that people get together and say, “Look, since we can’t fully trust each other, let’s establish an independent governing system—a referee of sorts—that has a monopoly on the legitimate use of force. By replacing anarchy with hierarchy, we can also replace the constant threat of harm with law and order.” Hobbes didn’t believe that this happened historically, only that this predicament is what justifies the existence of the state. According to Steven Pinker, the Leviathan is a major reason that violence has declined in recent centuries. The point is that if individuals—you and I—can overcome the constant threat of harm posed by our neighbors by establishing a governing system, then maybe future species could get together and create some sort of cosmic governing system that could similarly guarantee peace by replacing anarchy with hierarchy. Unfortunately, this looks unpromising within the “cosmopolitical” realm. One reason is that for states to maintain law and order among their citizens, their various appendages—e.g., law enforcement, courts—need to be properly coordinated. If you call the police about a robbery and they don’t show up for three weeks, then what’s the point of living in that society? You’d be just as well off on your own! The question is, then, whether the appendages of a cosmic governing system could be sufficiently well-coordinated to respond to conflicts and make top-down decisions about how to respond to particular situations. To put it differently: If conflict were to break out in some region of the universe, could the relevant governing authorities respond soon enough for it to matter, for it to make a difference? Probably not, because of the immense vastness of space. For example, consider again Epsilon Eridani b, Gliese 674 b, and Gliese 581 d. These are, respectively, 10.5, 14.8, and 20.4 light-years from Earth. This means that a signal sent as of this writing, in 2018, wouldn’t reach Gliese 581 d until 2038. A spaceship traveling at one-quarter the cosmic speed limit wouldn’t arrive until 2098, and a message to simply affirm that it had arrived safely wouldn’t return to Earth until 2118. And Gliese 581 is relatively close as far as exoplanets go. Just consider that he Andromeda Galaxy is some 2.5 million light-years from Earth and the Triangulum Galaxy about 3 million light-years away. What’s more, there are some 54 galaxies in our Local Group, which is about 10 million light-years wide, within a universe that stretches some 93 billion light-years across. These facts make it look hopeless for a governing system to effectively coordinate law enforcement activities, judicial decisions, and so on, across cosmic distances. The universe is simply too big for a government to establish law and order in a top-down fashion. But there is another strategy for achieving peace: Future civilizations could use a policy of deterrence to prevent other civilizations from launching first strikes. A policy of this sort, which must be credible to work, says: “I won’t attack you first, but if you attack me first, I have the capabilities to destroy you in retaliation.” This was the predicament of the US and Soviet Union during the Cold War, known as “mutually-assured destruction” (MAD). But could this work in the cosmopolitical realm of space? It seems unlikely. First, consider how many future species there could be: upwards of many billions. While some of these species would be too far away to pose a threat to each other—although see the qualification below—there will nonetheless exist a huge number within one’s galactic backyard. The point is that the sheer number would make it incredibly hard to determine who initiated a first strike, if one is attacked. And without a method for identifying instigators with high reliability, one’s policy of deterrence won’t be credible. And if one’s policy of deterrence isn’t credible, then one has no such policy! Second, ponder the sorts of weapons that could become available to future spacefaring civilizations. Redirected asteroids (a.k.a., “planetoid bombs”), “rods from God,” sun guns, laser weapons, and no doubt an array of exceptionally powerful super-weapons that we can’t currently imagine. It has even been speculated that the universe might exist in a “metastable” state and that a high-powered particle accelerator could tip the universe into a more stable state. This would create a bubble of total annihilation that spreads in all directions at the speed of light—which opens up the possibility that a suicidal cult, or whatever, weaponizes a particle accelerator to destroy the universe.