# 1AC V2 – Berkeley

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### Plan

#### Plan: Private entities should not appropriate outer space via commercial space stations that replace the International Space Station.

### Advantage

#### The ISS is retiring and being replaced solely by the private sector – extension reverse causally stops privatization

Heilwell 12/03 [Rebecca, reporter for Open Sourced, covering emerging technologies, artificial intelligence, and logistics, “NASA gave Jeff Bezos money to build his office park in space”, Updated 12-03-2021 (I couldn’t find the original publishing date – this is the only one that showed up on the website – if you can please lmk), Vox Recode, https://www.vox.com/recode/2021/10/27/22747509/blue-origin-orbital-reef-office-park-bezos]//pranav

After more than two decades in orbit, NASA is preparing to retire the International Space Station. The habitable satellite only has permission to operate until 2024, and while it’s likely that the space station’s funding could be extended until 2028, NASA plans to decommission the ISS and find a replacement by the end of the decade. Cue Jeff Bezos. The billionaire’s spaceflight company, Blue Origin, has proposed a new commercial space station called Orbital Reef, which would provide a “mixed use business park” in space. This concept now has the support of NASA. The agency announced on Thursday that it would award Blue Origin and its partner companies $130 million to develop the space station, which NASA hopes will launch before 2030. With the help of several other companies, including Sierra Space and Boeing, Blue Origin plans to build a satellite that’s slightly smaller than the ISS and houses up to 10 people. The design includes desk space, computers, laboratories, a garden, and 3D printers. The goal, the company says, is to lease out office space to interested parties, including government agencies, researchers, tourism companies, and even movie production crews. Blue Origin’s plan is predicated on the idea that the end is coming for the ISS, which NASA is still figuring out how exactly to remove from orbit. While space stations have been helpful for space exploration, Blue Origin senior vice president Brent Sherwood argued in an October op-ed that private companies now have the capabilities to take over much of the burgeoning economy in low-Earth orbit, or LEO. Blue Origin is even building a space tug, a transport vehicle that moves cargo between different orbits, that could reportedly be used to salvage parts from the ISS and incorporate them into Orbital Reef’s systems. NASA doesn’t mind the corporate takeover of low-Earth orbit. The agency’s first space station, SkyLab, was only in orbit for a few months before NASA let the vehicle descend and decompose into the atmosphere. The space agency has been weighing defunding the ISS, which is full of aging hardware, for several years, and NASA’s investment in Orbital Reef is part of more than $400 million in funding that the agency has set aside to develop new, privately built and operated space stations through its Commercial LEO Destinations program. Eventually, NASA hopes that it can send its astronauts to these stations instead of paying to maintain the ISS. Overall, the plan could save the government more than $1 billion every year. “This is technology that is over 20 years old at this point. When you expose that infrastructure to radiation, solar weather ... things are going to break down,” Wendy Whitman Cobb, a professor at the US Air Force’s School of Air and Space Studies, told Recode. “Having these commercial space stations will be a way of America keeping their foot in low-Earth orbit while focusing more of their resources on moon and Mars exploration.” In the meantime, NASA is currently focusing on the Artemis program, an ambitious plan to establish a long-term human presence on the moon. The agency intends to send people to the moon for the first time in decades as soon as 2025, and hopes the project will eventually serve as a stepping stone to future exploration of Mars. Private companies, including Blue Origin, have desperately fought for a role in this prestigious mission, and especially a lucrative contract to develop pivotal moon landing technology. SpaceX won that contract earlier this year, prompting Bezos’s company to sue NASA and lobby the Senate to reverse the decision. Those efforts have yet to bear fruit, so Bezos now seems to be turning his attention back to the low-Earth orbit economy, where there are more customers and less competition from Elon Musk. “Most, if not all, of the problems or the challenges that need to be worked to have a commercial LEO destination have already been solved by the International Space Station program,” Sherwood, of Blue Origin, said in a Thursday press conference. “That’s the explanation for why we can develop a commercial space station for so much less than it cost NASA the first time.” But there’s reason to believe that the Orbital Reef project may not succeed in the near future — or at all. Blue Origin still hasn’t launched humans into orbit, a feat SpaceX achieved last month during the Inspiration4 mission. Blue Origin also lists its New Glenn reusable launch system and Boeing’s Starliner crew vehicle as pivotal parts of the Orbital Reef plan, but both vehicles have yet to conduct a problem-free spaceflight.

#### Private-Public partnerships owned by NASA replace the ISS better and are coming now

Jones ’18 [Karen, a senior project leader with The Aerospace Corporation’s Center for Space Policy and Strategy. She has experience and expertise in the disciplines of technology strategy, program evaluation, and regulatory and policy analysis spanning the public sector, telecommunications, space, aerospace defense, energy, and environmental industries. She is a former management consultant with IBM Global Services and Arthur D. Little and has an M.B.A. from the Yale School of Management, “PUBLIC-PRIVATE PARTNERSHIPS: STIMULATING INNOVATION IN THE SPACE SECTOR”, April 2018, Center for Space Policy and Strategy, [https://aerospace.org/sites/default/files/2018-06/Partnerships\_Rev\_5-4-18.pdf]//pranav](https://aerospace.org/sites/default/files/2018-06/Partnerships_Rev_5-4-18.pdf%5d//pranav)

* P3 = public-private partnership

When a public-sector entity considers a P3 arrangement, it should articulate the objectives. Within the space sector this could include:

• Mission Support—to advance science, space exploration, or national security and defense.

• Functional Support—such as communications, Earth observation, space logistics.

• Technology Advancement—such as prototyping or developing new technologies.

• Space Industrial Base—to promote a competitive and robust commercial space sector

Traditional public infrastructure projects are structured across a range of P3 project delivery models to provide functional support—from operation and maintenance to concession agreements (see Figure 1). By contrast, space industry P3 delivery models typically include various arrangements for sharing risk and know how through cooperative research, Space Act Agreements (SAAs), or longer term development agreements. The current emphasis appears to be leveraging commercial sector innovation and agility (see Figure 2). Perhaps over time the space sector will introduce more traditional P3 functional support models such as:

◆ Example: Future Low Earth Orbit (LEO) Modules/

Habitat (“Concession” P3 Model). NASA could potentially apply a concession arrangement to replace the ISS with one or more commercial modules. The space module(s) could be owned by the U.S. government and designed, built and operated by one or more commercial companies for a specific period of time. Several commercial companies, including Axiom Space, Bigelow Aerospace and NanoRacks, have already expressed interest in the provisioning of space modules to replace the existing International Space Station (ISS). Note that if these commercial modules were owned, built, operated and maintained by the commercial sector then this would shift the business model from a P3 model to full privatization.

#### Public control of commercial space stations solves all neg offense – OST proves

Smith ’79 [Delbert D., Legal Advisor for the Space Science and Engineering Center of the University of Wisconsin, “Space Stations International Law and Policy”, October 30, 1979, https://www.google.com/books/edition/Space\_Stations\_International\_Law\_And\_Pol/4U2fDwAAQBAJ?hl=en&gbpv=0&kptab=overview]//pranav

Three potential limitations on these conclusions should be noted. First, the interpretation set forth above would not permit commercial or international organizations from claiming exclusive rights to a particular area of outer space in the absence of actual use. Thus, if such an organization had maintained a space station in a specific orbital slot for a substantial period of time and the station-keeping system subsequently failed, the organization would not be entitled to prevent any other entity from occupying that slot pending the orbiting to a replacement station by the original occupant. Second, if an entity were established that, although commercial in form, was essentially under the control of the government of the country in which it was organized, permanent use would constitute national, as distinguished from nonnational, appropriation. This is especially true in light of the Article VI provision that makes states responsible for acts of their nationals and for international organizations of which they are members. Third, dispute has arisen regarding the minimum standard of universality that would determine whether an international organization of relatively universal membership satisfies the minimum standard. However, some question remains regarding the exemption of an organization composed of a limited number of governments.

#### The path to space is “not…one or the other”, but rather P3 cooperation that brings new governments into the fold and decreases financial constraints.

Smith ’21 (Yes this is a 3rd different Smith card) [Fisher, second year law student at the University of Mississippi where he is currently part of the Space Law concentration. Additionally, he is part of the Ole Miss Trial Advocacy Board and a junior staff editor on the Air and Space Law Journal at the university, “Public-Private Partnerships: The Way to Space”, 03-31-2021, NSS, [https://space.nss.org/public-private-partnerships-the-way-to-space/]//pranav](https://space.nss.org/public-private-partnerships-the-way-to-space/%5d//pranav)

* Solvency advocate
* Straight turns tradeoffs/funding disad

However, while these companies have accomplished much, there is still a need for an organized, governmental role in space development. Government involvement is necessary to ensure that the public maintains access to space and to advance the frontier of development beyond Earth. For instance, consider NASA and the American government. NASA’s ongoing scientific efforts are characterized by four key strategic goals: 1) expanding knowledge of our human species, 2) creating “sustainable long-term exploration and utilization” of outer space for the whole species, 3) addressing national challenges and aiding in economic development, and 4) continuing to optimize and develop their capabilities and operations within outer space. NASA’s ongoing commitments are to develop outer space and technology for the United States and for humanity as a whole. Their missions of exploration, scientific discovery and technological development have continued to advance humanity.

The fundamental structure of democratic governments such as those in the U.S. allow regular people to influence and participate in space development policy. People can vote for and petition their elected representatives to promote certain policies for the use of outer space, or join non-profits such as the National Space Society (NSS) to represent their views. This allows anyone to have a say in our development of outer space.

While private companies are pushing the boundaries of outer space, NASA and the US government have the ability to create policies that encourage more rapid and beneficial development in space. The National Space Society (NSS) advocates that the government promote policies for infrastructure development and reusability for outer space expansion. The successful model of public-private partnerships that has been used to transport both cargo and crew to the International Space station via the commercial purchase of launch services should be extended throughout cis-lunar space. Further, through NASA, NSS recommends that the government continue to promote international cooperation. The international community has cooperated in the past, particularly with the International Space Station. By continuing this partnership, multiple States can contribute to outer space exploration and development, and private organizations can continue provide vital services at lower cost, allowing government funds to accomplish more in space.

While past developments in outer space have been led by governments and governmental space agencies, that is no longer true. Private organizations have reignited space exploration and provided a way for humanity to continue to expand and revolutionize technology needed to expand beyond Earth, without many of the hurdles, including cost and regulations, that sometimes hamper government advances. But, the path to the stars is not paved by one or the other. Instead, cooperation, between States, governmental agencies, and private companies, will ensure that we continue to push our boundaries into space.

#### Only P3 reinvigorates multilateralism – brings new governments into the arena

Smith ’18 [Milton, Air Force Academy graduate with a doctorate in air and space law, Skip is a former Air Force JAG who held several significant leadership positions during his Air Force career, including director of space law at Space Command and chief of air and space law for the Air Force. He also served in Geneva as the legal advisor of the 50-person U.S. Delegation at the ITU Conference on the Geostationary Satellite Orbit. A past chair of the Colorado Space Business Roundtable, Skip is on the board of the International Institute of Space Law. He has served as an adjunct professor of space law at the University of Colorado Law School, the George Washington University Law School, and currently teaches commercial space law at the University of Denver Law School. Regarded as a leader in the field, Skip has received numerous honors, including the Lifetime Achievement Award from the International Institute of Space Law. Skip was selected to author the United States chapter in the inaugural edition of the “Space Law Review,” a series published by The Law Reviews. He is the author of six space-related law review articles and of a book on the international regulation of satellite communication. Skip speaks nationally and internationally on commercial space law issues., “Op-ed | P3 or not P3: What can space ventures learn from terrestrial infrastructure projects?”, 04-19-2018, Space News, https://spacenews.com/op-ed-p3-or-not-p3-what-can-space-ventures-learn-from-terrestrial-infrastructure-projects/]//pranav

P3s for space projects, however, have generally been fairly simple agreements involving one public entity and one private entity. Future large space activities such as privatizing the International Space Station and establishing a cislunar Deep Space Gateway and a base on the moon, will require far more complex contractual arrangements and international participation. International participation is best exemplified by the ISS. The program has a complex legal structure based on an intergovernmental agreement signed by the government partners, four memoranda of understanding between NASA and other cooperating space agencies, and numerous bilateral implementing arrangements between space agencies. In many respects, the ISS has been a tremendous success and it is now facing issues of what to do next. Privatization using a P3 structure is one option. Another example: Sierra Nevada Corp. has teamed with the UN Office for Outer Space Affairs in a type of international P3 where the Dream Chaser spaceplane will be used by countries to fly payloads or experiments. Mark Sirangelo, executive vice president of SNC Space Systems stated: “The benefits of a joint mission between government and private organizations on a level of this scale is incalculable.” Hopefully, it will open up the space arena to many governments otherwise unable to participate. As space activities and investments mature, we must look to industries like construction and finance for lessons on major P3 projects. All involve large sums of capital and allocation of risk. To have people living and working in space will take P3 leverage of the government budget with commercial collaboration. In evaluating P3s, the space industry should carefully review P3 experience on many large infrastructure projects and evaluate best practices and lessons learned. Typical infrastructure P3 projects have included airports, toll roads, higher education facilities, water projects, telecommunications, energy and utilities. Europe, Canada and Australia have outpaced the United States in their use of P3s for infrastructure projects. The largest P3 project is the Channel Tunnel between England and France, now known as the Eurotunnel. It cost about $25 billion, took eight years to build, and was financed by private debt and sales of shares in a private company formed to build and maintain the tunnel under a long-term management contract. Although the project experienced significant financing problems during construction, it has certainly provided great benefit. The U.S. is catching up and is turning more toward P3s for infrastructure projects because of the limited availability of federal, state and local government funding for necessary projects. The Trump administration infrastructure plan released in February outlines many new incentives and initiatives to facilitate $1.5 trillion in infrastructure investment over a 10-year period. Bootstrapping a $200 billion federal investment into $1.5 trillion will be challenging. The plan seeks to accomplish this by using investment from state and local governments, other public agencies, and substantial private investment including P3s. If P3s can help remedy vast infrastructure problems, perhaps P3s can also accomplish wonders for space projects, particularly if there is international support. A full P3 project involves a partnership among all phases of a project from design-build construction and finance to operations and maintenance. Developing an equitable allocation of risks among partners over many decades is probably the most challenging task. Thanks to the vast number of P3 projects around the world, there has been considerable analysis of the various types of P3 projects. The commonly recognized P3 best practices generally include things such as: appropriately preparing, creating a shared vision, understanding the partners, clarifying long-term risks and rewards, establishing effective decision-making processes, negotiating fair and reasonable contracts that will withstand decades of implementation, and finding the right champion. That last one can be the most difficult since large projects tend to take many years to plan and implement. Politicians and administrators often have a limited shelf life. Policies, including National Space Policies, often change with new administrations.

#### Militarization is inevitable, but reinvigorating space multilateralism, solves future militarization that spills over into conflict – brings revisionist powers to the table.

Mason ’21 [Paul, author of several books, and a visiting professor at the University of Wolverhampton, “How to halt the space arms race”, 11-17-2021, New Statesman, https://www.newstatesman.com/comment/2021/11/how-to-halt-the-space-arms-race]//pranav

Could space be demilitarised? Not a chance, say the experts, who point out that – in contrast to the space exploration of the popular imagination, where it is still seen as a benign, trans-national endeavour – the entire history of space technology, from the Nazi V2 rocket to the recent Russian anti-satellite strike, has been driven by the military. Yet military activity in space could be made more orderly and transparent. The two most authoritative annual reports on military space capabilities are both reliant on open-source information and acknowledge that there are huge gaps in what even the experts know. We know how many satellites are up there: we do not know much about what weapons they might carry. This stands in contrast to the way the rival superpowers have managed both nuclear and conventional deterrence since the onset of the Cold War, with a series of treaties signed by Russia and the West to minimise or regulate aggression – for example, limiting the possession of nuclear weapons or the deployment of armoured vehicles. But there is almost no such framework for regulating the space arms race, or for achieving basic transparency about who’s doing what, still less for avoiding conflict. US and Russian space commanders convened in Vienna last July, agreeing to “enhance communications between the two countries about space-related operational issues in order to reduce the risks of misunderstanding, help prevent or manage space-related incidents, and prevent inadvertent escalation”. This did not stop Russia’s surprise launch of an anti-satellite missile on 15 November, nor did it avert the war of words that followed it. In truth the US-Russia space dialogue, a hangover from the Cold War, is a long way from the multilateral and comprehensive framework needed to bring China, India, Israel and Iran around the table. Lacking any formal international treaty beyond the anti-nuclear one, space has, in effect, become a demonstration zone for geopolitical realism. Those who have real power on Earth have untrammelled power in space. They will zap their own satellites at will, buzz the satellites of others, launch “projectiles” from existing satellites – as Russia allegedly did last year – and unleash spoofing attacks to disorient civilian shipping, all without acknowledgement or explanation. The emerging field of space war looks, in other words, exactly like terrestrial conflict would if there were no treaties and deployment patterns, or journalists and NGOs to observe them. This year the UK launched its own space command, with military chiefs acknowledging space as a domain of conflict co-equal with air, land, sea and cyber. Britain is late to the space war game and, after years of offshoring and outsourcing, lacks the expertise and resources to compete with the big four space powers: it doesn’t figure in either of the monitoring reports on space militarisation documenting significant offensive capabilities. As a medium-sized power, self-excluded from large parts of the EU’s space programmes, it is in Britain’s interest to promote order, multilateralism and transparency in space, and to resist its further militarisation. And, to an extent, haltingly, it has done so, promoting the first real debate at the UN over a new space treaty.

#### Weaponization of space and dual-use tech results in unsustainable arms races and causes a laundry list of impacts – alternative measures to check weaponization are NOT mutually exclusive with the aff

Ortega et al. ’21 [ALMUDENA AZCÁRATE ORTEGA - associate researcher, John Borrie - senior research fellow, James Revill - program lead of the Weapons of Mass Destruction and Other Strategic Weapons Programme of the United Nations Institute for Disarmament Research, “Star Wars: the not-so-phantom menace”, 05-12-2021, [https://english.elpais.com/opinion/2021-05-12/star-wars-the-not-so-phantom-menace.html]//pranav](https://english.elpais.com/opinion/2021-05-12/star-wars-the-not-so-phantom-menace.html%5d//pranav) \*modified for ableist language\*

The picture isn’t all rosy, however. Due to the critical importance of space, several countries have, in recent years, formed “space forces” and are developing national doctrines for fighting in space. A handful of nations have even tested offensive capabilities of various kinds. These countries have some legitimate security concerns. The problem is this pattern of responses to the actions and activities of space competitors is fuelling an arms race. If the international community doesn’t act to turn down the dial on space’s quickening weaponization, humankind risks suffering the devastating consequences of a space-based conflict, such as mass disruption of services like GPS and denial of internet access. Debris from the destruction of space objects could also prevent space users from using orbits, possibly for years. States have long sought to ensure that outer space is used only for peaceful purposes. Even at the height of the Cold War, they reached international agreements such as the 1967 Outer Space Treaty that, among other things, indicates that states shall not “place nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies or station them in outer space.” These treaties have contributed to safety and security in space and on Earth, but as technology advances so does the risk of conflict in space. Counterspace capabilities have the capacity to interfere, incapacitate or destroy adversaries’ space assets, and some of them are commonly used nowadays, such as cyberattacks and electronic interference with satellites. Others, such as interceptor missiles launched from Earth to attack space objects, could be used during a conflict on Earth, and would have a [devastating]~~crippling~~ effect on militaries and civilians alike. Even if specific space technologies were not invented with a counterspace purpose in mind, their characteristics nevertheless could make them a threat in the eyes of others. An example of this is the so-called space harpoon, a barbed projectile fired from a satellite to collect space junk, which could be exploited for hostile purposes. In the face of such strategic unpredictability, trust deficit grows and tensions escalate more easily. For decades governments have argued about “preventing an arms race in outer space” in multilateral forums like the Geneva-based Conference on Disarmament. Now the space arms race is here – and given what is at stake – governments need to focus afresh on practical steps to provide each other meaningful reassurance about their capabilities and intentions in space. There are already several proposals. China and Russia have proposed a treaty to prevent weapons from being placed in space and threats against space objects. Other, predominantly Western governments, have proposed “reducing space threats through norms, rules and principles of responsible behaviors.” These approaches are not mutually exclusive. Arms control history suggests legal and normative measures can be combined and sequenced in ways that are mutually reinforcing. Even then, it’s unlikely these measures will be sufficient to ensure the safe and secure use of space in the future. Measures to increase transparency and confidence in space-related activities to minimize misunderstandings are also required. This could be augmented by the publication of national policies on counterspace capabilities and by encouraging dialogue between space users – including commercial stakeholders – about the impacts of and risks introduced by new strategic technologies. Greater mutual understanding of these issues among space users could help to avoid escalatory situations. Space is critical for sustaining and enhancing life on Earth. It actively contributes to sustainable development in a myriad of ways. To ensure space’s continued contribution to humankind’s wellbeing, spacefaring nations must work to arrest their weaponization of outer space and develop safeguards to prevent current tensions blowing out into full-blown conflict, thus keeping Star Wars firmly in the realm of science fiction.

#### Goes nuclear – great powers are developing nukes for new territorial conflicts in space

Tisdall ’20 [Simon, foreign affairs commentator. He has been a foreign leader writer, foreign editor and US editor for the Guardian, “A nuclear arms race in space? It seems we've learned nothing from Hiroshima”, 08-02-2020, The Guardian, https://www.theguardian.com/commentisfree/2020/aug/02/a-nuclear-arms-race-in-space-it-seems-weve-learned-nothing-from-hiroshima]//pranav

The battle for outer space is only getting going – yet deserves immediate attention. Russia’s alleged development of anti-satellite weapons is almost certainly matched by the US and China, and undermines past undertakings about the peaceful use of space. Christopher Ford, US assistant secretary of state for international security and non-proliferation, warned last week that Russia and China had already turned space into a “war-fighting domain”. “What [the Russians] are doing is signalling to the world that they’re able to destroy satellites in orbit with other satellites,” Ford said. “This is the sort of thing that could get out of hand and go very badly rather quickly.” The UK called the alleged test “a threat to space systems on which the world depends” – meaning use of such weapons could, in theory, produce an instant global security and communications blackout. Yet in relaunching US space command last year, Donald Trump also pointed to space as the next great-power battlefield. Nato secretary-general Jens Stoltenberg says the alliance will not deploy weapons in space but is obliged to defend its interests, which include 2,000 orbiting satellites. For Nato, too, space is now an “operational domain”. New and “improved” nuclear weapons are proliferating in parallel with the race for space. According to the Stockholm International Peace Research Institute (Sipri), nine states – the US, Russia, China, Israel, the UK, France, India, Pakistan and North Korea – together possess about 13,400 weapons. While the overall total is falling, “retired” warheads and bombs are being replaced by more powerful, versatile devices, such as smaller, “use-able” US battlefield nukes. “All these states are either developing or deploying new weapon systems or have announced their intention to do so,” Sipri’s annual report said. The US and Russia each possessed about 1,550 deployed, long-range weapons, while China had about 300. Both the US and Russia were spending more and placing greater reliance on nuclear weapons in future military planning, it said, while China was rushing to catch up. “China is in the middle of a significant modernisation of its nuclear arsenal. It is developing a so-called nuclear triad for the first time, made up of new land- and sea-based missiles and nuclear-capable aircraft. India and Pakistan are slowly increasing the size and diversity of their nuclear forces,” Sipri reported. Meanwhile, North Korea continued to prioritise its military nuclear programme, while conducting “multiple” ballistic missile tests. “Instead of planning for nuclear disarmament, the nuclear-armed states appear to plan to retain large arsenals for the indefinite future, are adding new nuclear weapons, and are increasing the role such weapons play in their national strategies,” a Federation of American Scientists survey said. It estimated about 1,800 warheads were kept on high alert, ready for use at short notice. Russia claims to lead the world in developing hi-tech weaponry. Speaking in July, Putin boasted that Russia’s navy was being equipped with nuclear-powered hypersonic cruise missiles, which supposedly have unlimited range, and submarine-launched underwater nuclear drones. Despite celebrated speeches supporting a nuclear-free world, Barack Obama authorised a $1.2tn plan to upgrade America’s nuclear triad while pursuing strategic arms reductions via the 2010 New Start treaty with Russia. Trump has doubled down, at the same time abandoning arms control pacts. His 2018 nuclear posture review proposed an extra $500bn in spending, including $17bn for low-yield, battlefield weapons. Trump looks set to scupper New Start, which expires in February, on the spurious ground that it does not reduce China’s much smaller arsenal (which it was never intended to do). He has previously reneged on the 2015 Iran nuclear treaty, the 1987 Intermediate-range Nuclear Forces treaty, and is said to favour resumed nuclear testing in Nevada in defiance of the 1996 Comprehensive Nuclear-Test-Ban treaty. Like Britain and other signatories, the US continues to fail to fulfil its obligation under the 1970 Nuclear Non-Proliferation treaty “to pursue nuclear disarmament aimed at the ultimate elimination of nuclear arsenals”. Despite its acute financial situation, Britain remains committed to replacing its Trident missile system at an estimated cost of £205bn over 30 years. While nuclear weapons have not been used since 1945, great-power military flashpoints are increasing the risk that they might be. These potential triggers include the South China Sea, Taiwan, the India-Pakistan and India-China borders, the US-Israel-Iran conflict, North Korea and Ukraine. Heightened international tensions and collapsing arms-control regimes only partly explain the accelerating pace of nuclear rearmament. Resurgent nationalism, authoritarian rightwing populism, revived or new territorial rivalries (as in space), the bypassing of the UN and multilateral institutions, and a shifting economic and geopolitical power balance are all aggravating factors.

**Causes extinction** through winter, firestorms, EMP blasts, ozone damage, and meltdowns

-Immediate death -Climate destruction spurring an ice age (Nuclear winter) via nuclear firestorms and smoke -Ozone collapses -2 Billion insta-die in famine -kills biodiversity -Meltdowns and grid collapse via EMPs -Remaining fallout

**Starr 14** {Steven, Senior Scientist for Physicians for Social Responsibility, Director of the Clinical Laboratory Science Program (Missouri), commentator in the Bulletin of the Atomic Scientists and the Strategic Arms Reduction, Associate member of the Nuclear Age Peace Foundation, “The Lethality of Nuclear Weapons: Nuclear War has No Winner,” Global Research: Centre for Research on Globalization, 6/5, http://www.globalresearch.ca/the-lethality-of-nuclear-weapons-nuclear-war-has-no-winner/5385611}

Nuclear war **has no winner**. Beginning in 2006, several of the world’s **leading climatologists** (at Rutgers, UCLA, John Hopkins University, and the University of Colorado-Boulder) published a series of studies that evaluated the long-term environmental consequences of a nuclear war, including baseline scenarios fought with **merely 1%** of the explosive power in the US and/or Russian launch-ready nuclear arsenals. They concluded that the consequences of even a “small” nuclear war would include **catastrophic disruptions** of global climate[i] and **massive destruction** of Earth’s protective ozone layer[ii]. These **and more recent studies** predict that global agriculture would be so negatively affected by such a war, a global famine would result, which would cause up to **2 billion people to starve to death**. [iii]¶ These **peer-reviewed** studies – which were analyzed by the **best scientists in the world** and found to be without error – also predict that a war fought with less than half of US or Russian strategic nuclear weapons would **destroy the human race**.[iv] In other words, a US-Russian nuclear war would create such extreme long-term damage to the global environment that it would leave the Earth **uninhabitable** for humans and most animal forms of life.¶ A recent article in the Bulletin of the Atomic Scientists, “Self-assured destruction: The climate impacts of nuclear war”,[v] begins by stating:¶ “A nuclear war between Russia and the United States, **even after the arsenal reductions** planned under New START, could produce a nuclear winter. Hence, an attack by either side could be **suicidal**, resulting in self-assured **destruction**.”¶ In 2009, I wrote an article[vi] for the International Commission on Nuclear Non-proliferation and Disarmament that summarizes the findings of these studies. It explains that nuclear firestorms would produce millions of tons of smoke, which would rise above cloud level and form a global stratospheric smoke layer that would **rapidly encircle the Earth**. The smoke layer would remain for at least a **decade**, and it would act to destroy the protective ozone layer (vastly increasing the UV-B reaching Earth[vii]) as well as block warming sunlight, thus creating Ice Age weather conditions that would last **10 years** or longer.¶ Following a US-Russian nuclear war, temperatures in the central US and Eurasia would fall below freezing every day for one to three years; the intense cold would **completely eliminate growing seasons for a decade** or longer. No crops could be grown, leading to a famine that would **kill most humans and large animal populations**.¶ Electromagnetic pulse from high-altitude nuclear detonations would destroy the integrated circuits in all modern electronic devices[viii], including those in commercial nuclear power plants. Every nuclear reactor would almost **instantly** meltdown; every nuclear spent fuel pool (which contain many times more radioactivity than found in the reactors) would boil-off, releasing vast amounts of **long-lived** radioactivity. The fallout would make most of the US and Europe **uninhabitable**. Of course, the survivors of the nuclear war would be **starving to death anyway.** Once nuclear weapons were introduced into a US-Russian conflict, there would be little chance that a **nuclear holocaust** could be avoided. Theories of “limited nuclear war” and “nuclear de-escalation” are **unrealistic**.[ix] In 2002 the Bush administration modified US strategic doctrine from a retaliatory role to permit preemptive nuclear attack; in 2010, the Obama administration made only incremental and miniscule changes to this doctrine, leaving it essentially unchanged. Furthermore, Counterforce doctrine – used by both the US and Russian military – emphasizes the need for preemptive strikes once nuclear war begins. Both sides would be under immense pressure to launch a preemptive nuclear first-strike once military hostilities had commenced, especially if nuclear weapons had already been used on the battlefield.

#### Independently, increases readiness, innovation, and tighter coordination – it’s try or die aff

Johnson ’19 [Kent, retired USAF F-15 Strike Eagle and A-10 Warthog pilot, and political-military advisor on the staff of the secretary of the Air Force, and an adjunct at North Central Texas College in Gainesville, Texas, specializing in defense studies, “Public-Private Partnerships in Space – An Approach to Risk Mitigation”, 05-09-2019, Real Clear Defense, https://www.realcleardefense.com/articles/2019/05/09/public-private\_partnerships\_in\_space\_\_an\_approach\_to\_risk\_mitigation\_114409.html]//pranav

If the USG is serious about acquiring more capability from the commercial space industry – especially as a way to maintain an advantage over peer competitors that are moving quickly in space – working with the private sector will be imperative. After all, it is in the commercial space industry where all of the dynamic innovation is occurring now – from the development of lower cost launch vehicles to highly-capable smaller satellites, to game-changing data processing technology. Increasing calls are coming from all corners of government – from high-ranking leaders in DoD to members of the U.S. Congress – to find more ways to leverage the commercial space industry to enhance our national defense and intelligence capabilities in space.

That being said, the private sector can only commit so many resources and capital without expecting or realizing a reasonable return on investment. Thus, a public-private partnership that spreads the risk and establishes workable arrangements for both industry and government allows for shared “skin in the game.”

Additionally, healthy public-private partnerships might allow for tighter coordination between the USG and industry on the technological development of U.S. national security capabilities. In this sense, industry becomes a vital partner with the USG on our most critical national security imperatives in space – for everything from increased satellite resiliency, reduced data interruption, streamlining of data processing, enhanced persistence and accuracy of ISR, and more rapidly responsive space launch. These partnerships also improve and enhance the regulatory and oversight dynamics between the USG and commercial industry.

Quite frankly, the time for this type of approach is now. If America is going to retain our dominance in space against peer competitors who are expanding their capabilities – civil and military – at a rapid clip, public-private partnerships may be critical to harnessing the promise of commercial industry. Three key points add reinforcement.

#### Only U.S. space heg solves war – it’s sustainable and Chinese counter-hegemonic pushes on Earth mean it’s try or die for American hegemony

Elvevold ’19 [Eirik Billingsø, master’s in international Relations from Universidade Nova, ““War in Space: Why Not?” A Neorealist Analysis of International Space Politics (1957-2018)”, May 2019, https://run.unl.pt/bitstream/10362/82269/1/Thesis\_InternationalRelations\_EirikBElvevold\_47082.pdf]//pranav

* ON = Offensive Neorealism - anarchy forces states to maximize space power instead of security and aim for space hegemony

The risk of space war seems to have decreased substantially in the beginning of the Second Space Age because no other state could threaten the US in space – the ideal position for any state seeking security according to Mearsheimer.973 The US had, by force of all its satellites, the most to lose from a space war, but also the most space weapons to strike back. The US had already developed conventional and nuclear ASATs together with a slowly maturing ABM systems, both domestically and regionally. All of these space capabilities came on top of conventional military capabilities, which was in turn was enhanced further by US capabilities. Meanwhile, the USSR lost physical control over its primary spaceport, Baikonur, and important ground facilities as the union broke up in the transition between the First and Second Space Age.974 By joining both the ISS975 and the MTCR976, and commercialising and selling its space launchers977978979980, Russia appear to have admitted to US space hegemony – at least temporarily. Chinese space capabilities were growing, but placed under strict export controls by the US.981 In sum, a space attack from any state could undoubtedly have been met with even harsher US attacks in retribution. The US was a threat to other states in space in the second Space Age.982 Several unilateralist moves in space proved that the distribution of space power was in fact unipolar. The US pulled out of the ABMT, a corner-stone treaty of space stability, on the back of an explicitly unilateralist space doctrine.983 After the 9/11 terrorist attacks, the US conducted what has been called “informationalised warfare” in Afghanistan and Iraq.984 All along, new space weapons ideas – like the “Rods for Gods” concept – were being explored.985 Space institutions under the UN provided some goods to China and Russia, but ultimately served the US better, as made clear by the latter states´ attempts at replacing central international space treaties.986 As the US invested in advanced defensive space power systems, the two other states faced a dilemma. Enter into an arms race with the US in space and potentially lose? Or give away sovereignty by being dominated by superior US space weapons circling above? Regardless, US dominance in space during the Second Space age was a source of insecurity to less powerful states. China and Russia dealt with growing space insecurity by balancing against the US in space. China has built and tested a broad range of military space capabilities987, developed its own counterspace strategy based on the observed US “informationalised warfare”988, and lobbied for new international space weapons laws through the UN system.989 The EU and China has become less dependent on GPS by investing in the Galileo and Baidu navigation systems, which Bolton argues to be a form of techno-nationalist balancing.990 The two challengers have united to change the international space regime in their advantage by suggesting a ban on space-based weapons instead of Earth-based ASATs like the ones they possess themselves.991 In order to stop the return of an idea like “Brilliant Pebbles”, China emulated the US and Soviet two-track approach. To develop ASATs while negotiating to ban them. Russian re-took control over some of the commercialised space sector, invested in and reorganised military space, and restarted GLONASS launches. The risk of space war in the Second Space Age has so far peaked in 2007 and 2008. Ever since the mid 1980s, before the USSR collapsed and the Second Space Age ended, the two reigning superpowers had abstained from further ASAT testing.992 Suddenly, the old bipolar balance of space power was gone. At first, the balance of space power became unipolar, allowing the US to pull out from a core space treaty like the ABMT.993 China, however, had a larger population and growing wealth from industry and advanced technology. Ever sine the new millennium, China had been developing new space weapons. To prove that it was one the countries with such a capability and realise its potential threat, China decided to begin conducting ASAT tests.994 By studying and emulation US “informationalised warfare”, China developed and demonstrated capabilities which can take advantage of US vulnerabilities in space. This has played into the historical fear of a new “Pearl Harbor” in the US. If a “tit for tat” pattern of ASAT testing had manifested, tensions between China and the US could have escalated into direct confrontation. The gradual shift to multipolarity seems to haves increased the risk of space war during the Second Space Age. For the last decades, new actors – primarily China – have been able to level the playing field, while space capabilities have become cheaper and more easily available.995 As Petroni and Bianchi found, economic leadership has become the foundation of military space supremacy in the multipolar world.996 China benefited greatly from what Mearsheimer's might call latent military space power997 from its rapidly growing commercial satellites industry, but Russia also focused its attention to its commercial sector in the Second Space Age.99899910001001 Multipolarity in space comes with increased complexity and likelihood of miscalculation. In that light, China's balancing act with an ASAT test in 2007 appear even more dangerous. The US answered in turn with their own ASAT test, destroying their own satellite to match the Chinese one circling Earth as scattered debris.1002 Russia's attempt in the last decade to counterbalance against the US has also been reflected in international space politics, in the shape of more state control, military spending and reorganisation, and new alliances. Sino-Russian space cooperation, however, is not running on full throttle, as China is now developing more capabilities at home, while Russia is spending more at home. Wohlforth argues that the current US unipolarity is stable because of the superpower´s preponderance1003 , but judging by the behaviour of China and Russia, the perceived threat seems large enough to trigger balancing behaviour in space. The quest for regional hegemony on Earth has increased the risk of space war. As China grows stronger, US military hegemony, especially in Asia, is being challenged. Satellites have long played an important part in wars far off the US mainland. From Vietnam to the two wars in Iraq, the Balkan Wars, Afghanistan: military space capabilities have been involved involved in all of them. Similarly, the US military presence in the western Pacific also relies on space power to a high degree. The US still enjoys an overwhelming space superiority compared to China and Russia (See Figure 6), but experts believe that China aims to use its rapidly growing arsenal of asymmetric counterspace capabilities to deny US space dominance in case of a conflict in Asia over critical national interests, such as the status of Taiwan.10041005 In a potential war over the Taiwan or Spratlay Islands, China could be tempted to try to delay US aircraft carriers by destroying, blinding or jamming the satellites such carriers rely on for navigation, coordination and precision strikes.1006 The strategy involves denying opponents access to information by interfering with their space capabilities and thereby retarding their command and control. In short, by denying an opponent the ability to use space freely, the PLA would be denying them the ability to achieve information dominance and therefore make them less able to fight an “informationalised war”. O´Hanlon predicts that if “China could find major U.S. naval assets with satellites, it would only need to sneak a single airplane, ship, or submarine into the region east of Taiwan to have a good chance of sinking a ship”1007, thus deterring the US from entering a war to protects its allies. Similarly, Russia has demonstrated operational counterspace capabilities in regional conflicts in Chechnya1008 as well as Ukraine and Syria1009. The risk of space war decreased during the Second Space Age because states still maximised space security to a high degree, and because technological maturity and high costs are still important factors. China's ASAT test in 2007 can not be labelled space security maximisation, but after the US response in 2008, the US approach in space actually shifted to become less confrontational and slight more accepting to a multipolar balance of space power in the international system.10101011 Even at the peak of the unipolar moment in space, with space weapons like “Rod from Gods” on the drawing board, the US never placed weapons permanently in orbit. Instead of using its ASAT weapons when it suddenly became an underdog, Russia cooperated with the US, though much out of necessity. The Columbia accident in 2003, showed that even the state with the most space power – in this case the US – was struggling to develop safe and functioning space capabilities. However, a number of factor predicts a dangerous future in international space politics. The true nature of new space capabilities continued to be blurred due to its dual-use. According to the Pentagon, roughly 95 percent of space technologies can be considered dual use.1012 As Mutschler has argued, space security cooperation must produce balanced gains to stand a chance for success1013, but as Hansel has pointed out, the US, China and Russia have opposing interests on space arms control. 1014 The incentives for striking first in space, which according to Glaser and Kaufmann1015 is an important factor in explaining the likelihood of war in the international system, is made worse by limitations in space situational awareness (SSA)1016. Perhaps more importantly, the US and China – the two most powerful states on Earth – have little to no cooperation in space, leaving slim chances for successful, substantial space cooperation based on balanced, relative gains.1017 Ultimately, as Bahney and Pearl have recently concluded in Foreign Affairs, “[e]ven if it were possible to convince Moscow and Beijing of the benefits of comprehensive space arms control, existing technology makes it extremely difficult to verify compliance with the necessary treaty provisions—and without comprehensive and reliable verification, treaties are toothless”1018.

#### American unipolarity is not mutually exclusive from multilateral cooperation – it creates a new form of institutionally bound multilateralism via benign hegemony

**Stokes ’18** [Doug, Professor in International Security and Strategy in the Department of Politics at the University of Exeter, “Trump, American Hegemony, and the Future of the Liberal International Order”, International Affairs 94: I, 2018 issue, https://www.chathamhouse.org/sites/default/files/images/ia/INTA94\_1\_8\_238\_Stokes.pdf]//pranav

At the end of the Second World War, the United States possessed almost half the world’s manufacturing capacity, the majority of its food supplies, nearly all of its capital reserves and a military power unparalleled in human history. In this context, the US national interest became globalized as America set about using its hegemonic leadership to fashion a new world order. Whereas closed economic blocs had exacerbated the rise of nationalist extremism after the First World War, after 1945 American foreign policy elites sought to use the new US hegemony to create an international order based on economic interdependence, a conditional and institutionally bound multilateralism and strategic alliance networks under US leadership. These networks existed in part to contain Soviet expansionism militarily, but also to dampen geopolitical competition from other centres of world power such as Japan or western Europe.14 The promotion of the LIO thus represented the institutional instantiation of the kind of world order that would allow the United States to thrive while also remaining first among equals in a Pax Americana.15 This order, while allowing the United States to flourish, also carried substantial costs, with the emergence of economic challenges from other states. Both Germany and Japan, formerly locked into an existential struggle for world mastery, emerged as economic challengers to the United States a little over three decades after the cessation of hostilities. This was, then, a remarkably benign form of hegemony, giving rise to the question: why would the United States choose this form of hegemonic leadership, and the often steep concomitant costs in blood and treasure, to maintain a system that, in economic terms at least, allowed other centres of power to emerge? At this point we can usefully turn to IR theory, and in particular hegemonic stability theory (HST), which can help us to understand the structural logic underpinning hegemonic leadership. Broadly speaking, HST argues that the international system is more likely to be stable when a single state is the dominant power within that system. The existence of a hegemon helps eliminate collec- tive action problems associated with the generation of often costly global public goods necessary to world commerce and to the underwriting of the political and strategic contexts of global economic interdependence—problems that have long bedevilled international politics. Aside from the alleged efficacy of world hegemonic leadership, what does HST tell us about why a preponderant power would seek this often costly role of global leadership? The first explanation is most closely associated with Kindleberger, and argues that a hegemon provides leadership as a form of benevolent service to the international community.16 In this sense, the hegemon seeks to promote not only its own interests but also the collective interests of the states that it leads: a form of noblesse oblige. In so far as hegemonic leadership is ‘thought of as the provision of the public good of responsibility, rather than exploitation of followers or the private good of prestige, it remains a positive idea’. Importantly, hegemonic leadership can help to pacify forms of economic rivalry inherent within the global economy. That is, leadership can help ‘pool sovereignties to limit the capacity of separate countries to work against the general interest; such pooling is virtually attained today in some of the functions needed to stabilize the world economic system’ and is ‘necessary in the absence of delegated authority’.17 The hegemon is benign as its net resource transfers to the rest of the international community through the costs of the public goods it supplies, including security public goods in the form of alliance networks such as NATO, are extremely costly. This implies that the United States is not predominantly seeking either its own immediate advantage or its own one-sided long-term strength *vis-à-vis* other economic centres. Instead, it is promoting change in the collective interests of world prosperity through the exercise of a benign hegemony.

#### Privatization alone fails – they’re unproven, decades away, and underestimate ISS resiliency

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But while those options show promise, they are still unproven and years from hitting the market.

As a result, NASA has been increasingly concerned it could have a gap in low Earth orbit that would be even more consequential than the ignominious period after the space shuttle fleet was retired that left the space agency with no way to launch its astronauts to space from U.S. soil. Instead, NASA was forced to rely on the Russians for rides to space, at a price that grew to as much as $90 million a seat, before Elon Musk’s SpaceX restored human spaceflight for NASA earlier this year.

Even if the station is extended, NASA needs to be working now on its replacement, officials said. It took years to get the ISS up and running. The concept was born in 1984, when President Ronald Reagan announced the United States would put a station, eventually dubbed Freedom, in orbit. But after different administrations and design changes, the first segments weren’t launched until 1998. Since then, NASA has invested more than $100 billion in the facility, which receives more than $3 billion annually from NASA.

Privately run stations would also need time to build their business cases, signing foreign governments as tenants, working with companies and universities that want to do research in space, and wealthy tourists who would pay millions of dollars to visit.

While NASA and the private sector work toward developing commercial habitats, China is building its own space station that it hopes to launch within a couple of years and is recruiting countries around the world as partners. The United States would not be one of them, however, since NASA is effectively barred by law from partnering with China in space.

“I think it would be a tragedy if, after all of this time and all of this effort, we were to abandon low Earth orbit and cede that territory,” NASA administrator Jim Bridenstine told a Senate panel earlier this year.

The ISS still does have some good years left, officials said. “We’re good from an engineering standpoint,” Joel Montalbano, NASA’s space station program manager, said in an interview. “We’re cleared through 2028.”

Boeing, which is paid $225 million per year as the prime contractor supporting space station operations, said it could stay in orbit for even longer.

“The ISS is incredibly healthy, with life capability well beyond 2030,” said John Mulholland, Boeing’s ISS program manager. He said the U.S. and Russia recently completed a life extension study “and all the hardware has been cleared to a minimum of 2030. That’s a real testament to the design and the maintenance that’s been done on it.”

Recently, the station got new lithium-ion batteries that “are less than half the size of the original batteries and produce twice the power,” Mulholland said. The power upgrade also doubled the speed at which the station’s crew can send data from science experiments back to Earth.

Over the years, the station’s water recovery system has improved to the point where today, 95 percent of the water used for drinking and cooking is recycled, Montalbano said. The communications systems have also been upgraded, as have life support systems like carbon dioxide removal.

### Framing

#### The introspective connection between pain and pleasure and phenomenal conceptions of intrinsic value and disvalue is irrefutable – everything else regresses – robust neuroscience proves.

Blum et al. 18 Kenneth Blum, 1Department of Psychiatry, Boonshoft School of Medicine, Dayton VA Medical Center, Wright State University, Dayton, OH, USA 2Department of Psychiatry, McKnight Brain Institute, University of Florida College of Medicine, Gainesville, FL, USA 3Department of Psychiatry and Behavioral Sciences, Keck Medicine University of Southern California, Los Angeles, CA, USA 4Division of Applied Clinical Research & Education, Dominion Diagnostics, LLC, North Kingstown, RI, USA 5Department of Precision Medicine, Geneus Health LLC, San Antonio, TX, USA 6Department of Addiction Research & Therapy, Nupathways Inc., Innsbrook, MO, USA 7Department of Clinical Neurology, Path Foundation, New York, NY, USA 8Division of Neuroscience-Based Addiction Therapy, The Shores Treatment & Recovery Center, Port Saint Lucie, FL, USA 9Institute of Psychology, Eötvös Loránd University, Budapest, Hungary 10Division of Addiction Research, Dominion Diagnostics, LLC. North Kingston, RI, USA 11Victory Nutrition International, Lederach, PA., USA 12National Human Genome Center at Howard University, Washington, DC., USA, Marjorie Gondré-Lewis, 12National Human Genome Center at Howard University, Washington, DC., USA 13Departments of Anatomy and Psychiatry, Howard University College of Medicine, Washington, DC US, Bruce Steinberg, 4Division of Applied Clinical Research & Education, Dominion Diagnostics, LLC, North Kingstown, RI, USA, Igor Elman, 15Department Psychiatry, Cooper University School of Medicine, Camden, NJ, USA, David Baron, 3Department of Psychiatry and Behavioral Sciences, Keck Medicine University of Southern California, Los Angeles, CA, USA, Edward J Modestino, 14Department of Psychology, Curry College, Milton, MA, USA, Rajendra D Badgaiyan, 15Department Psychiatry, Cooper University School of Medicine, Camden, NJ, USA, Mark S Gold 16Department of Psychiatry, Washington University, St. Louis, MO, USA, “Our evolved unique pleasure circuit makes humans different from apes: Reconsideration of data derived from animal studies”, U.S. Department of Veterans Affairs, 28 February 2018, accessed: 19 August 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6446569/>, R.S.

**Pleasure** is not only one of the three primary reward functions but it also **defines reward.** As homeostasis explains the functions of only a limited number of rewards, the principal reason why particular stimuli, objects, events, situations, and activities are rewarding may be due to pleasure. This applies first of all to sex and to the primary homeostatic rewards of food and liquid and extends to money, taste, beauty, social encounters and nonmaterial, internally set, and intrinsic rewards. Pleasure, as the primary effect of rewards, drives the prime reward functions of learning, approach behavior, and decision making and provides the **basis for hedonic theories** of reward function. We are attracted by most rewards and exert intense efforts to obtain them, just because they are enjoyable [10].

Pleasure is a passive reaction that derives from the experience or prediction of reward and may lead to a long-lasting state of happiness. The word happiness is difficult to define. In fact, just obtaining physical pleasure may not be enough. One key to happiness involves a network of good friends. However, it is not obvious how the higher forms of satisfaction and pleasure are related to an ice cream cone, or to your team winning a sporting event. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure [14].

Pleasure as a hallmark of reward is sufficient for defining a reward, but it may not be necessary. A reward may generate positive learning and approach behavior simply because it contains substances that are essential for body function. When we are hungry, we may eat bad and unpleasant meals. A monkey who receives hundreds of small drops of water every morning in the laboratory is unlikely to feel a rush of pleasure every time it gets the 0.1 ml. Nevertheless, with these precautions in mind, we may define any stimulus, object, event, activity, or situation that has the potential to produce pleasure as a reward. In the context of reward deficiency or for disorders of addiction, homeostasis pursues pharmacological treatments: drugs to treat drug addiction, obesity, and other compulsive behaviors. The theory of allostasis suggests broader approaches - such as re-expanding the range of possible pleasures and providing opportunities to expend effort in their pursuit. [15]. It is noteworthy, the first animal studies eliciting approach behavior by electrical brain stimulation interpreted their findings as a discovery of the brain’s pleasure centers [16] which were later partly associated with midbrain dopamine neurons [17–19] despite the notorious difficulties of identifying emotions in animals.

Evolutionary theories of pleasure: The love connection BO:D

Charles Darwin and other biological scientists that have examined the biological evolution and its basic principles found various mechanisms that steer behavior and biological development. Besides their theory on natural selection, it was particularly the sexual selection process that gained significance in the latter context over the last century, especially when it comes to the question of what makes us “what we are,” i.e., human. However, the capacity to sexually select and evolve is not at all a human accomplishment alone or a sign of our uniqueness; yet, we humans, as it seems, are ingenious in fooling ourselves and others–when we are in love or desperately search for it.

It is well established that modern biological theory conjectures that **organisms are** the **result of evolutionary competition.** In fact, Richard Dawkins stresses gene survival and propagation as the basic mechanism of life [20]. Only genes that lead to the fittest phenotype will make it. It is noteworthy that the phenotype is selected based on behavior that maximizes gene propagation. To do so, the phenotype must survive and generate offspring, and be better at it than its competitors. Thus, the ultimate, distal function of rewards is to increase evolutionary fitness

by ensuring the survival of the organism and reproduction. It is agreed that learning, approach, economic decisions, and positive emotions are the proximal functions through which phenotypes obtain other necessary nutrients for survival, mating, and care for offspring.

Behavioral reward functions have evolved to help individuals to survive and propagate their genes. Apparently, people need to live well and long enough to reproduce. Most would agree that homo-sapiens do so by ingesting the substances that make their bodies function properly. For this reason, foods and drinks are rewards. Additional rewards, including those used for economic exchanges, ensure sufficient palatable food and drink supply. Mating and gene propagation is supported by powerful sexual attraction. Additional properties, like body form, augment the chance to mate and nourish and defend offspring and are therefore also rewards. Care for offspring until they can reproduce themselves helps gene propagation and is rewarding; otherwise, many believe mating is useless. According to David E Comings, as any small edge will ultimately result in evolutionary advantage [21], additional reward mechanisms like novelty seeking and exploration widen the spectrum of available rewards and thus enhance the chance for survival, reproduction, and ultimate gene propagation. These functions may help us to obtain the benefits of distant rewards that are determined by our own interests and not immediately available in the environment. Thus the distal reward function in gene propagation and evolutionary fitness defines the proximal reward functions that we see in everyday behavior. That is why foods, drinks, mates, and offspring are rewarding.

There have been theories linking pleasure as a required component of health benefits salutogenesis, (salugenesis). In essence, under these terms, pleasure is described as a state or feeling of happiness and satisfaction resulting from an experience that one enjoys. Regarding pleasure, it is a double-edged sword, on the one hand, it promotes positive feelings (like mindfulness) and even better cognition, possibly through the release of dopamine [22]. But on the other hand, pleasure simultaneously encourages addiction and other negative behaviors, i.e., motivational toxicity. It is a complex neurobiological phenomenon, relying on reward circuitry or limbic activity. It is important to realize that through the “Brain Reward Cascade” (BRC) endorphin and endogenous morphinergic mechanisms may play a role [23]. While natural rewards are essential for survival and appetitive motivation leading to beneficial biological behaviors like eating, sex, and reproduction, crucial social interactions seem to further facilitate the positive effects exerted by pleasurable experiences. Indeed, experimentation with addictive drugs is capable of directly acting on reward pathways and causing deterioration of these systems promoting hypodopaminergia [24]. Most would agree that pleasurable activities can stimulate personal growth and may help to induce healthy behavioral changes, including stress management [25]. The work of Esch and Stefano [26] concerning the link between compassion and love implicate the brain reward system, and pleasure induction suggests that social contact in general, i.e., love, attachment, and compassion, can be highly effective in stress reduction, survival, and overall health.

Understanding the role of neurotransmission and pleasurable states both positive and negative have been adequately studied over many decades [26–37], but comparative anatomical and neurobiological function between animals and homo sapiens appear to be required and seem to be in an infancy stage.

Finding happiness is different between apes and humans

As stated earlier in this expert opinion one key to happiness involves a network of good friends [38]. However, it is not entirely clear exactly how the higher forms of satisfaction and pleasure are related to a sugar rush, winning a sports event or even sky diving, all of which augment dopamine release at the reward brain site. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure.

Remarkably, there are pathways for ordinary liking and pleasure, which are limited in scope as described above in this commentary. However, there are **many brain regions**, often termed hot and cold spots, that significantly **modulate** (increase or decrease) our **pleasure or** even produce **the opposite** of pleasure— that is disgust and fear [39]. One specific region of the nucleus accumbens is organized like a computer keyboard, with particular stimulus triggers in rows— producing an increase and decrease of pleasure and disgust. Moreover, the cortex has unique roles in the cognitive evaluation of our feelings of pleasure [40]. Importantly, the interplay of these multiple triggers and the higher brain centers in the prefrontal cortex are very intricate and are just being uncovered.

Desire and reward centers

It is surprising that many different sources of pleasure activate the same circuits between the mesocorticolimbic regions (Figure 1). Reward and desire are two aspects pleasure induction and have a very widespread, large circuit. Some part of this circuit distinguishes between desire and dread. The so-called pleasure circuitry called “REWARD” involves a well-known dopamine pathway in the mesolimbic system that can influence both pleasure and motivation.

In simplest terms, the well-established mesolimbic system is a dopamine circuit for reward. It starts in the ventral tegmental area (VTA) of the midbrain and travels to the nucleus accumbens (Figure 2). It is the cornerstone target to all addictions. The VTA is encompassed with neurons using glutamate, GABA, and dopamine. The nucleus accumbens (NAc) is located within the ventral striatum and is divided into two sub-regions—the motor and limbic regions associated with its core and shell, respectively. The NAc has spiny neurons that receive dopamine from the VTA and glutamate (a dopamine driver) from the hippocampus, amygdala and medial prefrontal cortex. Subsequently, the NAc projects GABA signals to an area termed the ventral pallidum (VP). The region is a relay station in the limbic loop of the basal ganglia, critical for motivation, behavior, emotions and the “Feel Good” response. This defined system of the brain is involved in all addictions –substance, and non –substance related. In 1995, our laboratory coined the term “Reward Deficiency Syndrome” (RDS) to describe genetic and epigenetic induced hypodopaminergia in the “Brain Reward Cascade” that contribute to addiction and compulsive behaviors [3,6,41].

Furthermore, ordinary “liking” of something, or pure pleasure, is represented by small regions mainly in the limbic system (old reptilian part of the brain). These may be part of larger neural circuits. In Latin, hedus is the term for “sweet”; and in Greek, hodone is the term for “pleasure.” Thus, the word Hedonic is now referring to various subcomponents of pleasure: some associated with purely sensory and others with more complex emotions involving morals, aesthetics, and social interactions. The capacity to have pleasure is part of being healthy and may even extend life, especially if linked to optimism as a dopaminergic response [42].

Psychiatric illness often includes symptoms of an abnormal inability to experience pleasure, referred to as anhedonia. A negative feeling state is called dysphoria, which can consist of many emotions such as pain, depression, anxiety, fear, and disgust. Previously many scientists used animal research to uncover the complex mechanisms of pleasure, liking, motivation and even emotions like panic and fear, as discussed above [43]. However, as a significant amount of related research about the specific brain regions of pleasure/reward circuitry has been derived from invasive studies of animals, these cannot be directly compared with subjective states experienced by humans.

In an attempt to resolve the controversy regarding the causal contributions of mesolimbic dopamine systems to reward, we have previously evaluated the three-main competing explanatory categories: “liking,” “learning,” and “wanting” [3]. That is, dopamine may mediate (a) liking: the hedonic impact of reward, (b) learning: learned predictions about rewarding effects, or (c) wanting: the pursuit of rewards by attributing incentive salience to reward-related stimuli [44]. We have evaluated these hypotheses, especially as they relate to the RDS, and we find that the incentive salience or “wanting” hypothesis of dopaminergic functioning is supported by a majority of the scientific evidence. Various neuroimaging studies have shown that anticipated behaviors such as sex and gaming, delicious foods and drugs of abuse all affect brain regions associated with reward networks, and may not be unidirectional. Drugs of abuse enhance dopamine signaling which sensitizes mesolimbic brain mechanisms that apparently evolved explicitly to attribute incentive salience to various rewards [45].

Addictive substances are voluntarily self-administered, and they enhance (directly or indirectly) dopaminergic synaptic function in the NAc. This activation of the brain reward networks (producing the ecstatic “high” that users seek). Although these circuits were initially thought to encode a set point of hedonic tone, it is now being considered to be far more complicated in function, also encoding attention, reward expectancy, disconfirmation of reward expectancy, and incentive motivation [46]. The argument about addiction as a disease may be confused with a predisposition to substance and nonsubstance rewards relative to the extreme effect of drugs of abuse on brain neurochemistry. The former sets up an individual to be at high risk through both genetic polymorphisms in reward genes as well as harmful epigenetic insult. Some Psychologists, even with all the data, still infer that addiction is not a disease [47]. Elevated stress levels, together with polymorphisms (genetic variations) of various dopaminergic genes and the genes related to other neurotransmitters (and their genetic variants), and may have an additive effect on vulnerability to various addictions [48]. In this regard, Vanyukov, et al. [48] suggested based on review that whereas the gateway hypothesis does not specify mechanistic connections between “stages,” and does not extend to the risks for addictions the concept of common liability to addictions may be more parsimonious. The latter theory is grounded in genetic theory and supported by data identifying common sources of variation in the risk for specific addictions (e.g., RDS). This commonality has identifiable neurobiological substrate and plausible evolutionary explanations.

Over many years the controversy of dopamine involvement in especially “pleasure” has led to confusion concerning separating motivation from actual pleasure (wanting versus liking) [49]. We take the position that animal studies cannot provide real clinical information as described by self-reports in humans. As mentioned earlier and in the abstract, on November 23rd, 2017, evidence for our concerns was discovered [50]

In essence, although nonhuman primate brains are similar to our own, the disparity between other primates and those of human cognitive abilities tells us that surface similarity is not the whole story. Sousa et al. [50] small case found various differentially expressed genes, to associate with pleasure related systems. Furthermore, the dopaminergic interneurons located in the human neocortex were absent from the neocortex of nonhuman African apes. Such differences in neuronal transcriptional programs may underlie a variety of neurodevelopmental disorders.

In simpler terms, the system controls the production of dopamine, a chemical messenger that plays a significant role in pleasure and rewards. The senior author, Dr. Nenad Sestan from Yale, stated: “Humans have evolved a dopamine system that is different than the one in chimpanzees.” This may explain why the behavior of humans is so unique from that of non-human primates, even though our brains are so surprisingly similar, Sestan said: “It might also shed light on why people are vulnerable to mental disorders such as autism (possibly even addiction).” Remarkably, this research finding emerged from an extensive, multicenter collaboration to compare the brains across several species. These researchers examined 247 specimens of neural tissue from six humans, five chimpanzees, and five macaque monkeys. Moreover, these investigators analyzed which genes were turned on or off in 16 regions of the brain. While the differences among species were subtle, **there was** a **remarkable contrast in** the **neocortices**, specifically in an area of the brain that is much more developed in humans than in chimpanzees. In fact, these researchers found that a gene called tyrosine hydroxylase (TH) for the enzyme, responsible for the production of dopamine, was expressed in the neocortex of humans, but not chimpanzees. As discussed earlier, dopamine is best known for its essential role within the brain’s reward system; the very system that responds to everything from sex, to gambling, to food, and to addictive drugs. However, dopamine also assists in regulating emotional responses, memory, and movement. Notably, abnormal dopamine levels have been linked to disorders including Parkinson’s, schizophrenia and spectrum disorders such as autism and addiction or RDS.

Nora Volkow, the director of NIDA, pointed out that one alluring possibility is that the neurotransmitter dopamine plays a substantial role in humans’ ability to pursue various rewards that are perhaps months or even years away in the future. This same idea has been suggested by Dr. Robert Sapolsky, a professor of biology and neurology at Stanford University. Dr. Sapolsky cited evidence that dopamine levels rise dramatically in humans when we anticipate potential rewards that are uncertain and even far off in our futures, such as retirement or even the possible alterlife. This may explain what often motivates people to work for things that have no apparent short-term benefit [51]. In similar work, Volkow and Bale [52] proposed a model in which dopamine can favor NOW processes through phasic signaling in reward circuits or LATER processes through tonic signaling in control circuits. Specifically, they suggest that through its modulation of the orbitofrontal cortex, which processes salience attribution, dopamine also enables shilting from NOW to LATER, while its modulation of the insula, which processes interoceptive information, influences the probability of selecting NOW versus LATER actions based on an individual’s physiological state. This hypothesis further supports the concept that disruptions along these circuits contribute to diverse pathologies, including obesity and addiction or RDS.

#### Science proves non util ethics are impossible.

Greene 10 – Joshua, Associate Professor of Social science in the Department of Psychology at Harvard University

(The Secret Joke of Kant’s Soul published in Moral Psychology: Historical and Contemporary Readings, accessed: www.fed.cuhk.edu.hk/~lchang/material/Evolutionary/Developmental/Greene-KantSoul.pdf)

**What turn-of-the-millennium science** **is telling us is that human moral judgment is not a pristine rational enterprise**, that our **moral judgments are driven by a hodgepodge of emotional dispositions, which themselves were shaped by a hodgepodge of evolutionary forces, both biological and cultural**. **Because of this, it is exceedingly unlikely that there is any rationally coherent normative moral theory that can accommodate our moral intuitions**. Moreover, **anyone who claims to have such a theory**, or even part of one, **almost certainly doesn't**. Instead, what that person probably has is a moral rationalization. It seems then, that we have somehow crossed the infamous "is"-"ought" divide. How did this happen? Didn't Hume (Hume, 1978) and Moore (Moore, 1966) warn us against trying to derive an "ought" from and "is?" How did we go from descriptive scientific theories concerning moral psychology to skepticism about a whole class of normative moral theories? The answer is that we did not, as Hume and Moore anticipated, attempt to derive an "ought" from and "is." That is, our method has been inductive rather than deductive. We have inferred on the basis of the available evidence that the phenomenon of rationalist deontological philosophy is best explained as a rationalization of evolved emotional intuition (Harman, 1977). Missing the Deontological Point I suspect that **rationalist deontologists will remain unmoved by the arguments presented here**. Instead, I suspect, **they** **will insist that I have simply misunderstood what** Kant and like-minded **deontologists are all about**. **Deontology, they will say, isn't about this intuition or that intuition**. It's not defined by its normative differences with consequentialism. **Rather, deontology is about taking humanity seriously**. Above all else, it's about respect for persons. It's about treating others as fellow rational creatures rather than as mere objects, about acting for reasons rational beings can share. And so on (Korsgaard, 1996a; Korsgaard, 1996b). **This is, no doubt, how many deontologists see deontology. But this insider's view**, as I've suggested, **may be misleading**. **The problem**, more specifically, **is that it defines deontology in terms of values that are not distinctively deontological**, though they may appear to be from the inside. **Consider the following analogy with religion. When one asks a religious person to explain the essence of his religion, one often gets an answer like this: "It's about love**, really. It's about looking out for other people, looking beyond oneself. It's about community, being part of something larger than oneself." **This sort of answer accurately captures the phenomenology of many people's religion, but it's nevertheless inadequate for distinguishing religion from other things**. This is because many, if not most, non-religious people aspire to love deeply, look out for other people, avoid self-absorption, have a sense of a community, and be connected to things larger than themselves. In other words, secular humanists and atheists can assent to most of what many religious people think religion is all about. From a secular humanist's point of view, in contrast, what's distinctive about religion is its commitment to the existence of supernatural entities as well as formal religious institutions and doctrines. And they're right. These things really do distinguish religious from non-religious practices, though they may appear to be secondary to many people operating from within a religious point of view. In the same way, I believe that most of **the standard deontological/Kantian self-characterizatons fail to distinguish deontology from other approaches to ethics**. (See also Kagan (Kagan, 1997, pp. 70-78.) on the difficulty of defining deontology.) It seems to me that **consequentialists**, as much as anyone else, **have respect for persons**, **are against treating people as mere objects,** **wish to act for reasons that rational creatures can share, etc**. **A consequentialist respects other persons, and refrains from treating them as mere objects, by counting every person's well-being in the decision-making process**. **Likewise, a consequentialist attempts to act according to reasons that rational creatures can share by acting according to principles that give equal weight to everyone's interests, i.e. that are impartial**. This is not to say that consequentialists and deontologists don't differ. They do. It's just that the real differences may not be what deontologists often take them to be. What, then, distinguishes deontology from other kinds of moral thought? A good strategy for answering this question is to start with concrete disagreements between deontologists and others (such as consequentialists) and then work backward in search of deeper principles. This is what I've attempted to do with the trolley and footbridge cases, and other instances in which deontologists and consequentialists disagree. **If you ask a deontologically-minded person why it's wrong to push someone in front of speeding trolley in order to save five others, you will get** characteristically deontological **answers**. Some **will be tautological**: **"Because it's murder!"** **Others will be more sophisticated: "The ends don't justify the means**." "You have to respect people's rights." **But**, as we know, **these answers don't really explain anything**, because **if you give the same people** (on different occasions) **the trolley case** or the loop case (See above), **they'll make the opposite judgment**, even though their initial explanation concerning the footbridge case applies equally well to one or both of these cases. **Talk about rights, respect for persons, and reasons we can share are natural attempts to explain, in "cognitive" terms, what we feel when we find ourselves having emotionally driven intuitions that are odds with the cold calculus of consequentialism**. Although these explanations are inevitably incomplete, **there seems to be "something deeply right" about them because they give voice to powerful moral emotions**. **But, as with many religious people's accounts of what's essential to religion, they don't really explain what's distinctive about the philosophy in question**.

#### Even the most conservative estimates prove reducing existential risk outweighs all other impacts, regardless of probability – actively prioritize our calculus since you are cognitively biased against it

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The number of people alive today pales in comparison to the number who could exist in the future. It may therefore be extremely important to ensure that human civilization flourishes far into the future, enjoying fulfilling lives free of suffering.

There are a number of ways we might work to ensure a positive future for humanity. We could work to better understand and prevent extinction risks - catastrophic events that have the potential to destroy all life on this planet.[1] We may want to focus on the broader category of existential risks- events that could dramatically and irreversibly curtail humanity’s potential.[2] Or we might focus on increasing the chance that the lives of our descendants are positive in other ways: for example, improving democracy or the ability of institutions to make good decisions.

Attempts to shape the long-term future seem highly neglected relative to the problems we face today. There are fewer incentives to address longer-term problems, and they can also be harder for us to take seriously.

It is, of course, hard to be certain about the impact of our actions on the very long-term future. However, it does seem that there are things we can do - and given the vast scale we are talking about, these actions could therefore have an enormous impact in expectation.

This profile sets out why you might want to focus your altruistic efforts on the long-term future - and why you might not. You may be particularly inclined to focus on this if you think we face serious existential threats in the next century, and if you’re comfortable accepting a reasonable amount of uncertainty about the impact you are having, especially in the short-term.

The case for the long-term future as a target of altruism

The case for focusing on the long-term future can be summarised as follows:

The long-term future has enormous potential for good or evil: our descendants could live for billions or trillions of years, and have very high-quality lives;

It seems likely there are things we can do today that will affect the long-term future in non-negligible ways;

Possible ways of shaping the long-term future are currently highly neglected by individuals and society;

Given points 1 to 3 above, actions aimed at shaping the long-term future seem to have extremely high expected value, higher than any actions aiming for more near-term benefits.

Below we discuss each part of this argument in more detail.

The long-term future has enormous potential

Civilisation could continue for a billion years, until the Earth becomes uninhabitable.[3] It’s hard to say how likely this is, but it certainly seems plausible - and putting less than, say, a 1% chance on this possibility seems overconfident.[4] You may disagree that 1% is a reasonable lower bound here, but changing the figure by an order of magnitude or two would still yield an extremely impressive result. And even if civilisation only survives for another million years, that still amounts to another ~50,000 generations of people, i.e. trillions of future lives.[5]

If our descendants survive for long enough, then they are likely to advance in ways we cannot currently imagine - even someone living a few hundred years ago could not possibly have imagined the technological advances we’ve made today. It is possible they might even develop technology enabling them to reach and colonise planets outside our solar system, and survive well beyond a billion years.[6]

Let’s say that if we survive until the end of the Earth’s lifespan, there is a 1% chance of space colonisation. This would make the overall probability of survival beyond Earth 1 in 10,000 (1% chance of surviving to a billion years, multiplied by a 1% chance of surviving further given that). This sounds incredibly low, but suppose that space colonisation could allow our descendants to survive up to 100 trillion years[7]. This suggests we could have up to 1/10,000 x 100 trillion years = 10 billion expected years of civilisation ahead of us.

If we expect life in the future to be, on average, about as good as the present, then this would make the whole of the future about 100 million times more important than everything that has happened in the last 100 years. In fact, it seems like there could be more people in the future with better lives than those living today: economic, social, and technological progress could enable us to cure diseases, lift people out of poverty, and better solve other problems. It also seems possible that people in the future will be more altruistic than people alive today[8] - which also makes it more likely that they will be motivated to create a happy and valuable world.

However, it’s precisely because of this enormous potential that it’s so important to ensure that things go as well as possible. The loss of potential would be enormous if we end up on a negative trajectory. It could result in a great deal of suffering or the end of life.[9] And just as the potential to solve many of the world’s problems is growing, threats seem to be growing too. In particular, advanced technologies and increasing interconnectedness pose great risks.[10]

There are things we can do today that could affect the long-term future

There are a number of things we could work on today that seem likely to influence the long-term future:

Reducing extinction risks: We could reduce the risk of catastrophic climate change by putting in place laws and regulations to cut carbon emissions. We could reduce the risks from new technologies by investing in research to ensure their safety. Alternatively, we could work to improve global cooperation so that we are better able to deal with unforeseen risks that might arise.

Changing the values of a civilisation: Values tend to be stable in societies,[11] so attempts to shift values, whilst difficult, could have long-lasting effects. Some forms of value change, like increasing altruism, seem robustly good, and may be a way of realizing the very best possible futures. However, spreading poorly considered values could be harmful.

Reducing suffering risks: Historically, technological advances have enabled great welfare improvements (e.g. through modern agriculture and medicine), but also some of the greatest sources of present-day suffering (e.g. factory farming). To prevent the worst risks from new technologies, we could improve global cooperation and work on specific problems like preventing worst-case outcomes from artificial intelligence.

“Speeding up” development: Boosting technological innovation or scientific progress could have a lasting “speed up” effect on the entire future, making all future benefits happen slightly earlier than they otherwise would have. Curing a disease just a few years earlier could save millions of lives, for example. (That said, it’s not clear whether speeding up development is good or bad for existential risk - developing new technologies faster might help us to mitigate certain threats, but pose new risks of their own.)

Ripple effects of our ordinary actions: Improvements in health not only benefit individuals directly but allow them to be more economically successful, meaning that society and other individuals have to invest less in supporting them. In aggregate, this could easily have substantial knock-on effects on the productivity of society, which could affect the future.

Other ways we might create positive trajectory changes: These include improving education, science, and political systems.

Paul Christiano also points out that even if opportunities to shape the long-term future with any degree of certainty do not exist today, they may well exist in the future. Investing in our own current capacity could have an indirect but large impact by improving our ability to take such opportunities when they do arise. Similarly, we can do research today to learn more about how we might be able to impact the long-term future.

The long-term future is neglected, especially relative to its importance

Attempts to shape the long-term future are neglected by individuals, organisations and governments.

One reason is that there is little incentive to focus on far-off, uncertain issues compared to more certain, immediate ones. As 80,000 Hours put it, “Future generations matter, but they can’t vote, they can’t buy things, they can’t stand up for their interests.”

Problems faced by future generations are also more uncertain and more abstract, making it harder for us to care about them. There is a well-established phenomenon called temporal discounting, which means that we tend to give less weight to outcomes that are far in the future.

This may explain our tendency to neglect long-term risks and problems. For example, it’s a large part of why we seem to have such difficulty tackling climate change.

Generally, there are diminishing returns to additional work in an area. This means that the neglectedness of the long-term future makes it more likely to be high impact.

Efforts to shape the long-term future could be extremely high in expected value

Even if the chance of our actions influencing the long-term trajectory of humanity is relatively low, there are extremely large potential benefits, which mean that these actions could still have a very high expected value. For example, decreasing the probability of human extinction by just one in a million could result in an additional 1,000 to 10,000 expected years of civilisation (using earlier assumptions).[12]

Compare this to actions we could take to improve the lives of people alive today, without looking at longer-run effects. A dramatic victory such as curing the most common and deadly diseases, or ending all war, might only make the current time period (~100 years) about twice as good as otherwise.[13] Though this seems like an enormous success, given the calculations above, decreasing the probability of human extinction would be 10 or 100 times better in expectation.

We might want to adjust this naive estimate downwards slightly, however, given uncertainty about some of the assumptions that go into it - we could be wrong about the probability of humanity surviving far into the future, or about the value of the future (if we think that future flourishing might have diminishing value, for example.) However, even if we think these estimates should be adjusted downwards substantially, we might very conservatively imagine that reducing the likelihood of existential risk by one in a million only equates to 100 expected years of civilization. This still suggests that the value of working to reduce existential risk is comparable to the value of the biggest victories we could imagine in the current time period - and so well worth taking seriously.