### Inherency

#### Private space mining and ownership allowed now.

**Williams 20** [(Matt Williams, Reporter) “Trump signs an executive order allowing mining the moon and asteroids,” Phys Org, April 13, 2020, <https://phys.org/news/2020-04-trump-moon-asteroids.html>] TDI

Trump signs an executive order allowing mining the moon and asteroids

In 2015, the Obama administration signed the [U.S. Commercial Space Launch Competitiveness Act](https://www.congress.gov/bill/114th-congress/house-bill/2262/text) (CSLCA, or H.R. 2262) into law. This **bill** was intended to "facilitate a pro-growth environment for the developing commercial space industry" by making it legal for American companies and citizens to own and sell resources that they extract from asteroids and off-world locations (like the moon, Mars or beyond).

On April 6th, the Trump administration took things a step further by signing an [executive order](https://www.space.com/trump-moon-mining-space-resources-executive-order.html) that formally recognizes the rights of private interests to claim resources in [space](https://phys.org/tags/space/). This order, titled "[Encouraging International Support for the Recovery and Use of Space Resources](https://www.whitehouse.gov/presidential-actions/executive-order-encouraging-international-support-recovery-use-space-resources/)," effectively ends the decades-long debate that began with the signing of [the Outer Space Treaty](https://www.universetoday.com/20590/moon-for-sale/) in 1967.

#### New investments coming and companies are launching – economic incentives make it alluring.

**Tosar 20** [(Borja Tosar, reporter) “Asteroid Mining: A New Space Race,” OpenMind BBVA, May 18, 2020, <https://www.bbvaopenmind.com/en/science/physics/asteroid-mining-a-new-space-race/>] TDI

This is not science fiction. There are now space mining companies, such as [Planetary Resources,](https://www.consensys.space/pr) which has already launched several mini-satellites to test several of its patents. Other companies like [Asteroid Mining Corporation](https://asteroidminingcorporation.co.uk/) or [Trans Astronautica Corporation,](https://www.transastracorp.com/) although still far from their goal, are already attracting millions of dollars of private investment interested in being on the front line of a possible future space business.

Is asteroid mining possible? This new space race already began back when the Hayabusa missions successfully returned a few grams of an asteroid’s regolith, so the technology to harvest asteroid material exists, we just have to change the scale. It is no longer a technological problem.

Is it economically viable? We are increasingly dependent on rare elements (such as those in the palladium group), which are expensive to exploit on Earth and come with a high environmental cost, so the sum of these two factors could make it profitable to travel to the asteroids to extract these raw materials. Astrophysicist Neil deGrasse argues that [the planet’s first trillionaire will undoubtedly be a space miner.](https://www.cnbc.com/2015/05/01/build-the-economy-here-on-earth-by-exploring-space-tyson.html)

### ADV --- Debris

#### The Advantage is Debris

#### Asteroid mining spikes the risk of satellite-dust collisions.

**Scoles 15** [(Sarah Scoles, freelance science writer, contributor at Wired and Popular Science, author of the books Making Contact and They Are Already Here) “Dust from asteroid mining spells danger for satellites,” New Scientist, May 27, 2015, <https://www.newscientist.com/article/mg22630235-100-dust-from-asteroid-mining-spells-danger-for-satellites/>] TDI

* Study this is citing – Javier Roa, Space Dynamic Group, Applied Physics Department, Technical University of Madrid. Casey J Handmer, Theoretical Astrophysics, California Institute of Technology. Both PhD Candidates. “Quantifying hazards: asteroid disruption in lunar distant retrograde orbits,” arXiv, Cornell University, May 14, 2015, <https://arxiv.org/pdf/1505.03800.pdf>

NASA chose the second option for its [Asteroid Redirect Mission](http://www.nasa.gov/content/what-is-nasa-s-asteroid-redirect-mission/), which aims to [pluck a boulder from an asteroid’s surface](https://www.newscientist.com/article/dn27243-rock-grab-from-asteroid-will-aid-human-mission-to-mars) and relocate it to a stable orbit around the moon. But an asteroid’s gravity is so weak that it’s not hard for surface particles to escape into space. Now a new model warns that debris shed by such transplanted rocks could intrude where many defence and communication satellites live – in geosynchronous orbit.

According to [Casey Handmer](http://www.caseyhandmer.com/) of the California Institute of Technology in Pasadena and Javier Roa of the Technical University of Madrid in Spain, 5 per cent of the escaped debris will end up in regions traversed by satellites. Over 10 years, it would cross geosynchronous orbit 63 times on average. A satellite in the wrong spot at the wrong time will suffer a damaging high-speed collision with that dust.

The study also looks at the “catastrophic disruption” of an asteroid 5 metres across or bigger. Its total break-up into a pile of rubble would increase the risk to satellites by more than 30 per cent ([arxiv.org/abs/1505.03800](http://arxiv.org/abs/1505.03800)).

#### Space dust wrecks satellites and debris exponentially spirals.

**Intagliata 17** [(Christopher Intagliata, MA Journalism from NYU, Editor for NPRs All Things Considered, Reporter/Host for Scientific American’s 60 Second Science) “The Sneaky Danger of Space Dust,” Scientific American, May 11, 2017, <https://www.scientificamerican.com/podcast/episode/the-sneaky-danger-of-space-dust/>] TDI

When tiny particles of space debris slam into satellites, the collision could cause the emission of hardware-frying radiation, Christopher Intagliata reports.

Aside from all the satellites, and the space station orbiting the Earth, there's a lot of trash circling the planet, too. Twenty-one thousand [baseball-sized chunks](https://www.scientificamerican.com/article/orbital-debris-space-fence/) of debris, [according to NASA](https://www.orbitaldebris.jsc.nasa.gov/faq.html). But that number's dwarfed by the number of small particles. There's hundreds of millions of those.

"And those smaller particles tend to be going fast. Think of picking up a grain of sand at the beach, and that would be on the large side. But they're going 60 kilometers per second."

Sigrid Close, an applied physicist and astronautical engineer at Stanford University. Close says that whereas mechanical damage—like punctures—is the worry with the bigger chunks, the dust-sized stuff might leave more insidious, invisible marks on satellites—by causing electrical damage.

"We also think this phenomenon can be attributed to some of the failures and anomalies we see on orbit, that right now are basically tagged as 'unknown cause.'"

Close and her colleague Alex Fletcher modeled this phenomenon mathematically, based on plasma physics behavior. And here's what they think happens. First, the dust slams into the spacecraft. Incredibly fast. It vaporizes and ionizes a bit of the ship—and itself. Which generates a cloud of ions and electrons, traveling at different speeds. And then: "It's like a spring action, the electrons are pulled back to the ions, ions are being pushed ahead a little bit. And then the electrons overshoot the ions, so they oscillate, and then they go back out again.”

That movement of electrons creates a pulse of electromagnetic radiation, which Close says could be the culprit for some of that electrical damage to satellites. The study is in the journal Physics of Plasmas. [Alex C. Fletcher and Sigrid Close, [Particle-in-cell simulations of an RF emission mechanism associated with hypervelocity impact plasmas](http://aip.scitation.org/doi/full/10.1063/1.4980833)]

#### Scenario 1 is Climate

#### Earth observation satellites key to warming adaptation.

**Alonso 18** [(Elisa Jiménez Alonso, communications consultant with Acclimatise, climate resilience organization) “Earth Observation of Increasing Importance for Climate Change Adaptation,” Acclimatise, May 2, 2018, <https://www.acclimatise.uk.com/2018/05/02/earth-observation-of-increasing-importance-for-climate-change-adaptation/>] TDI

Earth observation (EO) satellites are playing an increasingly important role in assessing climate change. By providing a constant and consistent stream of data about the state of the climate, EO is not just improving scientific outcomes but can also inform climate policy.

Managing climate-related risks effectively requires accurate, robust, sustained, and wide-ranging climate information. Reliable observational climate data can help scientists test the accuracy of their models and improve the science of attributing certain events to climate change. Information based on projections from models and historic data can help decision makers plan and implement adaptation actions.

Providing information in data-sparse regions

Ground-based weather and climate monitoring systems only cover about 30% of the Earth’s surface. In many parts of the world such data is incomplete and patchy due to poorly maintained weather stations and a general lack of such facilities.

EO satellites and rapidly improving satellite technology, especially data from open access programmes, offer a valuable source information for such data-sparse regions. This is especially important since countries and regions with a lack of climate data are often particularly vulnerable to climate change impacts.

International efforts for systematic observation The importance of satellite-based observations is also recognised by the international community. Following the recommendations of the World Meteorological Organization’s (WMO) Global Climate Observing System (GCOS) programme, the UNFCCC strongly encourages countries that support space agencies with EO programmes to get involved in GCOS and support the programme’s implementation. The Paris Agreement highlights the need for and importance of effective and progressive responses to the threat of climate change based on the best available scientific knowledge. This implies that climate knowledge needs to be strengthened, which includes continuously improving systematic observations of the Earth’s climate. To meet the need of such systematic climate observations, GCOS developed the concept of the Essential Climate Variable, or ECV. According to WMO, an ECV “is a physical, chemical or biological variable or a group of linked variables that critically contributes to the characterization of Earth’ s climate.” In 2010, 50 ECVs which would help the work of the UNFCCC and IPCC were defined by GCOS. The ECVs, which can be seen below, were identified due to their relevance for characterising the climate system and its changes, the technical feasibility of observing or deriving them on a global scale, and their cost effectiveness. The 50 Essential Climate Variables as defined by GCOS. One effort supporting the systemic observation of the climate is the European Space Agency’s (ESA) Climate Change Initiative (CCI). The programme taps into its own and its member countries’ EO archives that have been established in the last three decades in order to provide a timely and adequate contribution to the ECV databases required by the UNFCCC. Robust evidence supporting climate risk management Earth observation satellites can observe the entire Earth on a daily basis (polar orbiting satellites) or continuously monitor the disk of Earth below them (geostationary satellites) maintaining a constant watch of the entire globe. Sensors can target any point on Earth even the most remote and inhospitable areas which helps monitor deforestation in vast tropical forests and the melting of the ice caps.

Without insights offered by EO satellites there would not be enough evidence for decision makers to base their climate policies on, increasing the risk of maladaptation. Robust EO data is an invaluable resource for collecting climate information that can inform climate risk management and make it more effective.

#### It’s fast---extinction within 5 years.

**Garrison 21** (Dr. Jim Garrison 21, PhD from the University of Cambridge, MA from Harvard University, BA from the University of Santa Clara, Founder/President of Ubiquity University, “Human Extinction by 2026? Scientists Speak Out”, UbiVerse, 7/1/2021, https://ubiverse.org/posts/human-extinction-by-2026-scientists-speak-out)

This may be the most important article you will ever read, from Arctic News June 13, 2021. It is a presentation of current climate data around planet earth with the assertion that if present trends continue, rising temperatures and CO2 emissions could make human life impossible by 2026. That's how bad our situation is. We are not talking about what might happen over the next decades. We are talking about what is happening NOW. We are entering a time of escalating turbulence due to our governments' refusal to take any kind of real action to reduce global warming. We must immediately and with every ounce of awareness and strength that we can muster take concerted action to REGENERATE human community and the planetary ecology. We must all become REGENERATION FIRST RESPONDERS, which is the focus of our Masters in Regenerative Action.

#### Scenario 2 is US-Russia War

#### Increased space debris makes future space exploration impossible.

Webb 18 [(Amy Webb is a professor at the NYU Stern School of Business and is the chief executive of the Future Today Institute, a strategic foresight and research group in Washington, D.C.), “Space Oddities: We Need a Plan to Stop Polluting Space Before It’s Too Late” WIRED Science April 12, 2018 https://www.wired.com/story/we-need-a-plan-to-stop-polluting-space-before-its-too-late/] TDI

Space is our next dumping ground. As many as 170 million fragments of metal and astro debris necklace Earth. That includes 20,000 pieces larger than a softball, and 500,000 about the size of a marble, according to NASA. Old satellites, like Tiangong-1, are the biggest and highest-profile lumps of rubbish, but most of it comes from rocket parts and even lost astronaut tools. Size doesn’t always matter—a fleck of paint, orbiting at a high velocity, cracked the Space Shuttle's windshield. This debris will pose a navigation hazard for many centuries to come. At least 200 objects roar back into the atmosphere each year, including pieces of solar panels and antennas and fragments of metal. All of them pose dangers for future astronauts: One plum-sized piece of gnarled space trash traveling faster than a speeding bullet could rip a five-foot hole into a spacecraft. And that collision, then, would hatch its own spectacle of shrapnel, which would join the rushing river of junk already circling the planet. It’s not just Americans doing the dumping. China and Russia each have dozens of decommissioned satellites overhead, though the US certainly does it with style. Like everyone, I marveled at the successful launch of SpaceX’s Falcon Heavy rocket, whose cargo included Elon Musk’s Tesla Roaster and a mannequin driver named Starman. I’ll admit, I teared up listening to David Bowie as the rockets separated from the payload. It was an incredible technological achievement, one proving that the system could someday transport people and goods—perhaps real cars, and real people—into space. Now that Tesla and its driver are overhead, in America’s junkyard in the sky. To be sure, space is big. Really big. Most debris soars about 1,250 miles above the Earth’s surface, so you have better odds scoring a seat on Virgin Galactic’s maiden voyage than witnessing Starman crash into your next door neighbor’s house. But it’s our behavior back here on Earth—our insistence on sending things up, without really thinking how to safely contain or send them back down—that should concern you. We weren’t always so short-sighted. Ancient Native Americans lived by the Seventh Generation Principal, a way of long-term thinking that considered how every decision would affect their descendants seven generations into the future. In Japan, Buddhist monks devoted part of their daily rituals and work to ensuring the longevity of their communities, even planting and tending to bamboo forests, which would eventually be harvested, treated and used to repair temple roofs many decades hence. With each new generation, we live life faster than our ancestors. As a result, we spend less time thinking about the farther future of humanity. We now have our sights set on colonizing Mars, mining asteroids for research and commerce, and venturing out to the furthest reaches of our galaxy. Space is no longer the final frontier; we’re already exploring it. Our current approach is about getting there, rather than considering what “getting there” could mean for future generations of humans, not to mention other life in the universe. Where all that junk winds up isn’t something we can predict accurately. We could be unintentionally wreaking havoc on civilizations far away from Earth, catalyzing future intergalactic wars. Or, we might cause far less scintillating problems. Space junk could start to behave in unpredictable ways, reflecting sunlight the wrong direction, or changing our atmosphere, or impacting the universe in ways that don’t fit into our current understanding of physics. Last week—30 years after my friends and I created an imaginary net to capture space debris—SpaceX launched RemoveDEBRIS, its own prototype, an experimental net to collect junk in orbit. It’s a neat idea, but even as middle schoolers, we knew it was an impractical one. Individual nets can’t possibly scale to address the hundreds of millions of particles of debris already in orbit. The challenge is that all of our space agencies are inextricably tied to national governments and militaries. Seeking a global agreement on how to mitigate debris would involve each country divulging exactly what it was launching and when—an unlikely scenario. The private sector could collaborate to build grand-scale orbital cleaners, but their commercial interests are driven by immediate launches. Given all the planned launches in our near future, we don’t have much time to wait. We must learn to be better stewards of our own planet—and commit to very long-term thinking—before we try to colonize any others.

#### Deep space exploration is a shared goal that prevents escalation of US-Russia tensions BUT privatization foils cooperation.

CSIS 18 [(Center for Strategic and International Studies), “Why Human Space Exploration Matters,” August 21, 2018 https://www.csis.org/blogs/post-soviet-post/space-cooperation] TDI

U.S.-Russian space cooperation continues to be a stated mutual goal. In April 2018, President Putin said of space, “Thank God, this field of activity is not being influenced by problems in politics. Therefore, I hope that everything will develop, since it is in the interests of everyone…This is a sphere that unites people. I hope it will continue to be this way.” During his statement at a recent event at CSIS, NASA Administrator Jim Bridenstine said, “[space] is our best opportunity to dialogue when everything else falls apart. We’ve got American astronauts and Russian cosmonauts dependent on each other on the International Space Station, which enables us to ultimately maintain that dialogue.” The U.S. and Russia both benefit from the ISS partnership. Russia provides transportation to the ISS for U.S. astronauts, from which Russia receives an average of $81 million per seat on the Soyuz (and recognition of its status as a space power). The U.S. also benefits from Russia’s technical contributions to the ISS while Russia benefits The U.S. and Russia signed a joint statement in 2017 in support of the idea of collaborating on deep space exploration, including the construction of the Lunar Orbital Platform-Gateway, a research-focused space station orbiting the moon. Through agreements on civilian space exploration, such as the Lunar Orbital Platform-Gateway or future Mars projects, that have clear benefits to both sides, some degree of cooperation will remain in both countries’ interest. The high price tag for pursuing space exploration alone and opportunities for sharing and receiving technical expertise encourages international partnerships like the ISS. However, at least three factors, apart from the overall deterioration of U.S.-Russia relations, threaten this cooperation. First, growth of the private sector space industry may alter the economic arrangement between the U.S. and Russia, and ultimately lower the benefits of cooperation to both countries. The development of advanced technologies by private companies will give NASA new options to choose from and reduce the need to depend on (and negotiate with) Russia. If NASA and its Russian counterpart, Roskosmos, have no need to talk with one another, they probably won’t in the face of tense political relations. The U.S. intends to use Boeing and SpaceX capsules for human spaceflight beginning in 2020, and a Congressional plan in 2016 set a phase out date of Russian RD-180 rocket engines by 2022.

#### It’s make or break for the relationship—Ukraine, decline of US moral authority on international affairs puts us at the brink of the end of Russian diplomacy and even war.

Weir 21 [(Fred Weir has been the Monitor's Moscow correspondent, covering Russia and the former Soviet Union, since 1998. He's traveled over much of that vast territory, reporting on stories ranging from Russia's financial crash to the war in Chechnya, creeping Islamization in central Asia, Russia's demographic crisis, the rise of Vladimir Putin and his repeated returns to the Kremlin, and the ups and downs of US-Russia relations). “Worse than the Cold War? US-Russia relations hit new low.“ Christian Science Monitor 4-20-2021 https://www.csmonitor.com/World/Europe/2021/0420/Worse-than-the-Cold-War-US-Russia-relations-hit-new-low] TDI

Russia’s relations with the West, and the United States in particular, appear to be plumbing depths of acrimony and mutual misunderstanding unseen even during the original Cold War.After years of deteriorating relations, sanctions, tit-for-tat diplomatic expulsions, and an escalating “information war,” some in Moscow are asking if there even is any point in seeking renewed dialogue with the U.S., if only out of concern that more talking might just make things worse. Events have cascaded over the past month. Russia’s treatment of imprisoned dissident Alexei Navalny, who has been sent to a prison hospital amid reports of failing health, underlines the sharp perceived differences between Russia and the West over matters of human rights. Meanwhile, a Russian military buildup near Ukraine has illustrated that the conflict in the Donbass region might explode at any time, possibly even dragging Russia and NATO into direct confrontation. With its relations with Washington at a nadir, Russia is eyeing a more pragmatic, if adversarial, relationship with the U.S. in the hopes of getting the respect it desires. President Joe Biden surprised the Kremlin by proposing a “personal summit” to discuss the growing list of U.S.-Russia disagreements in a phone conversation with Vladimir Putin last week. He later spoke of the need for “disengagement” in the escalating tensions around Ukraine, and postponed a planned visit of two U.S. warships to Russia-adjacent waters in the Black Sea. But days later he also imposed a package of tough sanctions against Russia, for its alleged SolarWinds hacking and interference in the 2020 U.S. presidential elections, infuriating Moscow and drawing threats of retaliation. Last month, after Mr. Biden agreed with a journalist’s intimation that Mr. Putin is a “killer,” the Kremlin ordered Russia’s ambassador to the U.S. to return home for intensive consultations, an almost unprecedented peacetime move. Over the weekend, Russian Foreign Minister Sergey Lavrov suggested that the acting U.S. ambassador to Moscow, John Sullivan, should likewise go back to Washington for a spell. On Tuesday, Mr. Sullivan announced he would do just that this week. And there is a growing sense in Moscow that the downward spiral of East-West ties has reached a point of no return, and that Russia should consider abandoning hopes of reconciliation with the West and seek permanent alternatives: perhaps in an intensified compact with China, and targeted relationships with countries of Europe and other regions that are willing to do business with Moscow. “Things are at rock bottom. This may not be structurally a cold war in the way the old one was, but mentally, in terms of atmosphere, it’s even worse,” says Fyodor Lukyanov, editor of Russia in Global Affairs, a Moscow-based foreign policy journal. “The fact that Biden offered a summit meeting would have sounded a hopeful note anytime in the past. Now, nobody can be sure of that. A hypothetical Putin-Biden meeting might not prove to be a path to better relations, but just the opposite. It could just become a shouting match that would bring a hardening of differences, and make relations look like even more of a dead end.” Room for discussion Foreign policy experts agree that there is a long list of practical issues that could benefit from purposeful high-level discussion. With the U.S. preparing to finally exit Afghanistan, some coordination with regional countries, including Russia and its Central Asian allies, might make the transition easier for everyone. One of Mr. Biden’s first acts in office was to extend the New START arms control agreement, which the Trump administration had been threatening to abandon, but the former paradigm of strategic stability remains in tatters and requires urgent attention, experts say. “If you are looking for opportunities to make the world a safer place through reason and compromise, there are quite a few,” says Andrey Kortunov, director of the Russian International Affairs Council, which is affiliated with the Foreign Ministry. “There are also some areas where the best we could do is agree to disagree, such as Ukraine and human rights issues.” The plight of Mr. Navalny, which has evoked so much outrage in the West, seems unlikely to provide leverage in dealing with the Kremlin because – as Western moral authority fades – Russian public opinion appears indifferent, or even in agreement with its government’s actions. Recent surveys by the Levada Center in Moscow, Russia’s only independent pollster, found that fewer than a fifth of Russians approve of Mr. Navalny’s activities, while well over half disapprove. An April poll found that while 29% of Russians consider Mr. Navalny’s imprisonment unfair, 48% think it is fair. Russian opposition figure Alexei Navalny, shown here during a hearing in the Babuskinsky District Court in Moscow Feb. 12, 2021, is in poor health amid his hunger strike while in prison in Russia. He was recently moved to a prison hospital. Tensions around the Russian-backed rebel republics in eastern Ukraine have been much severer than usual, with a spike in violent incidents on the front line, a demonstrative Russian military buildup near the borders, and strong U.S. and NATO affirmations of support for Kyiv. The Russian narrative claims that Ukrainian President Volodymyr Zelenskiy triggered the crisis a month ago by signing a decree that makes retaking the Russian-annexed territory of Crimea official Ukrainian state policy. Mr. Zelenskiy has also appealed to the U.S. and Europe to expedite Ukraine’s membership in NATO, which Russia has long described as a “red line” that would lead to war. But Russian leaders, who have been at pains to deny any direct involvement in Ukraine’s war for the past seven years, now say openly that they will fight to defend the two rebel republics. Top Kremlin official Dmitry Kozak even warned that if conflict erupts, it could be “the beginning of the end” for Ukraine. “This is a very desperate situation,” says Vadim Karasyov, director of the independent Institute of Global Strategies in Kyiv. “We know the West is not going to help Ukraine militarily if it comes to war. So we need to find some kind of workable compromises, not more pretexts for war.” Time to turn eastward? In this increasingly vexed atmosphere, the Russians appear to be saying there is no point in Mr. Putin and Mr. Biden meeting unless an agenda has been prepared well in advance, setting out a few achievable goals and leaving aside areas where there can be no agreement. “Russia isn’t going to take part in another circus like we had with Trump in Helsinki in 2018,” says Sergei Markedonov, an expert with MGIMO University in Moscow. “What is needed is a deeper dialogue. That could begin if we had a real old-fashioned summit between Biden and Putin, one that has been calculated to yield at least some positive results. We need to find a modus vivendi going forward, and the present course is not leading there.” Alternatively, Russia may turn away from any hopes of even pragmatic rapprochement with the West, experts warn. Mr. Lukyanov, who maintains close contact with his Chinese counterparts, says they felt blindsided at a summit with U.S. foreign policy chiefs in Alaska last month, when what they expected to be a practical discussion of how to overcome the acrimonious Trump-era legacy in their relations turned into what they saw as a U.S. lecture about how China needs to obey the “rules-based” international order. “It was the Chinese, in the past, who were very cautious about participating” in anything that looked like an anti-Western alliance, says Mr. Lukyanov. “We are hearing a new tone from them now. Now our growing relationship with China isn’t just about compensating for a lack of relations with the U.S. It’s about the need to build up a group of countries that will resist the U.S., aimed at containing U.S. activities and policies that are harmful to our two countries.”

#### Nuke war causes extinction – it won’t stay limited.

**Barratt 17** (Owen Cotton-Barratt 17. PhD in Pure Mathematics, Oxford, Lecturer in Mathematics at Oxford, Research Associate at the Future of Humanity Institute. 2-3-2017. “Existential Risk: Diplomacy and Governance.” https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf)

The bombings of Hiroshima and Nagasaki demonstrated the unprecedented destructive power of nuclear weapons. However, even in an all-out nuclear war between the United States and Russia, despite horrific casualties, neither country’s population is likely to be completely destroyed by the direct effects of the blast, fire, and radiation.8 The aftermath could be much worse: the burning of flammable materials could send massive amounts of smoke into the atmosphere, which would absorb sunlight and cause sustained global cooling, severe ozone loss, and agricultural disruption – a nuclear winter. According to one model 9, an all-out exchange of 4,000 weapons10 could lead to a drop in global temperatures of around 8°C, making it impossible to grow food for 4 to 5 years. This could leave some survivors in parts of Australia and New Zealand, but they would be in a very precarious situation and the threat of extinction from other sources would be great. An exchange on this scale is only possible between the US and Russia who have more than 90% of the world’s nuclear weapons, with stockpiles of around 4,500 warheads each, although many are not operationally deployed.11 Some models suggest that even a small regional nuclear war involving 100 nuclear weapons would produce a nuclear winter serious enough to put two billion people at risk of starvation,12 though this estimate might be pessimistic.13 Wars on this scale are unlikely to lead to outright human extinction, but this does suggest that conflicts which are around an order of magnitude larger may be likely to threaten civilisation. It should be emphasised that there is very large uncertainty about the effects of a large nuclear war on global climate. This remains an area where increased academic research work, including more detailed climate modelling and a better understanding of how survivors might be able to cope and adapt, would have high returns. It is very difficult to precisely estimate the probability of existential risk from nuclear war over the next century, and existing attempts leave very large confidence intervals. According to many experts, the most likely nuclear war at present is between India and Pakistan.14 However, given the relatively modest size of their arsenals, the risk of human extinction is plausibly greater from a conflict between the United States and Russia. Tensions between these countries have increased in recent years and it seems unreasonable to rule out the possibility of them rising further in the future.

#### Scenario 3 is African ICT

#### Orbital debris prevents developing country regional space associations.

**Ngcofe 16** (L.Ngcofe, Chief Directorate: National Geo-Spatial Information, Department of Land Reform, South Africa, et al. K. Gottschalk, Department of Political Studies, University of the Western Cape, Cape Town S.Madlanga, 3 National Research Foundation: Hartebeesthoek Radio Astronomy Observatory ’16, “THE SPACE RUSH - THE COST OF BEING A LATE STARTER FROM AN AFRICAN PERSPECTIVE,”African Association of Remote Sensing of the Environment, http://www.africanremotesensing.org/page-1524987/4136883)

Abstract The costs of Africa being a late starter in space include the exponentially accumulating space debris. This threat to space assets is worse in low earth orbit (LEO), where it has already destroyed an Irridium operational US comsat.

The current discussions in international forums about mitigating the creation of new space debris, has not yet gone to the next stage to **discuss financial liability for collisions caused by such debris**. Late starters in space need to table the responsibility of the historic space powers to seek ways to remove their cumulative debris from orbit, and finance this.

Introduction

The ability to observe the Earth from space has enhanced accurate-up-to-date environmental monitoring, thus overcoming some of the environmental challenges experienced by humankind. Investment in space activities has endless, long term, benefits including diplomatic relations; technological advancement through collaboration with other countries; improving overall economic activities in the global arena, which in turn vastly contributes towards addressing social ills. Acknowledging this Chung et al., (2010) argues that where ground based systems are limited in frequency, continuity and coverage of important ecosystems, satellites can provide essential earth observation data on a continuous basis and over a range of scales, from local, regional, to global. Access to and the development of space technology has historically been a key determinant of a country’s **wealth**, **power**, **influence**, status and **prestige**. However, space exploration has been an issue of marginal political interest in Africa, thus leading the continent to be the late starter in space matters. Sharpe (2010) shows Africa as the least active continent with regards to space exploration activities. Aganaba-Jeanty (2013) cites a lack of consistent funding as the greatest barrier of the African space technology development. He argues that according to 2009 to 2012 the countries within Africa represent the lowest spending countries in space exploration when compared to developed and developing countries. Africa as a late starter in space might be seen through Abiodun (2012) words of wisdom starting that “the quality and character of a man’s perceptions as well as his subsequent responses are determined in part by limitations imposed by or opportunities available in his environment. If he is to manifest any real growth and reach his higher potentials, his creativity would need nourishment from his environment”. Currently there are recent strides documented in literature showing Africa’s growing interest and participation in space exploration (Ngcofe et al., 2013; Abiodun, 2012; Wood & Wiegel, 2012; Gottschalk, 2010; Martinez, 2008; Mostert, 2008). It is of this view that this paper attempts to examine the impact of being a late starter on space exploration, particularly looking at the issue of space debris and its potential impact on Africa as a developing space fearing nation.

Space debris

The current major threat of space exploration is the risk pertaining to **space debris relative to the cost of launching satellites** in space. The need to justify expenditure on space-related endeavours competes with other pressing expenditure needs such as provision of food, clean drinking water, housing, electricity, roads infrastructure and other commercial development. Space debris also known as orbital debris, or space junk, or space waste, is the collection of man-made objects that have exceeded its service life and broken down while in orbit around the earth (Interagency Report on Orbital Debris 2005; UN, 1999; Sénéchal, 2007; Colliot, 2002; Glassman, 2009; Griffiths, 2010). These include everything from spent rocket stages, old satellites, and fragments from disintegration erosion and collision. Space debris has vastly increased since the beginning of space travel in 1957 thus leading to orbit congestion (Colliot, 2012; Figure 2). According to NASA (2013), there are 500 000 pieces of debris tracked in orbit on Earth.

Collision at orbital velocity can be extremely dangerous to functioning satellites and space manned missions. Sénéchal (2007) argues that at orbital velocity of more than 28000 km/h, an object as small as 1 cm in diameter has enough kinetic energy to produce significant impact damage, to partially or completely destruct an operational satellite. While an object of 1mm size can cause surface pitting and erosion, with larger objects of about 10 cm totally destroying operational satellites, and may even kill space explorers. According to the Kessler Syndrome space debris model, as the number of debris object increases, collisions become more likely to occur thus creating yet more debris (Griffiths, 2010; Colliot, 2012; Durrieu & Nelson, 2013). This is an immense concern, which threatens safety of future space explorations. Though space is a large environment, satellites are actually concentrated in a few orbits that are currently optimal, namely:

Low Earth Orbit (LEO) – this is the altitude from 160 km to 2000 km above the earth’s surface. LEO is largely used for earth monitoring, military surveillance, and communication satellites, especially around 350 km.

Medium Earth Orbit (MEO) – this is an area from 2000 km to 35 000 km and is mainly used by navigation satellites such as global position system (GPS) networks at around 20 000 km.

Geostationary Orbit (GEO) – this is the belt at 36 000 km and is optimal for communication satellites. However, Griffiths (2010) argues that it is more expensive to launch satellites to this orbit. Hence, many communication satellites are placed at LEO.

High Earth Orbit (HEO) – This is the area above 36 000 km, and used almost only by satellites researching the magnetosphere or other solar-terrestrial physics.

LEO is regarded as the major used space orbit environment and therefore has a larger record of space debris than any other orbit. There has been four accidental collision events up-to-date (Durrieu and Nelson 2003), with a recent collision incident occurring in 2009 where a United States communication satellite collided with a defunct Russian satellite (Glassman, 2009; Griffiths, 2010; Smitham, 2010). These satellites collided at a speed of over 40 000 km/h, causing complete destruction of both satellites. Thus resulting in around 1400 recorded debris objects (Glassman, 2009; Griffiths, 2010; Smitham, 2010). The available computer models based on observation of debris used to predict future growth of the debris population and probability of collision with satellites under different assumptions reveal that in the next 40 years, collisions with objects larger than 10 cm in LEO are expected to occur on average every 5 years (Griffiths, 2010). This statistics coincide with Sénéchal (2007); Williamson (2003); Liou and Johnson (1996) who argued that in LEO the spatial density of objects is above critical point and the continuation of debris in this orbit may render it inaccessible in the future.

Space availability

The vulnerability of space asserts interference and disruption, led to the view, held by the USA security space community, that space is a contested domain. Whoever seizes space has a powerful advantage both for social and economic enhancement together with military applications (Sadeh, 2009). Space asserts provide a persistent view of the earth and offer ability of real or near real time global collection and dissemination of crucial information. Although, recently, there have been vast strides by Africa within the space arena, the continent still lags behind in space matters. Out of 53 countries in Africa, only four countries (Algeria, Egypt, Nigeria and South Africa) have successfully participated in space activities, through the development of their own space agencies which led to launching of their own satellites in space. The development of **micro sat**ellite technology and multiple constellations is now making space technology more affordable for developing countries to utilise the space environment (Durrieu & Nelson, 2013). Thus debate about the **African Space Agency**, which will cater for participation in space activities for Africa’s needs, is gaining momentum. Currently, Africa has an inspiring mission to the moon (http://africa2moon.developspacesa.org). With the vast interest in space activities by the African continent, one wonders, is there still space in space? Rex (1998) on his paper seeking to answer ‘will space run out of space’. He argues that there would be no major risk for space endeavours from current operational satellites **only if it were not for space debris**. The issue of space availability in space has been, and is still a major area of concern, more especially for Africa. Since the initial space exploration, the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPOUS) was established in 1959 in order to safeguard the use of space and promote space sustainability. This resulted in five UN treaties on Outer Space (http://www.oosa.unvienna.org/oosa/COPUOS/copuos.html) namely:

Outer Space Treaty (1967) - This treaty promotes the international cooperation in the exploration and use of space, however, prohibits the usage of space for any nuclear weapons and / or any kind of weapons of mass destruction. It clearly emphasises that no state can claim sovereignty of or occupy outer space, the moon or any other Celestial Body. This treaty further deals with liability and states responsibility as to inform the UN secretary general and the international scientific community of the nature, conduct, location and results of their activities in outer space.

Rescue Agreement Treaty (1968) - This agreement deals with the rescue of astronauts, the return of astronauts and the return of objects launched into outer space. This agreement has a legal framework for emergency assistance of astronauts and the notification of launching of any space objects which has to return to earth and express who should be responsible for all the cost incurred for such a particular mission.

Liability Convention (1972) - This convention is a pact of international liability for damage caused by space objects. It imposes an international and absolute liability on a launching state, or states as well as on those states who are members of inter-governmental organisations, for any damage caused by their objects. Launching state is defined as the state which launches or procures the launching of a space object or from whose territory or facility a space object is launched, irrespective of the success or not of the launch. Damage includes the loss of life, personal injury or any other impairment or health or loss of damage to property of state or of persons, natural or juridical or property of international, intergovernmental organisations. This also applies to any damage caused by a space object on the surface of the earth or to an aircraft flight.

Registration Convention Treaty (1974) - The treaty obliges states to register all space objects in a register, which is maintained by the UN secretary general since 1962.

Moon Treaty (1979) - The treaty declares that the moon is a global common for all humankind and is not subject to national appropriation and occupation. It further stresses that no private ownership is allowed but all state parties have the right to exploration and use of the moon. In practice, this treaty has no force, because none of the space powers who engage in lunar exploration have ratified it: USA, Russia, China and India.

Although, these treaties exist there has been non-compliance by those leading space faring countries. Since the 1960s, the United States and Russia have conducted dozens of anti-satellite (ASAT) test missions in space, which resulted in most of orbital debris experienced even today (Weeden, 2013). Most recently China has performed an ASAT mission against its aging FY-1C weather satellite at 855 km altitude on the 11/01/2007. It launched a missile, which destroyed the satellite, resulting in 3000 pieces of debris larger than 10 cm in size (Glassman, 2009; Weeden, 2013). This event was further followed by the United States ASAT in 21/02/2008, firing a missile that destroyed one of its military satellites at around 250 km altitude. The US ascertained that the satellite was uncontrollably descending into the atmosphere with nearly fully fuelled tank of toxic hydrazine. Furthermore, its altitude was low enough to ensure swift re-entry of all the resulting space debris, and so, harmless to the space environment. The US delegate fully briefed the UN COPUOS unlike the Chinese. The outcome by the US in destroying its satellite is applaudable. However, ignorance has been shown by the former President George W. Bush when asked what would the people say about the mission? He said “I don’t care what people will say. We’re doing it for the right reason, and it’s transparent” (Oberg, 2008). These clearly are signs of bullying with regard to space matters by space powers with advanced space technologies.

Conclusion

The act of destroying a satellite can damage the space environment by creating dangerous amounts of space debris. Space debris can, therefore, lead to collisions and loss of important satellites, which has tremendous cost effects for Africa’s participation in space activities. Losing a satellite in-orbit due to space debris is no longer hypothetical, but rather a harsh reality and is likely to increase with years to come (Smitham, 2010). Grego (2014) argues that deliberate space debris creation might result in conflict between space fearing nations with unpredictable and dangerous consequences. Such consequences might trigger an arms race which would further divert the economic and political resources from other pressing issues like food security, climate change, health issues, etc. The need to sustain benefits of space for present and future generations and other countries that have not explored space as yet is vital if we are to obtain continuous benefits from space activities. Glassman (2009) suggests that a number of activities and commitments need to be revitalised. Current space best practice, also termed rules of the road, seek to minimize causing new space debris, through careful revision of both design and operational protocols:

· Separation of satellites from their carrier rocket should no longer result in loose bolts and other metal pieces flying off;

· satellites should have some propulsion capability to initiate collision avoidance manoeuvres;

· at the end of their service life, satellites, especially those in geosynchronous orbit (GSO), should be manoeuvred into a “graveyard orbit” at a different altitude;

· and valves should open to discharge any remaining propellant, to prevent overheating and explosive disruptions.

#### Regional cooperation is crucial to effecitive data integration and reducing interoperability costs.

**Gottschalk 08** (K. Gottschalk, Political Studies Department, University of the Western Cape, ‘8, “The Roles of Africa’s Institutions in Ensuring Africa’s Active Participation in the Space Enterprise: The Case for an African Space Agency (ASA), ”African Skies/Cieux Africains, No. 12)

By contrast, the underdeveloped, poorer countries of our continent only managed to re-engineer the ineffective OAU into the African Union in 2002 — and have not yet pooled their resources to form an African space agency. Let us spell out explicitly the case for continental coordination.

First is the efficient and effective use of our **scarce resources**. Africa is a capital-scarce continent. The allocation of resources to the extreme cost of access to space requires solid justification. The space enterprise also demands an allocation of scarce high-level human resources, plus costly hi-tech peripherals. Even combined as a whole continent, Africa will command less space resources than an individual member of ESA such as France. Consequently, the space enterprise in Africa needs such coordination far more than Europe does.

Second is the argument from **spherical geometry**. The geosynchronous orbit footprint of a satellite is continental, and of all the continents Africa more than any other has the equator at its centre, **optimal for geo-stationary orbit-keeping**. Medium-Earth Orbit satellites have a footprint which covers the whole of a Regional Economic Community, such as the Economic Community of West African States (ECOWAS), the East African Community (EAC), or the Southern African Development Community (SADC).

One after another, Algeria, Egypt, Nigeria and South Africa are now launching national constellations of micro sats whose image swathes **run through each other’s countries** — but we download data from **less than 1%** of each orbit of our satellites. It is logical to download data continuously during the transect of every satellite’s orbit over the whole of Africa, and to centrally archive and process such data. South Africa is discussing co-ordinated satellite programmes with African countries.1 As a continent we will be able to **negotiate better offers** for satellite construction, space launches, technology transfer, and share data, scarce facilities and infrastructure, than as individual small countries alone. Security issues, such as images of a specific location, or of a specific resolution, can be easily resolved by inter-governmental agreement. The African **Resource Management** Constellation will be best operated by a continental space agency.

#### Space assets provide information communication technology and telemedicine.

Ferreira-Snyman 13 [(Anél, B Juris (PUCHE); LLB (PUCHE); LLM (PUCHE); LLD (UJ). Professor: Department of Jurisprudence, at University of South Africa) “The environmental responsibility of states for space debris and the implications for developing countries in Africa” The Comparative and International Law Journal of Southern Africa, Vol. 46, No. 1, 44-49, 2013] TDI

* Space debris makes resources scarce and not accessible to the Global South because they are late comers.

As was pointed out at the onset, the involvement of states in space activities is no longer a mere luxury, but is increasingly becoming a necessity. Although it may be argued that African states are already struggling merely to meet the UN Millennium Development Goals and cannot, therefore, be expected to engage in space activities, space technology can be used in a number of beneficial ways,152 and involvement in space activities is especially important for their development and human security.153 This will also answer the objectives of NEPAD, which has identified the development of science and technology on the African continent as one of its sectoral priorities.154 In terms of section 13 of the Constitutive Act of the Africa Union,155 the Executive Council of the Union shall coordinate and take decisions on policies in certain areas of common interest to member states, including science and technology.156 Specifically, the use of satellite technology has the potential to promote a state's development and assist in transforming the socio-economic needs of its citizens.157 Communication satellites can provide developing states with the opportunity to communicate freely and to access in imperative for their economic, social, and technical development.158 Satellites are used for disaster management through remote sensing in order to promote human safety in the instance of disasters such as, floods, earthquakes, volcanic eruptions, landslides, and wildfires.159 Space telecommunication systems can also play an important role in promoting education on the African continent by, for example, providing for distance education via satellite, and by giving advice to farmers on the planting of their crops.160 In the health sector, too, space technology has a significant role to play in areas of tele-medicine (where specialists assist health care workers in remote areas by providing diagnostic and curative assistance), preventative health care, and infant mortality.16 These socio-economic benefits have made the development of space programmes attractive to a number of developing states.162 Several African states have also realised the importance of space technology in achieving their national development goals, as well as the Millennium Development Goals.163 Modest space programmes have, therefore, been launched which are mainly focused on earth observation for the purpose of environmental and agricultural monitoring in order to serve social and development goals. The main actors in this field are Nigeria, South Africa and Algeria. Nigeria has already launched a number of satellites on foreign launchers.164 After launching a government-owned earth observation satellite in 2009, South Africa established a national space agency165 in 2010 to implement South Africa's space policy166 which is focused on capacity-building, the development of space applications, and international space cooperation. South Africa has also created the South African National Space, Science and Technology Strategy. Algeria has a national space agency, and has constructed a centre for the development of satellites.167 Other states in North Africa, including Tunisia, Morocco, and Egypt (the fourth state to launch a satellite in Africa) also have space agencies or space application centres.168 Angola has shown an interest in space technology and concluded a contract for a communications satellite with Russia in 2009.169 A number of African states, including South Africa, have also enacted their own domestic space legislation. On a regional level, the African Leadership Conference on Space Science and Technology for Sustainable Development was established by South Africa, Algeria, Kenya, and Nigeria to discuss space-related issues. Between 2005 and 2011, four conferences have been held and their recommendations have been shared with non-African member states of the UNCOPUOS.171 A declaration of intent on the African Management and Environmental Constellation was signed by South Africa, Nigeria, and Algeria in 2008. The data accumulated by earth observation satellites in the lower earth orbit will be shared by these three states.172 On an international level, South Africa has shown that it has a role to play in the international space arena. It served as co-chair of the Group on Earth Observations in 2005, and it chaired the Committee of Earth Observation Satellites in 2008. In 2009, the European Union-South Africa Space Dialogue was established. In May 2012, an independent advisory committee decided that the world's largest and most advanced radio telescope, the Square Kilometre Array (SKA) will be constructed on sites in South Africa (with the majority of transmitters being sited here), Australia, and New Zealand. The telescope will be used to explore deep space in order to study the origins of the universe and detect weak signals indicating possible extraterritorial life.173 These opportunities for international cooperation have the potential of increasing the space capacity of developing states in Africa. As African states realise the socio-economic and human security benefits of space applications and thus become increasingly involved in space activities, the issue of space debris will inevitably also become a greater concern for these states. The consequences of damage as a result of satellites being involved in accidents with space debris will be especially serious for the developing states which have limited resources.175 There is also a possibility of environmental damage on the territories of the developing states as a result of falling space debris. It is, therefore, imperative that more African states (including states not involved in space activities) become parties to and comply with the space treaties. They should further increase their representation in the UNCOPUOS in order to have stronger bargaining power and influence in this Committee, by presenting a united African position on space issues One of the issues that will need to be negotiated between developing and developed states, is the responsibility for current and future levels of space debris. As the current levels of space debris are proportionate to the number of space launches to date, a greater responsibility for the maintenance of the environment should be assigned to the space powers that have carried out these launches.177 This is in accordance with the environmental law principle of ' common but differentiated responsibilities ' that is enunciated in a number of international environmental law instruments.178 In terms of this principle, which is based on the idea of international equity, environmental degradation has its origin mainly in industrialised countries and they should, therefore, be primarily responsible for eradicating environmental pollution. These countries usually also have greater capacity to respond to environmental problems and they should, therefore, assist developing countries in accessing relevant resources and technologies to achieve sustainable development.179 As a result of the difference in the social, economic, and ecological circumstances of states, the environmental standards applied to industrialised and developing countries cannot be the same, hence the need for a differentiated approach. In the context of outer space, non-space-faring nations insist that the space faring nations (thus mainly industrialised countries) that have caused (and continue to cause) the current levels of space pollution, should bear the main responsibility to improve the situation, so as to guarantee the possibility of future space activity (including that of developing states). Space-faring nations are obviously in a better position to take the necessary action in this regard.181

#### Telemedicine substantially reduces Africa’s disease burden.

Mbarika and Okoli 2 [(Victor W. A. Mbarika, Department of Information Systems and Decision Sciences)(Chitu Okoli, Department of Information Systems and Decision Sciences)“Telemedicine in Sub-Saharan Africa: A Proposed Delphi Study,” Proceedings of the 36th Hawaii International Conference on System Sciences, IEEE, 2002] TDI

1.2. Telemedicine in Sub-Saharan Africa

Numerous studies documenting the spread of the Internet in various parts of the world have highlighted the fact that Sub-Saharan Africa (SSA)— part of the world’s second largest continent—is the region with the lowest level of economic, technological, and Internet development in the world [15, 16]. The delivery of healthcare is unarguably one of the most fundamental needs for SSA, considering the region’s medical nightmare of growing medical problems with an acute shortage of medical facilities and personnel. Both academic and practitioner literature report on the many medical problems of SSA. The World Health Organization reported that by the end of 2001, an estimated 40 million people worldwide—2.7 million of them younger than 15 years—were living with HIV/AIDS. More than 70 percent of these people (28.1 million) live in SSA; another 15 percent (6.1 million) live in South and Southeast Asia [26]. Furthermore, malaria kills more than a million children each year—2,800 per day—in Africa alone. This represents as many as half the deaths of African children under the age of five. In regions of intense transmission, 40% of toddlers may die of acute malaria, even though there would be a good chance of survival with timely medical attention. Other diseases that kill millions of Africans each year include dysentery, cholera, typhoid, yellow fever, and diarrhea; there are many others. Another major problem faced by Sub-Saharan countries is the shortage of medical personnel. Many developing countries have an acute shortage of doctors, particularly specialists. SSA has fewer than 10 doctors per 100,000 people, and 14 countries do not have a single radiologist. The few specialists and services available are concentrated in cities. Rural health workers, who serve most of the population, are isolated from specialist support and up to date information by poor roads, scarce and expensive telephones, and a lack of library facilities [5].

Telemedicine overcomes the barriers of physical distribution of medical resources by bringing medical personnel and expertise virtually to those who need them in SSA. In a bid to find a solution to the growing medical problems of SSA, many governmental, non-governmental, and international developmental organizations have engaged in an endless effort to implement telemedicine. For example, during the period 1996-2000 the International Telecommunications Union organized several missions of telemedicine experts to selected African countries. These missions tried to identify Africa’s needs and priorities for the introduction of telemedicine services taking into account the state-ofthe-art of the local telecommunications networks and their evolution [9].

However, most of SSA’s telecommunications networks are very poorly developed [12]. Another obstacle is that few African countries have experience in the application of telemedicine, even in urban areas equipped with telecommunications infrastructure. Furthermore, African countries cannot afford the very sophisticated telemedicine solutions involving ATM, virtual reality, etc. Notwithstanding these obstacles, among many others, telemedicine adoption is still important and feasible for most, if not all, Sub-Saharan countries (Table 1).

### Plan

#### Plan – states ought to ban the appropriation of outer space for mining activities by private entities.

### Framing

#### The standard is maximizing expected well-being.

#### 1] Actor specificity –

#### A] Aggregation – every policy benefits some and harms others, which also means side constraints freeze action.

#### B] No intent-foresight distinction – If we foresee a consequence, then it becomes part of our deliberation which makes it intrinsic to our action since we intend it to happen

#### 2] Utils Good – Existential threats outweigh.

**GPP 17** (Global Priorities Project, Future of Humanity Institute at the University of Oxford, Ministry for Foreign Affairs of Finland, “Existential Risk: Diplomacy and Governance,” Global Priorities Project, 2017, <https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf>

1.2. THE ETHICS OF EXISTENTIAL RISK In his book Reasons and Persons, Oxford philosopher Derek Parfit advanced an influential argument about the importance of avoiding extinction: I believe that if we destroy mankind, as we now can, this outcome will be much worse than most people think. Compare three outcomes: (1) Peace. (2) A nuclear war that kills 99% of the world’s existing population. (3) A nuclear war that kills 100%. (2) would be worse than (1), and (3) would be worse than (2). Which is the greater of these two differences? Most people believe that the greater difference is between (1) and (2). I believe that the difference between (2) and (3) is very much greater**. ...** The Earth will remain habitable for at least another billion years. Civilization began only a few thousand years ago. If we do not destroy mankind, these few thousand years may be only a tiny fraction of the whole of civilized human history. The difference between (2) and (3) may thus be the difference between this tiny fraction and all of the rest of this history. If we compare this possible history to a day, what has occurred so far is only a fraction of a second.65 In this argument, it seems that Parfit is assuming that the survivors of a nuclear war that kills 99% of the population would eventually be able to recover civilisation without long-term effect. As we have seen, this may not be a safe assumption – but for the purposes of this thought experiment, the point stands. What makes existential catastrophes especially bad is that they would “destroy the future,” as another Oxford philosopher, Nick Bostrom, puts it.66 This future could potentially be extremely long and full of flourishing, and would therefore have extremely large value. In standard risk analysis, when working out how to respond to risk, we work out the expected value of risk reduction, by weighing the probability that an action will prevent an adverse event against the severity of the event. Because the value of preventing existential catastrophe is so vast, even a tiny probability of prevention has huge expected value.67 Of course, there is persisting reasonable disagreement about ethics and there are a number of ways one might resist this conclusion.68 Therefore, it would be unjustified to be overconfident in Parfit and Bostrom’s argument. In some areas, government policy does give significant weight to future generations. For example, in assessing the risks of nuclear waste storage, governments have considered timeframes of thousands, hundreds of thousands, and even a million years.69 Justifications for this policy usually appeal to principles of intergenerational equity according to which future generations ought to get as much protection as current generations.70 Similarly, widely accepted norms of sustainable development require development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs.71 However, when it comes to existential risk, it would seem that we fail to live up to principles of intergenerational equity. Existential catastrophe would not only give future generations less than the current generations; it would give them nothing. Indeed, reducing existential risk plausibly has a quite low cost for us in comparison with the huge expected value it has for future generations. In spite of this, relatively little is done to reduce existential risk. Unless we give up on norms of intergenerational equity, they give us a strong case for significantly increasing our efforts to reduce existential risks. 1.3. WHY EXISTENTIAL RISKS MAY BE SYSTEMATICALLY UNDERINVESTED IN, AND THE ROLE OF THE INTERNATIONAL COMMUNITY In spite of the importance of existential risk reduction, it probably receives less attention than is warranted. As a result, concerted international cooperation is required if we are to receive adequate protection from existential risks. 1.3.1. Why existential risks are likely to be underinvested in There are several reasons why existential risk reduction is likely to be underinvested in.Firstly, it is a global public good. Economic theory predicts that such goods tend to be underprovided.The benefits of existential risk reduction are widely and indivisibly dispersed around the globe from the countries responsible for taking action. Consequently, a country which reduces existential risk gains only a small portion of the benefits but bears the full brunt of the costs. Countries thus have strong incentives to free ride, receiving the benefits of risk reduction without contributing. As a result, too few do what is in the common interest. Secondly, as already suggested above, existential risk reduction is an intergenerational public good: most of the benefits are enjoyed by future generations who have no say in the political process. For these goods, the problem is temporal free riding: the current generation enjoys the benefits of inaction while future generations bear the costs. Thirdly, many existential risks, such as machine superintelligence, engineered pandemics, and solar geoengineering, pose an unprecedented and uncertain future threat. Consequently, it is hard to develop a satisfactory governance regime for them: there are few existing governance instruments which can be applied to these risks, and it is unclear what shape new instruments should take. In this way, our position with regard to these emerging risks is comparable to the one we faced when nuclear weapons first became available. Cognitive biases also lead people to underestimate existential risks.Since there have not been any catastrophes of this magnitude, these risks are not salient to politicians and the public.72 This is an example of the misapplication of the availability heuristic, a mental shortcut which assumes that something is important only if it can be readily recalled. Another cognitive bias affecting perceptions of existential risk is scope neglect. In a seminal 1992 study, three groups were asked how much they would be willing to pay to save 2,000, 20,000 or 200,000 birds from drowning in uncovered oil ponds. The groups answered $80, $78, and $88, respectively.73 In this case, the size of the benefits had little effect on the scale of the preferred response. People become numbed to the effect of saving lives when the numbers get too large. **74** Scope neglect is a particularly acute problem for existential risk because the numbers at stake are so large.Due to scope neglect, decision-makers are prone to treat existential risks in a similar way to problems which are less severe by many orders of magnitude.

#### 3] Methodological pluralism is necessary to any sustainable critique – we impact turn your notion of “severance” or “exclusivity”.

**Bleiker 14** – (6/17, Roland, Professor of International Relations at the University of Queensland, “International Theory Between Reification and Self-Reflective Critique,” International Studies Review, Volume 16, Issue 2, pages 325–327)

**Methodological pluralism lies at the heart of Levine's sustainable critique**. He borrows from what Adorno calls a “constellation”: an attempt to juxtapose, rather than integrate, different perspectives. It is in this spirit that Levine advocates multiple methods to understand the same event or phenomena. He writes of the need to validate “multiple and mutually incompatible ways of seeing” (p. 63, see also pp. 101–102). In this model, a scholar oscillates back and forth between different methods and paradigms, trying to understand the event in question from multiple perspectives. **No single method can ever adequately represent the event or should gain the upper hand. But each should, in a way, recognize and capture details or perspectives that the others cannot (p. 102). In practical terms, this means combining a range of methods even when—or, rather, precisely when—they are deemed incompatible. They can range from poststructual deconstruction to the tools pioneered and championed by positivist social sciences. The benefit of such a methodological polyphony is not just the opportunity to bring out nuances and new perspectives. Once the false hope of a smooth synthesis has been abandoned, the very incompatibility of the respective perspectives can then be used to identify the reifying tendencies** in each of them. For Levine, this is how reification may be “checked at the source” **and this is how a “critically reflexive moment might thus be rendered sustainable**” (p. 103). It is in this sense that Levine's approach is not really post-foundational but, rather, an attempt to “balance foundationalisms against one another” (p. 14). There are strong parallels here with arguments advanced by assemblage thinking and complexity theory—links that could have been explored in more detail.